

A FRAMEWORK FOR APPAREL DESIGN INNOVATION IN  
THE TEXTILE AND CLOTHING INDUSTRY OF PAKISTAN

BY

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## ABSTRACT

Pakistan's Textile and Clothing sector relies on cotton-based products, of which a major share entails textile raw material. Researchers have identified the importance of design innovation for value-added apparel products in the textile and clothing sector to encounter future challenges. Albeit the eminence of new product development in shaping future lifestyles and environments is realized in other research, it is important to address the apparel design process and what apparel products to design. Therefore, an in-depth study of apparel design practice is needed to facilitate product design innovation within the industrial setup. Consequently, this study proposes a framework to enhance the innovation potential of apparel design in Pakistan's textile and clothing industry. The framework determined factors related to product design components that influence new product development. It developed an outline to strategize the apparel design process by observing the current design practices in an industrial setup. Qualitative research revealed novel approaches for developing new apparel products by investigating the design practices of apparel designers. The study adopted an exploratory investigation of the effectiveness of design practice through the phenomenological empirical approach. The published sources' content analysis was performed, leading to an industrial inventory. Subsequently, concurrent research methods of field observation and semi-structured interviews were conducted to develop an insight into the phenomenon. The results established that the existing design practices focus on product interface and appearance-related chores. Thematic analysis of interviews and graphical analysis of the design processes revealed that design components related to the product's identity, functionality, and execution are less focused during the identification and ideation phase, resulting in limited design possibilities. Identification of design briefs is market-driven and primarily based on lifestyle, culture, events, and seasons. The data analysis revealed that the propositions for innovation strategies in apparel design have four essential components: aesthetics, function, production, and product identity. The study also found that the priorities to engage product design components during the design process vary according to product typology for achieving innovation. The framework classified change factors for each stage of the design process to recommend innovative identification of design briefs, methods of ideation to focus on the multiple design components of the garment, and collaborative ventures with internal and external design environments for improved fabrication of the products. The proposed framework is validated through focus group discussions with experts. The study provides a framework for directing apparel design practice to enhance new apparel products over three stages of identification, ideation, and fabrication in the design development process. The study concludes significant factors influencing apparel design innovation. The proposed framework invites further investigation in apparel design innovation on the degree and nature of design collaborations, design networking systems, the discovery of alternate resources, exploration of new materials, skill development of young designers, and reforms in design education to augment innovation.

## ملخص البحث

إن قطاع الملابس والمنسوجات في باكستان يركز على كمية محدودة من المنتجات معظمها من القطن. وتشتمل الحصة الكبرى منها من المواد الخام للنسيج . نوه الباحثون على أهمية التصميم المبتكرة الفريدة للملابس بحيث تكون ذات قيمة ورواج كبير في قطاع المنسوجات والملابس في مواجهة التحديات المستقبلية لهذا القطاع. على الرغم من أن تطوير المنتجات الجديدة من الملابس برز بشكل واضح في تشكيل البيئات المستقبلية في أبحاث أخرى كان من الأهمية بإمكانية معالجة طرق تصميم الملابس والمنسوجات وتصميمها، ولأجل ذلك هناك حاجة ماسة لدراسة متعمقة لطرق ووسائل تصميم الملابس بغية تسهيل ابتكار التصميم الملائمة داخل الصناعة الحديثة وبالتالي تأتي هذه الدراسة في لتعزيز إمكانيات ابتكار التصميم للملابس والمنسوجات الباكستانية في اطار حدود العمل المتعلقة بتصميم المنتج التي تؤثر على إبراز وتطوير منتج جديد فريد اثناء التصميم. ويتضمن البحث تخطيطا مفصلا لاستراتيجية تصميم الملابس من خلال مراقبة التصميم الحالية في المعامل الصناعية وأبان البحث عن مناهج جديدة لتطوير منتجات الملابس الجديدة من خلال المراقبة عن كثب في عمل المصممين. وتبنت الدراسة تحقيقا واسعا شاملا لكيفية وضع التصميم من خلال المنهج التجريبي ومن ثم استخلاص تحليل المحتوى من المصادر المنشورة للمخازن الصناعية بعد ذلك، تم اتخاذ طرق بحث بالتزامن للملاحظة الميدانية والمقابلات شبه المنتظمة لإبداء نظرة ثاقبة قريبة لهذه الظاهرة. أثبتت النتائج أن التصميم الحالية تركز على الأعمال المتعلقة بالمظهر الخارجي. أما المقابلات فقد كشفت التحاليل المستنبطة من خلال التحليل البياني أن التصميم التي تتعلق بالمنتج أقل تركيزا خلا مرحلة تحديد الفكرة ما يؤدي إلى ظهور تصميم محدودة متداولة. إن التصميم الحالية تعتمد في خلفياتها وجمالها على ما يرغب فيه السوق وهذا يعتمد بشكل أساسي على نمط الحياة والثقافة وأيضا يعتمد على حسب الأحداث والمواسم والمناسبات. كشفت نتائج التحليل أن الابتكار في تصميم الملابس لها أربعة اركان أساسية: الزينة والوظيفة والإنتاج وهوية المنتج. ووجدت الدراسة أيضاً أن دمج الأركان للتصميم والواحد يختلف وفقا للمنتج وطرق الابتكار لهذا التصميم أن المستخلص في التصميم مبني على التقارير والمبيعات السابقة. وترتكز على واجهة الملابس التصميم حسب المتعارف بين المصممين وبناء على ما يروونه مناسباً في العمل ومن النادر أن يكون الأمر متعاوناً فيه عدة أطراف لإنتاج تصميم واحد، حيث يعتبر ذلك إما خارج نطاق عملية التصميم أو المشار إليها بإيجاز. تم التحقق من صحة ووضوح الأطروحة من خلال مناقشة مجموعة من الخبراء الذين لهم سوابق أكاديمية وصناعية في هذا المجال. بجانب اهتمام الرسالة بتوجيه المصممين وحثهم على الجديد من المنتجات من خلال مراحل ثلاثة بدءاً من التحديد ومروراً بالتفكير وانتهاءً بالتصنيع لأجل تطوير هذه الصناعات. تخلص الدراسة بالإشارة إلى العوامل المهمة التي تؤثر على الابتكار في تصميم الملابس من قبل المتخصصين في هذا المجال الذين لهم باع طويل في قطاع الملابس في باكستان. وتدعو الرسالة أيضاً إلى المزيد من البحث والاستقصاء في تصميم الملابس بطريقة مبتكرة مناسبة للعصر الحاضر من حيث التعاون في التصميم وإيجاد شبكة منظمة واكتشاف الموارد البديلة لتطوير المهارات الشابة في هذا المجال و الدعوة إلى المزيد من الإصلاح و الابتكار في علم التصميم لزيادة الابتكار فيه.

## **APPROVAL PAGE**

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## DECLARATION

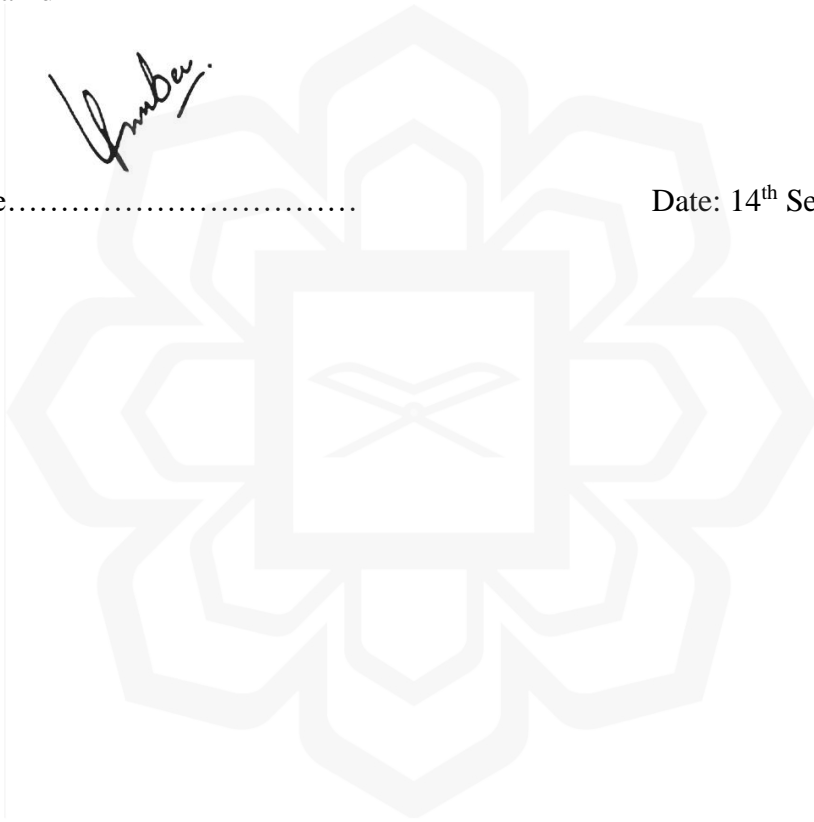
I hereby declare that this thesis is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted for any other degrees at IIUM or other institutions.

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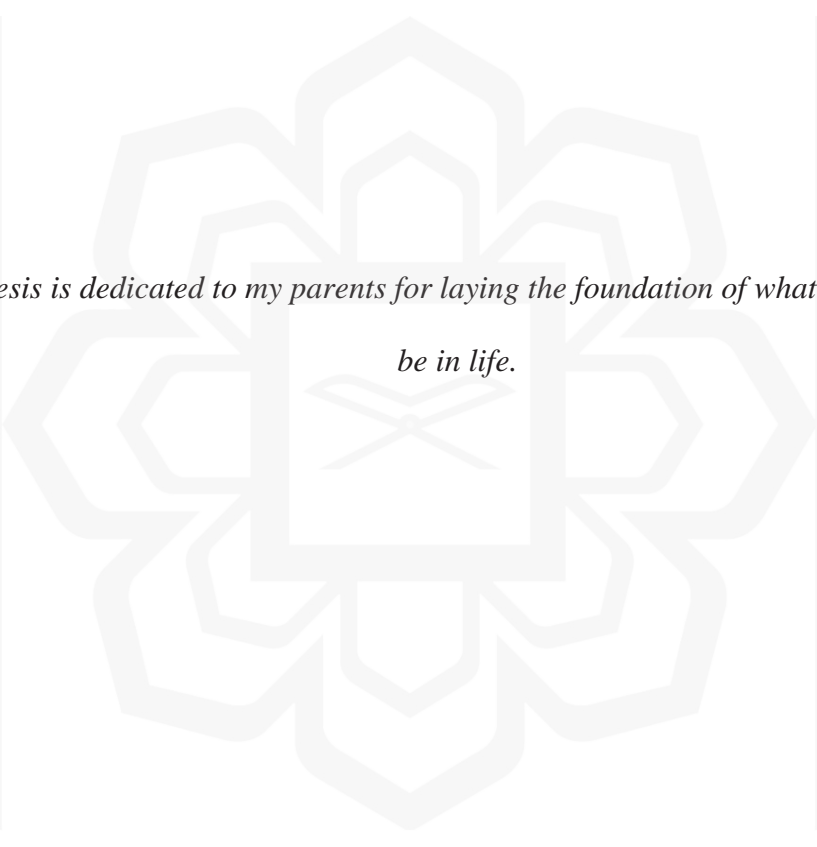
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*This thesis is dedicated to my parents for laying the foundation of what I turned out to  
be in life.*

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## LIST OF ABBREVIATIONS

AD	Apparel Design
ADI	Apparel design innovation
APTMA	All Pakistan Textile Association
AW	Activewear/ sportswear/knitwear
DM	Denim
EPB	Export Promotion Bureau of Pakistan
FA	Fashion Garments, fashion Apparel, Pret
FF	Finished Fabrics
NPD	New product development
MM	Martial arts, bikers, military garments
PRGMEA	Pakistan Readymade Garments Manufacturers and Exporters Association
SME	Small manufacturing enterprise
T&C	Textile and Clothing also Textile and Apparel
TT	Hand-crafted, traditional textiles
UN	United Nations
WTO	World Trade Organization
WEF	World Economic Forum

# CHAPTER ONE

## INTRODUCTION

### 1.1 INTRODUCTION

The changing lifestyles, the pursuit of environment-responsible product developments, the advancements in textile materials, and reforms in production technology require a revisit to apparel design practices to mend new textile and clothing product developments accordingly (Hodges, n.d.; Horne, 2011; Mazzarella, 2017; Perivoliotis, 2005; Silva et al., n.d.; Starbuck, 2011; Vila, 2007). The apparel industry is one category of the textile industry. It is the main category of Pakistan's textile sector and has earned a good name in manufacturing textile goods. Figure 1.1 illustrates the three categories of the textile industry and the types of products under each category.

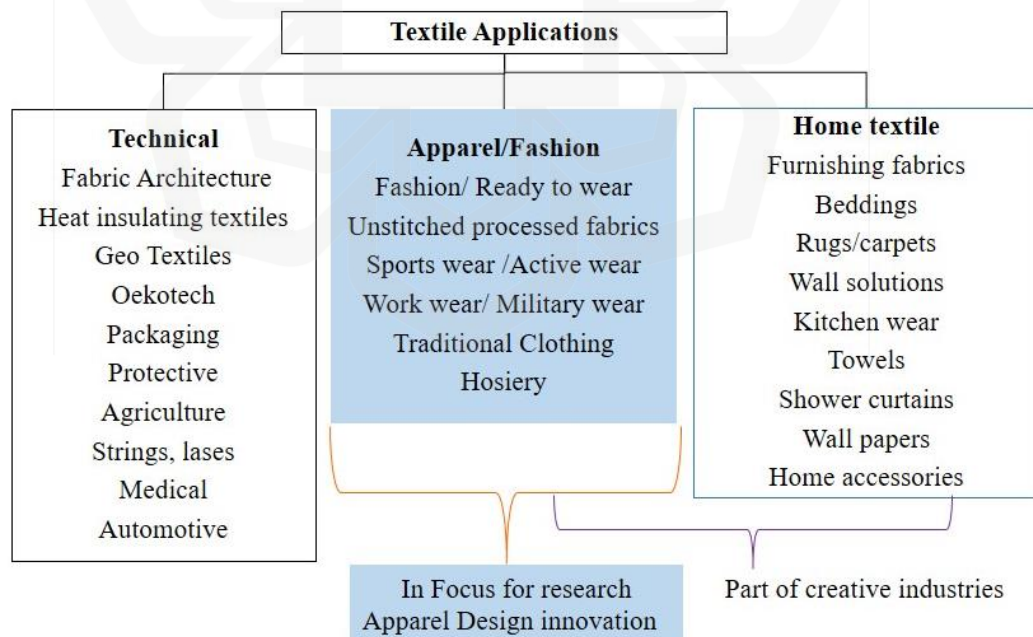


Figure 1.1 Textile applications based on Jacquie Wilson (2001) and (Horne, 2011)

According to Nayak (2015), the apparel industry manufactures outer and inner clothing, including work, leisure, sportswear, jersey goods, and lingerie. Pakistan's clothing sector produces products for many types of apparel for domestic and export markets. The products manufactured for the export market are mostly inclined towards cotton fabrics and made-up such as denim, active wear, hosiery, and outerwear. The products for the domestic market have a wider product range, including fashion wear. Over the past few decades, the need to bring reforms in product innovation has been realized to upgrade and excel further in the field (Baffes, 2005; James Howe, Tineka Michelle Smith, 2018; Pakistan, 2019).

Apparel design is one stream of textile product development that contemplates shaping products formed as body coverings (Tabassum, 2020; Brannon, 2011). Apparel design involves many products of use for men, women and children as well as multiple functions such as jackets, accessories, scarfs and dresses. However, fabrics and fabric adornment techniques are integral to apparel design. The aspects of fabric materials and their processing are like other textile products. The required fabric quality determines the production and fabrication techniques for all types of textile products. Therefore, the term Textile and Clothing (T&C) is also used to refer to the fields related to textiles and apparel. Most of the mainstream textile firms in Pakistan produce apparel and interior textile products. Some SMEs and fashion labels concentrate only on styling and stitching apparel products and outsource fabrics from other setups. Similarly, some apparel firms only focus on designing fabrics and fabric surfaces and do not use styling and stitching. Hence, clothing firms do not have to be engaged in a complete value chain; instead, they work as loops of the textile value chain (Uddin, 2019).

Innovation in apparel design refers to design solutions that are more effective and suitable for the users, the environment, and the producer (Gupta, 2022; McBee-Black, 2022). The predominantly digital revolution in the Textile and Clothing (T&C) sector, sustainability, environmental concerns, elimination of cross-cultural boundaries, social media, and post-pandemic protective clothing challenges have universally changed the social setup (Sayem, 2022; Wijewardhana, 2021; Islam, 2021). Emerging consumer trends and user behaviour have raised new challenges for designers to design relatable and suitable

apparel for users. The innovation and new product development frameworks suggested multi facets solutions specifically for apparel design and generally for industrial design. The researches in this regard suggest various strategies such as introducing technological reforms, developing an insight into the meaningfulness of the product, addressing functional aspects of the product, improving user experiences, introducing sustainable materials, encouraging small enterprises, and establishing brand identities (Gupta, 2022, Andersson, 2003; Frumkin et al., 2011; Lommerse et al., 2011a; Lucia Rampino, 2016; Mazzarella et al., 2017; Mohd Tajuddin et al., 2017; Smelik, 2018; Trott, 2012).

The domestic market has shown immense competition in clothing brands majorly producing finished products, whereas the share of value-added products in the export sector is still less. Despite being 57% of the country's export is Textile's 8<sup>th</sup> largest textile exporter in Asia (Dawn News 2018), the industry has not achieved competitiveness in product innovation amongst its regional competitors such as China, Bangladesh and India. In Pakistan, the T&C industry has to develop product innovation and adapt to change because it is no longer enough to rely on manufacturing, cost-cutting, and improving production efficiency (Klaus Schwab, 2018).

Identifying and mapping the key points related to apparel design developments to encounter innovation directed that reforms in design practices can lead to improvements. The inquiry on what design practices should lead to innovative apparel products was considered indispensable. This study investigated the current design development process being practised in the design departments of the textile product industry to identify the factors that affect the innovation process. The framework for innovation in apparel design developed in the context of Pakistan's clothing industry has addressed the factors that affect new product developments and suggested ways through which improved product functions and aesthetics can be achieved for Pakistan's T&C sector.

This research focuses on the apparel design practices that lead to new and improved product developments in Pakistan's textile and clothing sector. The reforms in designing would affect the complete apparel product from its birth to its use, reuse, and disposal. The

improved design practice requires suitable strategies to facilitate product design innovation in an industrial setup. Design innovation in apparel involves multiple aspects related to product concept, design process, textile materials, production techniques, and technologies. Therefore, this research proposes a framework to enhance the apparel design innovation potential of Pakistan's textile and clothing industry.

## **1.2 BACKGROUND OF THE STUDY**

The textile and clothing industry design is conventionally done for two textile applications: interior fabrics and apparel. The technological advancements and innovation in textile materials have not only introduced many other potentials of textiles resulting in other fields such as construction, agriculture, etc., but have inflated designing possibilities in apparel and textile for environments (Gupta, 2022; Sayem, 2022). These advancements in textile materials, production technology, and applications have also exaggerated the role of the designer working in the industry to develop new products.

The history of the apparel industry is deeply rooted in the traditional textiles of the region (Shafi, 2021). After industrialization in the early 1950s, Pakistan founded its textile industries that produced weaving yarn and unprocessed fabric. Much later, in the 1980s, it established many textile firms, including firms that could develop apparel products. Large-scale firms were producing unstitched cloth, whereas the production of garments was either held by boutiques or customized tailoring (Zahid, 2019). The traditional apparel styles and patterns were incorporated into mass-produced apparel fabrics to cater to domestic market users (Dad & Zahid, 2018). Hence, the traditional embroidery techniques and other indigenous design practices remained on a lower scale, patronised mainly by welfare organizations. Until the early 1990s, the clothing sector of Pakistan focused on unstitched fabrics, and by then, mass-produced garments were introduced by large-scale firms (Kashif, 2020; Zahid, 2019). Many apparel brands that could offer stitched garments were established for the domestic retail market. Parallel to the progressions in the domestic market, the export market focused on efficient production methods that could enhance

manufacturing or garments designed by international labels until value addition became the talk of the town in the first decade of the 2000s (A. A. Khan, 2010). Over the past years, design collections of clothing brands present dominance of apparel clothing styles that relate to cultural and native attires for cross-cultural attires, which are imported. Pakistan's textile industry either focuses on processes for export or printed apparel for the domestic market.

Pakistan's textile industry produces clothing on conventional regional product styles and manufacturing for international fashion labels. The apparel industry produces cotton fabrics and the finishing techniques of cotton fabrics on their own, but the other fibre contents and textiles are mostly imported, mainly from China and Turkey, and stitching is done in Pakistani clothing firms (Ahmed, 2008; A. A. Khan, 2010; Maier et al., 2013; Wadho, 2018). Different organizations, clothing associations, and apparel firms have realized improvements in the development of value-added textile products to compete in the global market since the early 2000s (Abdul Karim, 2023; Klaus Schwab, 2018; Sadaf et al., 2014). Apparel designing is a process where a product concept is developed and product features are realized. It also directs the production of garments and refers to the technical issues of production. Apparel designers control the outcome of the product and its suitability for the user during design development. The design innovation for value-added readymade products can improve the competency of Pakistan's textile industry because the infrastructure and resources are already available to firms as they are already manufacturing for international apparel brands (Khan, 1999; Shah, 2010; Silva et al., n.d.; P. B. of I. and Trade, 2018; Wadho, 2018)

According to Klaus Schwab(2018), the two leading indicators of innovation performance in firms are their engagements in research and development and commercialization, i.e., the capacity to launch innovative ideas successfully. Oslo's manual of product innovation (OECD/Eurostat, 2018) also classifies innovation indicators as the number of n or improved products launched commercially. The activities performed to track innovation include collaborative ventures in acquiring research development. In apparel, these two indicators refer to the product's design, production and marketing.

Nonetheless, both innovation indicators refer to the developments that typically originated in the creative departments of apparel firms.

Innovation can be technological and non-technological(OECD/Eurostat, 2018). In apparel design, technological innovation refers to technological advancements in textile materials, fabric production, processing machinery, digital tools of designing, technical advancements, and incorporation of technology at any stage of product development. Technological innovation refers to managerial and marketing-related innovation (Wadho, 2016). Waqar Wadho (2018) evaluated the performance of clothing firms in Pakistan and concluded that most of the firms focus on technological innovation related to improvements in production. In contrast, non-technological innovation remains neglected, including research and development in the product concept and features. The apparel sector includes other fields, such as engineering, merchandising, and management, besides apparel design, and in their research, the analysis focused on innovation as a collective phenomenon of multiple departments within apparel firms. The firm-level analysis by Waqar Wadho (2018) on innovation in Pakistan disclosed the percentage of different types of innovation happening in the apparel sector. It illustrated that the innovation types encompassing designing have a significant margin of improvement (Fig 1.2).

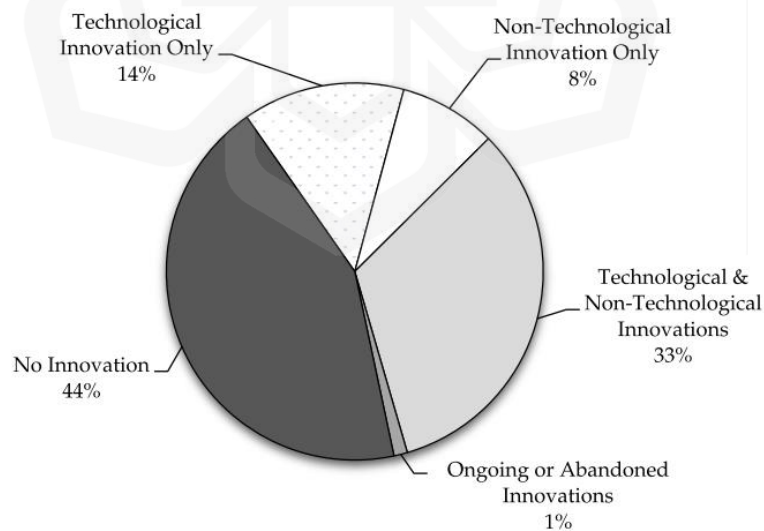


Figure 1.2 Innovation rate by type in the apparel sector of Pakistan  
Source:(Wadho, 2016)

Apparel design innovation can be technological or non-technological. Similarly, it can be tangible or intangible; some innovations are disruptive, and some are radical (Frumkin, 2011; Lucia Rampino, 2016). In apparel design, technological innovation involves design management in the organization environments and encompasses market analysis for design problem identification and launching of new products. So, non-technological innovation in apparel design may refer to improved product function, meaningfulness for the environment, and suitability according to user needs. For example, a garment design innovation that addresses better comfort, improved fittings, and enhanced service will be considered as non-technological innovation. Pursuing innovation in apparel design would address both technological and non-technological innovation, which would address multiple aspects related to product development.

Innovation in apparel design refers to both the design development process and the product's design (Zahid, 2022). The innovation implies either a new or improved service. Innovation in apparel design would mean developing an enhanced product by introducing innovative concepts or resilient design processes instituted in sustainable environments. So, the framework development for apparel innovation focused on both perspectives, processes, and products as an outcome of the processes that leave a long-term impact either socially, economically, or ecologically.

The designing of apparel engrosses multiple aspects of dress, including function, aesthetics, economics, market trends, production timeline, culture, material resources, product life cycle, and sustainability (O'Kane, 2015; Ha-Brookshire, 2013; Bye, 2005; Segonds, 2014; Labat, 1999). The designers accumulate knowledge from internal and external environments to address these variant aspects and respond accordingly to develop workable ideas (Trott, 2012). The accumulation of knowledge in the early design stages is chaotic and contains abstract notions. Later, designers analyze and filter these concepts into viable products by applying different apprehensions related to market, user, economics, innovation, and others (Lawson, 2006). The detailed design then resolves styling details, technical drawings, production plans, and production techniques (Min et al., 2015; Pahl et al., 2007; Segonds et al., 2014). Consequently, the study of design development practices in determining design innovation framework remains substantial.

Apparel designing in Pakistan is deeply rooted in the preindustrial era, when weavers used to weave clothes on hand looms, and the ornamentation of garments was done through intricate embroideries and block prints. With the advent of the industrial revolution, the textile and clothing industry established its foundations in mass production in the early years of Pakistan's birth. Initially, the focus remained on spinning and fabric lengths, unless in the late 1990's the apparel design reforms bloomed in the readymade garments for the domestic market(Saif, 1995). Hence, the export sector focused on technological reforms. It was the same time when apparel design education was considered essential to cultivate the apparel designing skills of designers. Later, by the 2000s, fashion and apparel design educational institutes and apparel brands were established, and some were patronized by fabric manufacturing firms (Role et al., 2019).

Pakistan's textile and clothing industry produces both apparel for export and domestic markets. The apparel sector comprises a complete textile value chain from yarn spinning to product packaging and marketing. The export sector relies on fibre and spinning regarding market share, and fewer cut-to-pack garments are exported (Islam, 2015; Khan, 1999; Memon, 2013; Shah, 2010). The annual reports of the All Pakistan Textile Mills Association (APTMA) present a slight rise in the apparel sector since 2005 (after the removal of the country quota system by WTO). However, the industry focuses on manufacturing cotton cloth and spinning cotton. Figure 1.3 illustrates the share of the apparel sector compared to other textile products, including cotton fibres, yarns, and clothes, from 2005 to 2019, according to the reports published by APTMA.



Figure 1.3 Authors compilation based on data acquired from APTMA.

Source: (APTMA, 2022)

Most of the apparel industry (export sector) focuses on manufacturing for international design houses, and the design firms design products for the domestic market. From early 2000, more than 100 retail stores and fashion/ life style brands have been launched nationwide (Textiles & Vol, 2005). These brands and fashion houses mainly focus on conventional clothing and sourcing fabrics and finishing processes from Pakistan, China, and India. Besides this massive growth in the domestic market, having good quality cotton and cotton blend fabrics, few brands have gained international recognition.

Even though value-added products increase profit share and finished garments bring on an average of US\$5 per pound compared to an average of US\$0.70 for cotton yarn and cotton fabrics (Khan, 1999); Pakistan's textile exports rely on raw material supply. International and regional competitors like India, Bangladesh, and China have excelled during the same time frame despite fluctuations during 2020. The average progress graph of these countries during 2018-2021 is stable (Lu, 2021). The regional competitors have flourished because of the focus on innovation and advancements in technical textiles, value addition, and synthetic materials (Wadho, 2016).

Some social and ecological factors have caused the shift of product and material ideology in the textile and clothing sector. The world we live in today is not the same as in the late 1990s. IT revolution, awareness of environmental issues, climatic and ecological changes, post-war settlements, and other cultural and social developments have transformed how we live and work. Consumer products are being reshaped. Constantly seeking better yields is vital to maintaining industrial profitability, better services, and resilient environments. The terms humanitarian design, ecological design, user-centric design, universal design, and service design are some of the few examples that have bloomed from these concepts. (Ballie, 2012; S. X. Liu et al., 2018)

Design can help industries to unmark their creative potential. It is a fundamental part of industrial strategies (Deborah 2017). Designers help deliver the outcome industrialist tries to achieve. Improved design can be embedded to support existing industries in meeting new challenges because designers are trained to look into challenges their businesses face to find solutions. Designers can contribute to developing better design solutions by engaging multiple factors to serve market needs with improved services. Some emerging design concerns are yet to be explored by the Pakistan Textile Industry.

Predictably, new markets have emerged because of new user demands and technological developments. The reasons for this shift can be emerging trends on sustainability, the IT revolution, and natural forces (pandemics, climate, etc.) because they have coexisted chronologically. The apparel designing, in terms of design processes as well as product features, are affected by this shift, and to meet the challenges of these emerging trends, an in-depth study is a prerequisite to identifying those aspects that can work as driving forces to improve the innovation capacity of apparel design practices in clothing sector of Pakistan. Consequently, this research focused on identifying the gaps, untapped resources, and processes of apparel design practices that may lead to improved new products and services instead of assessing the innovation capacity of textile and clothing firms in Pakistan.

### **1.3 DEFINITION OF TERMS**

The research aims to develop a framework for apparel design innovation; therefore, it is vital to define the contextual meaning and interpretation of apparel design innovation (ADI) that this research has referred to. It is derived from combining the two components of the term “innovation” and “apparel design.”

#### **1.3.1 Innovation**

Innovation is a new or improved usable idea, process, or product (or combination of any) that is different from the previous outcomes in a similar domain (Activities, 2018; Frumkin & Weiss, 2011; Horne, 2011; Padilha & Gomes, 2016)

#### **1.3.2 Apparel Design**

The wording ‘apparel design’ exclusively inherits the activity of generating an idea of a complete garment or part of it and then converting the idea into any form of visual (a sketch or material or both) that results in the creation of garments (Badge & Me, 2014; Kidd & Workman, 1999; J. S. Lee & Jirousek, 2015; Lottersberger, 2012; Park et al., 2014; Rieple, 2009; Wilson, 2011).

#### **1.3.3 Apparel Design Process (ADP)**

Apparel designing engages the concerns related to user personas, functional requirements of a garment, and cultural connotations, particularly during product identification. The designing process facilitates the concept's convergence to the product and tackles the

technical realization of the design concept (O'Kane, 2015; Lee, 2008). It means that the apparel design process would create a garment style and develop proposals and detailed designs on how it can be produced. During the design development process, an apparel designer must address several aspects related to the user, manufacturer, and brand label (Malik & Azhar, 2015; Park et al., 2014; Trott, 2012).

#### **1.3.4 New Product Development (NPD)**

New product development would encounter limited product range, compromised design solutions, low-grade products, improved services for the underserved needs of the target market, and the capability to produce apparel designs for multiple markets (Frumkin et al., 2011; Horne, 2011; James Howe, Tineka Michelle Smith, 2018).

New product development in the textile and clothing sector refers to developing a textile product from the conception of an idea to commercializing it until it is ready to be launched for selling. It may refer to the complete process or any stage of the development process. The new product is not necessarily innovative as it may not offer improved service or product features, an elementary unit of “product innovation.”

#### **1.3.5 Apparel design innovation (ADI)**

Apparel design innovation refers to innovation (process or product) from idea to visualization of the usable idea into a garment. The main purpose of design is to make something new that does not exist yet, mostly a modification to an existing product (Mahony, 2011; Hodges, Nancy, 2018; Activities, 2018; Cross, 2021). Frumkin (2011) describes innovation in textiles and clothing as unserved and underserved needs of the target market. Oslo's Manual of product innovation (2018) provides a guideline to identify innovation and illustrates that only the change in colours and ornamentation of the product cannot be considered as innovation; rather, it refers to improved processes, services, and

materials. These descriptions of innovation in apparel design would mean the identification of such design briefs that target unserved and underserved needs and address them in design development processes. Therefore, in this research, Apparel Design Innovation is considered an “Improvement in design that tends to characterize the change in apparel products through inheriting new or improved concepts in creation of textile raw materials: fibres, yarns, knitted, woven and non-woven fabrics and their conversion into apparel products.”

#### **1.4 STATEMENT OF THE PROBLEM**

The clothing industry of Pakistan is impaired compared to regional economies due to insufficient design inventiveness, incompetency to develop finished products, financing models for research and development, trade policies, energy shortage, energy tariffs, and political instability (Government, 2015; Hamid, 2014; Hussain et al., 2013; ILO, 2014; Khan, 2010; Sadaf et al., 2014; The Pakistan Business Council, 2019). The textiles and clothing sector has experienced growth in recent years, according to data from the Pakistan Bureau of Statistics (O. Afolabi & Abu Bakar, 2016). However, compared to its regional competitors, the T&C sector in Pakistan has been stagnant (Hussain et al., 2013). Its value-added textile and clothing product share does not fall in the top textile and apparel manufacturing countries. Value addition in the clothing sector has been up to 30% since 2006-2018 (United Nations Industrial Development Organization, 2022), which can be enhanced through product inventiveness (Klaus Schwab, 2018; WTO, 2020).

Punjab Board of Investment and Trade (2018) reported that Pakistan’s textile industry could improve its competitiveness in terms of quality, value addition, readymade products, and price optimization. Shahid Sattar (2018) referred to the Ease of Business report that Pakistan stands 147th out of 190 countries regarding business competitiveness. According to the Consortium for development policy research and the Pakistan business council report (Hussain et al., 2013), the lack of product diversification, a bias towards low-value addition, and lower-value exports are the weaknesses of Pakistan’s textile and clothing sector. These

highlighted issues involve research and development to develop new and efficient materials, services, and products. Vuletich Clara (2015) agrees that the current fashion textile industry is based on an outdated, exploitative system that encourages immediate consumption, generates huge amounts of textile waste, creates toxic impacts on ecosystems, and causes significant social impacts on production workers. (Christian Bason 2014) believes that “the prerequisite to strive for a sustainable future is to reform design-oriented inclusive organizational mechanisms. The initiatives to pursue service improvement through integrating design thinking would explicitly encourage innovation, and design can catalyse the “collective construction of the future” (Simonetta 1967).

Design is an integral part of new product development and value addition. The researchers have identified the problematic zones, such as lack of product diversity, limited material exploration, absence of value addition, issues regarding technological advancements, weaknesses in textile economic policies, and limited design possibilities for new markets and improved services. Hence, their research does not realm on apparel design innovation strategies. The previously developed new product development design frameworks either concentrate on the learning of designers in an academic environment (Cross, 2021; Lee,2018; Paul, 2007; Watkins, 1988) or provide a generic mapping of the apparel design process in the creative environments (Segonds, 2014; Rieple, 2009). Some other frameworks of apparel design prescribe the salient recurrent issues in industrial design practice and provide design innovation frameworks (Gam,2011; Preez, 2008; Jin Gam, 2009; Parsons, 2004) to achieve innovation, but none of such frameworks has taken Pakistan’s T&C sector as their case study.

Regarding apparel design innovation in Pakistan, other studies and surveys (Wadho, 2018; Hamid, 2014) have focused more on government, industrial, and organization policies, energy crises, cost reduction, technological innovation, and production processes. In contrast, the struggle to improve product value by developing a design framework to shape new garment styles and innovative apparel design practices remained deficient. Simonetta (1967), Christian Bason (2012), Lucy Kimbell (2016), and Maats (2016) are of the view that the role of design in shaping the industry and, consequently, society is vital; therefore, at present, it needs a fresh approach. They argue that meaningful

products can embody change. Furthermore, the impacts of apparel design are crucial because apparel products shape environments.

It is important to get familiarized with current design strategies and practices in the apparel sector of Pakistan to recommend suitable design innovation frameworks for new product development. The research that documents current design practices remains limited regarding scholarly sources. Previous studies (Gupta, 2022; Wadho, 2018; Segonds, 2014; Rigby, 2011; Frumkin, 2011) in textile and clothing design innovation have described multiple aspects of innovation. The innovation concerns regarding apparel design include two subjects: the processes of designing and the outcome of the design processes in product features (Cross, 2021; Labat et al., 1999). Designing apparel within industrial environments is challenging because it requires a functional, practical approach to design. Likewise, in other creative industry fields, the design concepts should be producible in the available resources (Colombi, 2016; Brookshire, 2013; Rieple, 2009). Additionally, the adaptation of new materials and techniques, new design concepts, and revisiting design methods and processes will lead to new levels of functionality in textiles and clothing to design according to the needs of current society (Gupta, 2022; Jensen, 2017; Jul, n.d.; Rigby, 2011; Torstensson, 2011).

The textile policy of Pakistan does not sufficiently explain its design strategies, nor any action plan is provided in this regard. The other national-level organizations, such as PRGMEA, APTMA, and PFDC, do not provide future visions on design strategies. The absence of a design vision statement caused interrogations regarding design capabilities and the ability to produce new tastes and products, equipping apparel designers with a descriptive design innovation framework. Hence, apparel firms lead to improved design practices.

## **1.5 RESEARCH AIM**

This research proposes a framework of apparel design innovation for developing new clothing. The framework would endorse prime factors that influence apparel design

innovation and would develop an outline to enhance the apparel design innovation potential of Pakistan's textile and clothing industry. This research would suggest design development strategies for developing new apparel products in Pakistan's clothing sector.

## **1.6 RESEARCH QUESTIONS**

Based on the statements of the problems, the study aimed to inquire about the following questions:

1. What factors contribute to designing apparel products for Pakistan's T&C sector in Punjab?
2. What are the design practices in the Pakistani textile and clothing industry for apparel products?
3. What design practices can strengthen new product development for Pakistan's textile and clothing industry?
4. How do novel design approaches enhance apparel innovation in Punjab, Pakistan's textile and clothing sector?

## **1.7 RESEARCH OBJECTIVES**

From the above questions, setting the objectives assisted in responding to the issues. The study aimed to achieve the following objectives:

1. To identify the factors influencing designing new apparel products in Pakistan's Textile and clothing sector in Punjab.
2. To examine current practices of apparel design for new product development.
3. To construct a framework for apparel design innovation in Pakistan's textile and clothing sector.

## 1.8 RESEARCH GAP

Despite the apparent importance of creativity to apparel design, a smaller number of studies focused on creativity required in the apparel design sector. Even fewer address specific strategies for teaching creativity within a conceptual model (Karpova, Marcketti, & Kamm, 2013). In recent studies, apparel industry professionals and researchers indicate a need to explore further and build a conceptual, theoretical framework designed to enhance and teach creative thinking strategies without noting a specific reason for the lack of currently available models (Omwami, 2020; Min, 2015; Bye, 2010; Min, 2015).

The research on the potential of the Pakistani Textile and clothing industry in developing innovative designs appears limited. Previous studies have highlighted issues related to trade policies, government policies, energy resources, and material resources. Even though many researchers have discussed the margin on improving the quality and range of products, how design strategies can be directed has not been sufficiently explored. This research has identified the current valuation of textile and apparel finished products and inflexion in design practice. This research intends to fill this gap by investigating the factors which can help boost Pakistan's textile industry with quality-assured, value-added, innovative products. The literature on the Pakistan apparel sector, apparel design, and design development for product innovation illustrated that the potential of apparel design practices had not been sufficiently explored.

Further, a framework that maps the design-related issues for apparel designers and Pakistan's apparel industry to engage in product innovation is unavailable. Most of the literature covering design processes and apparel design innovation is referred from non-native resources because of the lack of research done in the apparel design field in Pakistan. Figure 1.4 illustrates the three main components of the research gap that explain the need to research apparel product innovation by investigating design practices, the prospective design markets, and the current design scenarios in Pakistan's textile and clothing sector.

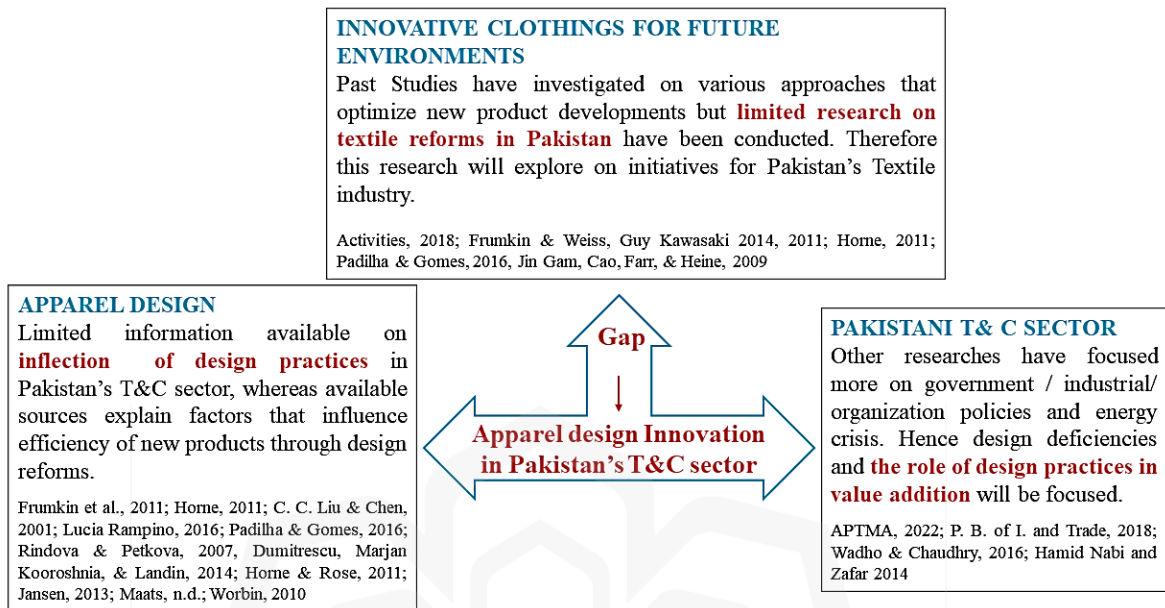


Figure 1.4 The research gap in apparel design innovation

## 1.9 SIGNIFICANCE OF THE STUDY

The findings of this study will rebound to the benefit of society, considering that apparel design plays an essential role in shaping industry and society. The greater demand for new ways to develop competitive products to thrive in the global market, practice, and engage with the sustainability agenda, addressing underserved demands of changing lifestyles and technological advancements, justifies the need for more effective, innovative, and resilient textile and clothing products.

This study will imply improvements toward innovation in the creative industries, particularly in the apparel sector. Thus, industries that apply the recommended approach derived from the result of this study will be able to establish a better R&D-based design setup and meaningful products subsequently. Creative heads will be guided on what should be emphasized to improve design inventiveness for the success of the well-reputed textile business.

This study will focus on mapping design processes and identifying the key issues that should be addressed during the design development processes of new apparel products. The designers would benefit from this research in identifying suitable design choices with strong contextual relevance to the strengths and weaknesses of the country's T&C industry.

For the design students and instructors, this study will help them uncover critical areas in the educational process to bridge gaps between education and practice. The mapping of design processes would develop a comprehensive understanding of design and assist in developing design skills.

### **1.10 RESEARCH SCOPE AND DELIMITATIONS**

The textile industry is fragmented into various subdivisions and sectors. This study dealt with apparel design development practices in the clothing sector. Assessment of clothing firms' innovation remained out of this research's scope. Rather, the focus was built on design processes that can lead to new and improved product designs through advancements in design developments. Figure 1.5 presents the delimitations of the study.

Apparel product development involves multiple disciplines besides designing, including management, marketing, merchandising, textile engineering, and manufacturing within textile firms, and the external factors include international and national-level textile policies. The focus of this study remained on apparel design issues, which is why the other contributing domains were passed over.

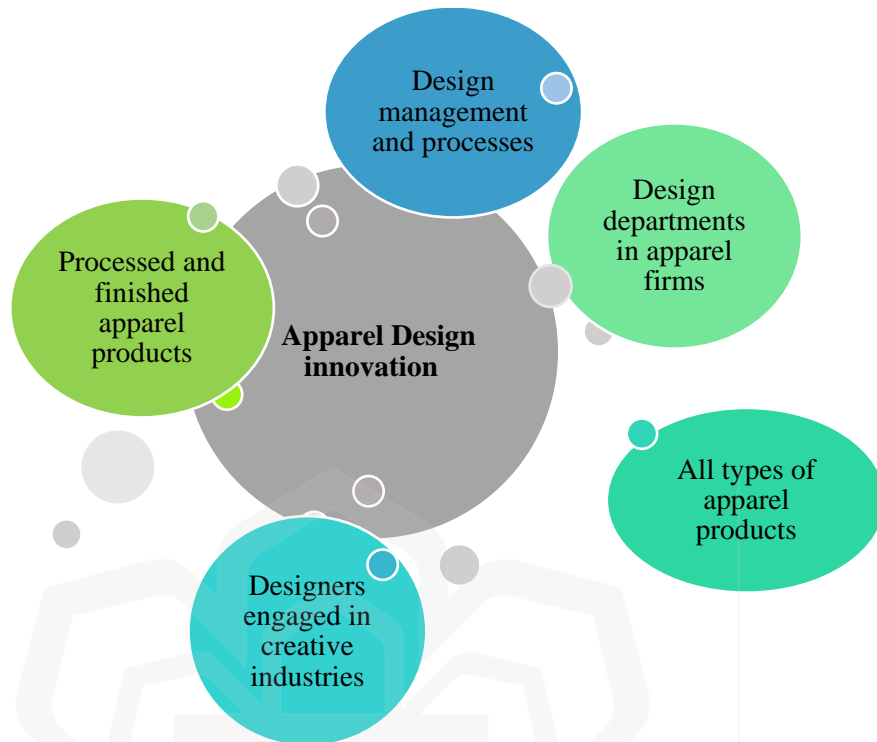


Figure 1.5 Delimitations of the study

Based on the research objectives, the study sample was limited to industrial zones in Punjab. The study focused on the valuation of apparel finished products and inflexion in design practice in Pakistan’s clothing sector; therefore, following points were considered.

The research included designers and developers employed in the textile industry as respondents.

1. The designers observed as respondents to collect data on design practices were not to be freelancers or self-employed.
2. The study included registered and certified industrial setups.
3. The firms that have established design departments were included in field research because research questions two and three inquire about design practices.

4. Industries that do not produce a finished apparel product are not included. The spinning and raw fabric-producing firms are not included because the focus of the study remained on apparel.
5. Industries developing for export and the domestic market have been included.

## **1.11 CHAPTER SUMMARY**

This chapter has presented and discussed the background of the study. This chapter also introduces the status and future challenges of the T&C industry in Pakistan and states the importance of apparel design in achieving product innovation. The first chapter also highlights the issues in apparel product efficiency and the contribution of design in this scenario. Additionally, the problem statement is discussed, as this study is set to discover the product innovation potential of Pakistan's textile and clothing sector through variations in design practices. The research questions and objectives to pursue expected outcomes are also presented in this chapter. The first chapter has also briefed about the beneficiaries that will benefit on social (designer, developer, and user), economic (industrialist), and ecological (environment) levels. The significance of the study highlighted how this study could be useful for apparel product innovation in general and specifically for design practices within Pakistan's T&C industry. Finally, the scope of the study is mentioned in the chapter.

## **CHAPTER TWO**

### **APPAREL DESIGN AND NEW PRODUCT DEVELOPMENT**

#### **2.1 INTRODUCTION**

The study aimed to enhance the innovation capability of apparel products in the Pakistan textile industry through reforms in apparel product design. This chapter illustrates the theoretical underpinnings of apparel design innovation and develops a comprehensive understanding of components of apparel products, apparel design processes, and innovation strategies recommended by other researchers. The design processes and innovative approaches in product design also built-up theoretical foundations because apparel design is a subcategory of product design and creative industries. Moreover, the research exploration in the related fields of product design innovation identified the research gaps in apparel product design. The theoretical underpinnings of the framework for apparel design innovation have been developed on the bases of the two main streams of the study, 1) Apparel design innovation and 2) Apparel design practices in Pakistan's textile and clothing industry. This chapter discusses the first of the two; apparel design innovation. The review of varied theories on product innovation emphasized possibilities to develop competitive products for the textile sector through adjustments during design development processes. Furthermore, a review of past and recent trends and design strategies that have contributed to the evolution of apparel design for future resilient communities assisted in developing the rationale for the research. The outcome of this chapter is a theoretical foundation that has assisted in developing the researcher's understanding and critical thinking on apparel design processes.

## 2.2 APPAREL DESIGNING: PROCESSES AND COMPONENTS

Apparel design encompasses the activity of generating and rationalizing garment ideas. The activity includes all the actions a designer takes for concept development and conversion of the product concept into a wearable garment. The activity involves designing apparel product components. The literature references on apparel design innovation necessitated insight into two aspects of design: apparel product components that are operated during the activity and the processes that are opted for (Cross, 2011, 2021).

Figure 2.1 illustrates these two core subjects of apparel design under the product design components and the design process of designers to design products.

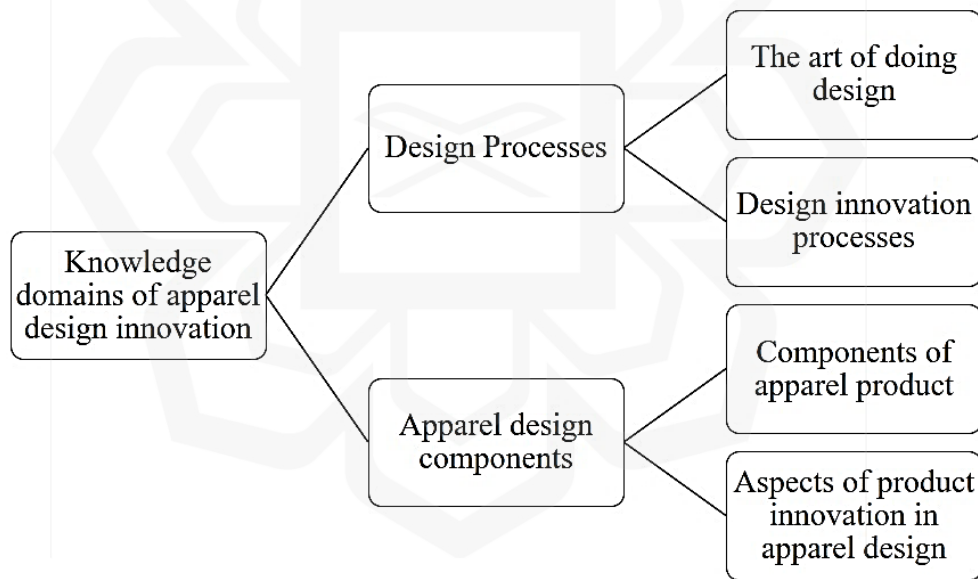


Figure 2.1 Core subjects for theoretical underpinning on apparel design innovation

The other researchers have explored both knowledge domains in pursuance of apparel design innovation. The inquiry on design processes revealed that improving the art of doing design facilitates the development of new and improved products (Blok et al., 2015; Cross, 2021; Pahl et al., 2007). The literature on product innovation in terms of

innovation in product components and product features includes improvements in product services, user experiences, materials, styling, aesthetics, life cycle, execution, and functionality of the product (Chen & Burns, 2006; Colombi, 2016; Frumkin et al., 2011; Frumkin & Weiss, 2011; Gam & Banning, 2011; Horne, 2011; O'Mahony, 2011; Park et al., 2014; Sherburne, 2009). The knowledge accumulation of designers about product components and the applicability of their acquired knowledge about product components during design processes shape product outcomes(Black et al., 2015; Lawson, 2006, 2012).

Hence it is important to highlight the concerns related to product components concerning strategies for design development to achieve product innovation. Both aspects are discussed in the following sections transversely because the actions during design processes are generated to optimize product components. To discuss designing in context to product outcome, they are dependent and reflective on each other.

### **2.2.1 The design process for new product development**

Designing is a highly personalized and multi-dimensional process which is why many researchers have been interested in the documentation of design processes to understand the effect of the process on the product (Dorst & Cross, 2001; Lawson, 2006; Lommerse et al., 2011a; Torkildsby, 2015). The design process is a step-by-step mapping of design activities during product development; the design processes are usually explained in a flow chart with some iterative and reverse actions(Cross, 2021; Watkins, 1988).

This research has provided comprehensive design models that suggest design and innovation strategies or describe pathways to improve performances for resilient product developments. Like other applied arts fields, the design process in apparel design could be subjective to the project type, problem statement, the designers' preferences, or any external factor(Zahid, 2017).

Researchers have drawn multiple maps to describe design processes that fall into two main categories, either to describe the designing sequence to develop a product or to

prescribe a better pattern of design activities(Cross, 2021). Here, firstly the sequence of design activities is described to develop an understanding of the steps involved in the apparel design process. The prescription of a better pattern of activities to persuade innovation and to develop a framework of design processes to guide new product development processes in apparel design is discussed later in section 2.3 after developing theoretical underpinnings on apparel design innovation factors. This is done so because the scholarly approaches to innovative design processes have addressed the innovation factors, and their recommended framework often prescribes suitable design processes that engross the innovation factors, for example, the framework developed by Juyeon Park(2014), Ballie (2014) and Niek D du Preez (2008). Amongst the descriptions of design processes for new product development, Nigel Cross's (2021, p. 30) descriptive model of design process caters to a generalized description of design processes for industrial design. His model comprises four stages for any domain in creative industries as

- 1) Exploration of the design problem to develop a concept
- 2) Idea generation
- 3) Evaluation of solution ideas and design concepts
- 4) Communication which includes final design.

He further explains that the first three stages in his model are iterative, and the “evaluation” may bring the designer back to step one, i.e., exploration. His idea of “evaluation” refers to the designer’s critical thinking and decisions regarding the notions that shall be moved forward to the next step of product development. The notions during the evaluation phase can be related to concepts, design ideas, design details, product components, or the process itself. So evaluation works as an aid to proceed in the appropriate direction and helps develop suitable solutions; therefore, it could not be considered a distinguished step in the design process.

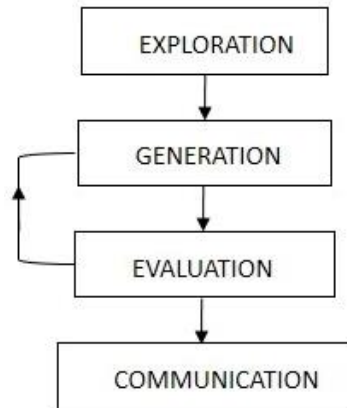


Figure 2.2 Generalized design process of industrial design

Source: (Adaptation from Cross, 2021)

The design processes mapped by Nigel Cross as a generalized design process represent the design processes from the viewpoint of a designer's actions taken to fulfil a given design task. Cross illustrates the actions of designers to investigate suitable product solutions, evaluate design proposals, and propose a workable design plan. In his lately developed design process models, he also developed a prescriptive design process model to explain the better ways of doing design that remained out of focus unless the approaches to innovation have been discussed in the later sections of this research. To develop an insight into the implications of apparel design in the industrial environment, further examination through the writings of Segond (2011), and Labat, Sokolowski (1999) investigated dimensions of product development processes and the participation of apparel designers in these activities.

Segond (2014) has mapped apparel product development processes in five stages and has discussed design practices within the apparel industry accordingly (Figure 2.3). Though his focus remains on developing digital tools that can assist apparel designers in their design development processes, his accumulation of the apparel development processes is noteworthy. He describes the apparel product development activity in an industrial environment as 1) Analyzing and structuring the collection by planning product categories, 2) Defining the product features and quantities, 3) Product design through prototyping, 4) drafting final documents, and 5) drafting technical files.

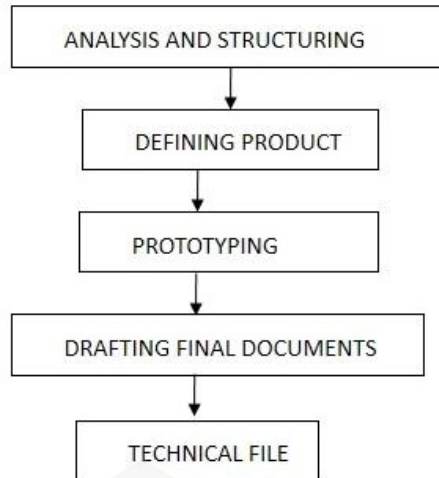


Figure 2.3 Apparel product development stages  
 Source: (Adaptation from Frederic Segonds et al., 2014)

His description of the apparel product development stage one as “analysis and structuring” refers to the idea presented as “Exploration” by Nigel Cross. Segonds explains the first stage as structuring design collections regarding quantities, design varieties, product categories, and even time planning that must be defined before the designers start their creative process while working in industrial environments. Stage two, “Defining product,” refers to the creative processes and something similar to Nigel’s idea of “generation.” Segonds has stressed the prototyping and drafting final documents and technical files as the last three significant stages in design practice within apparel industries. The Segond’s last three stages of product development are related to the later stages in the design process, described as detailing and working drawings by Nigel Cross that designers produce to communicate design concepts for production guides (2021, p. 31).

Labat and Sokolowski (1999) mapped product design, industrial design, and apparel design processes to develop a comprehensive understanding of design processes practised in the creative industries. He summarized three steps of the core design process for apparel design. He explained three steps of the core design process for apparel design 1) problem definition and research, 2) creative exploration, and 3) implementation. Labat has placed evaluation and assessment of the tasks under each course of action within design activity, whereas Nigel Cross considers it an iterative process under “evaluation.” Under these three

core stages of the apparel design process, he explains sub-stages related to product features, components, and development. Labat has grouped multiple tasks under each core theme based on the task's nature, objective, or outcome. For example, the first stage of problem definition and research includes all the processes required to define design problems, such as client definition of the problem, research on product components, and established design criteria. Labat's approach to the design process by classifying design activities into core groups of "concept development," "ideation," and "implementation" is considered most suitable for forming a design process framework because his approach has considered the fact that the industry has multifaceted and diverse nature of projects.

I. Problem Definition & Research	II. Creative exploration	III. Implementation
<u>A. Initial Problem Definition</u> <ul style="list-style-type: none"> <li>• Client definition</li> </ul> <u>B. Research</u> <ul style="list-style-type: none"> <li>• User needs</li> <li>• Market</li> </ul> <u>C. Working Problem Definition</u> <ul style="list-style-type: none"> <li>• Defined by client and designer</li> <li>• Design criteria established</li> </ul>	<u>A. Preliminary Ideas</u> <ul style="list-style-type: none"> <li>• All realm of possibilities</li> </ul> <u>B. Design Refinement</u> <ul style="list-style-type: none"> <li>• User constraints</li> </ul> <u>C. Prototype Development</u> <ul style="list-style-type: none"> <li>• Meshing design criteria and constraints to develop workable ideas</li> </ul> <u>D. Evaluation of Prototype</u> <ul style="list-style-type: none"> <li>• Preliminary: by designer</li> <li>• Final: By designer and client</li> </ul>	<u>A. Production Refinement</u> <ul style="list-style-type: none"> <li>• Cost to produce</li> <li>• Time to produce</li> <li>• Methods of production</li> <li>• Sales Potential</li> </ul> <u>B. Immediate Production</u> <ul style="list-style-type: none"> <li>• Changes in product or production</li> </ul> <u>C. Improvement/Refinement</u> <ul style="list-style-type: none"> <li>• Further development</li> </ul>

Figure 2.4 Apparel product design process stages  
Source:(Labat et al., 1999)

Watkins (1988) stressed that using an appropriate design process is vital for enhancing creative problem-solving abilities in apparel designers and explained analysis, definition, ideation, implementation, and evaluation as the step-by-step process of designing apparel products. Her design process framework presents similar ideas that Labat has explained within the three core stages of apparel design development. Additionally, she placed the evaluation of implemented designs at the end of the process. She considered that

designing is a process that generates better ideas if it is considered in a loop of the continuous urge to improve. The apparel design process is a multiphase process of design activities to achieve suitable design solutions. Therefore, to improve the services of apparel products or to develop new product ideas, it can be considered to map factors in the apparel design innovation framework. The activities and design methods applied during the processes may vary, but an overall flow of steps can be traced within a few core phases (Cross, 2021; Min et al., 2015; Watkins, 1981). Consequently, the sequence of product design development can be broadly mapped into the following phases in the light of the literature that has been discussed above; 1) identification; design brief or problem identification; 2) ideation; a conceptual design phase that includes initial developments, 3) fabrication; the second phase of developments to resolve technical issues, prototype development, and sampling is included in this phase. Figure 2.5 highlights the three stages of the design process in the cycle of apparel product development.

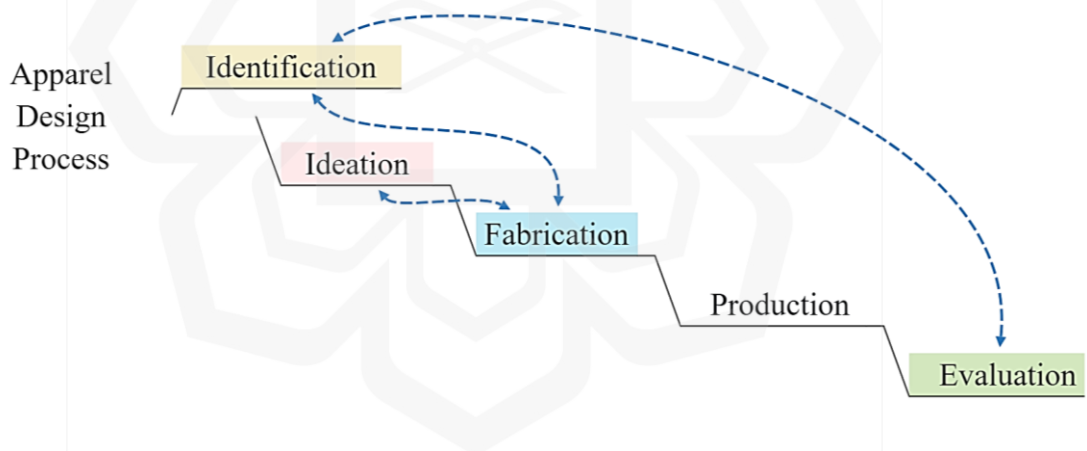


Figure 2.5 Author's collation of Apparel Design Process within the product development process

Researchers have been addressing each phase, and models have been developed to approach each phase to enhance innovation, particularly the second stage (ideate), where the phenomenon remains abstract, but the outcomes of this phase lead to creative and innovative solutions (Black et al., 2015). Once the design is finalized, it is forwarded to the production team. After the product is launched, the evaluation of the product and market

reports feed the first stage of design development that either happens outside or within the industrial environments(Watkins, 1988). Some researchers have considered the evaluation as another phase in the design process to increase product efficiency, conceptually and functionally; for others, it is part of the identification, ideation, and fabrication stages. The sequence, iteration, and design methods applied by apparel designers within each stage of the design process have also been debated in some research, where the focus remains on mapping different methods. Hence further investigation was necessitated with a focus on the industrial environment initiated during data collection. Moreover, it is required to elaborate further on each phase of the process, particularly if the innovation in the design process is considered vital for innovation in the apparel sector.

#### 2.2.1.1 *Identification*

The “identification” of the design brief is the first step in the design activity and originates from the problem statement usually provided by the client or company management. The design statements, also known as design briefs, vary largely in content and form. They can be a statement that describes a fixed goal (Cross, 2011, 2021; Segonds et al., 2014). The design briefs may also identify the improvement of already developed products and developments of new products about already produced products (Cross, 2011).

Regarding product planning, identifying a “design brief” results in structuring collections, including product categories and quantities(Segonds et al., 2014). Regarding product features, the identification phase of design processes usually identifies a set goal, some constraints, and criteria by which a suitable design may be achieved (Cross, 2021).

#### 2.2.1.2 *Ideation*

Ideation is the second phase of design development, and it can comprise several iterative rounds of developing ideas regarding product features, to develop various possibilities and

solution proposals (Segonds et al., 2014; Watkins, 1988). This phase includes generating and transforming visual representations to create new solutions (Omwami et al., 2020). It is that phase that makes the greatest demands on designers and is considered the main scope of designing. It is the phase where critical, creative thinking, practical knowledge, production methods, and commercial aspects must be brought together (Cross, 2021). During this phase, designers think about the overall concept, and at the same time, they think about the detailed aspects. The main tool that apparel designers use during this phase is drawing, like other fields of industrial design, and sketches vary from quick idea sketches to detailed sketches. Figure 2.6 illustrates the data creation process during apparel design ideation, adapted from Segonds (2014).



Figure 2.6 Segonds description of data creation during "ideation"

Source: (Segonds, 2014)

Lawson (2006) discovered that designers tend to explore in the early phase of design development and then suggest various solutions until they find one most suitable solution to the design problem. He named this approach a solution-focused strategy and expressed those designers, during the exploration phase for design possibilities, either find a solution to the whole problem or explore partial solutions on the whole at a time. For example, if an apparel designer may design fabric textures and then later work on styling and pattern of the dress or vice versa. Lawson has further explained designers' processes during ideation

to generate suitable design solutions as ‘formulating,’ ‘moving,’ ‘representing,’ ‘evaluating,’ and ‘reflecting.’

Du Preez has drafted the sequence of the ideation process that further explains design activity during ideation (Figure 2.7). The ideas are first generated by formulating some aspects of the market, technology, etc. The information sources are consulted to collect information. The ideas are further developed and represented to reflect upon them.

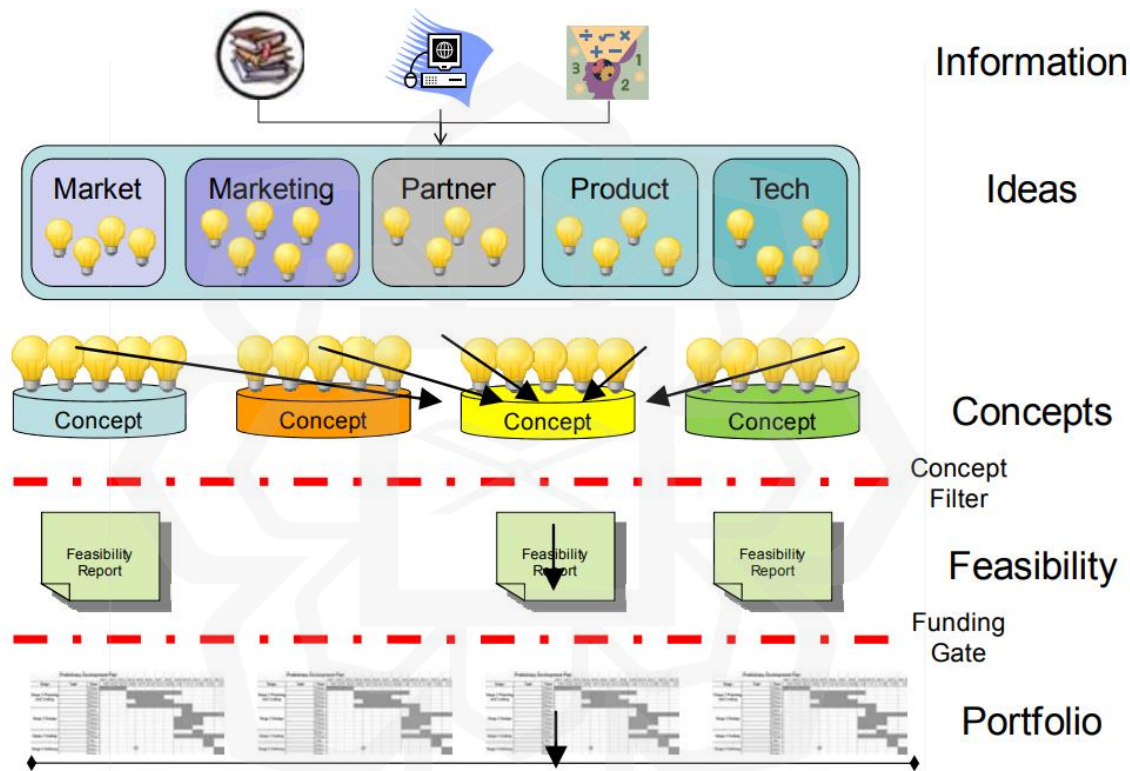


Figure 2.7 Ideation management process

Source: Adaptation from Du Preez, (2008)

Most apparel designers start with some reference images during ideation. The transformation of collected visuals into ideas is personal to each designer but sometimes reflects similarities with other designers (Omwami et al., 2020). Ideation is an iterative process. During ideation, designers mostly start with one imaginative idea, then refine it, develop a new idea, refer back to one or more previous ideas, discard some ideas, and refine or develop further unless they are satisfied with the outcome (Du Preez & Louw, 2008).

During ideation, designers draw upon a diversity of informal and intangible resources. Most are external to the firm resources, including social moods, street trends, perception of user liking, and atmosphere. However, some tangible resources (mostly related to the firm's capacity) also influence the ideation process, such as materials, techniques, and other physical resources (Min et al., 2015; Starbuck, 2011). The evaluation of design ideas happens back and forth to filter out concepts that the designer considers beyond production possibility within the provided or available resources.

### 2.2.1.3 *Fabrication*

Ideation provides a variety of design ideas and creative proposals for the design problem. The ideas are evaluated and selected for implementation once designers have developed as many options as possible (Labat, 1999; Min et al., 2015; Watkins, 1981). Then filtered apparel product ideas and concepts are developed further to take action and try out the workable ideas (Watkins, 1995). This phase includes the designer's workings on execution techniques, fabric and other materials, technical drawings, and other instruments that explain detailed design for production refinement (Labat et al., 1999).

This stage includes design workings for production methods, clothing measurements, fabric qualities, etc. It is the design phase when designers put their chosen ideas to work (Watkins, 1981). This last step is explained as 'technical file' and 'prototyping' in the apparel design process mapped by Seconds (See Figure 2.6). So the last stage of the design process and the creative process is considered as the making of a detailed design to address the productivity issues; during this stage, the apparel designers also evaluate functional aspects of production ability and feasibility besides other aesthetical and production concerns, and they may revisit ideation phase to analyze and implement accordingly (Du Preez & Louw, 2008; Omwami et al., 2020; Watkins, 1988).

### **2.2.2 Components of apparel product: A larger canvas**

Lee, Jung Soo, Jirousek, and Charlotte (2015) described apparel design elements as lines, cuts, shapes, colours, patterns, fabrics, silhouettes, and sizes. The design principles refer to how the elements are used, for example, symmetrical and asymmetrical balance, contrast, scale, emphasis, harmony, movement, and proportion. An apparel designer could mend design elements by applying design principles to develop attractive outcomes.

The visual elements of design and principles are the essential framework that an apparel designer uses to visualize product concepts (Omwami, 2020). The textile and clothing designers in the apparel sector design different fragments of apparel products, for example, embroidery designers, weave designers, print designers, and stylists. In this situation, the apparel designer's role is reflected as primarily makers or crafters who shape product features through these essential frameworks.

This description could be sufficient if apparel design is merely considered a process to develop an attractive wearable product. The role of clothing is much deeper than the basic cause of it as a mere protection and second skin to our body. Apparel design, both the product and process of design, play a significant role in societal governance – sometimes intentionally but more often unintentionally. More often unintentionally because traditionally, the role of a designer has been seen as someone who creates and develops aesthetically pleasing products that also serve the function they are developed for (Zahid, 2017). As Lee (2008) comments, "The aesthetic element of design, which is shared with art and craft, is still the core knowledge of the design professions." Apparel designers retain a certain aesthetic vocabulary to reflect on the consumer and environment, with knowledge of textiles construction and visual design (Black et al., 2015).

The functional, emotional, technological, environmental, and cultural connotations attached to apparel bring much more to the components of apparel design (Jane, 2005). Garment creates a sense of belonging and identity as it interfaces between the individual and society. It visually displays the user's choice and elicits emotions (Desmet, 2007). Many cultural, social, socio-economic, and ecological matters are attached to it. For

example, Figure 2.8 illustrates the connotations attached to a dress. In the figure, two dresses with different styles are placed in the centre to develop a comparison of the designer's use of design elements and elicit different expressions and connotations. A dress would represent interrelated and overlapped inferences about functional, aesthetical, environmental and cultural aspects.

- The persona and lifestyle of the wearer. Both dresses in the figure represent two different lifestyles and aesthetics accordingly.
- The wearer would wear the dress according to the situation, and event, thus would influence the environment or contributing to the ambience.
- The product's life cycle, material content, production process, and aftercare involve ecological matters.
- The dress style, textile patterns, colours, and aesthetics may represent regional and cultural identities.



Figure 2.8 Author's accumulation of apparel product connotations

Source: Left; dress design by Alveena Zaheer, Right; dress design by Maha Saqib (Source: Catalogue degree show PIFD 2018)

It means that apparel designing uses elements of apparel design as tools that Lee explains as line, colour, style, fabric, silhouette, and size to design products. During design development, the apparel designer considers the product experiences and connotations attached to the garment and manipulates design ideas accordingly. However, the facets of the product, related to user experiences, the product's lifecycle, and manufacturing, are vital for designing. In the following paras, these facets of products are identified as apparel design components.

Desmet (2007) identified some components of products based on experiences that products bring to their users. He has discussed these components for all everyday use goods and apparel as one of the most personal and intimate products that cannot be excluded (Jane, 2005). He explains that product components based on experience are aesthetic, significance or meaning (personal association or symbolic significance of products) and emotional. He further explains that this means that products bring to the users three experiences aesthetic pleasure, user attachment and association with the product, and emotional experience.

The different types of user experiences are explained in a garment design by Khaula Waseem (2018), shown in Figure 2.9. The designer has exhibited a hand-crafted winter cape, which reflects the imagery of her forefather's land, "Kashmir." She had not lived there, but the garment is meaningful because she can associate the product with herself regarding the material and motives related to her hometown. Besides the experience of attachment', the aesthetics of the dress would be the enjoyment and pleasant feeling she experiences because of the intricate, skillfully executed motives on the dress. The product's identity would be the association of the researcher with the dress, which reminds her of the special occasion and her association with the brand or the motives on the scarf have cultural attributes. The experience of emotion may refer to the feeling she experiences as the sense of belonging or comfort because of the suitable fit and material. A user could experience emotions in response to the product's 'significant identity' or aesthetics. Emotions are outcomes and responses to other product components, such as significant identity, aesthetics, and functionality. Furthermore, emotions are personal, subject to situations, and cannot be predicted when designing (Desmet, 2002; Jane, 2005).



Figure 2.9 The winter scarf designed by Khaula

Source: Catalogue degree shows PIFD 2018

Thus here, the researcher has concluded two components of apparel products from Desmet's descriptions of "product experience" and dress design by Khaula (Desmet & Hekkert, 2007; Khaula Waseem, 2018) that shall be considered during design development 1) Aesthetics and 2) Significant identity. Besides aesthetics and significant identity, aspects such as functionality, usability, fabrication and environmental impact have been mentioned by other researchers and have been discussed in the following paras. (Bushra Jameel, Umber Zahid, 2022; Lamb, 1992; Park et al., 2014).

Apparel products serve particular purposes, such as workwear, activewear, swimwear, etc. If we consider the usability of apparel, they are to provide clothing according to certain usage types, weather or event. The choice of material, styles, colours and texture of the garment is also affected by the usability and functionality of the garments. Desmet (2007) has mentioned this, but his research does not elaborate. Lamb & Kallal (1992) has identified functionality, expression, and aesthetics as components of

apparel products that are processed during the creativity process of new product developments. Norman's (2004) work provides an additional approach to components of product design through his proposal of three levels of design categories visceral, behavioural and reflective. Like Desmet's concept of "experience of aesthetics," Norman's visceral design is about an object's look, feel and sound, the behavioural design focuses on function and usability, and reflective design is about meanings about which product informs the user. Norman's reflective design concepts combine Desmet's category of product components related to "meaning attributes" and "emotional response". Since apparel design is part of creative industries and a consumer product, Norman's and Desmet's ideas can be applied to apparel design. Norman's and Desmet's ideas upsurge another component of apparel products, as the usability and functionality of the product according to its purpose.

Another component of apparel design is derived from its very nature of being a part of creative industries. The creative industries are those domains of practice that turn creative content into commercial outcomes(Lommerse et al., 2011b). Developing creative apparel ideas is inadequate unless the ideas can be commercially launched. M. Starbuck mentions it as a technical aspect (2011). Technical knowledge includes designer experience developing a system to deliver and manufacture whatever is designed. Production techniques and technical limitations sometimes influence other product design components in textiles and apparel design, particularly aesthetics and functional product experiences. For example, the design expression and digital printing technique's delimitations will guide the design process and design elements differently than laser printing. That is why for an apparel designer to design systems for fabrication is as important as identifying and visualising product concepts.

The components that have been discovered in this section are the following;

1. Function: includes usability-related sub-components, for example, suitability according to the weather, the fittings according to body measurements, wearability conferring with the human activity
2. Fabrication: technique, craftsmanship, production, appropriate material selection, techniques and technology. Skilful use of design tools to develop technical and detailed working drawings, patterns, etc.

3. Aesthetics: the elements and principles of design, consumer choices, beauty, and styling. Shaping products with attractive colours, motives, patterns, textures and silhouettes to develop seemly personas.
4. Significance: The meaning of the product deals with uniqueness and value. Adding an element of surprise, association, attachment, identity or expression signifies the product and gives the dress a special character and look.

These components of apparel design are correlated, and during design activity, the focus shifts from one to another. The designers are trained to process creative activity involving diverse design methods according to the type of design domain. Hence each designer can process these fundamentals of design in their personalized way. This phenomenon of personalized design development is generated through their perception of the world and their relationship to creative thinking(Zahid, 2017).

The designer's creative thinking and cognitive skills inform the designers on which design component be focused more. The focus on a particular product component more than others is sometimes directed according to product type. For example, designing bike wear might prioritize functionality, whereas designing a party dress would keep aesthetics or significance on preference during idea development. No matter which product component is manipulated more than others during designing. All of these four components are part and parcel of apparel product design.

Innovation in apparel design would call for new product development employing any or all of these components during design developments. Aesthetic innovation is related to a product's appearance. It deals with the product's attributes such as texture, shape, size, proportion of elements, colour, styling, surface treatments, patterns and cut lines that can be judged visually without needing to interact with or understand the product (Rampino, 2011).

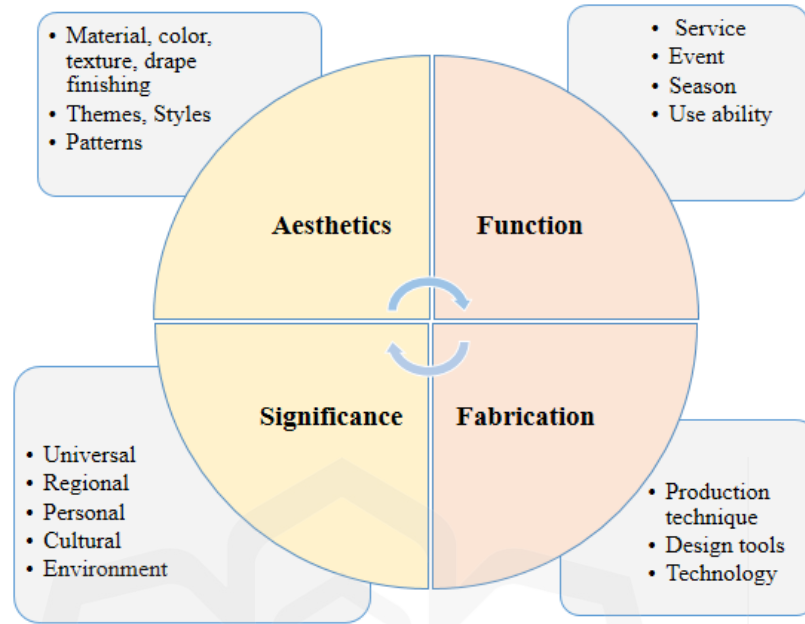


Figure 2.10 Author compilation of apparel design components from literature sources

Innovation in fabrication refers to material, technique and technology experimentation (Frumkin et al., 2011). Rampino has explained innovation of function as the degree to which a product improves or modifies its usage, perhaps adding new functions, as compared to products already on the market.

### 2.3 APPROACHES TO INNOVATION IN DESIGN PROCESSES

The role of research in design is to discover regularities that underline the phenomenon and represent them in a general way by extracting from individual practices (Kannengiesser, 2017). These regularities relate to either products or design processes. The regularities related to products address technical, technological, and functional matters of apparel product improvement. The regularities related to design processes in apparel design involve all the subjects related to the design as an activity. The other relates to the knowledge about design procedures and their outcomes (Cross, 2011). This research aimed at innovation in

design processes, so reviewing some approaches that have already been established to develop a framework for design processes were reviewed.

### **2.3.1 Pahl and Beitz; New product development through systematic design processes**

Pahl & Beitz developed a systematic approach for new product development design processes. They have demonstrated a systematic design process that guides each phase of product design, such as needs analysis to clarify tasks, conceptual design to specify essential design features, embodiment design to develop preliminary layouts, and detail design to assure implementation (Figure 2.11). Their design process framework enables a generic outline to guide designers in proceeding with each phase of product design development. This framework has the following stages.

- **Task and specification:**  
Clarification of the task refers to the identification of the requirements and constraints. In terms of apparel design, the clarification of tasks by the designer about the design brief given by the management or client would be included in this phase. The number of designs and any specific constraints related to fabrication, style, product, or production process is also addressed in this phase.
- **Specification of Concept:**  
Conceptual design refers to identifying a fundamental problem and establishing function structures, searching for solution principles, and combining concept variants by evaluating technical functional and cost criteria. The conceptual design stage combines the optimization of design principles with the optimization of form. Suppose one describes this stage of design specifically for apparel design. This stage includes structuring the design collection, identifying colour qualities, silhouettes, and fabric and pattern themes according to the user personas, function, and season. This stage is executed through quick sketches, a collection of inspirational images, fabric patterns, and texture effects.

- Preliminary layouts:

Embodiment design includes the design stage to optimize product form through the preliminary layouts and designs. Adapting product specifications and evaluating preliminary layouts to refine this stage further is an iterative process and requires the upgradation of layouts unless satisfactory results are achieved. So starting from the concept, the designer develops the layout and forms and develops a technical product or system by technical and economic considerations.

- Definitive layouts and documentation:

Detail design refers to making arrangements, dress form, dimensions, and surface options of all the individual parts of product components finally laid down. It includes dress materials, technical and economic feasibility, all drawings, and other production documents.

The framework of Pahl and Beitz highlights continuous upgradation and improvement of ideas during each phase of development to achieve innovation. This framework was a worthy guide to understanding the design process of any industrial design domain. Hence investigation of Pahl and Beitz's framework for new product development provided a sequential road map to find contextual matters related to an apparel design practice in the industrial environment.

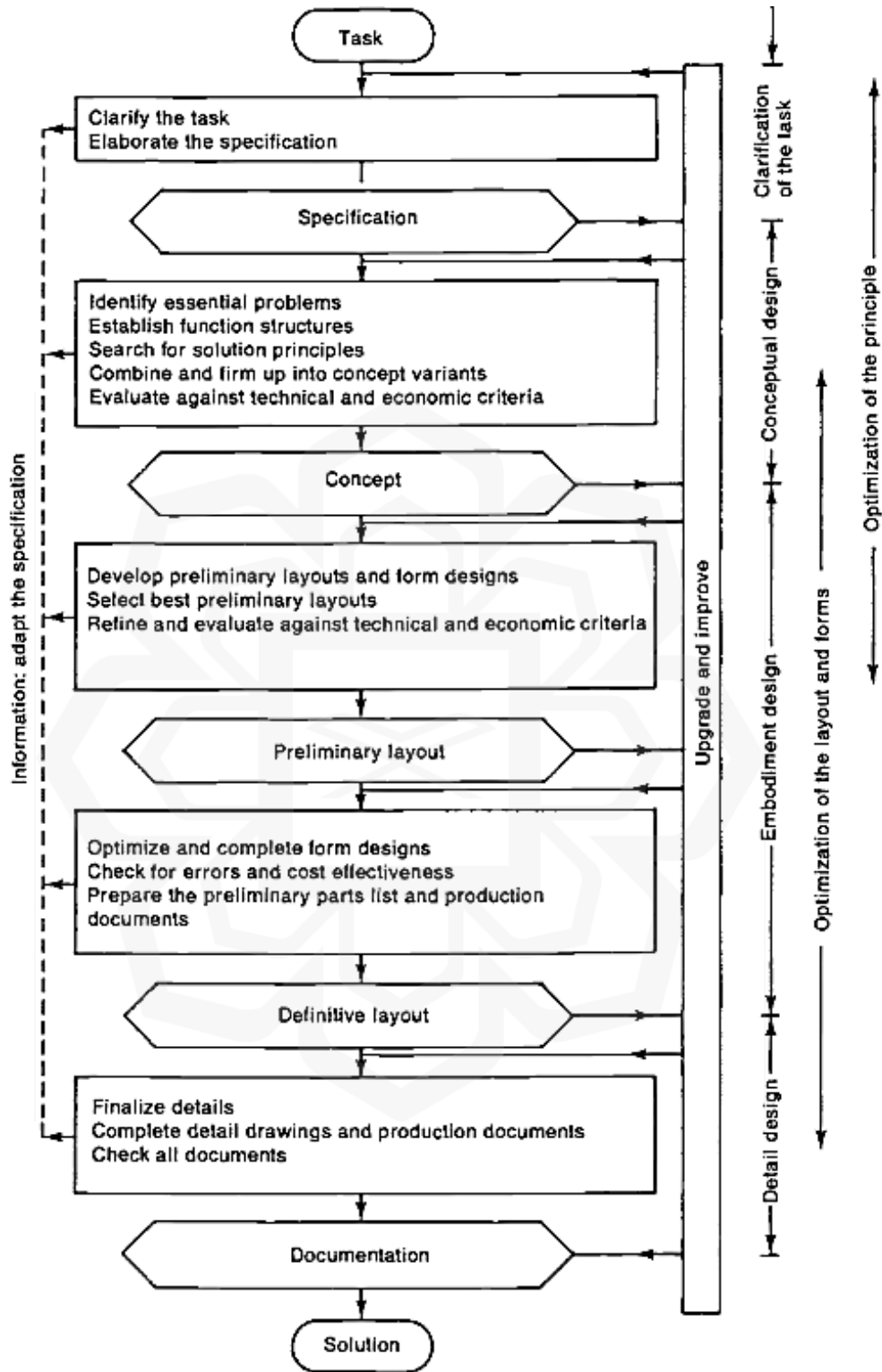


Figure 2.11 Framework for the design process of new product development,

Source: (Pahl et al., 2007)

### 2.3.2 N. Cross's descriptive and prescriptive design processes for new product development

Nigel Cross is a design professor who has presented a strategic approach to product design for designing successful new products. His strategic approach covers industrial design disciplines, so apparel design is a sub-discipline. He recommends design methods that can be opted for developing new products besides drafting a prescriptive design process framework.

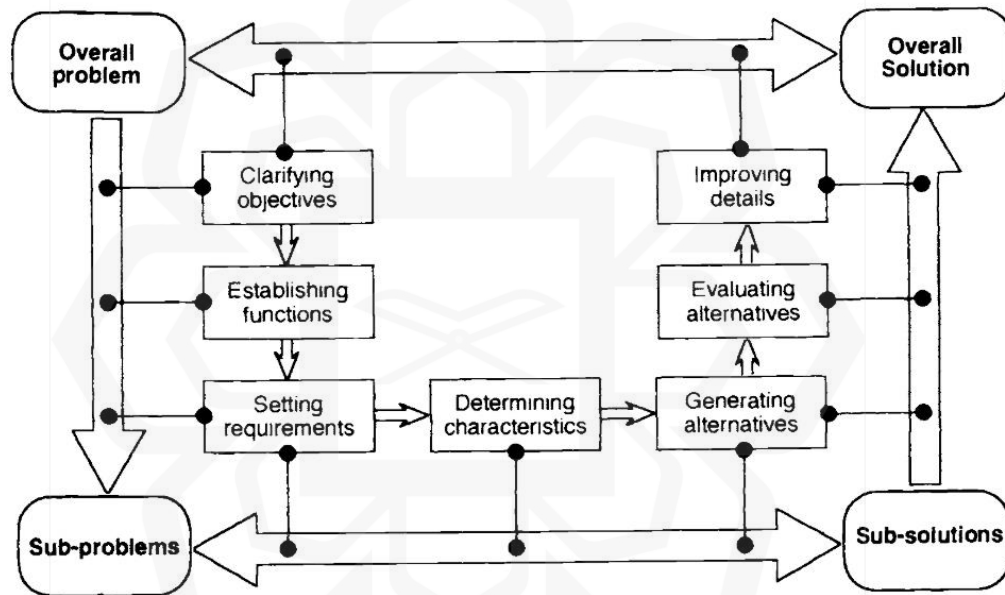


Figure 2.12 Seven-stage Framework for NPD

Source: Adaptation from Cross (2021)

His framework stresses identifying problems and sub-problems of the design task before starting with ideation. He has also recommended some design methods for each stage of the design process for designers to approach design solutions. He mentions seven design development stages, from problem identification to product solution. His first four stages of design development are related to clarifying and determining design requirements. The fifth and sixth stage refers to the exploration of ideas and evaluation of the ideas. The seventh stage refers to the detailed design to rationalize technicalities. His idea of

considering the management of design processes besides developing a strategy for design methods to rationalize design projects for industrial environments is much more relatable to the scope of this study.

In his descriptions of the NPD framework (Cross, 2021), he recommends suitable methods for each section of his design development framework. Another interesting matter regarding his framework is that he keeps the diversity of design briefs in mind by explaining the different types of design briefs and the importance of using appropriate design strategies.

He attempts to prescribe a more appropriate pattern of activities by breaking down a design problem into sub-problems to find sub-solutions. Then, in the later stages of designs, these sub-solutions can be combined by generating alternatives and improving details. The overall solution at the end of the design activity would be integrated. Relating his approach to apparel, the apparel product components can be considered segments for identifying sub-problems and sub-solutions. Nigel's framework explains the design process to achieve NPD in steps as; (1) between the overall problem and subproblems (sequentially) through clarifying objectives, establishing functions, and setting requirements, (2) from sub-problems to sub-solutions through setting requirements, determining characteristics, and generative alternatives, (3) from sub-solutions to overall solution through generating alternatives, evaluating alternatives and improving details, and (4) Between overall solution and overall problem by clarifying objectives and improving details.

### **2.3.3 Niek D du Preez integrated design processes to manage innovation.**

The writings of Nigel express that some frameworks for the design process prescribe more suitable and appropriate ways of doing design. Niek D du Preez develops one such framework for design innovation. He expressed that in achieving innovation, an integrated design process is required based on the idea that the integration, in this case, would engage design management, enterprise design, product design, and implementation design. He places product ideas on one edge of his innovation process and outcomes in the form of

products on the other edge. He establishes his arguments that incorporating new technologies, collaboration to compete for diversity, sharing ideas, and exploiting opportunities demands integration of effort and structure within some flexibility. Refine the concept, and identify opportunities but in which direction? And the influence of people and culture in the framework during phase 1 can be further discovered.

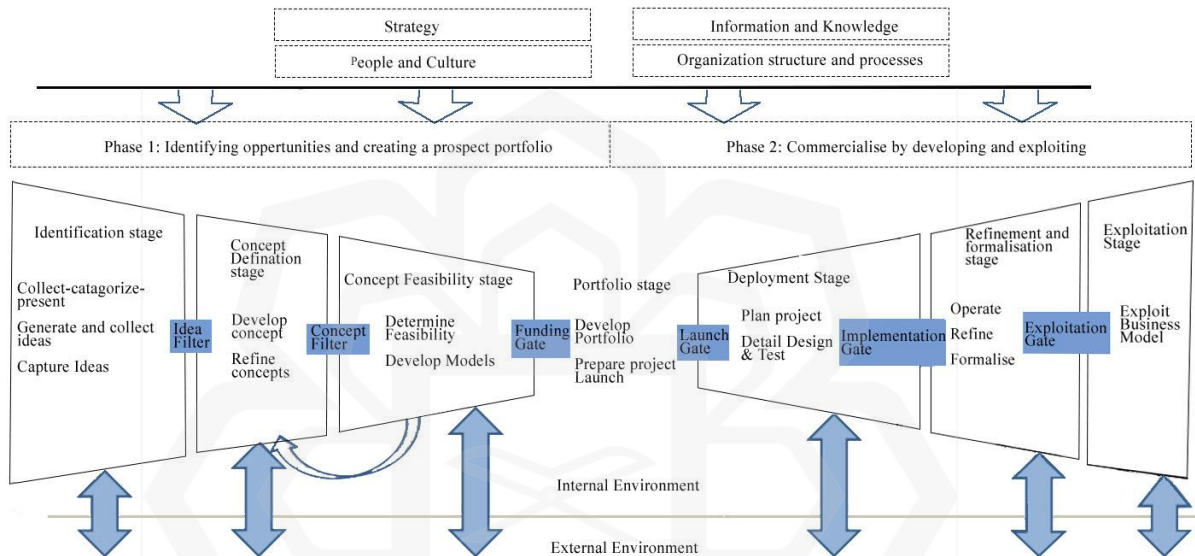


Figure 2.13 An integrated design framework for product innovation  
Source: Adaptation from (Preez, 2008)

### 2.3.4 Jin Gam, PDP to achieve innovation through incorporating future concepts

Design practitioners and researchers have explained concepts and methods that guide the design development process to pursue innovation and new product developments discussed above. Studies have also been conducted to search for product concepts that would result in new products; this refers to the other stream of design studies that focus on research related to product concepts, product prototypes, and innovative product features.

The researchers have identified multiple aspects and paths of innovation and the necessity to opt for any of these paths to achieve innovation. The sustainability-related concepts have been in the limelight for the past decades.

Figure 2.14 illustrates Jin Gan's framework for apparel innovation by introducing sustainability in the apparel product development process. The relevance of Jin Gan's framework with this research study was found in the idea that the design processes and product concepts are closely connected and go side by side. The product features are the outcome of certain processes. Similarly, the design processes are modified depending on design concepts. One such example is the framework developed by Jin, which has rationalized the product development process of design concepts on sustainability.

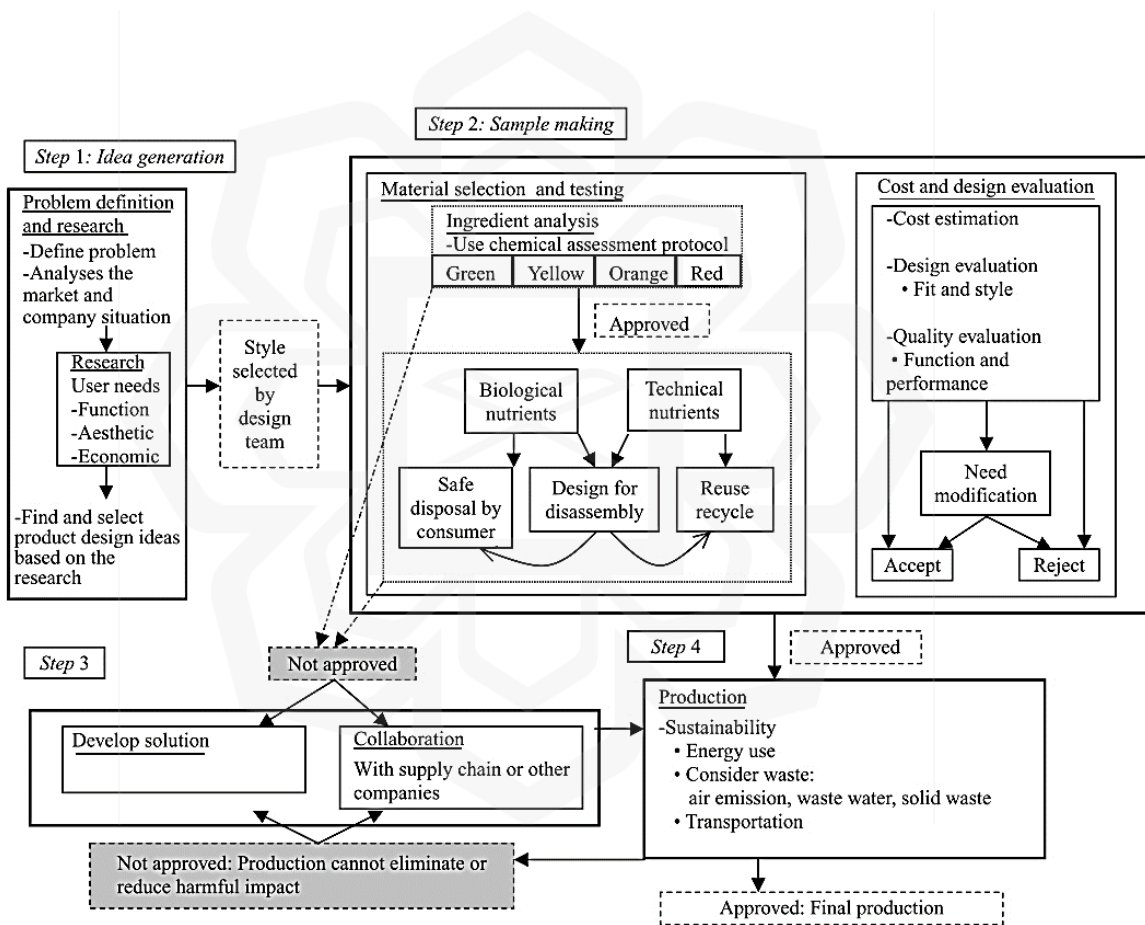


Figure 2.14 Apparel product innovation framework

Source: Adaptation from (Jin Gam et al., 2009)

### **2.3.5 Summary of design process frameworks for new product development**

This study has helped to understand the design process for new apparel product development. Section 2.3 presents the selected framework of new product development and innovation in apparel design from the literature. These frameworks present different approaches and systems developed to prescribe a better pattern of design activities. They all have their gains and contribute to developing a comprehensive understanding of design and innovation strategies. Some framework approach innovation in product design by covering different views for appropriate product features and functions. Some frameworks, such as Pahl, Beitz, and Nigel Cross, focus on developing a generalized stage involved in design development processes. The latter is good for identifying and understanding what happens when the design tasks are processed.

A framework that informs the designer of appropriate steps towards innovation and new product development with a concentration on product components of apparel products is further investigated in this research. In his framework, Nigel Cross suggests using some design methods for each development stage. However, the focus remains on design methods and their relevance to product development stages. Secondly, though the framework is recommended for all industrial designs, apparel, and textile design, such design projects originating in fashion and everyday clothing might require further inquiry. It is so because they do not mostly originate with problem-solving statements, but emotions and experiences dominate such products, as Desmet and L. Jane have mentioned (Desmet, 2002; Jane, 2005). These examples of the framework by various authors also supported the claim that innovation culture has a greater influence on the process than on the product components. It also stimulated inquiry, to what extent the designer's role would influence the innovation process and how will design innovation be achieved as an outcome of the design process?

## **2.4 FACTORS OF APPAREL DESIGN INNOVATION: EMERGING TRENDS AND CONCEPTS**

Guy Kawasaki (2014), summed up components of innovation and change for product design that shall be integrated into a product to develop a specific solution as 1) the Significance and meaning of the product, 2) To jump to the next development, 3) To thinking deep on functionality for better services 4) Technology smart 5) Interface and aesthetics of the product 6) Polarization of user types to achieve better functionality 7) Risk taking for revolutionary ideas 8) Developing niche through the balance between uniqueness and value 9) Customize. Lamb & Kallal (1992) has mentioned fabrication, occasion, visual impact, craftsmanship, and consumer as components of apparel design that are engaged to develop innovative solutions through creative thinking.

Design researchers have been interested in exploring the role of product design in shaping the environment and society. Some of them have developed theoretical underpinnings on change and innovation in product design by suggesting the change in materials, performances, services, and processes (Frumkin et al., 2011; Horne, 2011; C. C. Liu & Chen, 2001; Lucia Rampino, 2016; Padilha & Gomes, 2016; Rindova & Petkova, 2007) whereas others have conducted experiments related to the ideas that can bring change or otherwise that reflect change towards improvement (Dumitrescu et al., 2014; Horne & Rose, 2011; Jansen, 2013; Maats, n.d.; Worbin, 2010). It was also noteworthy that innovation indicators in an apparel firm don't rely on the size and age of the company. Rather, some researchers observed that new SMEs and companies in the market perform better in meeting challenges on new product developments and innovation (Howe, 2018; Wadho, 2018; Frumkin, 2011). It was considered essential to accumulate these arguments on change and innovation identified by scholars, to develop an insight into the design practices that lead to innovative and creative manipulation of apparel product components.

The design research mentioned in the preceding para established that “change” is the key to innovation and improvement. The investigation of multiple perspectives on product design innovation provided theoretical foundations for developing the conceptual framework for advancing apparel design innovation. Notably, the characteristics of

innovation, its nature, sources and factors that shape product design developments have been examined for this research because apparel design is a subsidiary of the creative industry and product design. Since textile product development is also a related field and involves business strategies and industrial setups, the innovation models and approaches in the field have been consulted.

The factors of change and apparel design innovation discovered from literature resources related to product design and creative industries in general and apparel design in particular. The following aspects of apparel design innovation have been discovered during the literature examination and discussed in the proceeding headings of section 2.3.

#### **2.4.1 Insight into user requirements**

Understanding the target market, competition, and brand position is important while designing new products (Frumkin et al., 2011). Product innovation refers to improving service, which involves understanding consumer needs to improve service accordingly. Customers view a new and potentially innovative offering in the context of the available products. The innovation process would involve critical thinking on how value is perceived by customers and their aesthetic choices (Fiore et al., 2015). It refers to new design developments that should preferably focus on product features with an insight into user requirements.

#### **2.4.2 The use of new technology and techniques**

Using new technology forces designers to expand their understanding of the design process and alter their design methods, thus potentially generating new products (Parsons & Campbell, 2004). New technologies improve performance during production processes and offer designers efficient design development tools. For example, the introduction of digital printing and digital design soft wares in apparel design (Parsons & Campbell, 2004).

### **2.4.3 Design methods for enhanced product design**

A new product must offer a simple, clear, and distinctive advantage over what is currently available. One way of achieving this advantage is selectively viewing the design situation in a particular way to explore a distinct standpoint. Design problems and their solutions can look different when explored from different points of view (Cross, 2021). Different points of view enable product innovation by framing the design process with a certain perspective (Lawson, 2006, pp. 292–293).

The role of an apparel designer and how he proceeds in his design development is crucial. Design researchers have observed and proposed variant design methods to transform ideas into suitable product features. Ballie(2014), Elsbach Stigliani(2018) and Peterson (2016) are of the view that if users are engaged during design developments, it helps in carving out better services and efficient product solutions and they have developed strategies and methods for “Co-design” with users in the field of apparel and textile design. Similarly, Zahid (2017), Glazzard (2014), and Worbin (2010) encourage multidisciplinary and interdisciplinary design development methods.

### **2.4.4 Innovation in textile materials**

O’Mahony (2011)has mentioned that textile materials and technologies are key innovations that can solve various social challenges. Advances in materials and processing can drive innovation. Innovation in apparel and textiles products happens by introducing efficient, sustainable or advanced materials that are achieved by introducing new fibre content, applying finishes, and improving available material properties (Frumkin & Weiss, 2011; Horne, 2011). Innovation in textile materials works both ways; the new materials expand possibilities to enhance product performance and aesthetics, and new product patterns can be explored with newly introduced materials(Colombi, 2016).

#### **2.4.5 Adapting new tastes and preferences**

It is important for design research to include how designing is conducted and how it might be conducted in the future. This activity is important because new advancements in materials, technology, production processes, sociocultural change, and other aspects keep evolving, resulting in changes in aesthetics and product functions (Lommerse et al., 2011b; O'Mahony, 2011; Smith et al., 2017). Apparel designing is an evolutionary process, and integrating new technologies, aesthetics, and materials in the design process is crucial. Adapting new tastes and preferences in the designing would mean that designers develop and form products with the techniques (Dumitrescu et al., 2014; Feng et al., 2015; Ng & Zhou, 2013), tools (Parsons & Campbell, 2004; Romeo & Lee, 2013) and aesthetics (Seifert & Chattaraman, 2017) that are most effective for future environments.

#### **2.4.6 Exploration of Patterns, colours, and expressional properties**

Trends in textile innovation: wearable electronics, biomedical, biomimetic, and nano-textiles. Smart textile technologies are also changing how the product is designed. Textile and apparel design is no longer concentrating on colour and patterns. So these new trends would also demand a change in the perception of a designer's role. Trends in textile innovation: wearable electronics, biomedical, biomimetic, and Nano-textiles. A final example of technical innovation is Visa, a fabric finish that resists stains and is used on various products, including clothing and tablecloths.

#### **2.4.7 Adding significance and meaningfulness**

Environmental concerns, sustainability vision of countries around the globe, health concerns, pandemics, lifestyle changes and technological advancements, cultural differences and globalization are the factors that affect design processes. Multiple

directions can feed the cause and identity of a product. Adding significance and meaningfulness to an apparel product requires the understanding and ability to design a product that carries an identity and cause of being there, for example, “universal design”, “Traditional outfit,” “sustainable design”, etc. Designers and artists are powerful change agents. A designer’s ability to transform objects, bodies, behaviours and events has been mainly used for exclusive commercial and marketing goals in the last decades. Still, they could also be the authors of scenarios that benefit sustainable practice that has been neglected (Simonetta Carbonaro, Christian Votava 1/11, 2009). A new notion of designing requires redesigning apparel products with a strong significance and meaningfulness attached to the product. The meaningfulness also leads to forming strong brand identities that are useful to enhance apparel businesses, particularly related to traditional textiles (Mohd Tajuddin et al., 2017).

#### **2.4.8 Integration of environmental concerns in design**

The environmental concerns in apparel design find two main subjects; 1) Environmental concerns as the hazardous effects of textile chemicals and landfill 2) the socio-economic concerns related to crafts and traditional textile products that include apparel. The innovation in sustainability-oriented apparel products has also followed these two streams. The first has become a major concern for the clothing industry involved in mass production.

Multiple industrial projects have addressed Process innovation, such as a design process that generates innovative concepts, energy-efficient production processes, smart materials, organic stuffs, product cycle and recycling. The product innovation related to design development and product idea generation has focused more on the second type of sustainable concerns by engaging in traditional textiles, organic materials, designing for handcrafted products and supporting SMEs(Engel-Enright, 2016).

This area of apparel design is in focus for many environmental and welfare associations, such as fair trade, Poly and Me, and USAID programs. In Pakistan, some NGOs are also working to upgrade traditional apparel. Cultural textile artisans have limited

resources and knowledge about product preferences and lifestyles of potential customers in the global marketplace.

Research-based guidance in product design decision-making with cultural artisans may develop strategies to innovate the supply chain to enter new markets (Littrell & Miller, 2001). Klewitz and Hansen (2014) described Sustainability-Oriented Innovation (SOI) as a process toward sustainability with relatively incremental improvements in process, product, and organizational innovations by creating more sustainable product design and development processes. SOI may be successful in niche or mass markets both (Dean, 2016)

#### **2.4.9 Evolution in product form, material, and mode of use**

The inventions in textile materials and the incorporation of smart materials into clothing have initiated challenges for designers to explore new expressions of textile patterns, colours, and clothing styles; this is so because IT revolutions and smart materials have influenced the apparel sector as well; designers have been finding ways to develop creative use of smart materials and technology to develop new product ideas such as the use of chromatic dyes to develop dynamic patterns, biodegradable clothing to meet the challenges of massive landfill of fast fashioned cloths, etc. (Dumitrescu et al., 2014; Jansen, 2013). Some of the product concepts have already been launched in the market.

#### **2.4.10 An integrated design process**

The innovation demands an integrated design process that comprehends and applies research and observation of trends, realizes competition with competitive brands, foresees the future, senses customer demand, and is intuitive about business success. Successful innovation requires an integrated design process, beginning with integration in the design of the enterprise, the design of the product, along with the design and implementation of new technologies (Jane, 2005; Meurer, 2002; Satomi & Perner-Wilson, 2011). An

integrated design process considers ideas and products created at any level of the organization. It should include those members of the firm with the most direct contact with the customers, that is, the sales, marketing and customer service staff (Frumkin et al., 2011). The integrated design process is one way of approaching and exploring design methods and processes to achieve innovation, likewise discussed in “Design methods for enhanced product design”. Similarly, it appears to be like a strategy to adapt new tastes and preferences discussed in section 2.4.5

#### **2.4.11 Networking with internal and external environments**

New product development is initiated by identifying the new product's requirements. Whether the new product is an improved edition of the previously produced product or a new style of a product range, the product development process is initiated by identifying requirements (Wadho, 2018). In apparel firms, particularly industrial environments, most requirements are identified by the management or client (J. S. Lee & Jirousek, 2015).

The accumulation of knowledge from various inputs, such as marketing, R&D and manufacturing, assists designers in developing design solutions to fulfil these requirements (Li et al., 2011; Trott, 2008). This knowledge is built gradually over time as the project progresses from the initial idea (technical breakthrough or market opportunity) through development. It is this process that forms the basis of the network models. External linkages can facilitate additional knowledge flows into the organization, enhancing product development.

These models suggest that NPD should be viewed as a knowledge-accumulation process requiring various sources' inputs. Figure 2.15 highlights the accumulation of knowledge within internal and external environments. Internal environment refers to the design department and then the design firm's other relevant departments, such as management, marketing and production (Segonds et al., 2014; Trott, 2008). External environments cater to research centres, education institutes and other groups which influence product development, such as garment associations, international design firms,

forecast companies etc. (Lommerse et al., 2011).

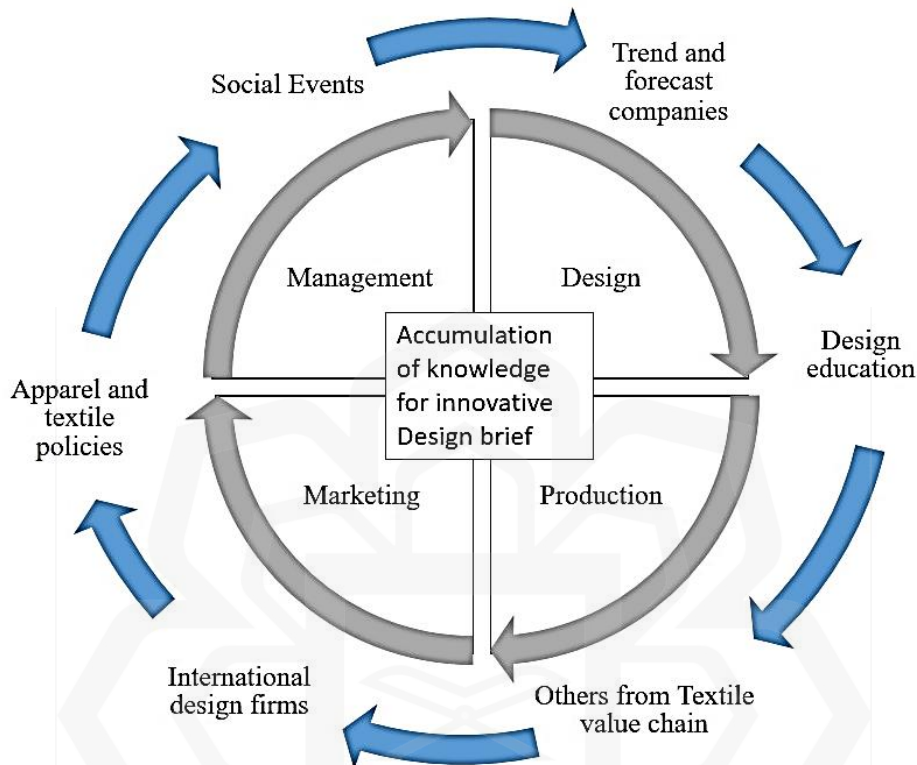


Figure 2.15 Networking of environments for apparel design innovation

Source: Adaptation from Paul Trott's innovation model (Trott, 2008)

## 2.5 CHALLENGES IN THE DESIGNING OF NEW APPAREL PRODUCTS

The above factors identified by the scholars for design innovation apply to multiple stages of apparel product development. These factors are useful in persuading ways of manipulating product components to develop improved and new products. The aspects identified by the scholars relate and do overlap; for example, integrated design processes would call for adapting new materials, aesthetics, technologies, and preferences during the design development process. Similarly, exploring new patterns, colours, and expressional properties (2.4.6) is subject to adapting new tastes and preferences (2.4.5). The networking of internal and external environments to enhance product innovation (2.4.11) is somewhat

similar to the integrated design process (2.4.10) because both concepts stress the idea of engaging other departments, disciplines, teams, and individuals in the design process to trigger change.

The following design innovation and change factors have been concluded;

1. Improved insights into user requirements
2. Exploration of new techniques and technologies during the design process
3. Redoing design methods for enhanced product design
4. Exploration of new materials
5. Adapting new tastes and preferences in the design process.
6. Significance and meaningfulness
7. Integration of environmental concerns in design
8. Evolution in product form and mode of use
9. Networking with internal and external environments

Section 2.2.2 identified four main components of apparel design. A relationship between apparel design components and design innovation approaches (identified in this section) was developed, as shown in Table 2.1. This relationship guided the knowledge domains, issues and aspects related to components of apparel product design for the development of a design innovation framework.

Section 2.2.1 illustrated three core stages of apparel design processes: identification, ideation and fabrication. The apparel design innovation factors were classified to determine their relevance with each phase of the apparel design process. The mapping (Table 2.2) observed the applicability and relevance of each change intervention with the three phases of the apparel design process. It was beneficial to map key factors that would later sway the framework for apparel design innovation.

Table 2.1 The relevance of design innovation aspects and components of apparel design

<b>A.D innovation factors</b>	<b>Relevance with design components</b>	<b>Authors</b>
Improved insights into user requirements	Function, Identity, Aesthetics	Johnson (2016), Fiore(2015), Piller & Rwth(2011)
Exploration of new techniques/technologies during the design process	Fabrication	Delia Dumitrescu, Shrimatti Indi, Agneta N. Andersson 2018, Barbara Jansen(2017), Zane Berzina, Kearney A T, Lucia Rampino(2011), Robert Skidmore, Linda Worbin(2006)
	Aesthetics	
	Significance	
Optimization of design methods for enhanced product design	All four components	Nigel Cross (Cross, 2021), Ryan (2014), C. C. Liu & Chen (2001)
Exploration of new materials	Function, Fabrication, Aesthetics	Delia Dumitrescu, Agneta N. Andersson(2018), Barbara Jansen(2017), Zane Berzina (2011), Linda Worbin (2006)
Adapting new tastes and preferences	All four components	Shrimatti Indi, Agneta N. Andersson (2018), Barbara Jansen(2017), Colombi (2016) Kearney A T , Zane Berzina, Stephen Fox (2011), Zane Berzina(2011), L. Horne (2008)
Significance, meaningfulness, and identity of apparel products	All four	Mohd Tajuddin (Mohd Tajuddin et al., 2017), Delia Dumitrescu, Shrimatti Indi (2018), Barbara Jansen (2017), Marjan Kooroshnia(2016), Park (Park et al., 2014) Linda Worbin (2006)
Integration of environmental Concerns in design	All four components	Christian Bason (2019),Barbara Jansen(2017), Marjan Kooroshnia(2016), Christiaan Maats (2014),Kearney, A T (2011), Linda Worbin(2006)
Evolution in product form and mode of use	All four components	Delia Dumitrescu, Shrimatti Indi, Agneta Andersson (2018), Barbara Jansen(2017), Clemens K (2016), Zane Berzina, Lucia Rampino (2011)
Networking with internal and external environments	Eternal factor	Agneta N. Andersson (2018), Glazzard(2014), Stephane Vincent (2012), Li, Deng, & Sorensen (2011), Trott (2008), Johannes Paul (2003)

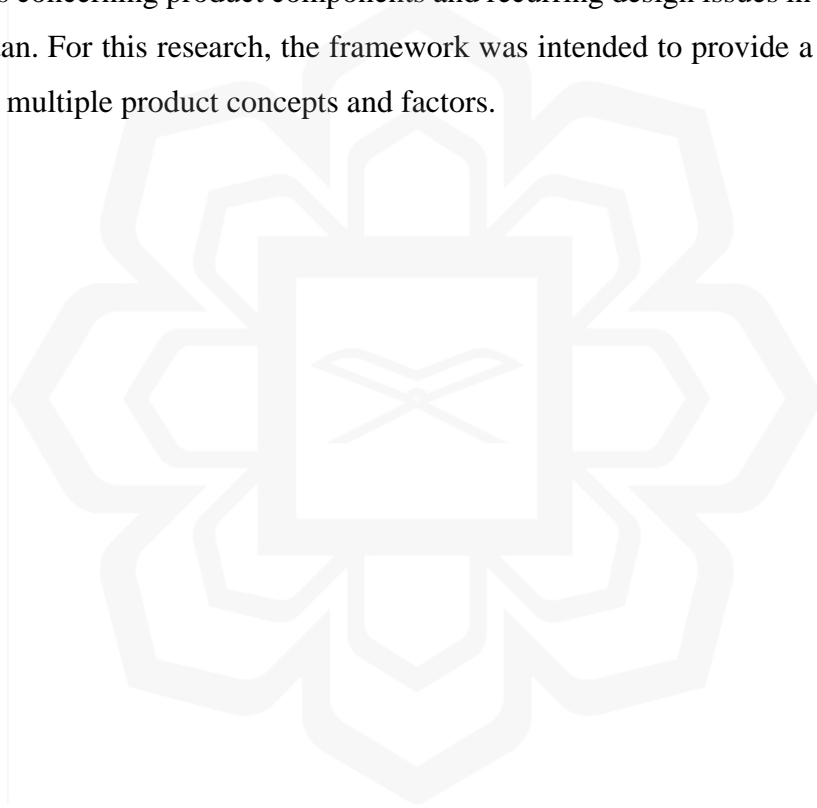
Table 2.2 Author's accumulation of change interventions in the apparel design process

Apparel Design Process	Change for design innovation
Identification	<ul style="list-style-type: none"> <li>Improved insights of user requirements and mode of use</li> <li>Adapting new tastes and preferences</li> <li>Significance and meaningfulness</li> </ul>
Ideation	<ul style="list-style-type: none"> <li>Revisiting design methods for enhanced product design</li> <li>Exploration of new materials</li> <li>Exploration of patterns, colors and other expressional properties</li> <li>Integration of environmental concerns in design</li> <li>Analytical thinking and creative thinking</li> <li>Networking with internal and external environments</li> </ul>
Fabrication	<ul style="list-style-type: none"> <li>Exploration of new techniques and technologies</li> <li>Exploration of new materials</li> <li>Networking with internal and external environments</li> <li>Integration of environmental concerns in design</li> </ul>

## 2.6 CHAPTER SUMMARY

This chapter laid the foundation for comprehension of apparel design activity and mapped the core components of apparel products. The three stages of the apparel design process were plotted as identification, ideation and fabrication (Figure 2.5). The review of previous studies on design activities and methods established arguments on dealing with product components during each stage of the design process. The terminology and key concepts of apparel design innovation and related functions were also conferred that highlighted factors of apparel design innovation. The relevance of apparel design innovation factors was

mapped on three stages of the design process. A review of developed frameworks and models of product design innovation was essentially helpful in building theoretical underpinning on apparel design innovation. The investigation of design process frameworks exposed footpaths to innovative design processes and methods. Previous studies that drafted strategies to achieve innovation in product design and industrial design were also discussed in the chapter. These studies recommended design innovation by introducing product components or design process reforms. The investigation stirred the research towards developing a framework for apparel design that comprehends design processes concerning product components and recurring design issues in the apparel sector of Pakistan. For this research, the framework was intended to provide a holistic approach covering multiple product concepts and factors.



## **CHAPTER THREE**

### **APPAREL DESIGN INDUSTRY IN PAKISTAN**

#### **3.1 INTRODUCTION**

This chapter illustrates the underpinnings of apparel design innovation and develops a comprehensive understanding of Pakistan's textile and clothing industry. The chapter presents the study on innovation factors of apparel products in the Pakistan textile industry that influence design practices. An overview was established to comprehend future challenges, mechanisms, and functioning business models of the textile industry value chain with a focus on the innovation capability of designers and design houses in developing apparel products to improve the apparel industry of Pakistan. The comprehension of Pakistan's textile industry design practices and challenges related to new product development led to the identification of the research gap presented in the later section of the chapter. Lastly, the summaries of studies related to apparel design innovation and Punjab, Pakistan's T&C sector, are also presented here, eventually conceding the theoretical foundations for primary research proceedings.

#### **3.2 AN OVERVIEW OF TEXTILE AND CLOTHING APPLICATIONS**

Textile is the second largest industry that is consumed worldwide. It is a vast field that includes a variety of products. If we consider the definition of textiles, anything made of fibre and yarn is included in the textile (Fiore et al., 2015). Hence three major domains of textiles are technical textiles, apparel, and interior textiles. Technical textiles include all those applications where textiles are used because of their fibrous, flexible, and absorbent, or any other physical and physiological properties that make them suitable for applications such as filters, bandages, etc. Apparel and interior textiles are textile applications that

involve aesthetics besides functionality because they hold a decorative purpose and functionality. These two domains are the ones that are considered part of creative industries, and conventionally, textile and apparel designers are engaged in the development of products for interiors and clothing.

The textile and clothing sector includes products from manufacturing fabrics for garments to finishing and stitching for different garments styles. The garments are categorized and classified according to the styling, purpose of use and production technique. Ready-to-wear garments (including Activewear) and processed lengths of fabrics for tailoring are the products that are categorized as fashion products together with shoes and other accessories. Traditional textiles represent the arts and crafts of the country besides products such as ceramics, furniture and else. According to United Nations Conference on Trade and Development report on country profiles, apparel products have the most design share in Pakistan's creative industries compared to other products (Outlook, 2018).

### **3.3 AN OVERVIEW OF PAKISTAN'S TEXTILE FIRMS AND PRODUCT TYPES**

Textile includes any manufacture from fibres, filaments or yarns characterized by flexibility, fineness, and apparel refers to the products made of textile materials against the body. The basic meaning of Textile is woven or knitted fabric made from yarn, but apart from fibre, yarn and fabric or any other product made from these combinations are also now defined as Textiles (Tabassum, 2020; Sayed, 2013). The textile industry is diverse in applications and processes and fragmented into multiple divisions of a complete product production cycle. The prospects of design involvement do not include raw material and spinning now in the T&C sector of Pakistan, eminently by observing the organizational structure of spinning industries and the fact that this area of study is generally classified, comprehended, and taught under textile engineering (Brookshire, 2013).

Pakistan is the 8th largest exporter of textile commodities in Asia. It is the 4th largest producer of cotton with the third largest spinning capacity in Asia after China and India and contributes 5% to the global spinning capacity. Cotton is the largest segment of textile production in Pakistan, and most of the cotton business is based on fibre and cotton spinning (APTMA, 2022; ILO, 2014; P. B. of I. and Trade, 2018).

Figure 3.1 illustrates the value distribution of products within the T&C industry in the export sector, which the author accumulates from the reports published by the All Pakistan Textile Association for 2018-2019 (Appendix A). The graph represents that garments, hosiery, and bed linen are the most exported products. Then cotton cloth, cotton yarn, and raw cotton material are exported. Notably, hosiery products and bed linen are mostly made of cotton and cotton blends, so one can understand that the clothing sector is also inclined towards cotton.

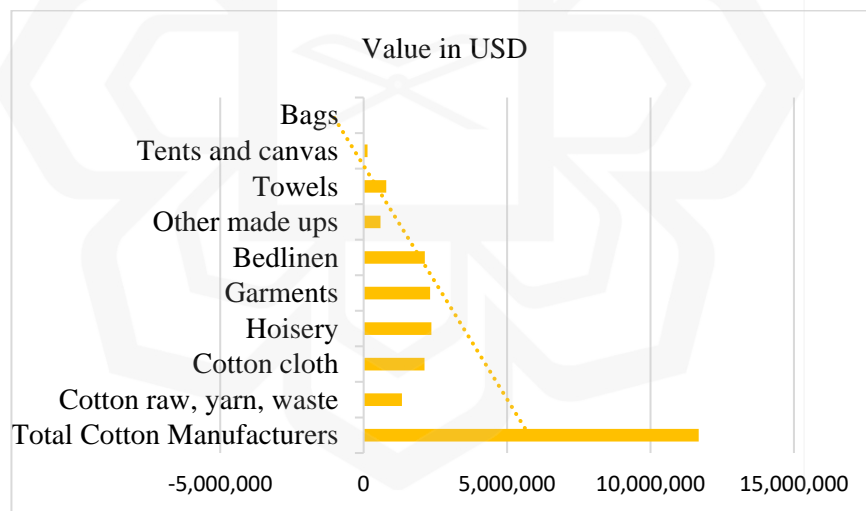


Figure 3.1 Accumulated data from the Annual APTMA report on Textile export Products of Pakistan 2018-2019

Figure 3.2 compares the product types and their share in exports excluding spinning. If the cotton spinning and raw fabric are separated to illustrate the share of textile finished products, the finished textile product share is 41%. The total apparel share, including

garments and hosiery, is the most among finished textile products. The annual report UN (Outlook, 2018) reassured share of apparel and apparel products have the most share among textile finished products. Hamid, Nabi and Zafar (2014) stated that the apparel sector of Pakistan is 48% of total textile exports and 30% of value-added products.

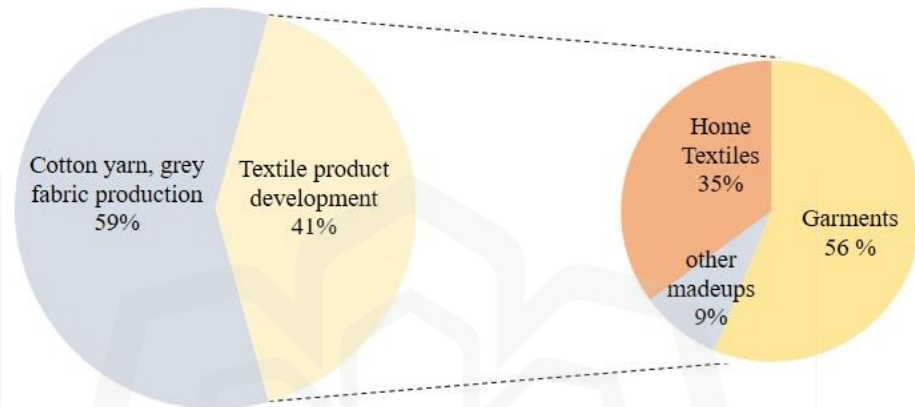


Figure 3.2 Author's accumulation of the share of apparel products

Source:(APTMA, 2022)

### 3.4 APPAREL SECTOR IN PUNJAB PAKISTAN

The apparel industry of Pakistan is majorly situated in Punjab (South region) and Sindh (North region). All Pakistan Textile Association (APTMA), Garment manufacturing association of Pakistan (PRGMEA), and Pakistan Fashion design council (PFDC) are the three main bodies; APTMA encompasses all types of textiles from the textile value chain, PRGMEA focuses on all types of garment industries whereas PFDC is specifically formulated for fashion apparel brands and labels. These organizations have provided the basic data frame for the research because the apparel companies are registered with these associations. Table 3.1 demonstrates the city-wise distribution of apparel setups in Pakistan. The number clearly explains that four cities of Punjab and only one city in Sindh (Karachi) can be considered apparel industry cities.

Table 3.1 Author's compilation of city-wise distribution of the apparel sector in Pakistan

Source: Registered Apparel Firms at PRGMEA (2020)

Punjab (North Zone)	Apparel Firms	Sindh (South Zone)	Apparel Firms
Lahore	83	Karachi	120
Sialkot	77	Hyderabad	2
Faisalabad	12	Balochistan	1
Multan	6	-	-
Total	178	Total	123

The research focused on major textile hubs of Punjab because, according to Punjab Board and Investment and Trade report (2020-2021), 68% of the firms with the capacity to develop finished products are placed in Punjab. The product range and city-wise distribution of product manufacturing are interestingly distributed within Punjab (See 4.7.1). Within Punjab majority of the setups are established in the suburbs of Lahore with a city office, Faisalabad and Sialkot. So Lahore, Faisalabad, Sialkot, and Multan are the main hubs of textile firms, and in Sindh, Karachi has almost all of the apparel setups (P. Board of Investment and Trade, 2018). Other than industrial setups, some brands are not linked with any specific industry. These brands either outsource production completely or partially from manufacturing industries. Apparel set-ups who wish to launch their retail brands sometimes collaborate with designer labels. It is noteworthy that these collaborations are for domestic retail businesses only.

Punjab's traditional textiles and cottage industry have head offices in Lahore and Multan, where their production is in various towns within the province. The prime hubs for traditional textiles in Punjab are Kasur, Multan, Bahawalpur and Gujarat. Some large-scale apparel setups that focus on such techniques and textile types have built their workshops besides their design houses in Lahore.

### **3.5 A BRIEF HISTORY OF APPAREL DESIGN IN PAKISTAN**

India's textile and apparel industry (Pakistan was included as of pre-partition) in pre-industrialization times was highly developed regarding product variety, significant regional design identities, and complex production techniques (Styles, 2022; Karl, 2016). Many finely handmade produced textiles were exported to Europe and other parts of the world. The textile patterns included a wide range, including floral, geometric and figurative patterns (Ghosh & Ghosh, 1995; Machado et al., 2018). The textile arts and crafts of the South Asian region included fine weaves and prints in natural materials such as cotton, silk, wool and jute. When industrialization was introduced in the region, textile materials were at the contested heart of industrial change. Since then, Textiles have stretched between art, craft, and industry (Gupta, 2022; Wilson, 2001).

In Pakistan, until the 1950s, some cotton spinning and cotton fabric production industries were functional, but until the 1990's the focus remained on manufacturing for the international market and processed running lengths of fabrics for the domestic retail market. However, in the late 1960s, the demand for readymade garments gradually increased. Correspondent (1967). The apparel styling was either tailor-made or imported readymade garments launched until then. In the late 1980s and 1990s, the apparel sector gradually explored new fashion styles in the domestic market of running fabric lengths, introduced design trends in readymade garments, expanded readymade garment retail businesses, and continued with the manufacturing for the export sector (History, 2023; Zahid & Kamarudin, 2019). The first decade of the 21<sup>st</sup> century witnessed the involvement of the textile industry in apparel designing opening of many design houses that operated independently or in collaboration with manufacturers. From the year 2000 and onwards, many new clothing labels were also launched by design entrepreneurs in the domestic market, whereas some of the manufacturing firms either collaborated with these design labels or established their in-house design teams. It was the time when fashion and apparel design education programs were introduced in colleges and universities (Rehman, 2007; Zahid & Kamarudin, 2019).

The textile and apparel mass production industry was established in the late 20th century, but handicrafts have also survived parallel to them (Shafi M. Y., 2021; Yang, 2018; Ghosh, 1995). In Pakistan, traditional textiles in various weaving, printing and embroidery techniques are still produced and mostly patronized by multiple craft-based organizations. Traditionally feminized associations clung to textiles across applied art, everyday fashion design, and industry (Zahid, 2019). The clothing cottage industry is spread in various villages of Pakistan, and mostly female skilled workers are involved in the production. Some well-established apparel brands produce products in liaison with skilled workers. A few craft boutiques are also run by the craft associations. Most such setups focus on the domestic market. Other than the products designed and produced with craft elements, traditional textile patterns are a great source of inspiration for designers. They develop designs and fabrics inspired by indigenous crafts, which are later produced on machines. The simulations of traditional textiles are a commonly used inspiration for contemporary designers.

Many well-known fashion and lifestyle brands develop their design collections by incorporating skills and aesthetics of traditional textile crafts (Organization, Ahan, 2019). Every year traditional textiles are taken as inspiration in collections of women's apparel launched by various well-known textile and fashion brands. "When it comes to quality, name, values, worth, origination, and followers, there lies a cosmic list of brands in focus that is well known for their efforts. These brands have pursued the traditional and cultural norms of Punjab, Sindh, Balochistan, Pashtun, and Kashmir regarding clothing. By this, they have attained and earned their worth in the socioeconomics of the country" (Glow, 2018). Generation Pakistani clothing company co-founded by Nosheen Khan in 1983, which constantly takes inspiration from textile handicrafts, found an ingenious way to demonstrate the richness of culture in 2016. Figure 3.3 shows their textile map of Pakistan, which used native embroidery techniques to mark different regions, and became a viral sensation, with more than 20,000 shares on Twitter (Stewart, 2017).

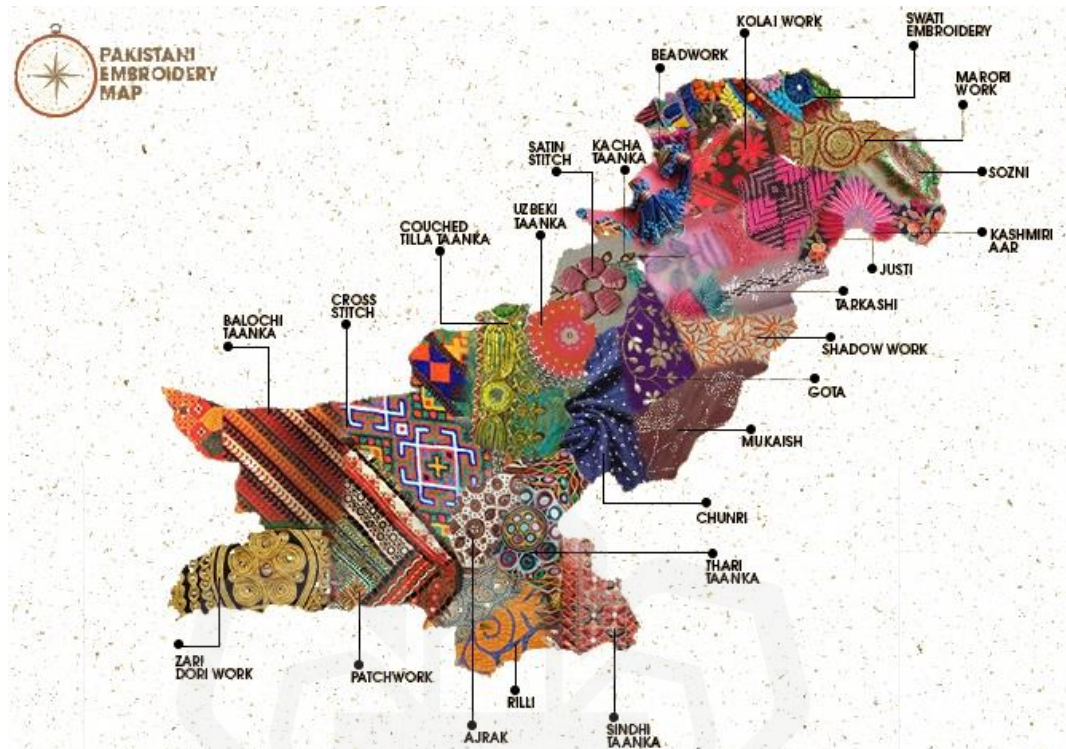


Figure 3.3 The traditional textile map of Pakistan  
 Source: Adaptation from (Jessica Stewart, 2017)

Consequently, Pakistan's technologically integrated T&C industry found its routes in the early years of its emergence. Initially, cotton fabric and yarn production overruled the industry, which is still the dominant industry sector. The production of finished products with printed and processed fabrics grew with time, and in the late 1990s till the first decade of the 21<sup>st</sup> century, the retail apparel sector witnessed a boom in the industry with many stitching and finishing units and the emergence of domestic apparel and fashion brands (Zahid & Kamarudin, 2019). The growth in the finishing and printing industry became a good reason for the growth of apparel design, and during this time, design departments were established within industrial setups. Since the designer's role has remained as an applied artist and decorator, designers have been hired by the industries producing relevant, particularly printed and embroidered women's apparel. The design departments proceeded in two directions; the products developed for international buyers were designed by foreign designers (employed by the concerned industry), and local designers were hired for the domestic market. The understanding of design and the requirement to hire designers

gradually established until it was well acknowledged after the launch of a few retail brands by some of the well-established industries in the late 1980s who also acknowledged “design” and “designer” in their marketing campaigns(*History*, 2023; Rehman, 2007; Saif, 1995).

### **3.6 IMPORTANCE OF DESIGN INNOVATION IN THE TEXTILE VALUE CHAIN**

The value chain in the T&C sector refers to the textile product development complete process from fibre to finished product in stores. In between, some multiple processes and steps are sometimes done by one single company and seldom by different companies. The textile industries either have independent setups for different applications that hire design teams accordingly, or some companies prefer to run separate independent units for various applications. In contrast, small companies prefer to focus in one direction. Different business modules are opted for by various industries as per their business philosophy and resources(Brookshire, 2013). Each step involved in textile product development is one loop in the textile value chain.

The design process of any apparel and textile product is conventionally involved after the yarn is processed (Omwami, 2020; Brannon, 2011; Lamb & Kallal, 1992; Segonds et al., 2014). Product design innovation refers to the steps within the value chain that involve product design with its mandatory components, such as a concept, design, sampling, and prototyping. Figure 3.4 identified the engagement of design-related activities within the textile value chain. Notably, apparel design and garment products sit in the value chain's later stage. Therefore, innovation in this domain will likely benefit more by influencing improved production circularity. This argument is supported by(Wadho, 2016) by claiming that, since apparel is generally at a higher stage in the textiles value chain, apparel manufacturing firms are also perceived as being more innovative.

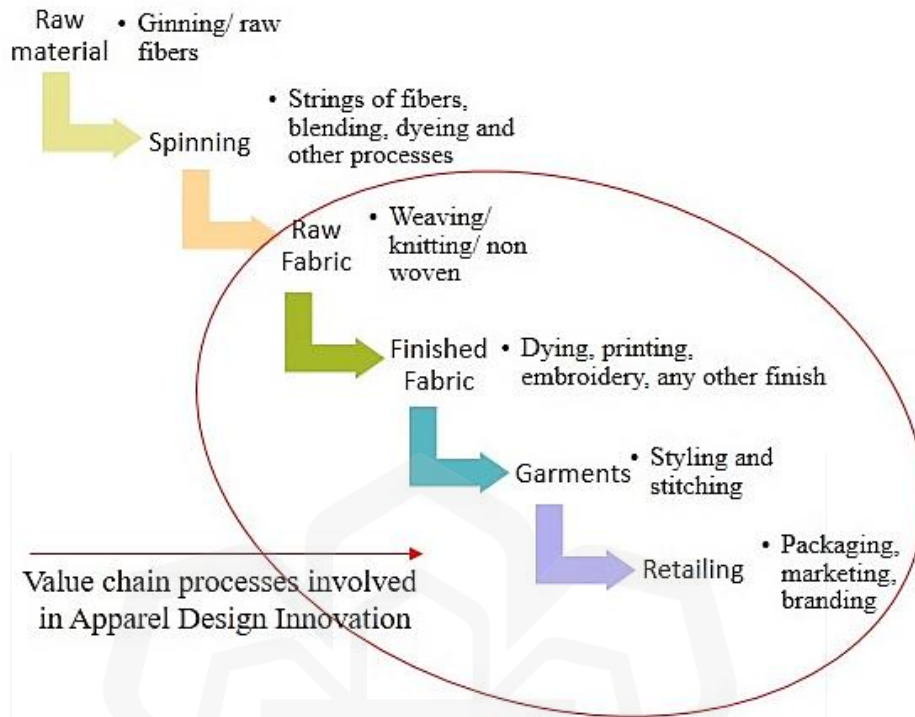


Figure 3.4 Author’s identification of design-related fields in the textile value chain

Pakistan’s textile and clothing industry is involved in a complete value chain. Most of the industry relies on cotton manufacturing, and many are spinning mills. About 60% of the industry is involved in raw material processing. Raw material processing falls in the downstream markets in the value chain. The other 40% of the industry is involved in home textile and apparel products. So, in the value chain of Pakistan’s T&C industry, only 23% produce finished apparel products (for further reading 2.1.2). The industries producing finished products are manufacturing for both export and domestic markets. Some large-scale industries that have maintained turnover in exports own sister companies for retail in the domestic market. The export sector relies on the production of products that are mostly designed and labelled by foreign clients, so the export sector mainly entails manufacturing for European and American design houses and brands (APTMA, 2019; James Howe, Tineka Michelle Smith, 2018; Wadho, 2018). On the other hand, the domestic market is occupied with retail businesses, design labels, and sufficiently producing textile and clothing products. A few clothing setups have also opened online and flagship stores abroad, mostly in Middle East countries (Zahid, 2019).

The value chain in the export sector is focused on the downstream market, and upstream markets still have a lot of margins for improvement. It is noteworthy that upstream products have more share in the global economic scenario than downstream entities, which is why many of the regional competitors of Pakistan (China, India, and Bangladesh) focus on product design and value addition (Abdul Karim, 2023; Wijewardhana, 2021; Klaus Schwab, 2018). James Howe (2018, p. 8) developed the smiling curve to enhance upstream product development through product innovation and has recommended five routes to value addition, including learning through participation in the value chain, adapting to new tastes and preferences, branding, R&D, and design developments. He further insists that complex technology production often begins with research and development (R&D) and product design. Relating the T&C industry of Pakistan with this vision, product design, concept, R&D, and envisioning the apparel sector with the future challenges of new markets and preferences is vital. Figure 3.5 illustrates the domain in product development that can lead to upstream product elements through reforms in apparel design practice.

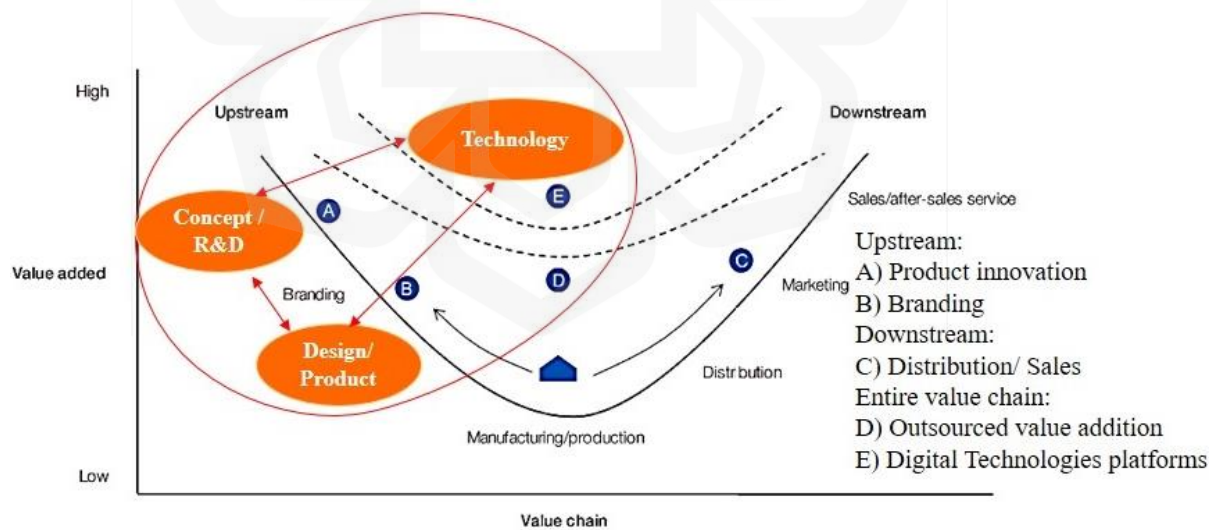


Figure 3.5 Author's marking of design-related fields on James Howe's Smiling Curve

Source: Adapted from (Howe, 2018)

### **3.7 PRODUCT INNOVATION IN PAKISTAN'S T&C INDUSTRY**

The T&C product development includes all processes from fibre to the making and selling of products with intrinsic potential for value addition at each processing step (Government, 2015). Innovation in the textile product may refer to the concept, design, production, retailing, branding, supply chain, and marketing. Apparel design innovation is one slice of the whole textile value chain. In this study, apparel product design innovation refers to the launch of new or improved product characteristics. The novelty of a product can be defined either through introducing new products in the firm or the market.

The measurement of innovation performance in apparel firms was beyond the scope of this research. Rather, the study focused on defining schemes and factors that could assist the designers and other concerned professionals. Consequently, acquiring the knowledge to design actions and processes that lead to innovative solutions remained in focus. Hence it was important to grab a holistic view of the innovation measurement done by other researchers in Pakistan.

Wadho (2016, 2018) obtained in their research on product innovation in apparel firms of Pakistan that only 38% of the Textile and clothing industry has presented advancements in new product developments. They have further described innovation in two categories technological and non-technological innovation. They define technological innovation as introducing new or improved product characteristics or improved processes.

Nontechnological innovation is described as managerial and marketing-related innovation. In this study, product design innovation would fall into both technological and non-technological innovation because nontechnological innovation refers to the product concept and need analysis. In contrast, technological innovation refers to product characteristics and features. Their research claimed that 56% of the firms were involved in technological and non-technological innovation, of which 38% was related to new product launches. Of this 38%, the innovation was mostly new to the firm, and product novelty new to the domestic and international markets was very few.

In Punjab, the firms in Sialkot recorded the highest new product developments. The firms in Sialkot scored a 22% innovation rate in introducing products new to the market, followed by Lahore, 17%. Amongst different textile product types, the apparel finished products scored the most, and Punjab scored more than Sindh in introducing new products(Wadho, 2016). This research provided a cohesive overview of textile and apparel innovation in Pakistan.

Pakistan's textile policy (2019) expounded that the apparel sector has grown only marginally. The causes are limited product range, reliance on cotton, little usage of manmade fibres, and inability to restructure itself to meet the challenges of future international markets. Others reported a lack of product customization, low-skilled workforce, resource efficiency, less attention on sustainability, fewer advancements in synthetic materials, low quality, lack of R&D for new alternate products, lack of modernised equipment, less exploration of new markets, and passive unstable government policies, as the prime hindrances in apparel product value addition (Hamid et al., 2014; Hassan Khawar, Nadia Mukhtar, Maheen Javaid, 2019; Hussain et al., 2013; A. A. Khan, 2010). The WEF(Howe, 2018, pp. 10–12) framework for developing countries to improve value addition through product innovation and design has identified factors that currently are the major issues in the apparel sector of Pakistan. These facts establish that addressing these issues would enhance value addition in the garment sector.

### **3.8 APPAREL DESIGN INNOVATION IN PAKISTAN'S T&C INDUSTRY**

The upstream market requires planning and execution of new concepts proficient in striking future needs; an insight into apparel design innovation is indispensable because a lack of product customization can be achieved through improvements in apparel design. The product innovation-related issues in Pakistan's apparel industry, highlighted in the research and reports by other scholars, were noted in the preceding sections of this chapter. Some points appeared as strengths, and some areas identified margins for improvement. These issues (See section 3.7) were related to design and other disciplines. Therefore, they were

exemplified to illustrate design-related tasks.

Section 2.5 (Factors of apparel design innovation: emerging trends and concepts) summed up design innovation factors. A relevance between design innovation factors and issues in the apparel sector of Pakistan was developed to take guidance in highlighting design innovation factors of Pakistan's apparel sector for two main reasons, 1) Absence of any framework related to product design innovation in the textile policy of Pakistan and 2) the literature sources summed up in section 2.5, focused on product design innovation for industrial environments.

The previous studies revealed issues of innovation that influence product development in the apparel sector of Pakistan. These issues were related to the administration, production, marketing, and design development of apparel products. The study focused on design-related issues, which is why the issues addressed during design development were highlighted. These factors may relate to other aspects of product development, but this remained beyond research limitations. Figure 3.6 demonstrates issues of Pakistan's Apparel sector identified in the study and classifies design innovation-related factors within them.

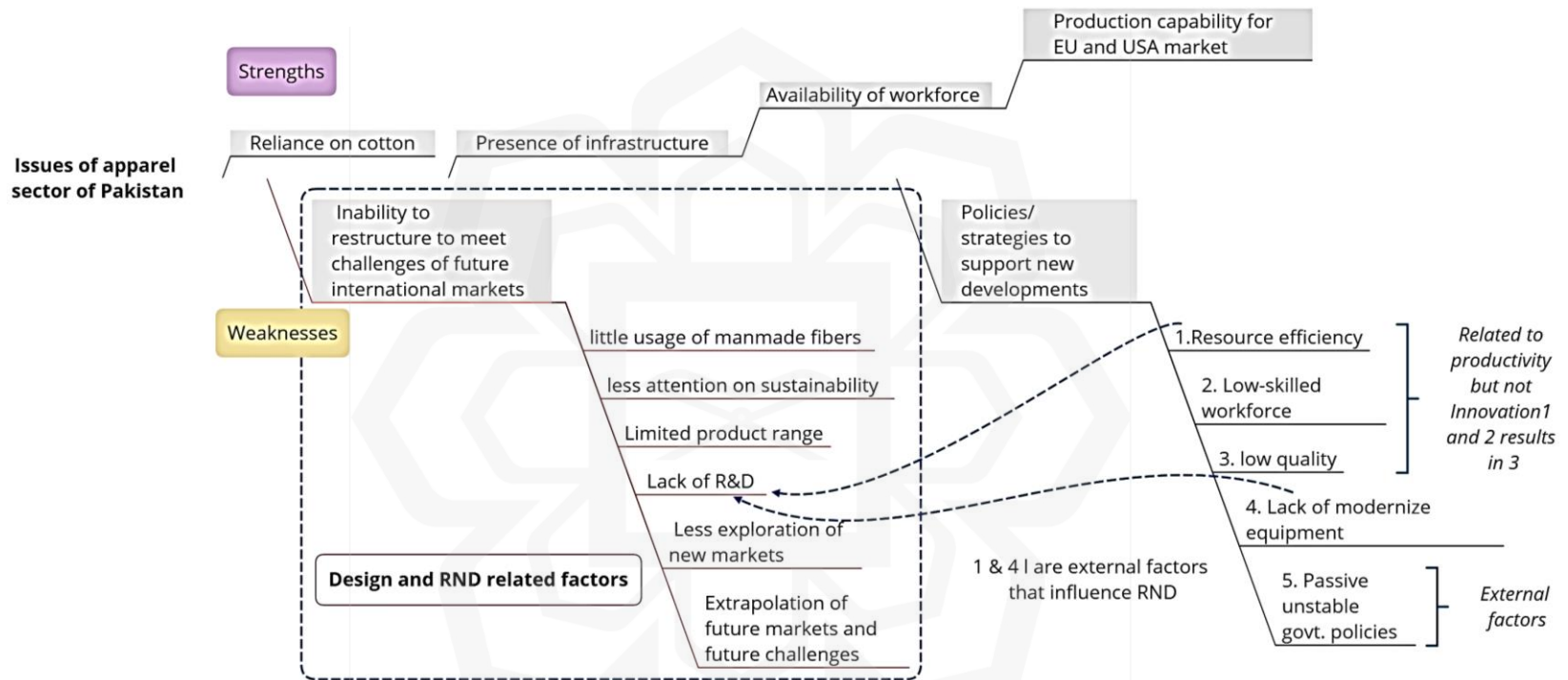


Figure 3.6 Filtration of design-related factors from issues of the apparel sector of Pakistan

### 3.9 KEY FINDINGS OF STUDIES IN APPAREL DESIGN INNOVATION FOR PAKISTAN'S TEXTILE AND CLOTHING SECTOR

The subjects that encompass the framework for apparel design innovation include understanding of apparel product components, apparel design processes that ensure successful product developments, suggestions and recipes of scholars to achieve apparel product innovation through product design and design processes, any specific strategies and approaches within apparel sector of Pakistan and review of already developed frameworks on design innovation. Figure 3.7 illustrates the apparel design innovation factors that were discovered in section 2.5, and they were also pondered by other researchers on Pakistan's apparel sector development (Hamid et al., 2014; Hussain et al., 2013; Kashif & Mubarik, 2020; Khan, 1999; The Pakistan Business Council, 2019).

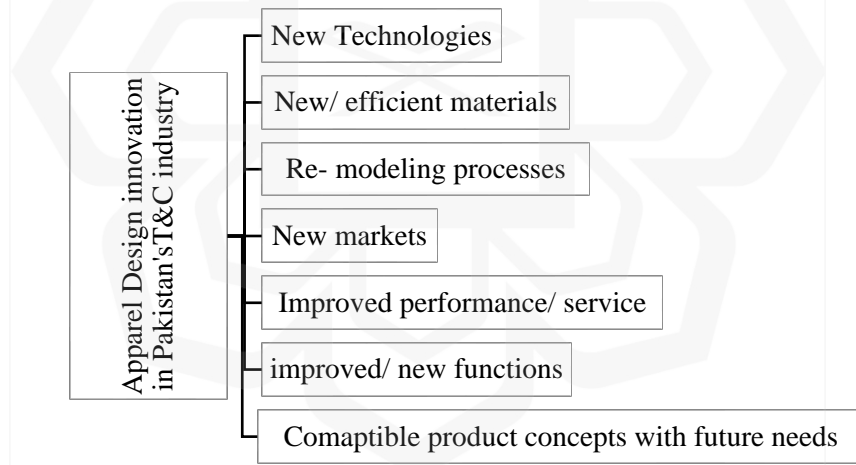


Figure 3.7 Author's accumulation of apparel design innovation determinants

L.R on apparel design innovation for Pakistan's T&C sector encompassed subjects such as comprehension of future apparel design challenges, product development for shaping the future, the role of design in enhancing product innovation, apparel product design mechanisms, and functioning, business models of the textile industry, value chain

with a focus on the innovation capability of designers and design houses in developing apparel products for the growth of Apparel Industry of Pakistan (Figure 3.8).

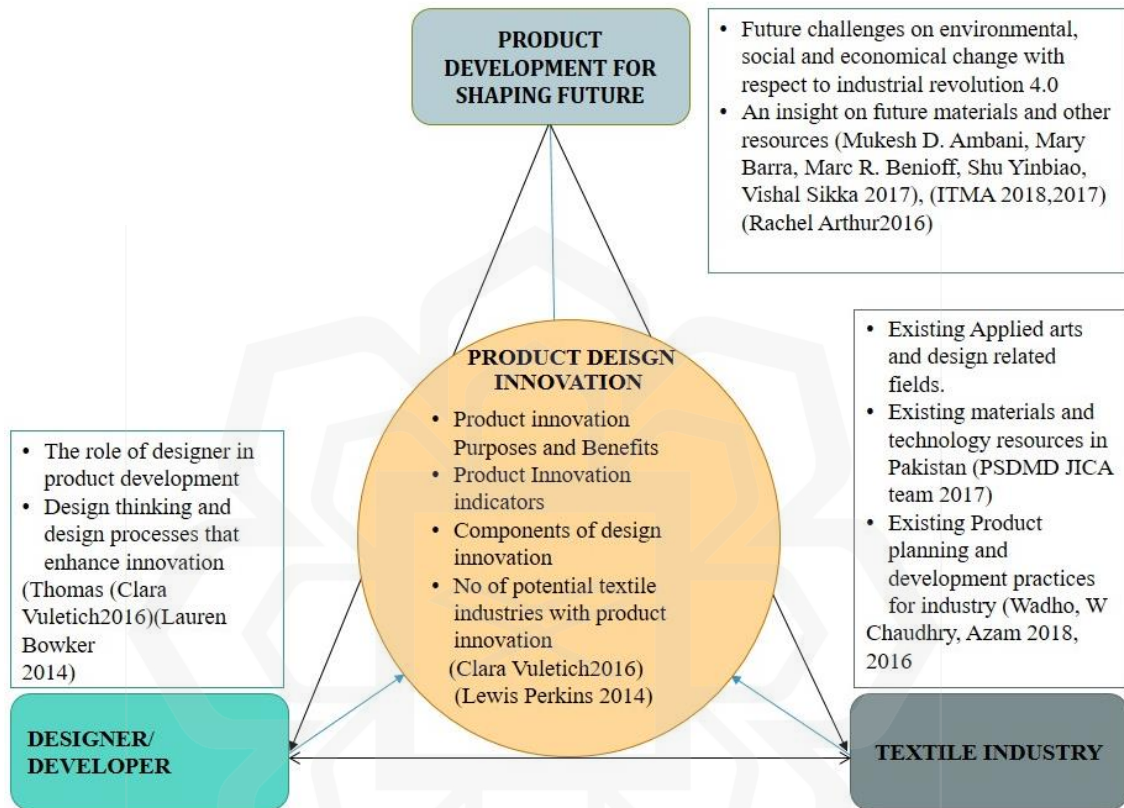


Figure 3.8 Key parameters identified from existing studies.

As discussed in sections 2.3 and 3.4.2.4, the design processes are affected by product development-related and external factors. The literature remained limited in this context, focusing on apparel design processes and design practices in Pakistan's T&C sector. However, many design pieces of research guide the design strategies that shall be opted for innovation in design (discussed in section 2.2.2). The literature review revealed that innovation in apparel design has strong social, economic, and environmental impacts. Design thinking is emerging toward meaningful design solutions by redefining materials, technologies, functions, and aesthetics. The reforms in design practice and design methods are required in Pakistan's T&C sector related to the design process, design development

methods, resources provided to designers, designing skills, product types, and refinement of product features.

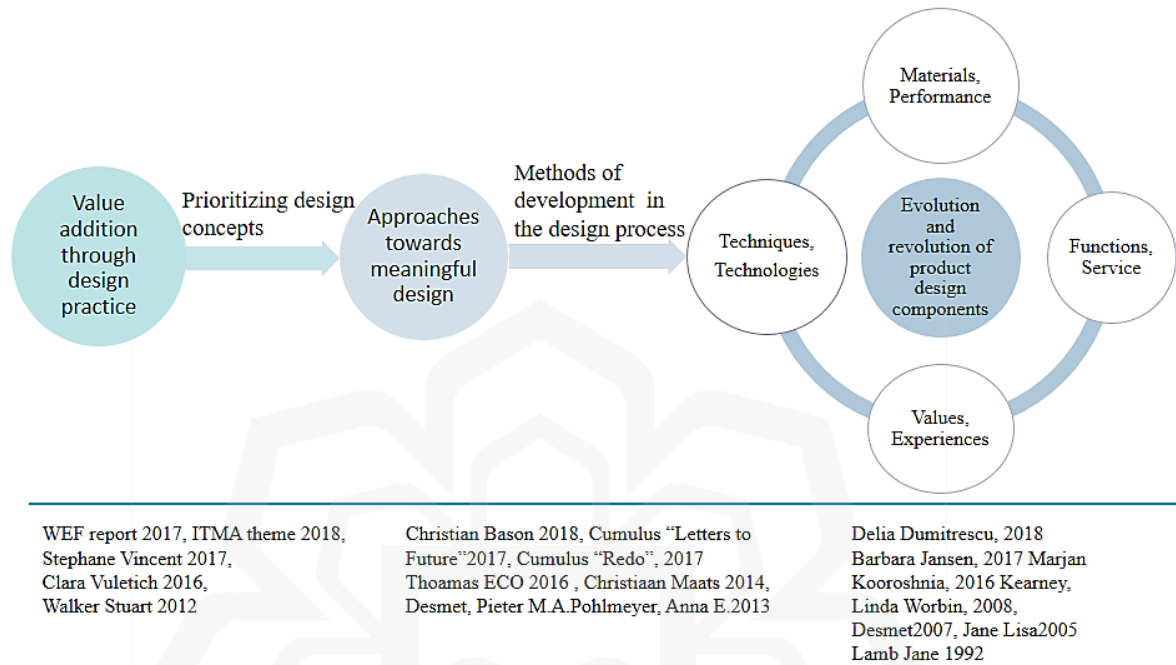


Figure 3.9 Conceptual framework on meaningful design

The strategies to improve new product development include collaborations, material reforms, technological advancements, sustainability, and the significance of traditional textiles. The strategies to improve on new product development guide through two main streams, product design development and product features; for example, material reforms would address two aspects, either the processes or methods of the use of material or the characteristic of textile materials that influence product features and lifecycle. The need for collaborative research work between designers, industrialists, and users is stressed. Innovation in apparel design means improved or new design activities that enhance the production of new or improved products. Table 3.2 summarizes the literature related to apparel innovation and the framework that has already been established to approach value addition in apparel design. The summary of the literature assisted in defining the shortcomings and gaps within the literature intended to be covered in field research. It was

identified that the framework contextualized to Pakistan's apparel industry and with a concentration on the diverse aspects of apparel design innovation is missing.

Table 3.2 Summaries of Studies in Apparel Design Innovation for Pakistan's T&C Sector

<b>In focus: Product Innovation Strategy for Pakistan's T&amp;C sector</b>			
Author	Contribution	Relevant Outcome	Limitation/Remarks
James Howe, Tineka Michelle Smith, Aditi Sara Verghese 2018	Product innovation can be achieved by developments in the concept, design and intellectual property domains.	Adapting new tastes and preferences, development of design process for innovation	Design is considered a stepping stone in value addition. The strategies within the design to pursue new preferences and improved processes are not in discussion.
Waqar Wadho, Azam Chaudhry, 2018	Identified the level of product innovation in the T&C sector of Pakistan	The determinants of product innovation for the apparel sector	This is aimed at firm-level innovation analysis, whereas the current research is headed to explore practical implications
Waqar Wadho, Azam Chaudhry, 2016	An evaluation of product innovation in Pakistan's Textile sector is developed through Norway as a	Product innovation has two main domains technological innovation and non-technological innovation.	Strategies to achieve non-technological innovation are not in focus.
Textile Policy 2019, Ministry of Textile Industry	identification of the need to re-modelling product development processes to improve the overall productivity of the sector	Innovation in new materials, design and development processes, and adoption of new concepts related to challenges of future markets, new brands, and exploration of new potential markets.	Absence of skill development plan, policies and strategies on apparel designing in the policy
Textile Weaving Sector Update 2018	Identified the challenges and positive developments within the weaving sector	Product customization achieved through improvements in apparel design is one of the key challenges.	Product customization and refined products are key innovation domains but lack discovery of factors despite the export sector focusing on production for international
Apparel Industry performance report 2018	Identified the challenges for value-added apparel products	inefficient technology, low-skilled workforce, resource efficiency, and sustainability are the challenges to add value to the sector	The strategies to improve a skilled workforce, improved sustainability concerns, and synthetic fibres
<b>In focus: Components of Apparel Design</b>			
Black Catherine, Freeman, Charles, Stump, Gordon 2015	Identified components of apparel design as Composition, Consumer, Occasion, and Visual impact that are processed during design thinking and creative	Components of apparel design as garment composition, garment type, the consumer, occasion or end use, and visual impact desired	Doesn't represent detailed variables to encompass a general theory on apparel design; therefore, it can be further elaborated for specific conditions.
<b>In focus: Framework for Apparel Design through innovation in product components and features</b>			
Black Catherine, Freeman, Charles,	A three-phase creative thinking model to achieve apparel design innovation	Product intention, Consensual assessment and evaluation, and thinking process requires motivation and heuristic	Keeps creative thinking as the main source to, first process components of design and later to evaluate ideas provides a model suitable for design

Stumpo, Gordon 2015		approach to domain related skills	teaching but not for industrial practice
Hae Jin Gam 2008	Apparel design and production model for sustainable development	Apparel product innovation can be achieved by bringing the idea of meaningfulness/sustainability as core and after and within each phase of design development should be reverted to central idea as the parameter of selection	Focuses on sustainable apparel products as core idea and the other central themes are not in focus
Pieter Desmet 2007	Developed framework for product design keeping product experience as main idea	Identified three components of product expressional identity (emotional), function and experience	Frame work for product enhancement through understanding emotions and experiences attached to product
<b>In focus: Framework for Apparel Design through innovation in design process</b>			
Nigel Cross 2021 2008	Identified stages of design developments applied in industrial environment. Two types of processes. Descriptive which is 1) solution focused from the start 2) then analysis & evaluation 3) Refinement 4) development to generate design proposal based on design brief.	Design briefs are provided by either client or the company management. So it is vital to add directions related to design management as well	Refinement is same as fabricate and Develops a broad outline of descriptive model of design processes, applicable for generalization
Lee, Jung Soo, Jirousek, Charlotte 2015	Developed an insight on apparel designer ideation methods	Description of design processes opted by designers in ideation phase	Focuses on designer's methods on interpreting visual references.
Frederic Segonds 2014	Product development stages 1) Analysing and structuring the collection by planning product categories 2) Defining product features and quantities 3) Product design through prototyping 4) drafting final documents 5) drafting technical file	These five stages are overlapping. His first stage is "identification, 2 and 3 both can be merged, similarly 4 and 5 both are to decide on design details	Focused on NPD with concerns on time management and provided collaborations and PLM (software tool) as solution. The other factors remained unaddressed
Paul Trott 2012	Identified innovation model for design practice in design firms. explained the members who contribute in knowledge accumulation for innovative design ideas	The internal and external environments that influence design innovation in the firms and outside firms	The practical implications in industrial environment for apparel product innovation can further be discovered
Niek D du Preez 2008	Identified components of innovation and developed framework to incorporate them in each stage of design process	Developed framework for innovation through integrated design process	Incorporated technology and user demand in the development process stages. Provides a holistic framework for innovation for product development.
Pahl and Beitz 2007	Four steps to NPD as clarification of task, conceptual design, embodiment, detail design	Systematic design processes and incorporated optimization of new concepts & alterations in design process	Explained general design process on NPD instead of innovation for all the product design categories,

### 3.10 THEORETICAL FRAMEWORK FOR APPAREL DESIGN INNOVATION

The need to improve design processes in pursuance of innovative solutions is realized by Petersen and Ryu (2013), who argued that a successful design outcome would arise from understanding strategic comprehension throughout the design process. The development of a framework for design innovation for the apparel sector is of much importance to take a positive purposive direction instead of heading towards a mushroom irresolute industrial growth that is happening right now in Pakistan's apparel sector (Section 2.3.2 and 2.3.3).

In this regard, a sensible and creative design approach is required to overcome the apparel industry's weaknesses (*Simonetta Carbonaro, Christian Votava 1/11, 2009*). A “sensible, creative, and technological design approach” means a direction for design innovation and a strategy to implement that would assist in developing apparel products that are compatible with future markets. Product development processes change with time and often in an unplanned or unforeseen manner. This uniqueness means that theories cannot be proved to be true or false in a traditional fashion (Andersson, 2003), and only when they are eventually used as methods can their productivity be evaluated. So, it is noteworthy that the framework for apparel design innovation is developed based on the following;

- The understanding of issues the Pakistani' apparel industry is facing
- The identification of emerging trends and aspects that scholars have pointed out as directions for innovation in design
- The knowledge of apparel design processes and proposed models by the scholars
- Understanding the local design practices

Zikmund, Babin, Carr, & Griffin (2013, p. 43) explain that a theory can be developed from a general statement to a specific assertion. The theoretical framework for this research included theories and points of view of technical experts and professionals related to product design and apparel design.

The research and statements of professionals and academicians concerned about design innovation were analyzed through scientific reasoning to derive a conclusion on the theory

for apparel design innovation. For this research scientific method followed a procedure of identifying factors mentioned in related research that have been discussed above in detail. Similar opinions were grouped, and the relationships between similar and dissimilar concepts were identified. It was also revealed that the design process for industrial apparel products could be divided into four main phases where the production and realisation of the design idea can not be set apart to ensure an innovative outcome. Hence the phases are connected and mostly dependent on each other.

Innovation in apparel design practices in Pakistan requires exploring tendencies in design practices by finding ways to address innovation factors during new product development processes. The analysis of the factors and application of design methods would be required accordingly. For example, the marriage between technology and apparel explores new materials and creates a unique aesthetic vocabulary (Jane, 2005). Technology is incorporated to improve garment performance and occasionally inform the design process.

Feeding the design process with analytical and creative thinking with a rationale of emerging themes inspired by environmental, social, economic, and ecological happening and issues is vital to keep the design process moving. The design process of new product development in industrial environments is conventionally a cyclic process where the market analysis of the launched products is evaluated for new developments. Designers either start the development based on their observations of available products and generate design ideas for either improved or different aesthetics and styles. The product design components are as follows;

- 1) Aesthetics,
- 2) Function,
- 3) Technical
- 4) Significance

These product components are manipulated during product design developments in the three phases of the design process. The strategies under each component would bring forward “identification” of innovative design briefs that can be optimized during “ideation,” and suitable advancements in materials, technologies, skills, and techniques can

assist in “fabricating” potential ideas. The conscience urge to innovate new products to offer better performance and services would require a framework for designers to recognize appropriate design methods and strategies during the optimization of new apparel product features. Figure 3.10 illustrates an extended version of the theoretical underpinnings of the research.

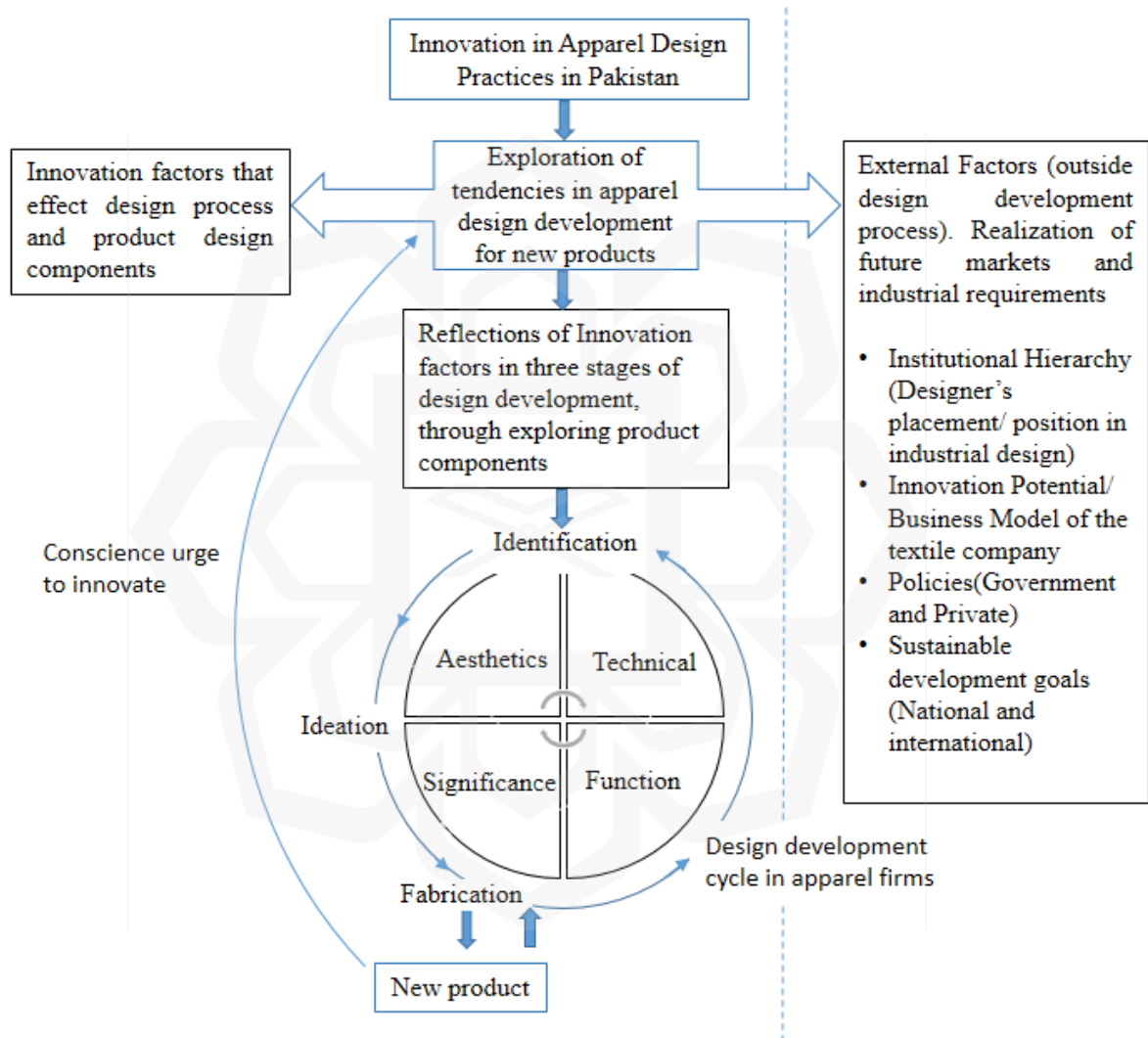


Figure 3.10 Theoretical framework for apparel design innovation

### **3.11 CHAPTER SUMMARY**

This chapter developed an inclusive overview of apparel product development in Pakistan's T&C industry. The chapter introduced the various aspects of new product developments in the apparel industries of Punjab. The chapter also presented a brief history of apparel design practices in Pakistan to understand the context better. Consequently, the third chapter identified the apparel design innovation factors by linking theoretical underpinnings on apparel design practices with new product development challenges in Pakistan's T&C sector. The chapter defined pragmatic design processes, choices and actions of designers that bridge from the future back to the present while attempting to align designing as an activity for improved product development. The key findings of the research related to design innovation have been explained in this chapter as; a review of design synthesis based on material value, efficient production process, synchronization of product components with user demands and design significance because the apparel industry focuses on efficiency and effectiveness of physical product design, trendiness and technical superiority of new products, smart ways to develop closed cycle textile products, focus on materials, efficient production processes and quality, use of new technologies or revival of old technologies. Finally, the chapter presented a theoretical framework for apparel design innovation and laid the field research foundation.

# **CHAPTER FOUR**

## **RESEARCH METHODOLOGY**

### **4.1 INTRODUCTION TO THE CHAPTER**

Research objectives and research questions to address the problem statement were set in the first chapter. Chapter Two explained apparel design processes and established theories on design innovation. Chapter Three discussed fundamental change and innovation factors in Chapters Two and Three provided a cohesive understanding of the research's problem statement and theoretical framework. The fourth chapter discusses research methodology suitable for proposing a framework to enhance Pakistan's textile industry's apparel design innovation potential. This chapter answers the question ‘which research philosophy is functioning as a driving force?’ and what is the corresponding process of the research? It emphasizes the processes and step-by-step developments as well as the research tools and procedures for this research.

### **4.2 METHODOLOGICAL FRAMEWORK FOR THE RESEARCH**

The research methodology streamlined the design of the research study, stemming from a congruent philosophy till the study's findings (Mills & Birks, 2014). The compatibility between each part of the research study and the sequential setting ensured the scientific study's logical and rational outcome. Research strategies informed the research methods and tools. The research approach informed research strategies. At the same time, the research approach was guided and informed by the research philosophy. Research philosophy was based on the underlying assumptions of the study.

The research methodology affirmed the suitability of research methods with research questions. The nature of the research questions was analyzed to define the underpinnings of the research process. The study was identified as exploratory, where the experiences and multiple interpretations of the people could produce knowledge of the field.

Saunders's (2009) research onion approach was adapted to encompass all the essentials of the methodological research framework. The research onion adaptation resulted in a step-by-step process demonstration of the complete research activity.

Figure 4.1 demonstrates the research phenomenon as a layer-by-layer process where each layer is sequential and vital to get genuine outcomes (Saunders et al., 2009). The first layer that influences the whole research activity is research philosophy. The second layer represents the research approach. The following layers represent methodological choices, research strategy, techniques, and data collection and analysis tools. In this paradigm, for each layer, multiple choices exist, and researchers decide on methods and tools according to their research philosophy.

In Figure 4.2 step by step methodology inspired by the research onion is presented. The exploratory nature of research objectives and questions led to an inductive approach to the research strategy. The research mainly followed an interpretive approach. It was conducted as a naturalistic inquiry to collect the opinions and experiences of several designers on a common phenomenon (product design development) without any influence of the researcher (Merriam & Tisdell, 2015). Descriptive methods were opted to inquire about the data acquired from the naturalistic inquiry. The naturalistic inquiry was conducted within the environments of apparel manufacturing companies in Pakistan. The following pages discuss each component of this methodological framework in detail.

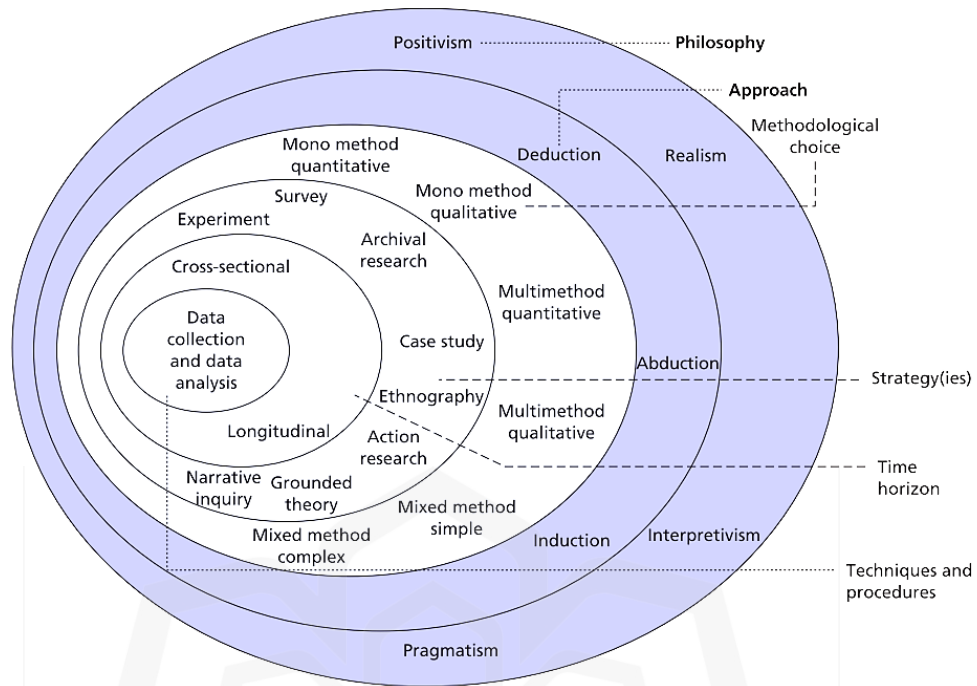


Figure 4.1 The research Onion' Source: Mark Saunders, Phillip Lewis and Andrian Thornhill 2019

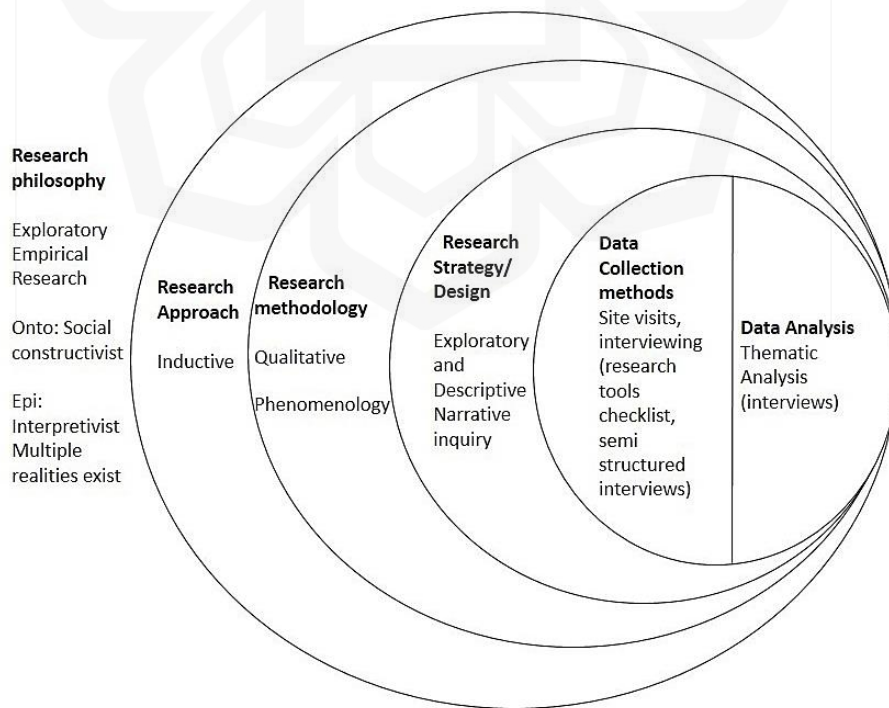


Figure 4.2 Research activity sequence based on Saunders research Onion (2019)

## **4.3 RESEARCH PHILOSOPHY: PURPOSE & PROCESS OF ONTOLOGICAL, EPISTEMOLOGICAL AND METHODOLOGY CONTEXTS**

### **4.3.1 Ontology**

The philosophical position determines how the research is conducted, analyzed, and judged. The study aimed to find the truth about design practices that lead to apparel innovation. Nevertheless, in the search for reality, multiple perspectives and research paradigms exist broadly under positivist and constructivist. Positivism suggested measuring social facts and quantified collected data results (Neville 2005 and Denscombe 2007). The social constructivist approach claims that data findings depend on one's perspective and interpretation of a phenomenon (Baxter, 2008; Creswell, 2017). The latter was deemed appropriate because it was believed that the respondents' rich narratives and individual experiences would bring multiple perspectives and knowledge diversity related to design practices and innovation factors.

The nature of any form of product design itself; is a social phenomenon. The interface and function of any product are conceived to reflect either the perception of the user, producer, designer, or any other stakeholder, individually or collectively. Apparel design innovation is a process of shaping the experiences and choices of different personnel into products. The very nature of design as an activity is to understand and reflect on people's needs and requirements that enable. The research was conducted from a social constructivist approach to develop insight regarding the design processes and experiences that result in multiple forms of products synchronized with future environments,

Since the research aimed to propose a framework to enhance the apparel design innovation potential of Pakistan's textile industry, the focus is on innovation. Design innovation is a subjective notion. Apparel design innovation is not linear and cannot be aligned as a single-direction process. However, in the search for reality, multiple perspectives and research paradigms exist. In developing a strategy for apparel design innovation, interpreting various experiences and factors would have led to a holistic

approach. The ontological claim for this research is that the lack of innovative solutions in textile product development depends on implementing the appropriate plan; the ideal product development is subject to the need for a concrete rationale. A rationale that guides the designers and other stakeholders toward an appropriate direction for production and sustaining world resources.

### **4.3.2 Epistemology**

A compromise on investigating the rationale tends more towards the constructivist than the objectivist approach. Considering the ontological view of approaching and observing the phenomena depends on the evidence and experience of the people involved in product development processes and designers. The relevance and usefulness of information sources and analysis methods were appraised to acquire knowledge from the observations on design activities within the apparel and other creative industries. It was important to evaluate how information regarding apparel design innovation was processed to be converted into a piece of knowledge.

Interpretivism was linked with constructivism for this study, which posits that truth and meaning does not exist in some external world but are created by the subject's interaction with the world. The interpretive approach enabled data analysis of the designer's assumptions on innovation and the discussion of their assumptions to interpret proper meaning, so this study developed knowledge of apparel design innovation by collecting evidence of the design world and analysing the meanings of the actions.

Furthermore, Patton (1990), Grix (2001), Oates (2005), Creswell (2005), Denscombe (2007), and Dawson (2009) detected that the interpretive position through epistemological assumptions results in a more interpretive approach. A similar approach influenced this research, and the following positions as interpretive were drafted for the research phenomenon, as shown in Table 4.1;

Table 4.1 Reasons for leaning more toward the position of the interpretivist.

Focus	Scholars and year	Relevance with the study
<b>Multiple subject realities</b>	Sapsford, Roger (2010) Birks(2014)	Designers and other professionals respond and react to develop various products according to their comprehension of multiple aspects.
<b>Multiple interpretations</b>	Yilmaz, K., (2013) Creswell & Creswell, (2017) Vila & Kuster,(2007) Cresswell, (2003)	The very nature of design is expressive and exploratory. To interpret the opinions regarding the phenomenon could proceed towards nonlinear interpretations.
<b>Quest for unknown meanings</b>	(M. Q. Patton, 2015) (Yilmaz, K., 2013) (Cupchik, 2001)	The study gap identifies less research in the field of apparel design processes. The interpretive approach is suitable where the process of the meaning is unknown.
<b>Dynamic, socially constructed meaning</b>	(M. Q. Patton, 2015) (Gummesson, 2003) (Patten, 2016)	The knowledge is based on perceived realities by individuals or groups of designers, and the understanding of it can only be realized through further social constructions.
<b>Study of respondents in their natural social setting</b>	(Merriam & Tisdell, 2015), (Freedman and Gene Comb, 1996)(Saunders et al., 2009a) (M. Q. Patton, 2015)	Subjects respond according to the environments they interact in. They develop understandings according to the world known to them. So environment and actors cannot be isolated.

**Multiple subject realities:** There is no single version of the truth. What constitutes the real world or knowledge about the world is a construction of the mind, individually or collectively. Different groups or cultures perceive the world differently. Designers and other professionals respond and react to develop various products according to their comprehension of multiple aspects.

**Multiple interpretations:** Due to the multidisciplinary nature of the research, the explanation is not expected to be fixed. Hence, more than one explanation and discussion will emerge because more evidence supports it (Gummesson, 2003). The very nature of design is expressive and exploratory. To interpret the opinions regarding the phenomenon could proceed towards nonlinear interpretations.

**Quest for unknown meaning:** The study gap identifies less research in apparel design processes. The interpretivist approach is suitable where the meaning is unknown or unclear.

**Dynamic, socially constructed meaning:** Whatever reality is for an individual or group, it can only be accessed and transmitted to others through yet more social constructions such as language, discourse, shared meanings, and understanding (Gummesson, 2003). The knowledge is based on perceived realities by individuals or groups of designers, and the understanding of it can only be realized through further social constructions.

**Study of respondents in their natural social setting:** The respondents' understanding in the field (apparel industrial setups) is very important because the industry and design offices are the field of study. In the section, some researchers identified that a motivational and suitable environment affects a designer's innovation capacity. Subjects respond according to the environments they interact in. They develop understandings according to the world known to them. So, the environment and actors cannot be isolated. So observing the environment and recording the designer's work was necessary as a naturalistic inquiry.

### **4.3.3 Methodological context**

The ontological and epistemological view followed, what and how can one understand the factors determining apparel design innovation for achieving a sustainable future in Pakistan's textile and clothing industry? First, it identifies factors determining the development of apparel products and then examines current design practices for new product development. The apparel product's producer, designer, and user have different perspectives and experiences regarding apparel product design.

It is claimed that observation of various experiences and pieces of evidence would investigate the complexity within depth inquiry of factors affecting the performance of the textile design industry and can lead to more efficient solutions to the problem. The knowledge gained through this study was directed towards observing and interpreting the experiences of people involved in the design activity, for example, how apparel designers develop products and how innovative design is perceived. That is why the empirical qualitative inquiry was considered to gain knowledge about appropriate design practices for future sustainable products.

## **4.4 RESEARCH APPROACH LOGIC AND OUTCOMES**

The research approach represents the theory generation and testing strategies adopted to answer the research questions. It is an overall umbrella that caters to research design and choice of research methods. The research approach influences research design. The research approach for this research was inductive because of the exploratory nature of the phenomenon. The literature review explained the arguments of design professionals on design innovation and design strategies that can enhance design innovation in general and apparel design in specific. The primary data collection aimed to discover any such strategies' presence or absence in the current design practices.

So that a framework can be developed for apparel design innovation, the problem statement and research gap investigated that; 1) researchers have optimized new product developments, but limited research on textile reforms in Pakistan has been conducted, 2) limited information available on the infrastructure and policies of design departments, whereas available sources explain factors that influence the efficiency of new product development but do not explain design activities that may enhance NPD. The empirical study explores the work processes and understandings of design innovation and new product development practices within the apparel sector. An in-depth study was required of the opinion of concerned professionals so that framework for design development can be apprehended that leads to product innovation. Consequently, the empirical study of design practices within the apparel design field was conducted to address, analyse, and guide the ambiguities.

#### **4.5 RESEARCH STRATEGIES**

Strategy is thinking and action towards the aim or a desired outcome. Research strategy is the specific strategy of inquiry that guides the selection of methods. The research strategies are generally lines of attack employed to address research problems. The philosophical standpoint on research directed the research toward qualitative research design. For qualitative research design, researchers have mentioned multiple research strategies such as case study, phenomenology, action research, grounded theory, and narrative inquiry, as observed by Clarke (2005); Denscombe (2007); Dawson (2011); Robson (2011); Creswell (2011) and M. Q. Patton (2015). For this qualitative study, phenomenological research (M. Q. Patton, 2015; Merriam, 2015) and narrative inquiry (Clandinin, 2016)(Thomas, 2012) were considered because the work experiences of designers were considered the prime source of information to explore design innovation possibilities and new product developments.

A well-conceived strategy was devised by providing overall direction to provide a framework for decision-making and action. The strategic framework of the research

incorporated different study components coherently and logically. As (M. Q. Patton, 2015, pp. 40–41) recommended, the research strategy would require planning in three stages Research design strategy, Data Collection and fieldwork strategy, and analysis strategy. As Patton(2015) mentions, a naturalist inquiry is where the researcher does not manipulate the phenomenon of interest and observations in real-world settings. Qualitative data with a naturalistic strategy primarily focuses on qualitative data; meanwhile, some quantitative data may be collected in naturalistic inquiry approaches(M. Q. Patton, 2015, p. 47). Thereby research strategy for data collection encompassed qualitative data through field observations and interviews within the naturalistic inquiry. Multiple tools such as a checklist, photographs, reviews of yearly reports, field notes, and interviews opted for data collection.

Analysis strategies included an inductive approach for primary data. Gathering evidence of design processes and practices to seek patterns of apparel design innovation towards a sustainable future was the logical move to induce qualitative research design for apparel design innovation for Pakistan’s textile industry. Observing designers’ experiences, recording their design practices, and interpreting their points of view developed an insight into novel design approaches. Table 4.2 presents themes that have been opted for each category of the research process. This strategic framework enabled specific research design and methods synchronization towards a common purpose.

Table 4.2 Strategies for 3 categories of Research process

Research Design Strategy	Naturalistic inquiry, non-manipulative and non-controlling(M. Q. Patton, 2015, p. 40)
Data Collection and fieldwork strategies	Qualitative data through fieldwork, interviews, and documents+ Dynamic systems
Analysis Strategies	Inductive analysis+ Holistic Perspective for direct personal observation and semi-structured interviews

## 4.6 RESEARCH DESIGN

The empirical approach was applied for research design based on the philosophical position on research methodology to ensure that the phenomenon of interest has been explored sufficiently and the related issues have been revealed through the empirical approach. The choice of research design was also influenced by the analysis of research by other scholars in the field of product design in general and apparel/textile design in specific. Because the creative industries have many sub-fields besides textile design, all dealing with the built environment (discussed in detail in Chapter 2).

The study explains that most research projects in the related fields opted for empirical exploratory study. Qualitative narrative inquiry was chosen as the research strategies and methods, including observations, field notes, photography, in-depth interviews, and recording of design processes and outcomes in product features. Those researchers that aimed to the impacts on product interface and functions also selected action research and experiments in their methodology. Research aimed at developing design strategies focused on design thinking and the impacts of design methods on product outcomes. Table 4.3 Research Design by other scholars in the related field of designs presented a review of research done in the related fields that assisted in deciding the appropriate research design for the current research task.

Table 4.3 Research Design by other scholars in the related field of design

Author/year	Research Area	Findings				Output
		Methodology	Strategy	Methods		
				Collection	Analysis	
<b>Jennifer Ballie 2014</b>	Textile Design	Qualitative Empirical	Exploratory	Action research, observation of participant's activity	Narrative and Descriptive	Design methods for new product development
<b>Priti Veja 2014</b>	Design processes for E-Textile	Experimental	Exploratory	Lab Experiments	Descriptive	Impact of design processes on product outcome
<b>Cross N. 2011</b>	Design Thinking and Practice	Qualitative Empirical	Exploratory	Observation of the design process, in-depth interviews	Content analysis	Research extended from particular to general.
<b>Sanders &amp; Stappers, 2008, 2012</b>	Textile design	Co- Qualitative Empirical	Narrative inquiry	Open-ended questions, narrative observations	Narrative and descriptive	The culmination of design criteria
<b>F. Almqvist, 2017;</b>	Service Design	Qualitative Empirical	Phenomenology	Interviews, observation of design projects	Narrative and descriptive	Design process exploration
<b>Frederic Segonds 2011</b>	Apparel Design	Qualitative Empirical	Phenomenology	Field notes, photos of projects in the industrial environment	Descriptive	Aspects that boost innovation
<b>Omwami, Anniliina 2020</b>	Apparel Design	Qualitative Empirical	Exploratory	Designer's work process observation	Content analysis	Design-driven innovation model
<b>Chiara Colombi 2016</b>	Textile Design	Qualitative	Exploratory	Observations on case studies	Descriptive	Innovation and creative models

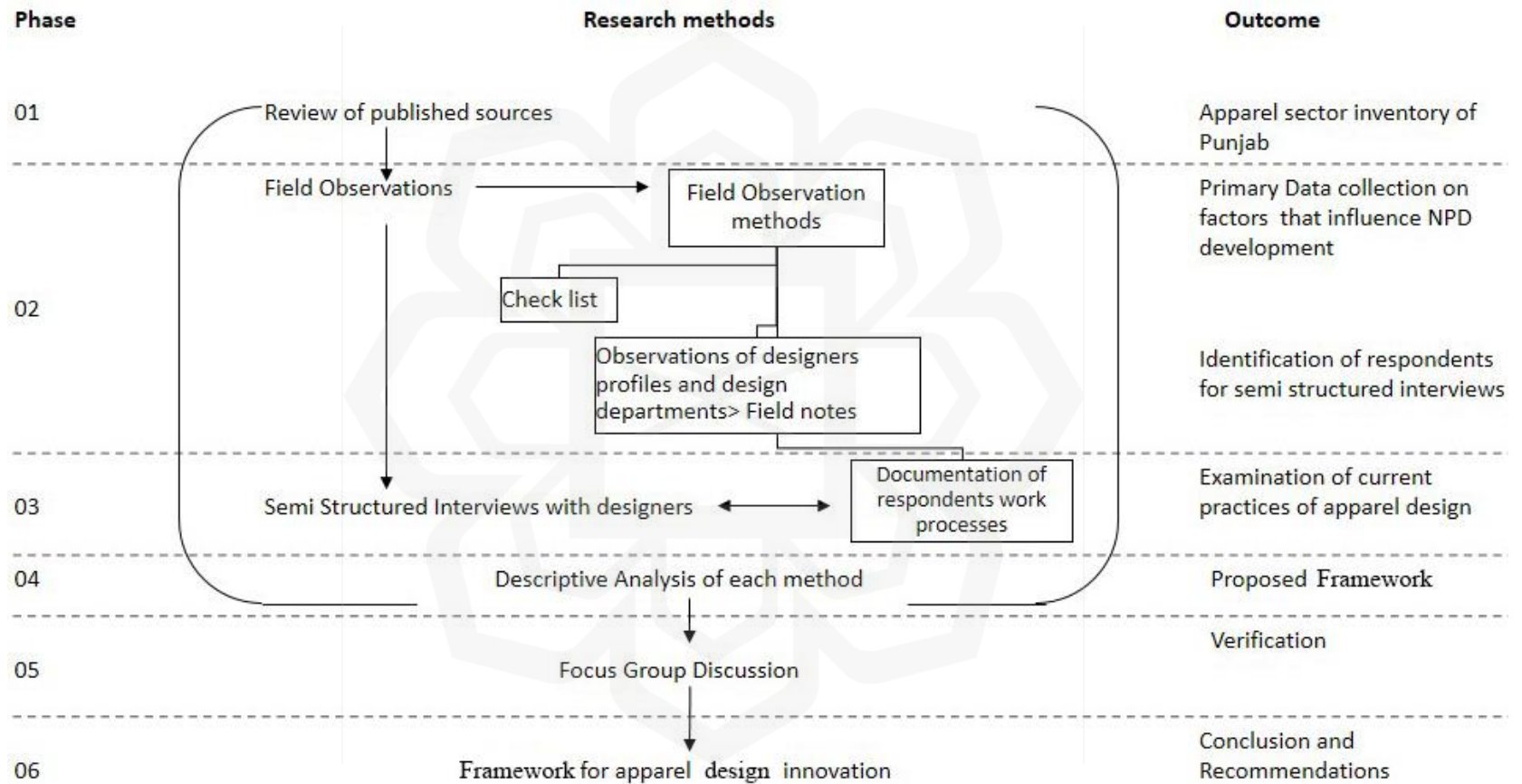
Due to the exploratory drive of this investigation on apparel product design positioned in diverse contexts, an empirical qualitative study was chosen to guide this project (Yin, 2017). Qualitative research is suitable when the researcher wants to examine any social phenomenon involving interwoven and subjective experiences to such an extent that they cannot be reduced to separated and quantifiable variables (M. Q. Patton, 2015). That is why the qualitative research methodology to explore the meaningful experiences of personnel was considered appropriate for research design (Cross, 2011). The questions set out for research inquired about design practices in Pakistan's apparel industry to enhance product innovation. The task could be approached by recording designers' experiences through interviews, content review of archival data, or field observations. The research design followed the researcher's belief that in the creative industries, the individual's perspective and interpretation of phenomenon contributes to developing collective understanding and knowledge about the field, so the research design focused on research methods and tools that were considered most suitable to achieve this objective. Richards, L. Morse, J.M. (2007, p. 35) mentions that "each method is a distinctive way of approaching the world and data," so different methods will have different analytical results. A congruent comparison of research objectives, methods, and tools was examined to align each component. Table 4.4 Research Framework represents the fit between the research problem and questions, research question and methods, and between methods for the data and data handling to bring methodological congruence towards purposeful research.

The research methods and tools were sequentially applied because the data to be acquired depended on the previous method's outcomes. The sequential setting of research methods was also for qualitative research validation. At the same time, one method could validate the analysis of the previous method in qualitative research. By verifying each research method by its proceeding, one could validate the information received from one qualitative method through another. Some visits, field observation and semi-structured interviews happened concurrently because the objective for both instruments was to observe the design processes of the designers. The data collection was done in three phases 1) Review of published sources, 2) Field Observations, and 3) Semi-structured Interviews with designers (Figure 4.3)

Table 4.4 Research Framework

		Data Collection	Analysis	Outcome
RQ1	What factors contribute to apparel product development for Pakistan's Textile and clothing sector?	Review of reports Literature review Field observation Semi-structured interviews	Interpretive Analysis	Identification of design related factors
RO1	To identify the factors that influence the development of apparel products in Pakistan's Textile and clothing industry			
Resource	Annual Reports of APTMA 2000-2019, Textile Policy of Pakistan 2014-2019 and 2018-2023, WEF 2018, WTO 2018-2020, Apparel firms company Profiles 2000-2020			
Tools	Documents and reports			
RQ2	What are the design practices in the Pakistani textile industry of Punjab for apparel products?	Field observations and semi-structured interviews	Descriptive analysis of field observations Thematic Analysis of the interview transcript	Identification of current design practices
RO2	To examine current practices of apparel design for new product development.			
Resource	Employed Designers and Industry visits			
Tools	Interview guide and field notes			
RQ3	What design practices can strengthen new product development for Pakistan's textile and clothing industry?	Review of reports and Semi-structured interviews to take out design practice methods and successful examples	Thematic analysis	Identification of design approaches
RO2	To examine current practices of apparel design for new product development.			
Resource	Employed Designers			
Tools	Printed reports and Interview guide			
RQ4	How does a novel design approach enhance product innovation in Punjab, Pakistan?	Review of reports and Semi-structured interviews Focus Group Discussion with design heads, designers, CEO, Policy makers, Academicians	Descriptive Analysis of discussion notes from FGD	Framework
RO3	To design a framework for apparel product design innovation in Pakistan's textile and clothing sector.			
Resource	CEO's of sample industries, Creative Heads, Academicians, Self Employed designers			
Tools	Focus group discussion guide, Consent form			

Figure 4.3 Research Flow



## 4.7 DATA COLLECTION

This section explains the methods of data collection used in this study. The personal observations and semi-structured interviews were conducted within the design office environment to record descriptions for qualitative data. As Patton mentions(2015, p. 56), “In practice, these approaches are often combined.”

The research used three main methods for data collection.

1. Apparel industry inventory
2. Field observation
3. Semi-structured interviews

Industry inventory was established in two further steps. The preliminary list is through examining records of registered apparel firms. The preliminary inventory identified the industry's capacity to develop apparel designs with different product specifications and techniques. It also identified the potential sites for field visits and direct observations. In the second phase of industry inventory, based on the findings of preliminary inventory, field visits were planned to the potential firms to examine the factors of product innovation and design developments to achieve new product development (Genot, 2018; Denzin, 2011).

The field observation collected data through checklist, photographs and field notes. The field notes, photographs focused on new product development processes, and the checklist identified the presence and frequency of product innovation identified in L.R. During field observation, potential key informants for interviews were also identified through observing the profiles of employed designers. A random selection of the designer for a semi-structured interview session was initiated where more than one designer's profile filled the criteria. So, industry inventory was formulated in two steps, one based on lists provided by the resources and introductory visits to the potential firms. The Checklist assisted in systematically identifying innovation factors explored during the literature review. Table 4.5 and Table 4.6 explain the rationale of each method and its alignment with the research objective.

Table 4.5 Data Collection Methods

No.	Data collection methods and aspects of inquiry	Resources	Rationale
1	Industry inventory		
	Preliminary listings from records	Printed sources from Pakistan readymade garment association, Pakistan Fashion Design council and company profiles	To understand apparel design scenario in textile and clothing sector To identify potential apparel firms for direct observation
2	Direct observation		
	Current strategies and approaches to enhance new product development in industrial environments	Apparel firms, two of each type. Checklist Field notes Photographs	To identify the capacity of industry in developing innovative apparel designs To identify NPD factors
3	Semi-structured interviews		
	Current and prospective design practices for new product development	Employed designers in textile companies with closed-cycle production	To validate and evaluate NPD and innovation factors identified in L.R To uncover preferences that involve in design selections

Table 4.6 Data collection instruments aligned with research objectives.

No.	Instrument	RO	Rationale
1	Checklist	1,2	To systematically explore innovation factors and design preferences
2	Photographs	2	To document product development processes and designs
3	Field notes	1,2	To record descriptions and observations To explain the designs that could not be captured because of company policies
4	Semi-structured interviews	2,3	To explore meanings of apparel design innovation, perceptions about design methods, and apparel innovation strategies

#### **4.7.1 Inventory of the Apparel industry in Punjab, Pakistan**

A literature review on the apparel industry of Pakistan identified a shortage of value-added products that can be enhanced through improvement in product innovation. The study gap identified the need to know the factors affecting new product development and the absence of value addition. Literature related to new product development and Pakistan's T&C industry uncovered; improvements required in the apparel designing for the export and retail market; the country must focus on upstream markets that can only be enhanced through innovation and value addition in the product design. The research objectives aligned with the literature findings demanded insight into the apparel sector of Pakistan's textile industry so that framework for apparel design innovation could be developed accordingly.

The literature on Pakistan's T&C industry identified some factors that influence NPD, but most of it catered to organizational and managerial issues. It was considered essential to identify the capacity of the T&C industry of Pakistan. Good knowledge of the total number of industrial setups that produce apparel was crucial to develop an insight into the factors related to new product development. For this purpose, a detailed inventory listing essential information about the apparel setups was required. This information was collected by compiling an apparel industry inventory containing information on new product development determinants such as product types, induction of designers, improved processes, new materials, etc. (see section 0).

The industry inventory was developed in two steps. The first step was to develop an insight into the apparel industry's facts and figures about product categories, facilities, number of designers working in the apparel sector, and potential sites for field observation. The preliminary industry inventory compiled elementary information gathered information through the following sources.

1. List of member industries in Pakistan Readymade Garment Association Pakistan
2. Review of industry profiles on their websites
3. Inquiry calls industry representatives to acquire any missing information.

The preliminary inventory identified the potential industrial setups for field observation. In the second step, direct observations were recorded through field visits to the selected sites. The textile apparel sector produces a range of apparel products, and these variant products are classified under clothing categories. Variant industries make one classification of products or more than one product group in parallel independent departments. There was a possibility that designers working for different classifications have different work patterns and concerns. Moreover, the capacity to innovate products could vary within product categories, so the need to collect all the related data was realized during the compilation of industry inventory.

No design associations record designers working in the apparel design field for the industry. There are two main wings of fashion design associations within Pakistan 1) the Lahore chapter (that covers Punjab) and 2) the Karachi chapter that covers (Sindh). The vision of these associations is to project designers working in couture or as freelancers, and it could not provide data regarding the allocation of designers and design activities within the apparel industry. There is no such platform so far that offers the biodata of designers with their professional capabilities. Hence the population of apparel designers was unknown.

For the above-stated purposes, an inventory of the apparel industry was developed. The information was collected through.

1. Pakistan Ready Made Garment Association (PRGMEA)
2. All Pakistan textile association (APTMA)
3. Pakistan Fashion Design Council (PFDC)
4. Industry profiles published on their websites.
5. Inquiry calls to industry representatives.

1) The inventory was compiled by entering the company names from the PRGMEA registered members initially, and then the catalogue of APTMA was consulted for review of names. 2) The second step was to add firms that were not active members of PRGMEA but participated in PFDC activities. The complete list of PFDC members was not added

because it concentrates on the fashion designers as well that are involved in couture. So those firms from the PFDC member list were added to producing apparel. The list was then filtered in three steps. 1) Firstly, PRGMEA had added the product range; the firms not involved in finished products were omitted. 2) the official websites were reviewed to determine the product range. 3) Thirdly, some firms did not have official websites, for those phone calls to their offices were done. It was discovered during that time that some of the firms had shut down, so they were also filtered from the list.

#### **4.7.2 Selection of industry for field observation**

The industry inventory had already identified apparel firms with the product specifications. The number of firms in each product category varied as 1) Activewear, 2) Finished Fabrics, 3) Fashion apparel, 4) Technical and biker garments, 5) Hosiery, 6) Denim, and 7) Traditional Textiles. Product innovation does not depend on the company's size or age; instead, small-size new design companies are more likely to be engaged in innovation (Wadho, 2018; Frumkin et al., 2011). Therefore, the industry selection for field observation was not intended on the company's scale and age; instead, a random selection from the qualified industries occurred. The textile and clothing setups qualified for field observation on the following point;

1. The industry should have the production capacity of any finished apparel product.
2. It should have a design department.
3. It should be engaged in export and domestic business.

A checklist was designed according to the design innovation factors identified in the literature review. During the field visits, information was collected from 12 industries, two from each type. The firms producing hosiery, socks, and uniform apparel products have not established formal design departments. They hire freelance designers on a project basis if

required; most apparel developments are designed by their clients. Therefore, no field visits were arranged to those setups.

#### **4.7.3 Pictorial analysis of product development processes from field visits**

During the field visit, the photographs were taken to support the field notes and develop a profound observation of the phenomenon. Since the study is related to design and design innovation in apparel products, the concerned industry restricted the reproduction of the designs and patterns. Though a remote capture was allowed that is used in the report. Field notes were produced to cover up this gap. Also, diagrams have been developed and grouped to explain the design processes and the designer's concerns. The designers designing for traditional textiles were more open regarding this matter.

#### **4.7.4 Field observation through the checklist**

Fieldwork is the central activity of qualitative data (M. Q. Patton, 2015) (Baxter P, 2008). Patton (2015, p. 81) mentions participant observation as “the primary method in which the investigator is immersed in the culture under study.” The researcher's viewpoint for field observation to study design practices in apparel firms was considered appropriate because it implies a degree of detachment.

The checklist was one of the instruments that was used during field observation. The checklist was prepared to align research objectives, and the components were based on the theoretical underpinnings related to apparel design processes and product design components. Table 4.7 illustrates the tools used to identify the information to acquire knowledge related to the research objectives. It helped align information and data received during field observations and brought forward the scientific study to answer the research questions on solid underpinnings. The purpose of this observational checklist was to record designers' work patterns, investigate the frequency of new product development, and note

the presence of product innovation factors in industrial environments within the design process of a designer during product development (ANNEX V).

The observation of design innovation factors during the design development processes of new products could be performed on the three stages of design development because innovation factors identified during the literature review cater to all phases of the design process (identification, ideation and fabrication). It was also essential to observe the availability of resources that support innovative activity in industrial environments. It was necessary because the literature sources on Pakistan's T&C sector identified some missing dimensions of innovation (Hamid, 2020; Wadho, 2018), as well as some references on design innovation, identified infrastructure and resource availability as essential change factors. Subsequently, the list had components derived through identified factors of design innovation in the literature review, and the observations were grouped into three sections based on the type of information and data expected to be gained from them. The observations were grouped as follows.

1. Resources of innovation: to observe the availability and frequency of innovation factors in the relevant offices of industrial environments.
2. Design Process: observe and map innovation activity during the three stages of design development.
3. Product components: to observe innovation factors in the new products.

The researcher filled the checklist during observations of field visits and discussions with the facilitators of the visit from HR offices, design departments and production departments within apparel firms. Thus, it was filled during the preliminary visits to the firm before the semi-structured interviews.

Table 4.7 Checklist observation tools and their alignment with research objectives

**Field Observational Checklist**

**Research Objectives**

1. To identify the factors that influence the designing of new apparel products in Pakistan's clothing industry in Punjab.
2. To examine current practices of apparel design for the new product development.
3. To propose a framework for apparel product design innovation in export sector.

	Tools	Relevance
<b>Resources and factors for Design Innovation</b>		
1 New technology or machinery for processing is available within five years.	Production process/ machinery	RO 1,2
2 Subscription to published research resources.	Consultation of Subscribed resources	RO 1,2
3 Designer with professional degree are hired.	Biography and CV of designers	RO1
4 Collaboration with researchers for new product development.	Records/Documents on design projects	RO1,2
5 Participation certificate in innovation projects nationally.	Related certificates	RO1,RO3
6 Participation certificate in innovation projects internationally.	Related certificates	RO1,RO3
7 Licensing to update design tools for apparel design. .	Related certificates/ authority letters	RO 1
8 The customer feedback reports are available in the design department.	Records/Documents on design projects	RO1,2
9 Company holds any international certification on sustainability.	Related certificates	RO1,2
10 Company holds any international certification on product competitiveness.	Related certificates	RO1
<b>Product Components</b>		
1 Company has its brand name.	Related certificates	RO 2,3
2 Company has display room/s.	Visit to the Design department	RO 1
3 Products are designed with ethnic identity.	Observation of material/prototype library	RO 2
4 Products carry sustainability slogan.	Visit to the Production/ Design department	RO 2
5 Company displays its vision in office environment.	Visit to the Production/ Design department	RO 1
6 Products are claimed to be ecological.	Observation of material/prototype library	RO2,3
7 Products life cycle and landfill is considered in the beginning.	Observation of design process	RO2,3
8 Products focus on a specific service or activity.	Observation of material/prototype library	RO2,3
9 Products focus on some specific types of materials.	Observation of material/prototype library	RO2
10 Company has used specific patterns and colors over the years.	Observation of material/prototype library	RO2,3
11 Products are redesigned on customer feed back.	Observation of design process	RO2,3
<b>Design process</b>		
1 Brainstorming sessions on NPD within departments?	Observation of design process	RO1,2,3
2 NPD tasks are assigned Individually to employees?	Observation of design process	RO1,2
3 Design developments initiate on sketches provided by the client?	Observation of design process	RO1,2
4 Design developments start with the review of previous market reports?	Observation of design process	RO1,2
5 Fabrication is proposed by the orderer company/buying house?	Observation of design process	RO 2
6 Fabrication is outsourced?	Observation of design process	RO2
7 Product is developed from the material library?	Observation of design process	RO 2
8 R&D has library of materials that doesn't belong to any project?	Observation of material/prototype library	RO 2
9 Prototypes are reviewed by representatives of different departments.	Visit to the Product/ Design department	RO1,2,3

#### **4.7.5 Semi-structured interviews**

For this study, the face-to-face interview (semi-structured) was adopted for data collection (Jankowicz, 2000; Devaus, 2002; Marshall and Rossman, 2006; Dillman, 2007; Saunders and Mark, 2009). The elementary step in this regard was to prepare an interview framework for gathering raw data revealing respondents' depth of work processes, experiences and points of view. Semi-structured interviews were considered appropriate because the theoretical framework provided foundations about the topic to frame the needed discussion in advance (Richards & Morse, 2007). Yet the study gap identified that the in-depth study focusing on product development processes is lacking. Semi-structured interviews were considered valuable in this situation, where a comprehensive analysis of the phenomenon was required within the guide developed through the literature review.

##### **4.7.5.1 *The objective of the semi-structured interviews***

Semi-structured interviews were conducted to discover predetermined models for design developments related to apparel products. They were considered a suitable source to collect raw data about designers and how they have organized themselves within their world (Weiss, 1994, p. 10). As Patton mentions, "the purpose of gathering responses to open-ended questions is to enable the researcher to understand and capture the points of view of other people without predetermining those points of view through the prior selection of questionnaire category." (M. Q. Patton, 2015, p. 21). The dense information acquired in semi-structured interviews of similar group members described many sectors of the complex entity and their relationships.

##### **4.7.5.2 *Interview Questions***

An interview guide was formulated for data collection related to apparel design development and the perception of designers about product innovation. The arguments and

theories developed by industry practitioners were a preliminary step to formulate questions regarding textile product design development. The study of product design-related research also provided a comprehensive foundation to develop interview questions for semi-structured interviews. In this case, the questions were not set with a predetermined answer. Questions asked were like:

1. What is your job scope as a textile designer?
2. What can a designer offer for the progressive future of Pakistan's textile export industry?
3. What skills should a designer master design a successful product regarding market shares?
4. How do you generate a new design idea?
5. How do you decide on appropriate material selection concerning product function and services?

The interview guide was initially classified into six sections. After the pilot study, the first section, which encompassed the meaning and definition of textile design in general and apparel design in specific, was removed for reasons; to reduce the time of the interview session, to eliminate the source of information that could be acquired from alternate sources and also to focus more on experiences and point of views of respondents on design related activities and prospects. The interview guide comprised forty-five questions and five sections as follows.

Section 1: The role of apparel designer in the development of the apparel sector

Section 2: The contributing factors of Textile product development

Section 3: Aspects of Textile design innovation

Section 4: Design Components in Apparel Product design

Section 5: Prospects of Textile design innovation for Pakistan's textile and clothing export industry.

(The interview guide is attached in ANNEX VI)

#### 4.7.5.3 *Probing during the interviews*

A naturalistic design unfolds or emerges as fieldwork unfolds (M. Q. Patton, 2015, p. 44). This approach (fixed question- open response) makes it possible to report proportions, correlations, experiences, and meanings (Weiss, 1994). An empathetic, strategic approach to interviewing young designers led the qualitative data collection because this could offer a better opportunity to form a holistic perspective on design innovation. Patton explains the empathetic approach as “interviewing seeks vicarious understanding without judgment by showing openness, sensitivity, respect, awareness, and responsiveness” (M. Q. Patton, 2015, p. 40). He further explains that the holistic approach assumes that the whole is understood as a complex system more significant than the sum of its parts. During interview sessions, considering the idea of empathy and a holistic approach meant that the designers as interviewees were considered the sources of knowledge segments. Their experiences and point of view were recorded as statements with diverse perspectives on design as an activity and units of information that could lead to a unified piece of knowledge upon compilation in the later research stage.

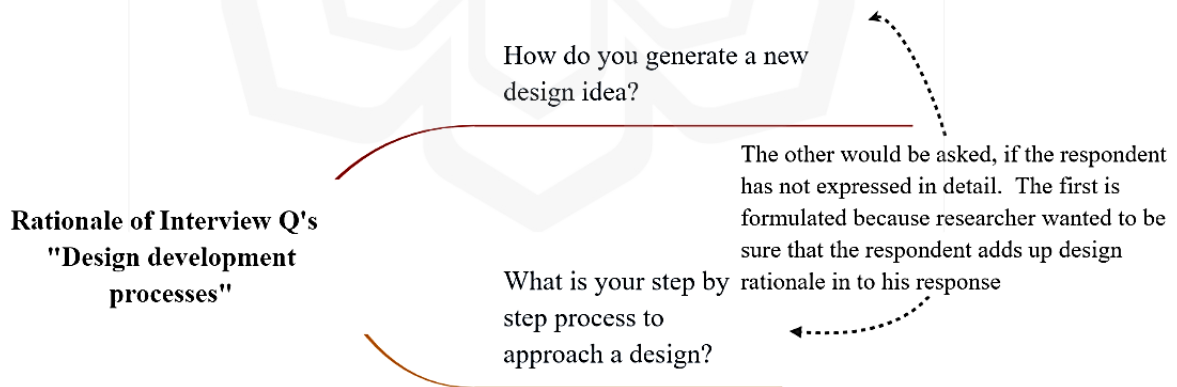


Figure 4.4 Sequence planning of interview questions, developed after the pilot study

Therefore, the questions were planned to probe the respondents on sharing their experiences, and they related one after another in the five main sections. Therefore, some were skipped, whereas others were rephrased to achieve good information. Figure 4.4 exemplifies how questions were planned to be asked during interview sessions.

#### 4.7.5.4 *Thematic analysis of semi-structured interviews*

The information concerning experiences, norms, designers' practices, and influencing factors on apparel product innovation was collected during interview sessions. Inductive analysis of semi-structured interviews was initiated to construct themes and categories that later formed the findings of this research and guided to build of a framework for apparel design innovation.

Some central themes, for example, the scope of apparel designers, aspects of apparel design innovation, factors that affect product development, and limitations of Pakistan's T&C industry, were the starting point of thematic analysis that was organized from the research objectives and questions of interview guide were aligned accordingly (ANNEX VII). The interview data was deconstructed and reconstructed to label codes, and codes were clustered to develop themes, concepts, and meanings (Braun & Clarke, 2006; Merriam & Tisdell, 2015).

To label codes and derive sub-themes, a semantic approach to transcriptions was applied while handling the data because designers were selected purposefully, and those interviewed had developed several collections and had completed some projects. Generally, they were clear about their point of view, and for most of the questions (sec1-4), they were asked questions related to their practices rather than their assumptions. The thematic analysis involved consolidating similar and dissimilar thoughts of interviewees on their lived experiences (through coding), reducing text and interpreting what they said. The consolidation of interview transcripts was done to make meanings of interview transcripts. The interpretation of transcripts was based on what the interviewees said, artefacts that were shown during the interview and what the researcher observed during field observation.

Observations then established the themes and sub-themes, and intuitive understandings were gleaned from interview information. Figure 4.5 exemplifies the process of knowledge accumulation through coding, meaning extractions, and the creation of themes and sub-themes out of rich interview transcripts.

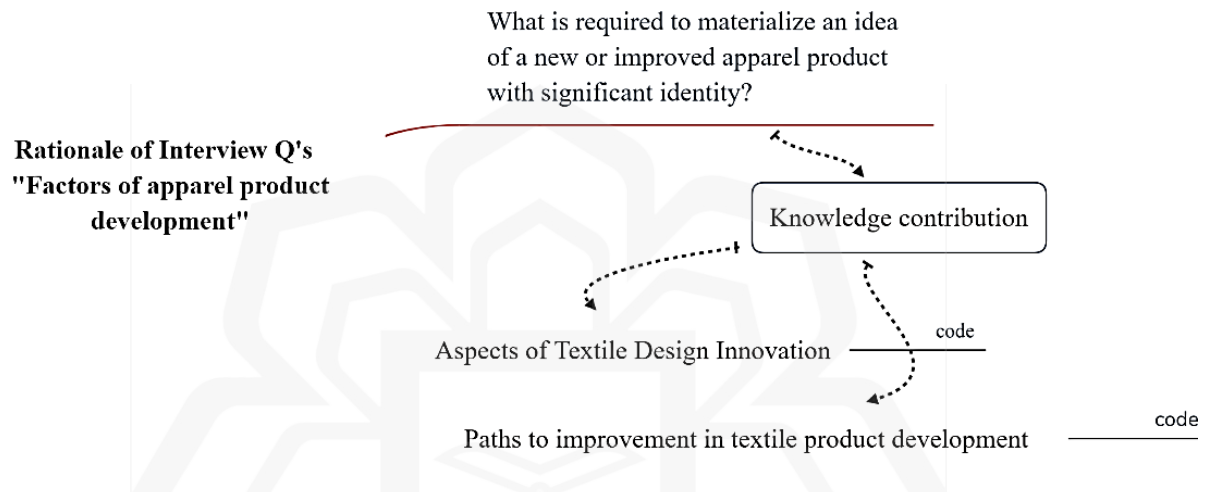


Figure 4.5 The grouping under the main knowledge components of the interview guide

#### 4.7.6 Sampling Design

It was initially considered essential to know the variant sample characteristics to understand what, where and whom to choose for the unit of analysis. The qualitative nature of the study guided the researcher to identify numerous sites that could be visited, activities that could be observed and people who could be selected purposely for interviews (Merriam, 2015) (Ritchie, 2003). A list of sites for field observation and interviewees was required to review potential entities. There was no data service available with APTMA, nor has any association of designers that had managed data on designers' placement within the industry. So, the records and reports of textile and clothing organizations in Punjab, Pakistan, were reviewed to know about the designer's profiles within the Punjab region. An inventory of

Textile apparel industries was prepared. The data for the inventory was collected and verified by the sources explained in 4.7.1. The visited firms' human resource departments provided the names of potential interviewees. This qualitative inquiry aimed to develop a framework for designers to pursue innovation in apparel design, so the designer's profile was evaluated according to the already set criteria.

The inventory of the apparel industry identified approximately 170 apparel setups in Punjab. All did not establish design departments; some did not envision product design as their firm's capacity, and some relied on design outsourcing. In the firms that had established design departments, the number of employed designers varied from 3 to 75, depending on the size and work nature of the company. The designers were employed for product development in different textile applications. Hence to represent each group within apparel design various applications, the sample design followed stratified sampling in the first stage. The industry inventory had already identified apparel firms with the product specifications.

The number of firms in each product category varied. According to the selection criteria for field observation, two classes were eliminated for field observation and semi-structured interviews because no design departments existed within the companies. A selection of two firms from each category (five types) was selected for field observation. Later after data analysis, a focus group discussion panel was decided by evaluating profiles of the key personnel in the field and based on the availability of the shortlisted profiles.

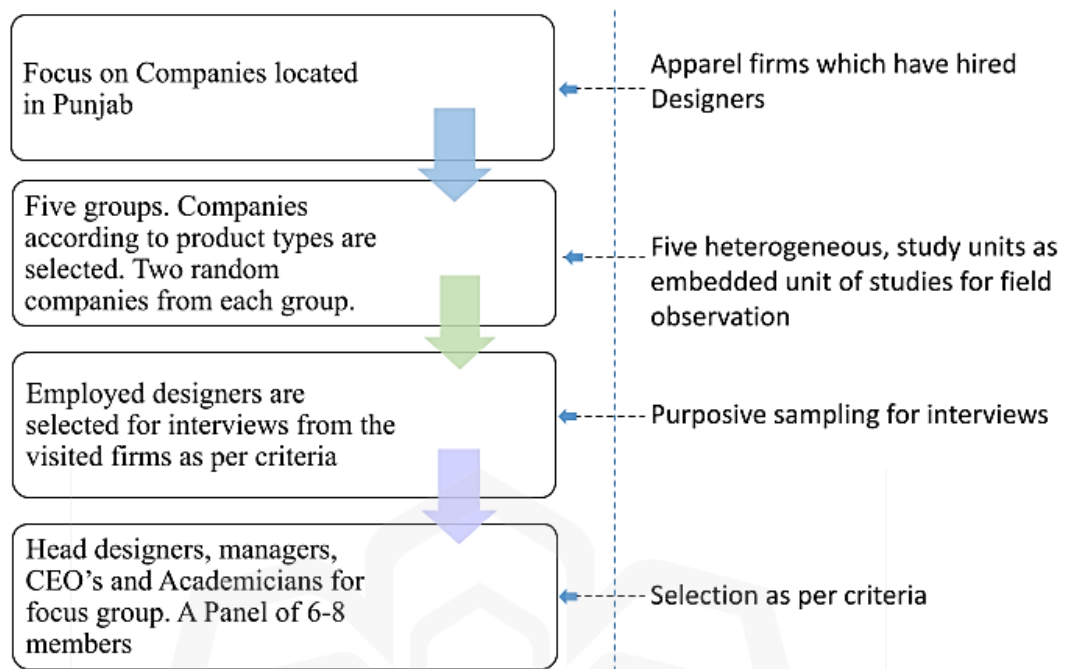


Figure 4.6 Sample selection design for primary research

#### 4.7.7 Selection criteria

Apparel setups for field observations and respondents for semi-structured interviews were to be selected. The criteria for both data collection methods were executed.

##### 4.7.7.1 *Clothing Industries*

Industries producing finished textile clothing products were selected because it was already established in the literature review that designing for upstream markets would require capacity and skill to make innovative textile products in grey fabric and a complete finished product ready to be displayed for retail. The textile industry in Pakistan, which can produce finished products, is mainly situated in industrial areas/neighbourhoods of Karachi, Lahore,

and Faisalabad. Faisalabad and Lahore are located in east Punjab, whereas Karachi is the capital of Sindh Province.

The study focuses only on Punjab. The reason for selecting the Punjab region is also that according to Punjab Board and investment and trade report 2020-2021, Punjab has the most significant share in the textile industry, and around 70% is based in Punjab province.

Focusing on the Punjab apparel sector for fieldwork was based on the rationale that;

- Around 70% of the textile industry is based in Punjab province.
- Punjab has a higher percentage of product innovations that are new to the world and new to the market that covers both; technological and non-technological innovation (Wadho, 2018)

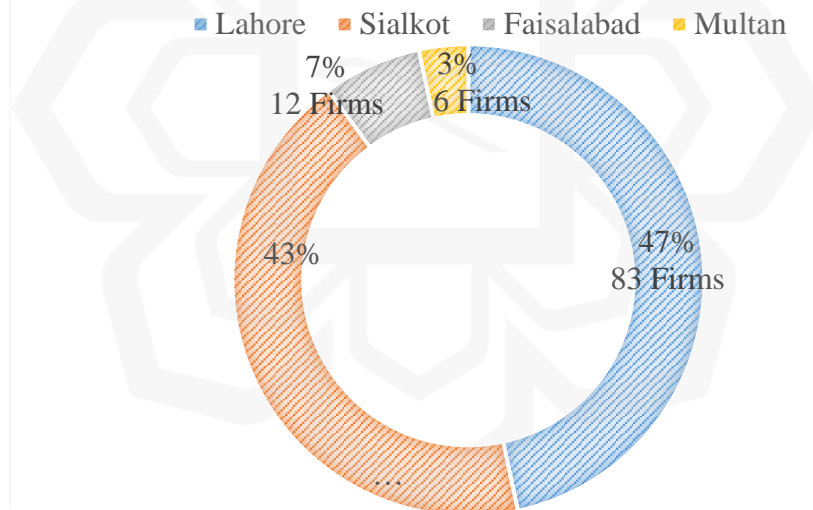


Figure 4.7 City-wise distribution of the apparel industry within Punjab

Source: Adapted from Pakistan Readymade Garment Manufacturer and Exporters Association (2019)

Four districts in Punjab (Faisalabad, Lahore, Multan, and Sialkot) were identified as apparel manufacturing hubs (Figure 4.7). Many industries in Faisalabad and its neighbourhoods

have established design houses in Lahore. Some industries also have their processing and finishing units near Lahore. A few small industries are situated in Gujranwala and Kasur. The grouping for stratified random sampling of the firms was done according to the product line. In case one firm producing more than one application was grouped with unit type details. For semi-structured interviews, the purposive sample was drawn by observing designers' strengths in the creative department, and two from each product group were selected.

#### 4.7.7.2 *Designers as interviewees*

A criterion to select designers was set. During the preliminary field visits, information regarding designers was gathered. The HR departments provided information regarding designers who were employed with more experience and who had worked in multiple design houses. A list of qualified designers was formed according to the following criteria. During the last industry visits, designers with more experience or who had worked in more than one industrial setup were randomly selected from the list.

- They must have experience in developing collections for industrial projects.
- They should have worked in more than one industrial setup to eliminate any biases with one particular form. Such respondents are likely to be capable of identifying a general theme on design practices within the apparel sector and narrating diverse experiences.
- Preferably has worked in both setups as domestic and export, so that they can identify the differences in work patterns, if any.
- The respondents must be able to reflect on the design issues with good reliability in their thoughts.

In terms of the number of service years, the respondents that had the most experience working in the firm were approached for the interview session on priority, resulting in the selection of most respondents for interview sessions as team

leads. However, it was not set as criteria. Table 4.8 explains the respondent's profiles.

Table 4.8 List of respondents

Type	Respondents (Code Name)	Designation	Experience	
			Duration	Number of employment
Fashion apparel	Bilal Ahmed (FA1)	Design Team Lead Sapphire Textile Mills	12years	2
Fashion apparel	Areena Khan (FA2)	Design Team Lead Nishat Linen	10years	3
Traditional apparel	Salman Afzal (TT1)	Creative Head Belismio Crafts	13years	2
Traditional apparel	Noor Gillani (TT2)	Senior designer Generation	8years	2
Active wear	Beenish Rehman (AW1)	Creative head (LHR) Masood Textiles	10	2
Active wear	Ahsan Khan (AW2)	Senior Designer Interloop Pvt.	11	3
Denim wear	M. Mateen (DM1)	Senior designer U.S Apparel	8	3
Denim wear	Haider Ali (DM2)	Head product dev. Cotton Web	14	2
Processed Fabrics	Imrat Saeed (PF1)	Jacquard Designer Kohinoor Textiles	12	3
Processed Fabrics	Mannan Haseeb (PF2)	Senior Designer Sana Safinaz	7	4

#### 4.7.8 Reliability

One of the main concerns during research design was understanding the phenomenon of interest from an apparel professional's perspective, not the researcher's. The methods

applied for data collection, such as semi-structured interviews and field observation in naturalistic inquiry, supported the idea of avoiding biases. During interviews, the respondents were asked to validate the researcher's comprehension of their answers at the end of each section. The affirmation of their responses was done to check the content's accuracy and to avoid contradictory interpretations of their responses. The information acquired from verbal communication of designers was verified with a field observation checklist, photographic documentation, and analysis to avoid any uncertainty. The data analysis followed an inductive strategy so that meanings and interpretations are led by the professionals' understanding of their work processes.

#### **4.7.9 Limitations and the alternate solutions**

Innovation is a subject that sometimes discourages photographic documentation of design processes. Some offices did not allow visual documentation of the designs during the fieldwork. Alternate solutions for visual documentation of collections were considered as field notes, published company catalogues and checklists.

### **4.8 FOCUS GROUP DISCUSSION**

#### **4.8.1 Objectives of focus group discussion**

Content analysis of literature and thematic analysis of semi-structured interviews was done to discover themes and theories practised in design houses. The analysis of field observations and semi-structured interviews led to the proposed framework for design innovation in textile product design. Practical and theoretical limitations in analyzing and interpreting qualitative data could lead to unreliability and subjectivity. So the validity of the proposed suggestions was validated by conducting a focus group arranged among the

professionals; R&D heads, design managers, and design Academicians. The focus group discussion was analyzed with a deductive approach because the objective was to validate and verify correlations and the importance of determinants.

#### **4.8.2 Criteria for Focus group discussion participants**

The exploratory study of the designer's experiences and work processes concluded aspects of design teaching, design practice and management in design houses, communications of corresponding departments, and supportive work environment to enhance design innovation. This required validation of results by the professionals involved in any of the mentioned aspects. Therefore, the focus group discussion was planned with the following professionals:

1. Apparel design academicians from textile/ apparel design universities
2. Head designers and creative heads of design departments within the apparel industry
3. R&D and production managers
4. CEO of the related apparel industry

The focus group discussion panelists were professionals from Punjab province's four apparel hubs (cities) (Appendix H). The focus group was conducted online in a two-hour session to resolve the time and distance issue. The panelists were introduced to the key findings and recommendations on the framework. They were asked to validate the proposed framework, and their responses were noted down. The proposed framework was modified according to the responses. A copy of the edited framework was later circulated amongst the panelists for further verification and validation.

## 4.9 CHAPTER SUMMARY

This research aimed to propose a framework to enhance the product innovation potential of Pakistan's textile and clothing industry. The critical investigation of the effectiveness of design practices of design-related industrial departments in providing apparel product solutions was intended. The insight into design practices was believed necessary to understand apparel design as a creative phenomenon in proposing multiple dimensions of the activity that lead to innovative products. Qualitative research means that novel problems or opportunities that have not been thought of otherwise can be exposed. In this research, the problem statement aimed to find meaningful insights about design processes and practices that lead to innovation in Textile product design, and qualitative research methods for the initial phase seemed a suitable option. The first two research objectives are related to current design practices, experience, and perceptions of designers and design firms. That is why the phenomenological empirical research approach directed the data collection process by selecting mixed sampling techniques, first stratified, then random/purposive. The naturalistic inquiry encompassed a research strategy to select data collection methods. The research design followed content analysis of published sources and concurrent research tools for field observation 1) checklist and 2) semi-structured interviews were conducted. 3) Focus group was conducted with the selected industrial and academic representatives to validate the recommended framework for apparel design innovation.

## **CHAPTER FIVE**

### **RESULTS AND FINDINGS ON APPAREL DESIGN PRACTICES IN PAKISTAN'S APPAREL SECTOR**

#### **5.1 INTRODUCTION**

This chapter has contributed to overcoming the shortage of research on apparel design as a sense-making process that enables the development of meaningful contexts by linking innovation with the personal and social needs and aspirations of communities in general and the T&C industry in specific. It elaborates the information collected through data collection methods; company profiles, semi-structured interviews, field observation, and focus group discussion. The data helped develop a framework for apparel product innovation. The chapter also reflects on the research findings conducted to explore the potential of innovation within the apparel industry of Pakistan. The chapter is divided into five parts. The first part establishes an overview of apparel design practices and industry categories subject to study. The second part defines the shortcomings and strengths of the apparel sector for product innovation. The third part summarizes the key factors related to apparel design innovation. The fourth section reports the meanings and perceptions of apparel design innovation. The fifth part discusses the findings and concludes the chapter.

#### **5.2 RESULTS OF APPAREL INDUSTRY INVENTORY**

The literature revealed that the apparel industry of Pakistan is distributed in two central regions, Punjab and Sindh. The research scope focused on the Punjab region based on the evidence that this region covers most of the apparel setups dispersed in different cities of Pakistan and more applications, including sportswear, denim, printed woven fabrics,

knitwear, safety wears, and leather garments, martial arts and military wear are produced here. In research on apparel innovation, Waqar Wadho(2016) investigated that Punjab, despite being the central hub of apparel, product innovation is less than the innovation in Karachi apparel firms(Wadho, 2018). The innovation rate of Punjab also became a cause of interest in the Punjab region because the study aimed at developing a framework for apparel design innovation following the industry's weaknesses.

During the literature review, it was discovered that there was no data available with the T&C organizations and associations to guide about the product range, design departments and the number of employed designers in the apparel sector. An inventory of the industry was prepared from the following sources to develop an insight into the apparel sector;

1. List of registered members of Pakistan Readymade Garments Manufacturers & Exporters Association (North Zone)
2. Company Profiles and official websites
3. List of members of Pakistan Fashion design Council (the brands with retail business only, Lahore Chapter)

The inventory gathered information in the followings domains;

1. The city-wise distribution of the apparel industry to locate potential industrial setups for field visits and any such use of information that would be helpful during the development of the innovation framework and its implementation.
2. Product range and product types of enteries to analyse each category's production capacity and issues.
3. The firms that hold businesses in exports and domestic markets.
4. To identify the firms that hold design departments. This information helped in approaching interviewees and also in the selection of field visits.

### 5.2.1 The city-wise distribution of the apparel industry

The LR related to Pakistan’s T&C industry revealed five cities in Punjab with most of the apparel setups. The inventory disclosed that the firms established in Gujranwala were not presented in the list. The reason could be the lack of interest in registering firms under the association, grouping associations with specific markets and product types, or that most of the industry in Gujranwala is producing for the domestic market wholesale. The field visits and interviews were planned for the sectors with the capacity to produce for both markets; that is why, whatever the reason could be for the absence of industry in Gujranwala city, they were omitted. Another reason was that entering non-registered firms in the list could add false information. So the potential apparel industries in Punjab are in four cities Lahore, Faisalabad, Sialkot and Multan (Figure 5.1). Lahore city has 83 apparel firms; Sialkot is second with 77 apparel setups, and the third most is Faisalabad with 12 industries. Multan has three industries producing apparel products. Besides the main apparel cities, a few registered small setups are in Kasur, Gujranwala and Islamabad.

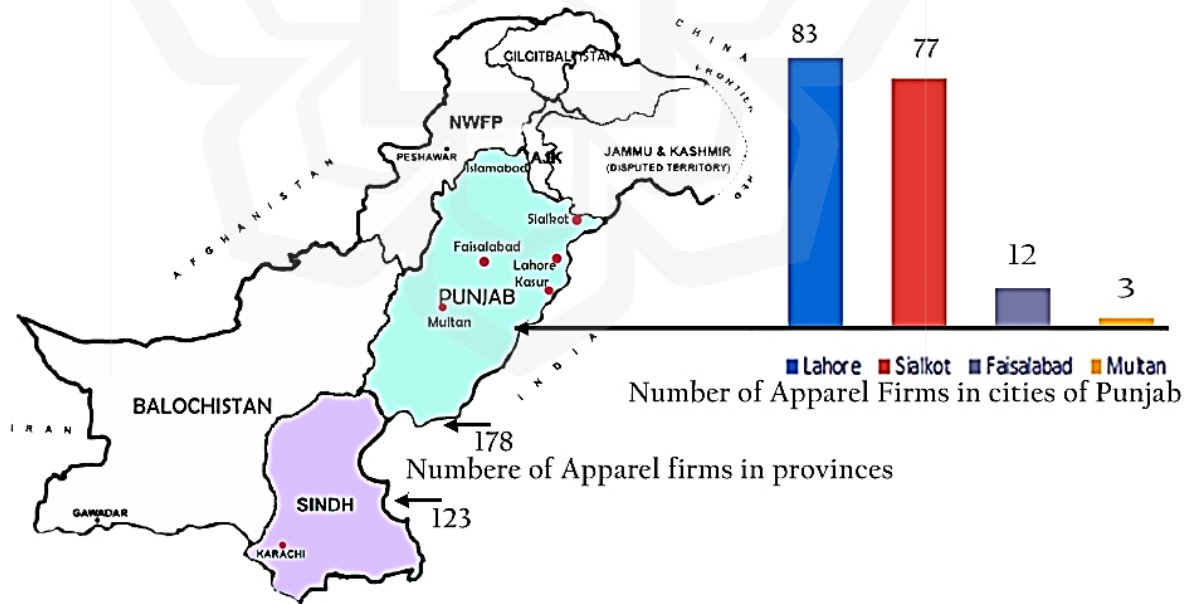


Figure 5.1 Author’s accumulation of Apparel hubs based on collected data

Source: Pakistan readymade garments manufacturers and exporters Association (*Member List*, 2019)

### 5.2.2 Product inventory in Punjab

The apparel firms in Punjab produce apparel products in seven categories. Besides these seven categories, the leather industry produces leather jackets and apparel accessories. The seven product categories are the following, and the symbols assigned to them for this research task are placed in the parenthesis;

- 1) Activewear (AW)
- 2) Fashion Apparel (FA)
- 3) Denim garments (DM)
- 4) Hosiery and gloves (H&G)
- 5) Processed fabrics for tailor-made products (PF)
- 6) Workwear, including all kinds of protective clothing (MM)
- 7) Traditional apparel (TT)

Table 5.1 presents apparel firms producing specific types and styles of products. Active wear has the greatest number of apparel firms, which is 61. Then denim sector has 43 firms, some producing fabric and stitching, whereas others have cut-to-pack facilities. Then military and work wear (38 set ups) manufacturers are primarily exporters of foreign labels. Processed fabrics and fashion apparel firms 35 and 27 mostly cater to the domestic market and produce for retail and manufacturing orders. Traditional apparels are a category that belongs to the cottage industry, and it is made through the skilled resources of indigenous crafts. Notably, some firms have sister setups to create multiple product types, so the total number of apparel firms in Punjab appears as 219 here. Table 5.2 is a visual representation of product types produced in the apparel production setups of Punjab.

Table 5.1 Results of product-wise distribution of the apparel industry in Punjab/Pakistan

AC	DM	MM	PF	FA	TT	H&G	Total Firms
61	43	38	35	27	8	7	219

Table 5.2 Author's accumulation of apparel product types produced in Punjab Pakistan

Processed fabrics (PF)

Total number: 35

Types : Dyed, printed, embroidered, patterned fabrics

Woven and mostly cotton. Printed fabrics include screen, rotary and digital.

Source: Nishat Pvt., Kohinoor Textiles



Technical garments (MM)

Total number:38

Types: gloves, bike wear, jackets and trousers, military wear, work wear, e.g. flame retardant, scratch resistant, martial arts.

Source: Escorts Advanced Textiles (Pvt) Ltd



Fashion Apparel (FA)

Total number:27

Types:

Dresses, trousers, tops, shirts, cardigans

Source: Generation Pvt. Sefam Pvt.



Hosiery (H&G)

Total number: 7

Types : Socks, Hosiery

Source: Interloop Pvt.



Traditional Apparel (TT)

Total number: 8

Types: All types of fashion apparel produced with traditional techniques

Source: Belismo Crafts, Behbood Crafts



Active wear (AC)

Total number: 61

Types: Track suits, jogging suits, leggings, tights, casual knit wear, T-shirts and polo shirts

Source: Masood textiles, Interloop



Denim (DM)

Total number: 43

Types: Jeans and multiple styles of denim wear

Source: Crescent Bahuman, Diamond Denim, Azgard 9



### 5.2.3 Product categorization of apparel firms and their city-wise distribution

The information regarding the apparel industry was first analyzed according to the product range each sector is developing. It was then observed if there was any relation between manufacturing cities and product types. The observation could identify which cities are concentrating more on design activities. Further this helped identify the location of potential apparel firms for field observation. The results revealed exciting dimensions as industries with similar types of products were clustered in different cities. Table 5.3 demonstrates city-wise distribution of apparel firm types in Punjab.

Table 5.3 Results of city-wise distribution of apparel types in Punjab

Product types	Number of apparel manufacturers in each city					Total
	Lahore	Sialkot	Faisalabad	Multan	Others.	
Traditional textiles (TT)	2	-	-	4	2	8
Activewear (AC)	12	44	3	-	2	61
Fashion Garments (FA)	22	-	3	-	2	27
Processed Fabrics (PF)	26	3	5	2	-	35
Denim (DM)	36	4	2	1	-	43
Technical, Bikers(MM)	6	30	-	1	1	38
Hosiery, Gloves(H&G)	3	3	1	-	-	7
Total number of	107	84	14	8	7	219

Faisalabad is a textile city, but most of the industry in Faisalabad is either providing industrial services or producing home textiles. Multan and its neighbourhood mostly have

traditional textile units and few jacquard weaving units. Some well-established industries have their design houses in Lahore and production units in other parts of Punjab, whereas others prefer it to be under one roof. The product range includes denim wear, sportswear, military wear, work wear, lengths of processed and grey fabrics, hosiery and leather wear.

Sialkot industry primarily consists of active wear, sportswear, and utility wear. Whereas Lahore and Faisalabad have most cotton processed fabric units, many have finishing and stitching units as well. Some of the well-established denim units are situated in Lahore as well. Besides apparel, most of the home textile industry is located in Faisalabad. Multan has many SMEs that are producing clothing with indigenous crafts of the southern Punjab region. But their representation is missing in the garment associations. They either supply in the local market, or few of them have established online and flagship stores in big cities.

Figure 5.2 explains that the most significant number of apparel firms are producing Active wear (AC), Denim products (DM) and technical apparel (MM) and the distribution of apparel firms in different cities is concentrated towards particular product types.

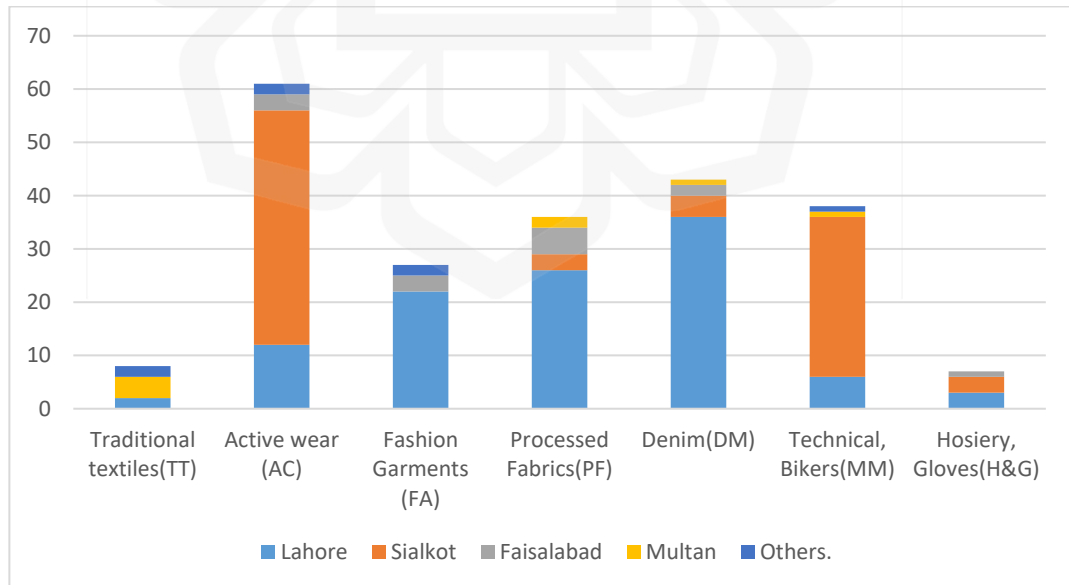


Figure 5.2 Product-wise distribution of the apparel industry in Punjab/Pakistan

#### 5.2.4 Design departments and R&D setups in the apparel industry

The representation of design departments in apparel firms is 74 out of 219, which is only 33% of the apparel sector of Punjab. Meaning that 67% of the firms have not yet availed the chance to develop new product concepts (Figure 5.3). Active wear, bike wear and other such application garment industry are mostly into exports, and compared to fashion garments and processed fabrics, these are small setups. They mostly have stitching facilities and outsource materials. So, despite being more in numbers, they have less potential to develop insight into designing because most of them have not hired designers, and now they are focusing on quality production and meeting up orders instead of developing new products. These companies focus on meeting demands from their foreign clients. Some of these industries are importing yarns from china or any other potential client.

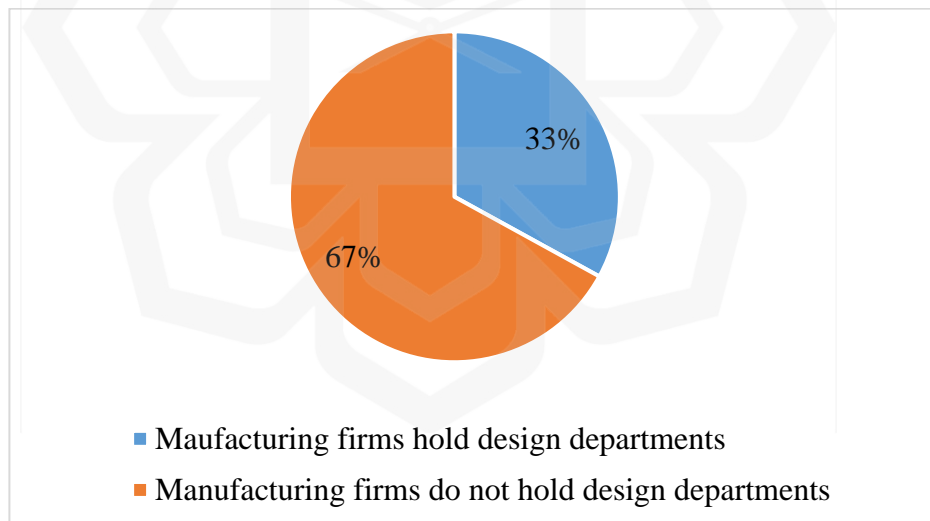


Figure 5.3 Design Departments in manufacturing firms

Some industrial firms have their design houses in Lahore whereas the production units are either in the suburbs of Lahore or in Faisalabad. Industries that produce processed fabrics and fashion garments are hiring the designers the most; most have design

departments. The activewear and denim sector has design departments, but there are some industries in these sectors which have R&D, but they do not focus on launching new products. They are manufacturing companies and provide outsourcing facilities to other apparel brands. Such setups either do not hire designers or the designer's role is not assigned as a product developer. The role of designers is discussed in detail in section 5.5.1. Hosiery and technical garments are developed without any formal existence of design departments in the industrial setups. Table 5.4 illustrates the number of apparel units under each product type that hold design departments.

Table 5.4 Industry that holds design departments.

Fabrics printed/woven and embroidered	27
Fashion garments	17
Activewear	14
Denim and denim garments	8
Traditional Textiles	8
Hosiery /misc.	0
Martial arts and bikers and military garments	0
Total	74

A comparison of the total number of firms in each product category and industries that hold a design and development department is drawn in Figure 5.4. The figure illustrates that the industry is leaning towards manufacturing; few have established design departments. The applications that deal more with aesthetical aspects, such as processed fabrics, fashion garments and traditional textiles, have established design departments.

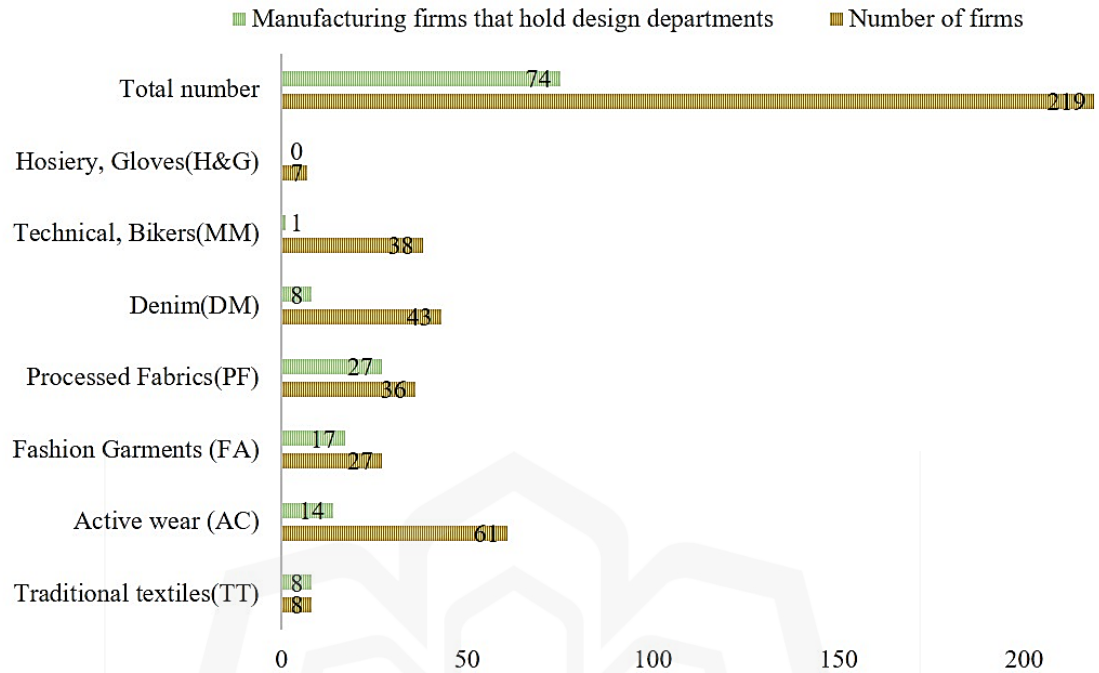


Figure 5.4 Comparison between the total number of Apparel firms and design departments

The field observation of the visited industries represented that the industries producing a wider range of ready-to-wear products have well-established design departments. The involvement of design departments in technical product developments, material manipulation and performance and R&D on fabrication is low. At the same time, these fields are showing progress in the international market because of future requirements on environmental responsibility. Many industrial setups have small design and R&D departments compared to their production capacity, so they are into basic-level innovation activities where they hire designer to facilitate their client to bridge gaps between production and order. This is claimed by observing ratio of a total number of industries in Punjab and total number of industries in Punjab that hold design departments, the number of designers hired by each industry and the job description of designers that was observed during field visits. Out of 219 industrial setups, only 74 have set up design departments.

Industries that have already developed retail and brand identity in the domestic market and are already dealing in exports, have the edge of better insights and experience in developing finished products, and they can move forward further with a stable infrastructure for aggressive innovation. Traditional textiles and hosiery products focus least on new product developments and investments in establishing large-scale units. No domestic retail brand was found within hosiery and socks though few small traditional textile setups could be identified.

### 5.3 RESULTS OF FIELD OBSERVATION AND SEMI-STRUCTURED INTERVIEWS

The results of the industry inventory identified the potential sites for field observation and respondents for semi-structured interviews to explore design practices. Ten respondents were chosen for interviews. There were five categories of design departments according to product category, so two from each group were selected. To refer to the respondent narratives while keeping their identity hidden, the codes have been used in the text instead of their names Table 5.5.

Table 5.5 Code names of respondents of Semi-structured interviews

Industry by product category	Respondent 1	Respondent 2
Traditional textiles (TT)	TT1	TT2
Active wear (AC)	AC1	AC2
Fashion Garments (FA)	FA1	FA2
Processed Fabrics (PF)	PF1	PF2
Denim (DM)	DM1	DM2

The field observations and semi-structured interviews were conducted concurrently and supported the results and findings of each method. For example, the respondent explains the design process during the interview, whereas the researcher could observe and document relevant processes during the field visit. Similarly, the respondent explained the production process, and field observations demonstrated how it is done within production halls. Figure 5.5 shows on the left the apparel product that takes inspiration from traditional textiles and machine made. On the right, the apparel product is handcrafted. The figure exemplifies the two production techniques the respondents discussed while explaining their design processes and drawing requirements for the different production techniques.



Figure 5.5 Machine and hand embroidery processes (from author's field research)

The responses revealed the interconnected yet diverse nature of design roles in innovative apparel product development. Findings conclude six central themes to find answers of the three research questions. The first three sections found answers to research question two and other countered research question three.

- 1) Factors that affect apparel product development

- 2) Components of apparel design
- 3) The role of designers in the T&C industry of Pakistan
- 4) Design processes and methods opted by designers for new product development
- 5) The required designing skills for prospective apparel developments
- 6) Design practices for new product development

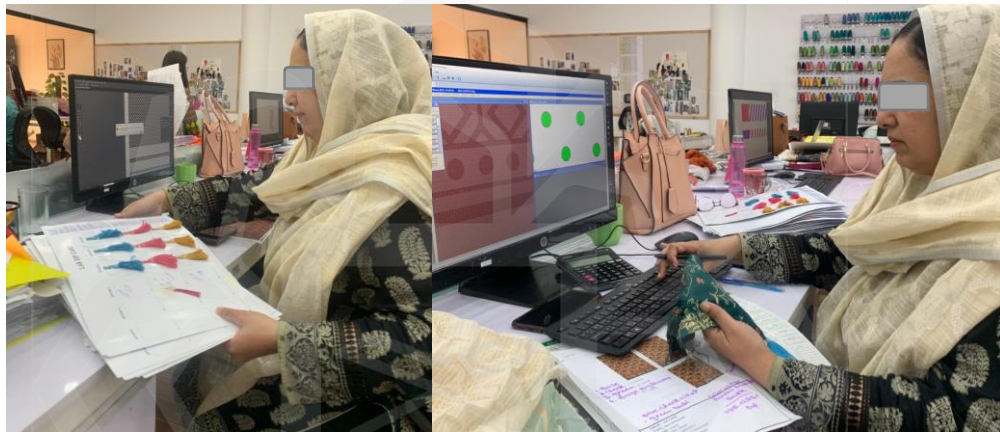


Figure 5.6 The respondent PF1 is demonstrating her design process.

Before addressing each theme individually, it should be noted that these themes are interconnected and not wholly distinct and disjointed. The meanings and contents relate, yet each section has significance in developing concepts related to innovation in apparel design. The interview guide and field observation were designed to initially investigate factors of apparel design and workings of apparel design and later to find effective strategies that contribute to new and improved product development. This sequence was implemented because the findings related to aspects of improved and new product development were dependent on the investigations related to product design processes. The description of themes followed the same sequential layout as the research questions. Each theme has its significance in the overall findings, and each identifies, supports, and elaborates the implications related to the research results. They are interconnected and gradually built up on understanding related to novel approaches to apparel design.

Given that, each theme has its signified value, yet they have integrated connection, each is discussed concerning others and lines between them are frequently overlapping and interrelated. The findings are discussed in three main sections following RQs, as factors of apparel product design, current design practices and aspects of new product development. The following paras discuss each central theme and its sub-themes in detail.

#### **5.4 FACTORS OF APPAREL DESIGN INNOVATION IN PAKISTAN'S APPAREL SECTOR**

The study on determinants of new product development and apparel design innovation identified some factors influencing apparel design innovation in Pakistan's T&C sector. It developed familiarity with the factors in product development processes. It verified those factors identified during L.R. Though the results of data collection methods further added to the list of apparel design innovation factors.

##### **5.4.1 Conscience urges to innovate.**

The motivation to develop new ideas by applying enhanced design tools and methods affects new product development. DM1 contributed that design developments can be initiated with a conscious will of the designer to push back conventional product ideas during ideation. He contributed that most designers consider practicality and limitations during the initial design stage and develop product concepts intuitively. Later the design ideas are evaluated, modified and transformed based on the designer's experience. AW1 expressed that the client's descriptions direct mostly the design briefs, so there is less margin to think out of the box. She said,

“It would be good if the local designers are trained in such a way that they can identify innovative design briefs on their own. Well, this requires their employer’s full confidence on them”

#### **5.4.2 Pursuance of original design ideas and designing methods**

FA 1 expressed that it is important to generate new and original design ideas instead of starting up with the references and references that designers usually consult and manipulate in the early stages of design development. PF1 explained that print designers do not start with their drawings. Rather they download images and patterns from various sources and develop a new version of those images into textile patterns. The process results in trend following instead of becoming trend making. AW2 showed the initial design development processes and expressed the visuals he collected to start his creative process. He explained.

“We initially received a brief from our design team in a foreign country. Here in this office, we collect different visuals from web searches and trend boards. We intentionally keep images that relate to our production capacity. Then take out styles and cut lines from them.”

#### **5.4.3 Discovering new technologies and techniques**

DM1 expressed that whenever some new techniques and technologies are trending, the management is asked to get them. The management evaluates the worth of investing in it. She recalled her experience of getting introduced to laser printing a few years ago.

“Our client brought up a sample that had this new effect. Our team asked to get this machine because we knew it was trending.... but at first, we looked up for outsourcing. The next season they realized it can be bought...so we

work as trend followers not as trend setters in introducing new techniques and technologies.”

DM2 shared the idea of introducing new technologies as his strength of designing. He proudly shared that he consciously incorporates new techniques into his design developments. He expressed that this gives him an edge in looking new garment effects. He recalled;

“Once I was working for ZARA, I did some strange, wild effects in patchwork on denim. Well, I knew ribbed fabric patchwork on jeans pockets would not be practical. Later I developed further. And you know what! We got a good number of orders on that collection.”

PF1, assigned to digital designs for woven fabrics, explained that their excellent command of digital tools and advancements in the soft wares used for design development over her fifteen years of experience had accelerated the design development process. Whereas the TT2 working on traditional fabrics expressed that technological advancements are necessary, they are not required for his design development process. He described the importance of new tools and instruments for diversity, but meanwhile, he presented reservations about using such “shortcuts” for the design development process of traditional garments.

#### **5.4.4 Investment in design research projects**

During the interview, DM2 recalled one of his experiences in a design research project when he experimented with processing techniques of denim and developed new effects on denim that helped the company develop value-added products. He said that the apparel sector currently invests in technology, but it is mainly done to buy new machinery. The industry lacks investment in design research projects that can lead the product development processes toward patents.

FA2 and PF1 explained that they work in a team with their other design team members. They explained that the team started the process with discussions and decided on mutual themes. “It is very much loaded in terms of short time limits,” says FA2. So they admitted that the focus remains on producing designs for the running market.

AW1, who works for an international client, explained that the focus during design development remains on the requirements of the client. He explained that the design team do work on experimental projects when it is intended to be displayed in exhibitions. So the investment in design research projects happens in his firm to attract clients. None of the respondents recalled any such activity on the design department floors purely in the quest of research, without a cause of bringing good business to the upcoming collection. So long-term investment in design research doesn’t happen.

FA1 responded, “Well, as a team lead, I always encourage experimentation” somewhat similar responses were recorded from DM2 and TT2. But this experimentation refers to the ideation phase of their design process, where the apparel designers usually develop multiple interpretations of their selected inspirational theme. The research-oriented design projects with design universities were recalled by two of the respondents, FA2 and TT1 which their employer planned in collaboration with the universities. Since the checklist had a section regarding the similar inquiry the results of checklist in this regard presented that only 30% of the industry had participated in innovation projects internationally out of which most of the projects were based on the creative use of already available techniques and technologies in their product developments.

#### **5.4.5 Short time limits in fast fashion**

The term “collection” in apparel design refers to a certain number of products launched together and made available to clients. The collections are usually planned according to the season and mainly follow two seasons spring and fall. Then there are a certain number of midseason collections that apparel firms decide on their own. The fashion apparels develop the most collections during one year because more than one midseason collection is also

launched. The designing of collections happens a season ahead, and because the designers working for processed fabrics apparel work in accordance to the schedule of fashion apparel, they also end up with similar schedules, timelines and frequency of producing designs in each collection. Fast fashion, both in terms of the product and activity, challenges the concept of NPD because design interventions and productivity is compromised to meet deadlines (Ballie, 2014; Jin Gam et al., 2009; Niinimäki et al., 2020). FA1, FA2 and TT2 shared the time constraints to complete collections in short timelines. The designers worked on already available patterns, downloaded digital imagery of various resources, reproduced motifs to develop quicker results. They realized that the compromises on innovation and creativity are made at the cost of short timelines.

#### **5.4.6 National and firm-level design strategies**

Some firms focus on their design philosophy and strategize; accordingly, for example, both firms which produce traditional textiles focus on native textile production techniques and traditional patterns. TT2 expressed that they would lose their clients if aesthetics were carried. However, the designers working in denim and active wear firms expressed that they develop as per their client's design philosophy. This is so because these firms are focusing on manufacturing. The visit to the display rooms of these firms illustrated that both denim and active wear firms had developed a wide range of fabric qualities in cotton. The respondents DM1 & 2 and AC1&2 all pointed out that there are no such design strategies and policies within firms either on the national level. They explained that design policies on a national level would provide strong foundations for value addition and product enhancement.

#### **5.4.7 Design collaborations**

The whole can be more than the sum of parts (Trott, 2008, p. 204). Design activity is realized as collective activity and individual in the textile firms. To develop innovation, enterprises

can collaborate with academic institutions or other enterprises that would profit from its development. Various factors determine collaboration. During data collection following practices were observed regarding collaborative activities within design firms;

- Collaborations with production teams to develop new fabric textures and surfaces. (PF1 & FA1)
- Collaborations with international designers so that the tastes and aesthetics of global markets can be learned (AW1)
- Collaborations with design institutes would introduce design experiments into fast fashion because, during busy timelines, there is no time for the employed designers to pursue them otherwise (FA2)
- Collaborations with design academic institutes will prepare the design students for practical implications and their skills to be mastered. (FA2)

Though the respondents realize the importance of collaborations on different levels, they explained to develop strong networks further. During field visits, teamwork in apparel design firms was observed on the following levels.

- The checklist results presented a collaboration with researchers and academicians for new product development. 54% of the firms claimed to collaborate with design institutes, but the internships of young designers were considered part of these collaborations. Other than internships, some design firms develop design briefs for young designers, and they develop solutions within studio environments (Figure 5.7). Notably, no research projects were found within the industrial environment where design teams would collaborate on post-graduation and doctorate levels.
- The checklist results show that 67% of firms refused to have any such activity to be considered as collaboration with research centres on the national level in the design and product concept development domain. They hence showed some collaborative projects that happened nationally in their production departments.



Figure 5.7 Collaboration with design universities and technical institute, Source: author's collection from field visit of firm type Traditional apparel

Teaming up with native designers from the prospective market, skill development and design trainings to compete with international designers, Teamwork with fabric development teams, R&D or production departments, and innovative production processes and techniques were missing from the design practices. There are design houses and research teams that have been working on innovation by forming groups on different levels of product development. The recorded design processes exposed that some team work happens during identification through brainstorming sessions to identify themes and visual references. Then the tasks are assigned separately to each designer. The fabrication happens with either fabric designers or production teams. Respondents engaged in apparel styling mentioned improving coordination between design and fabrication teams.

#### **5.4.8 Alternate and new materials**

Innovation in apparel design relies stalwartly on the innovation in textile fibres and materials because they are building blocks of an apparel product and can be a good source

in improving the performance of textile and clothing products (Frumkin & Weiss, 2011). DM1 and AC2 explained that they usually develop cotton and cotton blend products. FA1 expressed that they have resources in Pakistan for cotton, but the fashion products that require new textures and hand feel are mainly outsourced from other countries. She explained that some fabric manufacturing firms are designing fabrics with a wide range of options; however, they are insufficient in terms of quality and variety. They still need to import fabrics for specific products. FA2 expressed that the trims and accessories used to style garments are mostly imported because there is hardly any accessories manufacturing. He further insisted that designing these articles is also lacking other than manufacturing trims and accessories. Notably, fashion apparel designers engaged in fast fashion do not mostly design trims and accessories like buttons and cords but team up and outsource these materials. The following dimensions were discovered regarding the benefits of alternate and new materials in developing innovative products during data collection.

- To design products in materials that are new to the market
- To design products with features that have not been introduced earlier.
- To improve the functionality of the product
- To design a new product range and product type



Figure 5.8 Outsourced fabric qualities by FA1 to overcome market deficiencies

#### **5.4.9 Exposure to international market trends**

It is common for designers to observe international market trends to observe liking patterns. Traditional textiles are the one product type that would not prefer to follow global trends in terms of textile surface, colour, and patterns (TT1); however, this method can help identify product function and functionality (TT2). The importance of this notion was realized by observing universal choices and requirements of users that users develop as a reaction to their social activities. This phenomenon could be beneficial in developing the relevance of design with user choices (AW2).

#### **5.4.10 Extrapolation of future markets and future challenges**

The action of estimating or concluding design elements and product features by assuming that existing apparel styles and fabric trends will continue or will change for the next season is a phenomenon that designers are conscious of during their design process. FA1, FA2, PF1, and PF2 particularly stressed the idea of extrapolating future markets and challenges that these thoughts hammer them during their design activity. They expressed that during the last stages of designing, their and their team member's ability to predict a design idea's success works as evaluation criteria to select ideas that should be filtered for the fabrication stage of design. FA2 expressed that after his design team generates design ideas, the designer's team meets up to discuss the designs of each designer. He contributed that they try to throw new ideas into the market, not always designing for conventional solutions. He elaborated on the subject matter of their discussion,

“In case they will change, then what trends would be there? Sometimes designers design some products with new styles and materials to evaluate the market pulse. But it is not a frequent habit. The products produced to extrapolate future markets tend to develop new trends and markets.”

#### 5.4.11 Focus on design significance.

The design inspirations and themes of the interviewees were recorded. Designers working on women's fashion apparel (PF1, PF2, FA1, FA2, and TT2) for retail focused on four to five inspirations and themes for their seasoned collections. Six out of ten respondents presented the themes and design concepts generated from the traditional textiles of different world regions. The frequent use of traditional textile patterns in apparel designs and the replicas of hand-crafted fabrics produced on industrial machinery was also observed during field visits. They showed that the textile designs of Pakistan are rooted in the region's handicrafts. The traditional techniques as sources of inspiration included cotton weaving, block printing, thread embroideries, and metal and mirror works. Figure 5.9 illustrates the frequent use of traditional themes in apparel designs. The picture shows an overview of design developments within a design house, with various fabric developments inspired by traditional textiles.

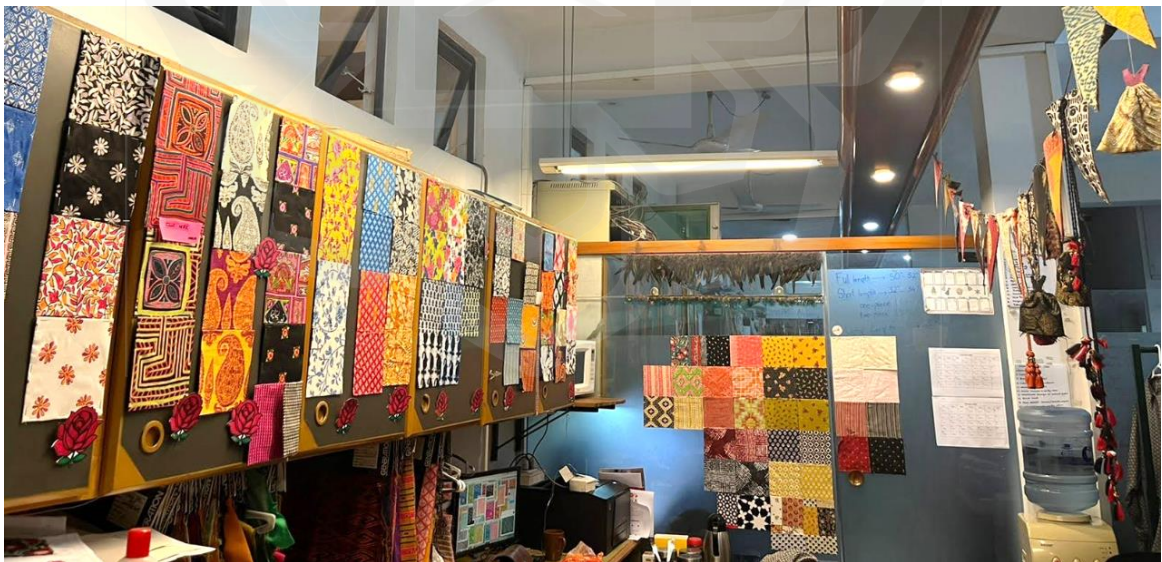


Figure 5.9 An overview of the designer's desk at one of the field observation sites

Design significance is realized important by designers, and they try to achieve it by combining product design elements so that the product represents a particular style and

aesthetic expression. The different combinations of design elements help designers build up their style and presentation that might signify design as their specific style of expression. DM1 explained his understanding of design identity: "Design significance refers to the quality of developing product that holds a strong identity which makes it different from others." He believed that it is the prime task of a designer, and that's how designers are differentiated in their job description from the production team. PF2, the respondent working on processed fabrics, explained that design significance could be achieved through combinations of design elements and components so that the outcome differs from what is available in the market. Figure 5.10 exemplifies two dress designs by TT1 and TT2, respectively, inspired by traditional arts and crafts of Pakistan. Both designs represent two different styles and personas.



Figure 5.10 Dress designs by TT1 and TT2 on personal/cultural identities, two different personas from similar theme selection (from field observation)

DM2 argued that significant identity is mandatory for new and diverse product development. The opinion of TT2 provisions that significance in design can be achieved by following a clear statement relating to design philosophy. A distinctive design philosophy is rare, and an almost similar pattern that focuses on manufacturing rather than new product development is adopted at the moment that can be challenged. There can be

many other ways to develop designs with significant identity. However, traditional textiles, native textile patterns, and the revival of old crafts are strong examples.

The results related to design significance were diversified and presented that for designers of different product types, the idea of bringing significance to their design varies. The designer who develops textile patterns and motifs considers significance accordingly. In contrast, traditional practices and activewear designers expressed that significance shall be introduced through material type and production techniques.

#### **5.4.12 Attention on SDG**

Sustainability goals and certifications are considered part of the production process and an assurance of quality control. The field visits to firms producing for the domestic retail market did not maintain any sustainability certifications though they presented their working codes and human resource rules. All the visited export firms had some sustainable product and production certifications. AW1, AW2, and DM2 respondents work in firms with sustainable certification. They both expressed that their company has certifications to maintain their client's requirements, which is handled in the production department. They further explained that the design concepts do not usually originate with any such concept. Rarely did they use organic materials, but only as per their client's demands. However, TT1 shared his experience using sustainability and organic materials as his inspiration during epidemic days and designed products that received a good response.

#### **5.4.13 Summary of factors discovered in collected data**

As was established in Chapter Three, the literature on design innovation factors for Pakistan's apparel sector lacked deep insights. The field observations and semi-structured interviews revealed some aspects of design innovation. Some of the factors were similar,

as identified by previous studies. Still, they expressed clearly the design activity, whereas some factors discovered during data collection were revealed that were not identified during the literature review. The factors that found relevance in the previous studies, such as “little usage of manmade fibres as alternate to cotton,” identified in previous studies were further elaborated by the respondents. At the same time, they explained that designers need to suggest and use alternate and new materials when they develop new product concepts.

Similarly, it was exposed in previous studies that limited research and development compromises new product developments. Results of collected data further elaborated that lack of research and development is caused by less participation in design research projects, usage of alternate materials, and the deficiency of conscious urge to innovate during the design process because of short time limits, urge to follow trends, and unwillingness for risk-taking, etc. Figure 5.11 sums up factors of design innovation that were discovered during research. These factors influence apparel design practice, which shall be addressed in developing a framework for apparel design innovation in Pakistan’s Textile and Clothing sector.

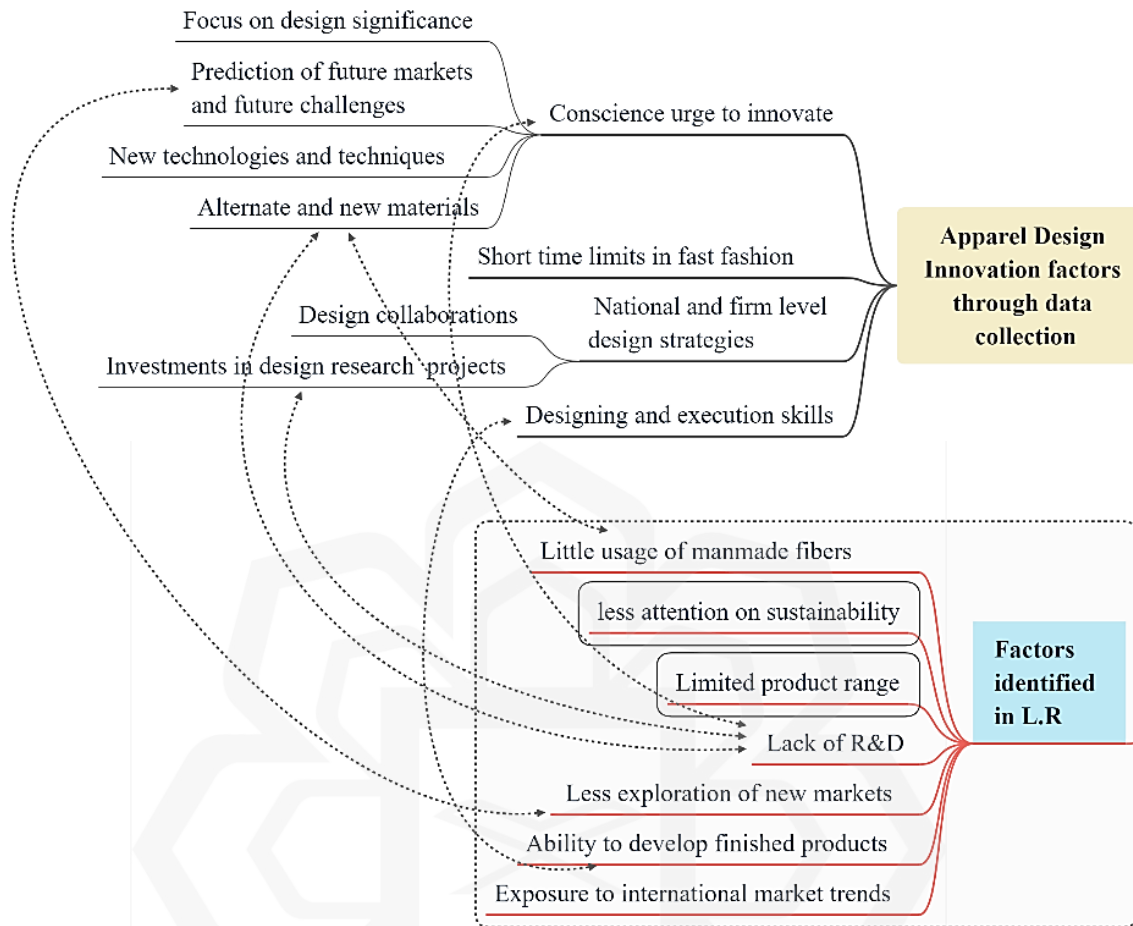


Figure 5.11 Apparel Design factors that influence product innovation

## 5.5 APPAREL DESIGN PRACTICES

### 5.5.1 The role of designers in the T&C industry of Pakistan

The responses reflected the interconnected yet diverse nature of the designer's role. The interview transcripts revealed that recruitment of designers in the apparel sector makes them responsible for different tasks such as digging out appropriate product concepts, presenting concepts to clients, drafting customer's design concepts, and managing supply

chains and product quality. The role of designers working in the manufacturing firm's export sector differed from that of designers working in retail. Similarly, a denim designer's scope differed from the processed fabric designers. Despite some standard aspects, the product range and the firm's vision for new product development shaped the designer's role. Designers identified the following roles.

#### **5.5.1.1 *Designer's role related to product concept for improved selling ability***

Designers lead the planning of product range and specifications in the setups where designers are hired as planners. Designers are conceptualizers of product ideas that may generate beneficial outcomes. During the product concept phase, the business and profitability are set as the main target by the designers who work as conceptualizers. This observation indicates that designers focusing more on a product's sellability prefer the product's functionality as the product that benefits business and employer demands. DM2 proudly recalled his contributions to increasing his employer's business by launching products that were successful in the market. He expressed,

“I designed many designs that got approval, launched, and sold successfully.

It happens if the design is a success. It eventually brings good business.”

TT2 endorsed that whatever idea designers conceive affects the production, sellability, and consumption, and during the Product concept phase, the business and profitability are set as standard.

#### **5.5.1.2 *Designer's role in shaping the outlook of a product***

A major concern of apparel design is the appearance of the product. So the designers are mostly hired to develop the interface and appearance of the product. The designer's prime concern is all the design components that add up to the product's appearance, such as colour,

texture, cutline, stitching, and finishing details, trims. Though the interviewees identified some other components of the design as garment fittings, aftercare of the fabric, physical properties of the garment, and sustainability of the garment as components of apparel design, they mentioned that the garment's appearance is their prime concern. The rest are important and sometimes affect the appearance, lifecycle of the product, and clientele a lot, but even then, the designer's job is to develop the product's appearance. Designers in fashion apparel, activewear, processed fabric, and traditional fabrics agreed. TT1 set this designer role as a criterion to judge a designer's professional achievements by stating that a successful designer can visualize the product's final look.

The industry inventory has identified that hosiery, technical apparel, and military wear setups have not hired designers. Activewear, sportswear, and denim have fewer designers, and fashion apparel has the maximum number of designers. These facts support the idea of assigning the role of designers only to product appearance. They are not hired for the product range, which focuses more on functional and usability concerns, for example, hosiery, technical and work wear, etc. If the understanding of their professional responsibilities has expanded as the ones who develop new product solutions, maybe appearance, functionality, usability, environmental, or any other, their product-wise inductions will vary.

#### ***5.5.1.3 Designers as utilizers of resources to develop meaningful products***

Interviewees articulated that designers are the ones who utilize raw materials and shape meaningful products out of them. In this way, they are a good resource to develop useful and meaningful ideas to utilize raw materials and available resources. DM1, working in the denim section (a product mostly produced with domestic cotton), explained that designers utilize resources and raw materials to convert them into meaningful products. He further elaborated on the importance of the designer's role in this regard, that accurate design element choices are crucial; they are to be innovative yet commercial. He was convinced that not only in the designing phase 1 and 2 (identification and ideation\*) for innovative

product ideas, but the designer with experience in sourcing can save wastage of sources by focusing on efficient production processes and introducing efficient and smart materials for the product. He expressed,

“Designer is the one who is responsible for using resources and making a final product out of them. It has to be commercial, yet it should be innovative and has to stand out. If product development is not appropriate, the sources are wasted. (DM1)”

#### 5.5.1.4 *Designers are engaged to avail creative advantage over competitors.*

It was discovered in the field observation that the induction of designers in the activewear, sportswear, processed fabric, and denim sector is not a common phenomenon; rather, some well-established setups have hired designers. The designers working in these setups identified that designers are engaged to avail creative advantage over competitors. AW1 and DM1 are working in setups that established their design department about a decade ago despite being in the export business for more than four decades explained that a designer is considered a luxury in the organization to facilitate foreign clients. AW1 elaborated that those investments in design and creativity can help the industry compete with others who do not have design departments to offer new developments, and some industries realize the importance of design departments to achieve innovation. So designer's role in this regard can be considered a valuable source to enhance value addition and innovation.

#### 5.5.1.5 *Facilitators in product production for international design houses*

The interviewees working in the export sector defined the role of designers as facilitators in product production for international design houses. The interviewees working in the export sector or setups producing the product types mentioned in 4.3.2.4 informed that the designs are developed in foreign design houses, and local designers work as quality control

managers. It was noted that other than the designers working for retail, all other interviewees had expressed similar opinions on new product development processes that the foreign clients mostly initiate. Designers are hired to ensure design specification is executed correctly and to develop prototypes and samples to present the potential for the sketches they receive. The designer experiments and develops fabric samples within the look provided by the client. DM2 expressed that designers can channel resources and processes toward producing that idea. PF2 stated,

“I am working on fabric production, and my clients are cutters for Guess. So mostly, the composition is provided by the client. They ask us to present all options within the limits of composition. The cutter normally has a fabric sample from the brand.... So, we start by copying the sample, and we develop options around that sample.”

AW1 explained that most of her tasks are related to compiling developments from the fabrication department and presenting them to foreign clients or designers. She considered that her role in the organization is to present the developments done on the sketches of foreign design houses. According to her, local designers are hired to ensure design specifications are executed correctly. She further expressed that sometimes the local designers develop ideas from scratch, but mostly it is for participation in fairs and exhibitions to acquire production orders. DM1 shared a similar scope of work for an apparel designer in her organization. Still, she supplemented that some industries realize the importance of design departments to achieve innovation by introducing new concepts to their foreign client. PF1 articulates that designers feel a strong sense of achievement when designing their concepts.

#### 5.5.1.6 *Creators of personas*

Interviewees conveyed that the designers convert people’s choices and requirements into patterns and colours. They are creators of personas. Client’s psychographics have an important role in apparel design development, and apparel designers visualize designs to

develop personas accordingly (FA2). PF1 stated,

“We are the ones who are translating customer choices and demands into products. My prime responsibility is to convert the customer need into pattern and colours.”

The respondents designing fashion apparel particularly expressed that they keep different personas in mind while developing silhouettes. Similarly, the respondents who are designing for activewear and mostly for foreign clients expressed that they always work in liaison with native designers from the client’s home country to understand the aesthetics of that particular market. This resulted in an understanding of the phenomenon that designers are the visualizers of personas and lifestyles. So whatever they perceive strongly affects their future lifestyles.

#### ***5.5.1.7 Moderators of product development processes***

The respondents working in the export sector (AW1, AW2, DM1, DM2, PF2, and FA2) identified another diverse role of apparel designers. They explained that while they work for international design houses as manufacturers. Their client’s aesthetics differ, so market demands differ based on season, sizes, aesthetics, etc. In such situations, the in-house designers work as a moderator between foreign designers and producers. AW2 explained,

“Hiring a designer resolves many communication problems for them. We understand what they require in terms of colours, styles, extra.... The design teams distribute the design tasks in design departments, particularly those involved in the complete product cycle. Some apparel designers are responsible for ensuring that pattern, colours and motif development, styling and fabrication is done according to the concept we received from the design office situated abroad.”

The role of designer as PF1 and DM1 also identified moderator. However, they presented another dimension to it. They expressed that the companies outsource textile

processes that are unavailable within the company. Mostly the fabrics are purchased from other manufacturers and sometimes even processing steps. In projects involving multiple processes, the fabric designer assures the product's final look is intact. So PF1 stated,

“I am the one who coordinates with other designers involved in garment making, weavers, finishing team, and suppliers.”

#### 5.5.1.8 *Tool in themselves to shape thoughts into objects*

Designers who work as fabricators are tools to shape clients' thoughts into objects and garments. PF2 works in a company that produces garments for different labels and brands. According to PF2, the designer is the one who converts product concepts of their client (brands) to garments. The designer's role in this regard is the one who can fabricate ideas into textile materials and textile production techniques. They have the capability to supervise transformation of patterns, into production techniques such as needle works and fabric ideas.

PF2 receives samples from the client to begin. The fabric sample from the client is the starting point for developments. This fabric sample is either from the competitor's product or market research. The sample is the source of inspiration, and the variety is developed by the designer. PF1 expressed alike view,

“Designers are the medium and tool in themselves to shape thoughts into objects. Also, that the idea that is conceived is born in the design cell.”

It is noteworthy that both PF1 and PF2 were the respondents who design processed fabrics. Processed fabrics are the category which is defined as running lengths in this research. So whatever they design is later shaped up as garment. Both the firms that were visited for fashion apparel had divided their apparel designers into teams. The designers who work for the finishing and designing of running lengths are sometimes provided a silhouette sketch by their team members who work on styling or sometimes they used to start with

discussion in their process. That is why both respondents considered that apparel designers are the medium and tool in themselves because the ideas are converted into tangible surfaces and products through them.

#### 5.5.1.9 *The prospective role of designers as change makers*

The interviews discovered the above-stated multiple dimensions of the role of designers. The interviewees defined the role of designers as conceivers of apparel products by considering choices of their foreign client brands or foreign design houses in the export sector. The designers working in retail and domestic markets focused more on user personas. Mostly to understand the choices in the export and domestic retail market, they observe trends by investigating market research discussed in the following section (5.5.3).

AW1 and DM2 mentioned another role of designers that they considered is not yet commonly practised but shall be practised, in their opinion. DM2 shared that he was hired for this specific role and thought it was a practical realization by his employer. He believed that it helped the organization in developing new successful products. DM2 contributed that the designers can work as change makers if they follow originality and practice to build something with a strong identity and newness. He elaborated that originality can be achieved by focusing on design identity instead of following trends and ideas already in the market.

AW1 realized this notion but felt that it is not yet commonly practised though the designer's role as change maker is the required perspective. A fresh and new perspective to design approach can excel in product possibilities. AW1 narrated,

“On the contrary, when we offer them designs, they have a variety of options to choose from, which could even excel the ideas they had in mind.... This also builds up their confidence in us as even if they do not choose from our suggestions, the next time, they

will consider our recommendations and seek our consultation before finalizing a design on their own.”

AW1 expressed that designers as change makers would require freedom and independence in developing product ideas instead of following the framework by the client. Designers who develop designs independently can develop new possibilities with fresh perspectives. AW1 further suggested that it is a gradual shift. Initially, new product ideas can be developed parallel to the customer’s choice to be presented as alternatives. AW1 believed that the realization of this strategy could help offer value addition. Moreover, if the design ideas are generated in the design house, this brings long-term relationships with the client.

## **5.5.2 Components of apparel design**

### **5.5.2.1 *Significant identity***

According to AW2 and DM1, significant design identity refers to distinct design philosophy reflected in the design idea generation and selection. The significant identity or design philosophy directs production processes, material choices, product functions, and interfaces. A significant identity helps build up the company's name in the market and can also be a means to earn good business. AW2 contributed, “Significant identity or clear design philosophy can help an enterprise maintain a good reputation in the export sector.”

The design cells are the places where the significance of a product is pursued (AW2). The designers working in the export sector, particularly in denim and activewear, contributed that the industrial setups, which focus on production only and not on product development, lack significance of design because the focus is on efficient production processes and other components of product development are ignored. For the brands and retail stores, the significance of design is taken as design selection criteria and functions as motivation to innovate.

The requirement to add significance in design has been realized by some setups (the company where AW1 is working) over some time. The working methods and design development processes of designers are changed because of this phenomenon. The international client also pushes the demand to innovate by adding significance. Earlier designers used to develop according to the framework of the foreign clients. Still, now they are expected to develop design options independently because this is a good source for bringing newness to design ideas. Designers from very different backgrounds can bring diversity and significance to design. AW1 explained in these words,

“They ask for what we can offer. Because their teams require a new flavour as well, they sit in a box and make things that look the the same almost.”

DM2 argued that significant identity is mandatory for new and diverse product development. The opinion of TT2 provisions that significance in design can be achieved by following a clear statement relating to design philosophy. The distinctive design philosophy is a rare and almost similar pattern that focuses on manufacturing rather than new product development adopted at the moment that can be challenged. Product diversity would lead the way where distinctive identities of textile products, techniques, processes and functions can be discovered both in terms of traditional native textiles as well as industrial products.

#### 5.5.2.2 *Aesthetics*

The respondents identified aesthetics as one of the prime concerns of designers during apparel designing. They defined; aesthetics is someone’s idea of beauty that results through a combination of colour, pattern, fabric texture, silhouette, finesse and detailing. The variety in combinations produces different appeal. The appeal and liking for a certain combination of these elements is called aesthetics. TT1 explained aesthetics as choices and likings about design elements. Evidenced by DM1 and AW2,

“Something which is eye-catching. The colour, the hand feel and texture. Also the pattern and motives if any. Aesthetics do include finesse of the product as well besides colour or fabric type.” (DM1)

“Aesthetics are likings of people. Certain colours, and cut lines.” (AW2)

The aesthetics in apparel design refers to the aesthetics of customers and the aesthetics of designers as well. The designers develop the combinations to achieve appealing results keeping in mind their customers' choices. DM1 explained that apparel designers reflect on the aesthetics of their customers. FA2 elaborated that designers actually imagine the ideal of beauty for their customers by imagining the persona and personality of their clients. This idea of aesthetics is related to the development of new and improved products as well because if apparel designing is related to imagination on user persona, the improvement and skill development in this regard would affect product outcomes. The respondent FA2 contributed as,

The ... imagination of what would be liked by the persons you are looking for as your clients. That would look beautiful. It is the persona. The choice that she would make. (FA2)

PF1 explained that the aesthetics of a designer refers to the designer's ability to develop combinations of design elements that would result in the aesthetics of users. The aesthetics of designers are led by the aesthetics of the user which means that the set of apparel designers who understand aesthetics from users' point of view try to develop designs based on their customers' choices. TT1 added that it is not necessarily always the persona of the user that an apparel designer considers developing aesthetics of the clothes but the aesthetics of a designer are also their point of view on beauty. This perspective leads the designer to choose sketching/ creating a persona. With this understanding of aesthetics, apparel designers perceive personas of beauty and style and then rationalize their ideas by observing similar profiles from the real world. FA1 considers this as an opportunity to develop diversity and change. As the response mentions, “the aesthetics of designers and the one they perceive as the user's both are vital. Their own choices bring significance to design.”

Designers identified physiological and psychological both aspects of aesthetics, such as colour, pattern (optional), styling, fabric quality, processing and finishing, season, function, and culture. Physiological aspects of aesthetics are related to texture, hand feel and other physical qualities of the garment. Psychological aspects of aesthetics deal with the demographics and psychographics of the user and designer.

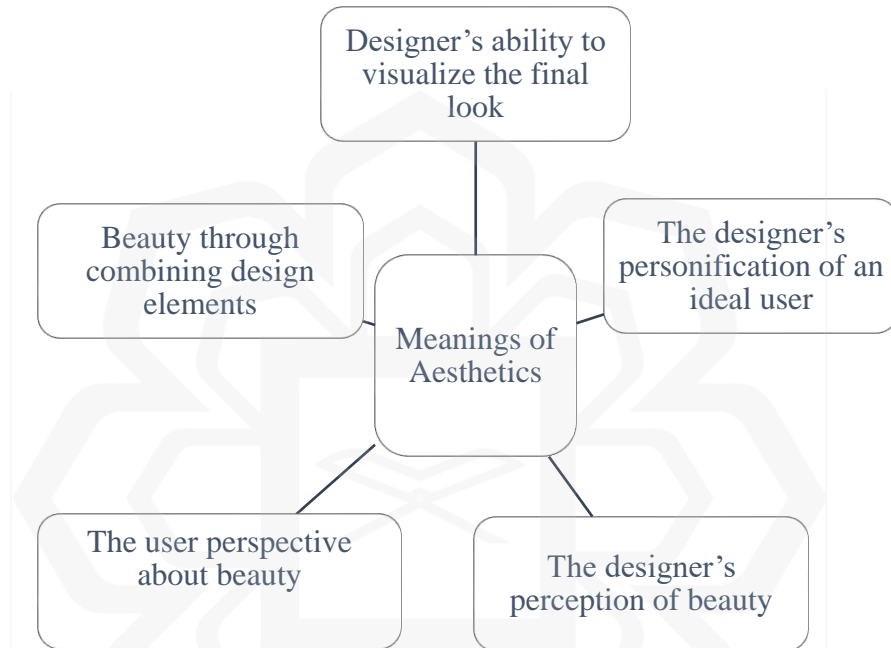


Figure 5.12 Constructs on aesthetics in apparel design based on thematic analysis.

### 5.5.2.3 *Fabrication*

Fabrication includes all those processes and actions involved in materializing the design idea into an apparel product. Textile materials and production techniques are also included. The choices regarding materials and production techniques are part of the design thinking process that usually happens in the second design stage. During this stage, the designers consider the company's available resources and rationalize their ideas accordingly. Outsourcing for any textile value chain provides freedom to apparel designers to outsource

any segment of the value chain if required. During fabrication, apparel designers either work closely with the production team or at least they are expected to have a good understanding of the company resources and capacity.

In some setups, the fabric developments are done in the Fabrication or R&D departments. AW1 is working in one of such setups of activewear. He explained that fabrication, despite being the most essential part of the garment, is not part of the apparel design process. Some industries have placed their R&D with production units in other cities. So apparel designers do not work as a team on fabric development and fabric diversity. The apparel designers are provided with the catalogues prepared in fabrication departments and choose fabrics from the catalogues. During their design development processes, they focus on styling and finishing.

Apparel designers consider their sources while designing a product, including the available fabric qualities, fabric processing, and finishing techniques. Creating for apparel products is done within the realization of limitations and availability of sources unless otherwise the horizon of resources is widened. DM2 believes that besides realizing limitations and resources, it should be the designer's initiative to pursue options beyond limits and resources by expanding the resources or looking up alternate resources. DM2 works in the denim unit. He prefers to develop his design options from fabric ideas. He adds new fabric developments in his initial design process besides finishing and styling.

The expansion of resources related to fabrics is challenging as well. It requires identifying new resources that can supply and produce varieties and quality assurance of new developments that are challenging but worth taking. Since DM2 claimed that he pursues such kind of inventiveness in his work, he expressed with pride that,

“Initially, I used to think that getting the right type of fabric from the market was the only problem, but later I realized it is much bigger than this. The requirement is sometimes to look up for inspection teams for authentic reports to review fabric grading.”

#### 5.5.2.4 *Functionality*

The interviewees shared the meanings associated with functionality as a component of apparel design in two respects. 1) The product's functionality encompasses usability and suitability of the apparel product for the user. 2) The suitability and alignment of the design idea with the employer's or brand's resources and philosophy. Notably, the designers working in denim and fashion apparel contributed to the second perspective of functionality that bounded the product's functionality with the availability of resources and employer business style. Both of these two T&C applications are related to fast fashion. Further, this shows that the concentration of designers is on employers' brand philosophy, their personification of the target user, and the available resources. The future demands and any such design activity that originates from the perception of future market needs and developing better customer services are not concentrated during the design development processes. Claimed because, out of 10 interview sessions, only three interviewees (TT2), (FA1), and (FA2) identified functionality as the improved service to users and considered that designing with a focus on improved functionality of the product can help develop new and innovative designs.

Understanding functionality that encompasses the product's usability and suitability prioritizes the user during the apparel design development process (identification, ideation, and fabrication). FA1 and FA2 contributed that the functionality of an apparel product includes concerns related to the suitability of fabric's physiological and physical qualities with the season, the event of use, fittings and finishing. Most interviewees shared their practices on observing trends to understand customer choices on aesthetics, but AW 2 enhanced the importance of research on trends for improved functionality. He elaborated that a useful product can be designed by observing market trends and responding to them accordingly. He articulated; during ideation, understanding user choices through observing trends and merging them with industry capacity brings out workable product solutions. DM2 expressed that it is important to consider the employer's business style during the initial design phase, i.e., identification and creativity. He narrated,

“I must know well my employer and their business style. So that means I should know my resources, limitations and the type of aesthetics I should design.”

Hence, during the design's ideation phase (Brainstorming and sketching), some considerations concern the designer. These concerns include employers' brand philosophy, design identity, production capacity, and customer aesthetics and design choices. These concerns are part of the design functionality. The designers consider or should consider these aspects to ensure the functionality of the design.

#### 5.5.2.5 *Integration between design components to generate innovative ideas*

The designers described the design components as stated above. Besides identifying apparel design components, they also expressed how they relate and that the design decisions on one component are reflected in the other. The designers (PF1PF2, TT1, and DM2) engaged in developing processed and finished products could mention most components and their inter-relationship, probably because they are concerned with the complete product cycle. PF2 stated that apparel designers develop product ideas according to their observations and analysis of user demands, market pulse, and colour and pattern choices of the users. They analyze these aspects to decide on the features of the new products. The new products are designed by keeping similar and dissimilar features from the observations. This analysis is subjective, individual and sometimes reflects grouped opinions. Similarly, PF1 reinforced the analysis of design components guides designers to decide on the product's features and interface. Integration between design components is required for decisions on new product development.

PF1 further elaborated that the design significance and identity lead the design development processes, and other design components are aligned. The significance of design can originate from any design component and aspect. Sometimes it originated from the technique, aesthetics, target market or else.

DM1 stressed the importance of integration between design components required for decisions on new product development. He identified that new design developments should proceed through considerations on 1) functionality, both types, but keeping user choices at first 2) fabrication, including all steps from fabric choices to styling and finishing 3) aesthetics observed through market trends and buying behaviour. DM1 did not consider technique, but TT1 (the designer who is designing traditional textiles) included technique in the list besides other design components that are integrated to assure successful outcomes, he expressed,

“Besides aesthetics. It is also the quality and selection of the right type of technique. It has happened to me, and my design was completely ruined when it was executed on cheap fabric quality. Then the control of production quality should match the sample. Until the designer controls the sample but afterwards during production, the designers here are not engaged.”

So the fourth point is added by TT1 in the suggestions by DM2; 4) selecting the most suitable technique according to the look and features of the sketch the designer has perceived is vital. This argument of TT1 is supported by FA1's statement, which considers that if a designer develops a good understanding of production techniques, one can develop better, more efficient and innovative design solutions.

#### **5.5.2.6 *Technology as an external component to facilitate new product development***

Some apparel designers mentioned technology as a resource that effectively influences design choices, expressions, and production processes. While sharing their achievements on new product developments, some had developed new products that either involved technological advancements or their new developments and product ideas originated from introducing technology in their design processes. For example, DM1 had developed a collection that introduced laser cutting and laser printing in her collection a few years back when it was new in the market. Similarly, PF1 and PF2 had transformed their design development methods and shifted to Cad designs after the setup of digital printing by their

employer. So interviewees thought technology could not be considered a design component but a resource for new product development.

Technology assists in developing efficient and quick solutions in production and designing (DM1). It is not part of aesthetics and probably does not affect aesthetics, but it is important to materialize and execute design ideas (FA1). Sometimes technological advancements in technique bring out new and unseen visual effects that can help build up new or improved aesthetics and fabric surfaces (DM1). It is also important to speed up the process and add diversity in design expression by introducing technological advancements in materials and design tools (AW1). However, design developments should not only rely on digital technology-based design tools but also focus on the design's significance. If design developments rely only on digital tools, the design will lose its identity (FA1).

### **5.5.3 Design processes and opted design methods during the three phases of the design process.**

The designers working for different product types were working with different processes. The diagrams were developed to map their step-by-step design processes (Figure 5.13, Figure 5.14 &

Figure 5.15). The mapping of the interviewees' design processes aided in understanding their work patterns. In Chapter 2, it was established that apparel product design has five main stages that apparel designers follow (See section 0). The apparel design process starts with a design brief, and designers apply multiple methods to approach solutions. The design methods vary on individual capacity and also because of product type, application, organization structure, or any other reason. The deficiency of research in this regard was also realized. Some of the literature references were extracted from product design practices and some from design practices in creative industries because product design is a subsidiary of creative industries and product design. Therefore the mapping of design processes was

considered inescapable to identify work patterns. Issues were identified through this and developed insight into the apparel designer's work patterns.

The designers concentrate on market trends, user requirements, employer capacity and resources while generating new product ideas. During the design phase, “ideation,” while they transform a brief into a design to shape the product, they use a lot of visual references.

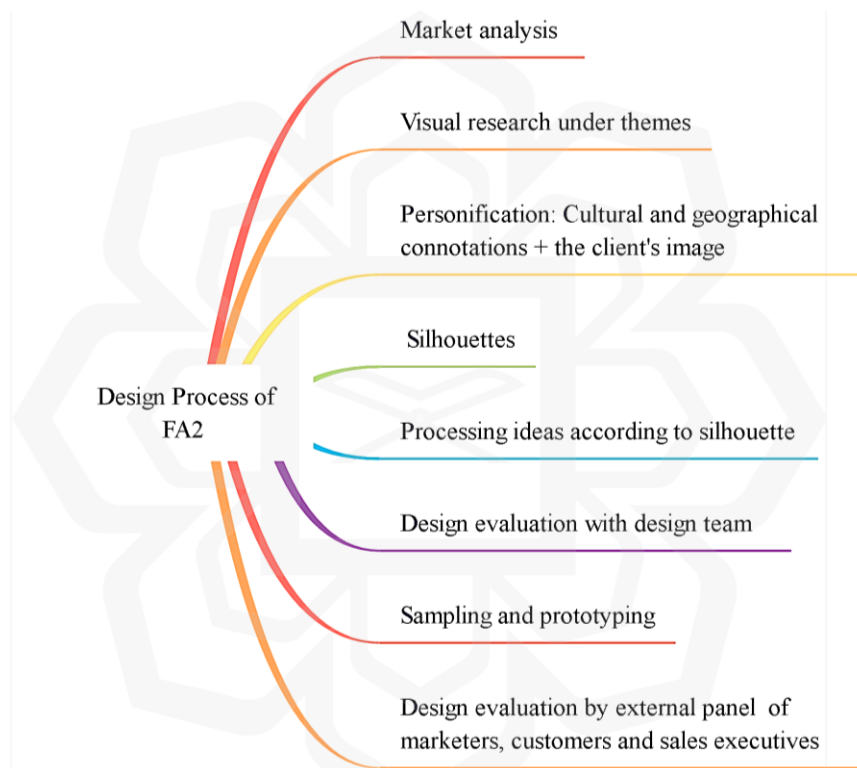


Figure 5.13 The step-by-step design developments of FA2

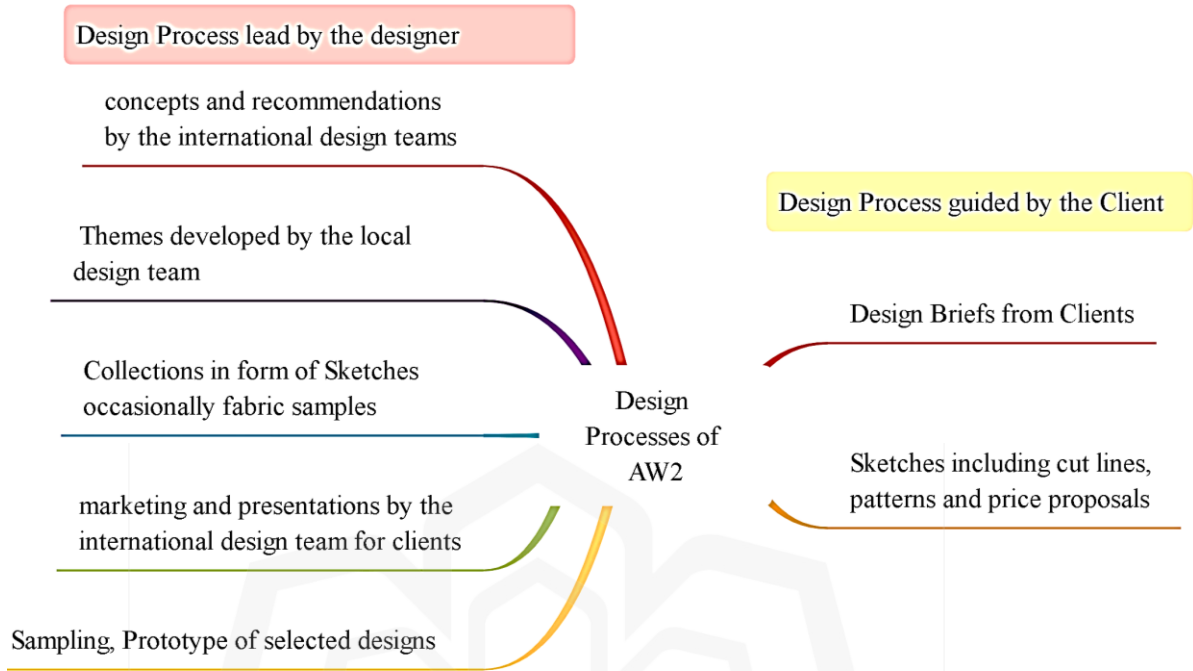


Figure 5.14 Step-by-step process of AW2

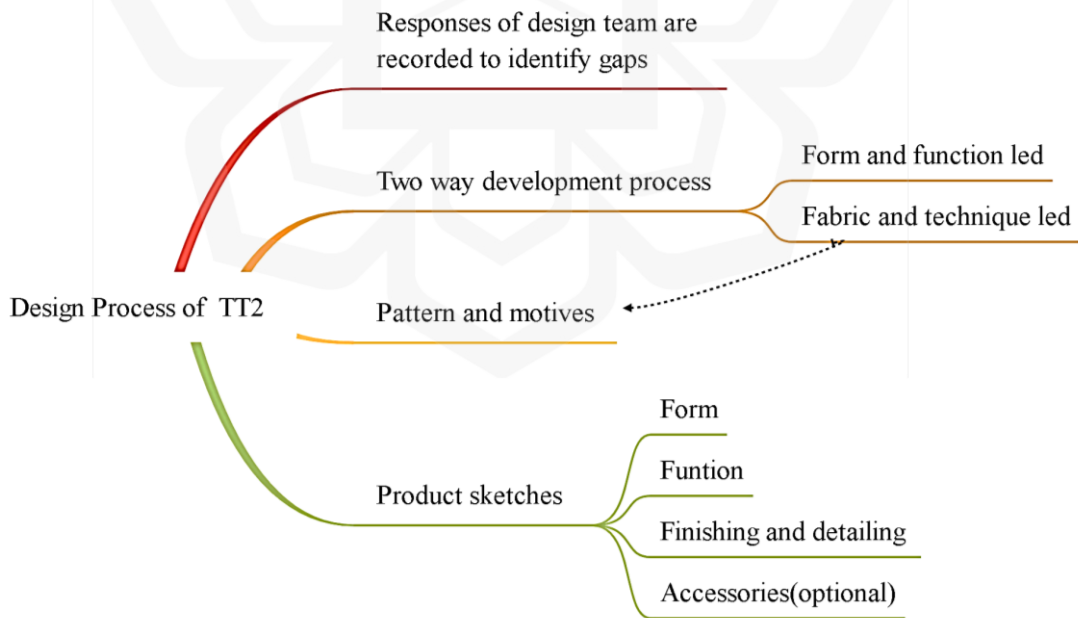


Figure 5.15 The step-by-step design development process of TT2

These visual references influence their design thoughts and help them define and explain their idea of aesthetics and product features. The designers dependent on the client's product sketch mostly rely on the visual references provided by their client in the form of reference boards and theme boards. Whichever role the designers are placed in, moderators, quality controllers, conceptualizers, or creators' interpretation and manipulation of visual references remains one of the main components of their design process.

The mapping of the design development process of interviewees also cultivated that designers opt for multiple methods during the design development process. The sequence and frequency of these methods varied for different respondents based on the nature of the design project, product type, firm's production capacity, and, most importantly, the designer's capacity to plan and tackle the project. Hence, some methods were observed frequently, such as market reports, theme boards, brainstorming sessions, sketching and review of dictations by the client (mostly in export) are widely used. The nature of these methods, tools and skills to proceed with these design methods could vary on the designer's capacity. For example, DM1 illustrated sketching as a method he uses to ideate design. He meant sketching for style silhouettes, surface textures, and production technique manipulation ideas. Similarly, for PF1, collecting different inspirational fabrics and generating new ideas with them was considered sketching during the ideation phase.

Table 5.6 shows each respondent's frequency and sequence of design methods and tools noted during field observation and interview sessions. The practices of respondents in approaching each stage of product development were discussed during interview sessions, and the findings are narrated in the following paragraphs.

Table 5.6 Design development methods opted for by respondents during the design process

Design methods were opted for by respondents during the three apparel	Respondents									
	DM1	DM2	TT1	TT2	PF1	PF2	AW1	AW2	FA1	FA2
<b>Stage 1: Identification</b>										
Scrapbook, mood boards from trend reports	/	/					/			
Form and function-led gap identification				/	/				/	
Market analysis to develop themes			/		/	/				/
Themes based on references from the client								/		
Interdisciplinary brainstorming sessions						/			/	
Fabric/ texture developments		/		/		/	/			
Sketch/reference provided by the client	/						/	/		
<b>Stage 2 Ideation</b>										
Personification			/	/					/	/
Sketching	/	/	/	/	/	/		/	/	/
Sketching based on sampling				/			/			
Sorting*					/					
Sampling-based on sketching	/		/	/	/	/		/	/	/
<b>Stage 3 Fabrication</b>										
Sampling for potential or finalised ideas	/		/							
Prototype			/			/			/	/
Testing			/			/				
Review to redevelop	/				/	/	/	/	/	
Costing to shortlist							/			

\*Sorting of different design components from developed ideas to optimize good ideas in relevance with design brief

### 5.5.3.1 Identification, Design Brief

Apparel designers first identify their design choices and product features by observing multiple methods. The selection of methods can be the designer's personal choice, but the interview sessions exposed that designers opt for some common methods and tools. Observations of visuals from multiple sources and discussions are common methods to identify design briefs. Designers working for exports and international markets tend to observe trends from international trend reports. The frequency of methods opted for by the designer to identify design requirements is shown in Figure 5.13

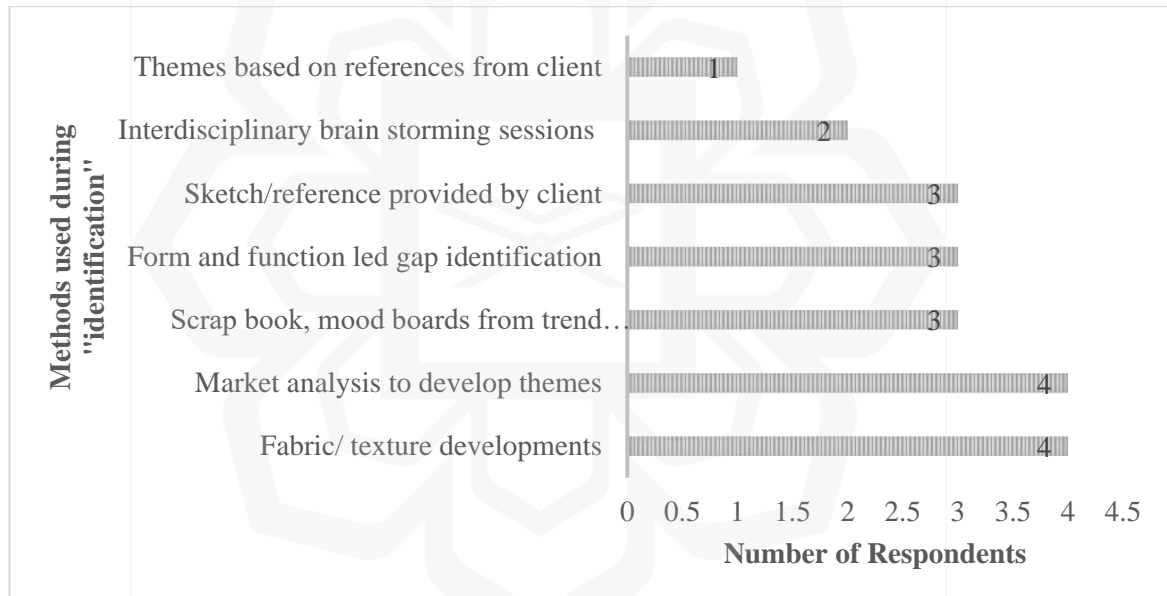


Figure 5.16 Methods used by interviewees for “design identification”

Designers working in the denim and activewear sector mostly rely on international trend reports, and according to the production capacity of their employers, they shortlist themes for design developments. Three of ten interviewees identified this notion, including DM1, DM2 and AW1. Designers working with apparel products primarily concerned with the appearance and aesthetics of products (processed fabrics, fashion apparel and traditional

textiles) identified that they look for gaps between form and function to develop design briefs. TT 1, who works with conventional materials, explained that his first step in the design process is to identify the product's form and function that can be developed utilizing a specific textile technique and craft. He added that for this purpose, he recognises the characteristics of a particular skill or product and then identifies what the user requires. Sometimes he identifies certain products with margins of improvement in terms of service and function. Form and function-led gap identification is made through observations and comparisons between "what is being produced" and "what should be produced". These designers also observe and prepare market reports to analyze user demands. Four out of ten interviewees acknowledged market analysis as a method to identify gaps and design features.

Likewise discussed in sections 5.2.4 and 5.5.1.5, some industries focus on production for international design firms. Most have not hired designers, but some have established their design departments over time after realizing the importance of value addition and product innovation. AW1 and DM1 work in one of the companies which produce for international design firms. He contributed that the designers do not identify their design brief but get references from foreign designers and develop options according to the sketches they receive.

Designers working in fashion apparel expressed that during the preliminary stages of design, when the design team identifies the features of the products, the designers have brainstorming sessions with their design team. These interdisciplinary sessions result in frameworks and strategies for their design collections. Sometimes these frameworks appear in fabric and texture developments (TT2, PF2, DM2). Later designers develop ideas according to fabrication ideas, mostly chalking out themes and styles for garments. In the latter option, the fabrication is done as the third stage of the design process.

### 5.5.3.2 Design methods of respondents during “ideation.”

Ideation is the second stage in design development, when apparel designers conceive ideas for products and develop options based on the design brief that has been created. Design possibilities are expanded during this phase, and product features are visualized (see section 0). Interviewees were asked questions in this regard to investigate how they approach and materialize design ideas and also if they foresee any improvements in current practices in pursuance of innovation and new product development. All interviewees identified that this stage is incremental, but the methods applied during this stage are intertwined. They also determined that pursuance of innovation in product development happens when the designers realize to discard standard and already available options.

The possibilities to develop opportunities with specific techniques are taken as a challenge, resulting in very different forms and aesthetics of products than others. Figure 5.17 Ideation phase of TT1 with technique as the first step, is the reproduction of his sketchbook that resulted in an organic cotton mask different from the products he produced earlier with the same material.

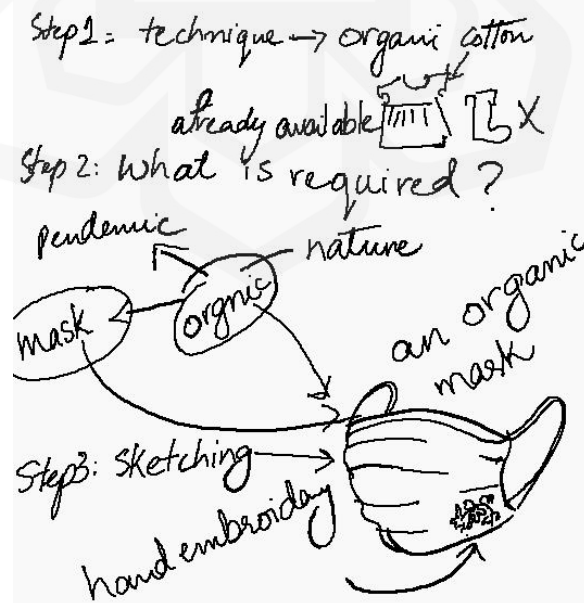


Figure 5.17 Ideation phase of TT1 with technique as the first step

Respondents mentioned that if the processes and preferences of any design component are put differently in the sequence would result in new product options or product expressions. For example, during the documentation of design processes, TT2 explained that he starts with either technique or function in mind.

Following design methods were observed that respondents applied during the ideation phase;

1. *Personification*: The preliminary method of apparel designers working in fashion apparel and traditional textiles is to imagine the persona of their ideal user. They do that through customer profile boards, group discussions within design teams or by observing the design philosophy of their employer brand.
2. *Theme boards*: They imagine and develop visual boards to shape up design choices of their client and user. These pictorial boards help them to observe design elements and their ratio. Designers who work for foreign design firms do not proceed this way and start directly with sketching, which is the next step for designers who work from scratch and are more likely to develop new products. The topics of theme boards, scrapbooks or visual boards (different names of visual research given by respondents) vary from floral motives, geometric patterns, traditional motives of other regions and garment styles. Figure 5.18 and Figure 5.19 represents theme boards by two respondents who opted for two very different themes based on their design task.



Figure 5.18 Theme boards of PF1 (print designer)

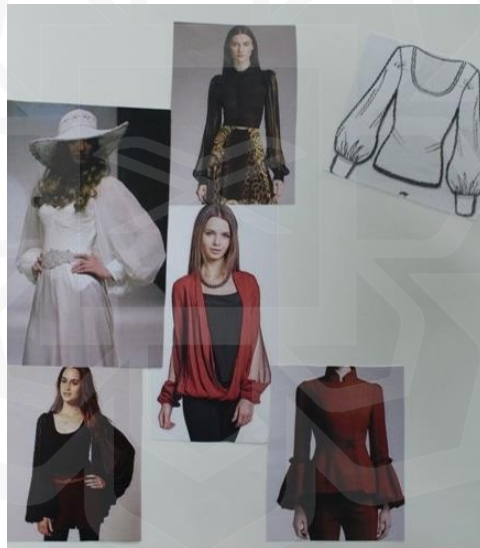





Figure 5.19 Theme board of FA1 (stylist/fashion apparel)

During interview sessions, all respondents presented their visual research. They consider This visual research the foundation for their new design developments, which is why some respondents did not allow photographs. The field notes, and observations during interview sessions concluded the following themes being plugged away by respondents Table 5.7. All the themes were focusing on visual impact and interface of the product and none were found related to function, service or material innovation.

Table 5.7 Classification of design themes for new product development

Sr.	Themes	Respondent	Visual type
1	Event-based	AW1,AW2,FA2,TT2	Related to the specific activity and event
2	Stripes and checks	PF1,PF2,FA1,FA2	
3	Traditional motifs	TT1,TT2, PF1,PF2, FA1, FA2	
4	Textile techniques manipulated	TT2, PF1, FA1, FA2	

5 Textile techniques processed

TT1, TT2



6 Geometric motifs

TT1,TT2,PF1,PF2,FA1,FA2,AW1,AW2



7 Floral motifs

FA1,FA2,PF2,AW1,TT1,TT2



8 Solids

PF1,PF2,FA1,FA2DM1,DM2



9 Textured effects

PF1,PF2,DM1,DM2



3. *Sketching*: Drawing design options to visualize ideas is the most common method used by interviewees. Apparel designers have utilized the use of sketching as a method to ideate in multiple ways. Some designers draw after developing themes, a collection of reference boards and fabric samples (TT2, PF1, and PF2). Nevertheless, for others (FA1 and FA2), it is the first step to visualizing design ideas; they instantly like to sketch after deciding on personas. FA2 explained his sketching process and that sometimes he wants to develop something by hand, but it is impossible due to time constraints. He further shared his experience that the designs he created by sketching from the beginning instead of starting with an available image bank resulted in good outcomes. Still, now, with their collection's timeline, it is impossible. He has been working in a fashion apparel brand, and his company is developing a new collection every six weeks.

The mediums used for sketching in apparel design include manual and digital sketching. The field of apparel design, such as print design, weave design and embroidery designs, is mainly done with digital tools. Activewear designers often work on digital mappings, and stylists prefer manual, quick sketching. The focus on design elements during sketches also varies according to the role of the designer in the design department; for example, the apparel designers involved in styling and finishing of garment started with silhouettes and finishing details (picture 1), print developers had patterns, motifs and colours as the primary focus during their design developments and traditional textile designers proffered according to the limitations of conventional techniques and motifs.



1. The sketches done as preliminary step of product design appears considering persona's (from FA1)



2. Refined sketches of print designer with technique and styling consideration (FA2)



3. Digital sketching and fabric simulation using apparel and textile-specific software. (PF1)



4. Sketching after developing fabric samples to generate product ideas and pattern and colour placements. (TT1)

Figure 5.20 Sketching styles of respondents

4. Experimental Sampling and sorting: Designers tend to find technical solutions by sampling after sketching. Within the apparel industry, the designers work on samples in two ways, 1) in collaboration with the production team of the same employer and 2) outsourcing. Eight out of ten interviewees prefer to be engaged in sampling with the production teams. Only two respondents expressed that they do not practice sampling to develop fabric options but rather sort and select fabrics from the developments of their R&D teams. Notably, both respondents are not engaged in sampling work for companies not involved in new product development. Instead, they focus on production orders for export.

TT1 expressed that the designer develops sketches first, and then these sketches are refined considering the production limits. Later the paper designs are handled by the production teams. TT1 further explained that the detachment of the designer from the sampling stage has sometimes brought many faults in the execution of the design idea. Similarly, DM2, who works in a denim company, explained that he finds more creative outcomes for his product idea when engaged in the sampling stage beside his production team. In Figure 5.21, the sampling stage of product development is shown.



Figure 5.21 Sampling and sorting

The results on methods opted by respondents during ideation indicated that apparel designers use 1) photographs as sources of inspiration. These photographs are from various resources, mostly digital references and seldom books. These visual references are mostly grouped according to the themes decided within design teams, and sometimes marketing team members are included. 2) Emphasis on simplification, motif placement, end-use, target group, and production technique during sketching, interpreting and adapting these sources are considered. 3) Sometimes, fabric samples are collected during this phase and sorted according to the visual references. 4) A group of designers designs the apparel with patterned surfaces.

### 5.5.3.3 *Sampling and prototyping*

The second sampling stage involves reviewing fabric development, stitching, pattern, and finishing details. During this phase, the designer works closely on the outlook of the garment and considers multiple aspects such as stitching style, fittings, and accessories. The respondents explained that this stage is critical because the designer has to keep the “persona” in mind to evaluate the product's appearance. Besides, he has to have a critical eye on technicalities such as fabric look, fittings, measurements and finishing details (FA1, FA2 and DM2). Five out of ten respondents considered prototyping as part of the design process. All five respondents involved in prototype making are the ones whose role in their company is a stylist. Others who did not consider it a part of designing worked in companies that detached the production department from the design department. Respondent AW1 explained the fabrication and prototyping process within such setups as;

“Our research and fabric department works on that and recommends those materials to the buyers. However, the fabrication department is not part of the design team. They work solely on fabrics and are often based in different cities. We bring together their work into an organized form like books.”



Figure 5.22 DM2 Explaining the details of prototyping (author's collection)

#### 5.5.3.4 *Synthesis through design selection parameters*

The final stage of product design development happens when the designers review the samples and prototype. Any required changes proceed at this stage. Some respondents also contributed that sometimes they drop product ideas at this. In some design departments, this process is done with design teams. Respondents working in a fashion retail brand said

The respondents identified the following points of consideration during this phase;

- The capacity and capability of the employer to produce a product without or with minimum outsourcing: AW2 informed, “We develop ideas according to the production capability. The design ideas are developed according to the resources available in the industry...so whatever can we produce in-house is preferred.”
- Ability to predict market trends: AW2 confidently said, “We know what the next season's expected trends are. We predict what is going to be hit for next season. For example, we did tie and die last season, and now it is a hit.”
- Affirmation of design components. DM2 pointed out that during the design's synthesis stage, he reviews if the product's aesthetics and functionality align with the customer profile and company philosophy.
- Risk-taking to avail opportunity on innovation. DM2 explained that sometimes his design team opts for different and innovative ideas. He believed such chances had benefited his company in acquiring good names amongst competitors. He further explained that the preference for choosing creative product ideas is not subject to increased business. He narrated, “Some innovative products are launched to observe market response, and in such cases, we do not hope for good business. We keep a margin of risk, and we expect that through this new product, we will train our customer, and once it becomes the trend in next season, we will generate business out of it.”
- Alignment with customer choices. DM1 explained that during this phase, he prefers to review designs and aesthetics according to the customer profile defined in the

early stages of design and does that individually. TT1 explained that to align ideas with customer choice, the in-house design team arranges a discussion on new developments but only before moving towards the production of products,

“After we are done with our development. Sharing your aesthetics and personification with your team member is important because one can develop something that might click.”

PF1 narrated the same idea of reverting to the first stage of design, where the design team had developed themes and classifications for design developments. The design team sits together and reviews the samples and prototypes to predict the suitability and inventiveness of the product. So it was revealed that designers tend to align their ideas with their perception of client preferences during the development processes and sometimes use different methods to evaluate their design concepts accordingly. Hence sometimes, it is done unintentionally and spontaneously based on their previous experiences.

#### ***5.5.3.5 Summary of results on design processes and methods***

Amongst the ten respondents, no one identified any systematic, defined or standardized analysis method for the new product concepts. Instead, the respondents considered this a matter of market observation. They intuitively responded based on previous experiences and their client as the primary source in case the client is some foreign design house.

It is done in two ways;

1. A sketch sample provided by the client as a design brief
2. The client offers a theme or concept

Figure 5.23 shows a sketch or sample provided by the client. The design concept is the other initiation point of design activity in case the client provides the design brief. For this,

a lot of visual references are interpreted. These visuals work as pieces of information, and then designers, as per their capability, reflect on what they see. The interpretation and reflection on the inspirational images are concluded in the form of reference boards'. Designers call them theme boards as well. (Figure 5.24)

blouse with roll up sleeve tab		fit block #79618	
<b>SEWING DETAILS</b>		<b>TRIMMINGS</b>	<b>CODE</b>
3/8" SEAM ALLOWANCE ALL OVER		MAIN LABEL: LISETTE-L	BLACK
double topstich collar, cuffs, side seam hem,yoke, as original		MITER LABEL	LISETTE-L
1/16" STAND, PLACKET ,cuff placket-as original		hang tag provided by Lisette-L	
		Lisette-L metal tab, provided by Lisette-L	
		sewn at bottom right hem	
FABRIC DIRECTION: <input type="checkbox"/> GRAINLINE <input type="checkbox"/> sleeve buttons for roll up tab <input type="checkbox"/> JT ACROSS <input type="checkbox"/> ONEWAY <input type="checkbox"/>		BUTTONS: 4 HOLE pearl dtm ground colour	
FRONT		LINE: 18L 12+1 extra	
BACK		OTHER: THREAD COLOR D.T.M GROUND COLOR	
Lisette logo metal tab		FUSING	
FABRIC		SUPPLIER	
SELF		SUPPLIER BY MAKER -	
COMBO 1		CODE	
COMBO 2		COLOR	
LINING		BIAS BINDING	
		DUPLICATES TO BE CUT	
		DATE:	
		DUPLICATE TOTAL	
		S-photo	
		M	

Figure 5.23 Sketch provided by the client. Source SEFUHA TIJARI

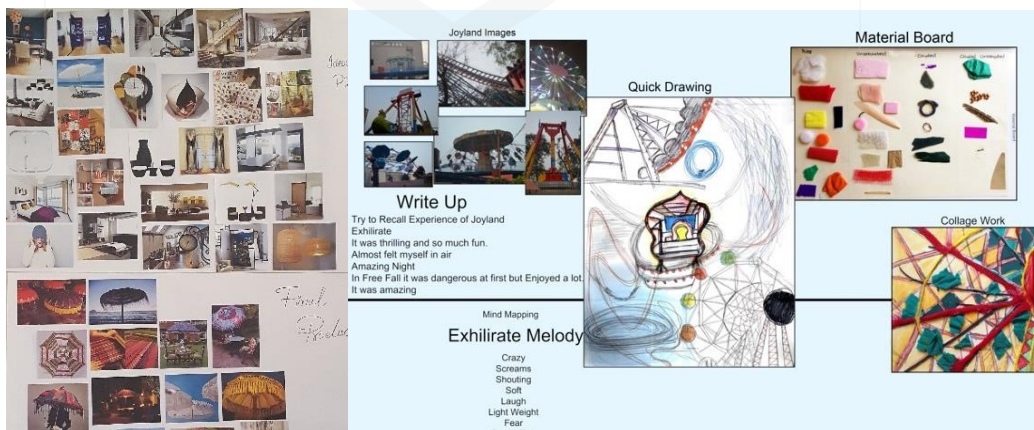


Figure 5.24 The visuals collection according to the theme

After product identification, the designers develop design ideas, including silhouettes, fabric qualities, finishing, and trimmings. The designers choose the method to ideate according to their preferences. Their preferences for opting for a particular sequence and approach were discovered in detail during semi-structured interviews. Each designer chooses ideation methods according to their preference and planning to achieve expected outcomes. Unlike the first phase of design development, they work individually, more likely as a response to the discussions and brainstorming sessions that had happened earlier. None of the recorded design processes were group tasks. This stage is accomplished in the following ways.

1. Drawings and sketches
2. Material collection and sorting
3. Fabric sample development in collaboration with the production department
4. Reliance on fabric qualities that are available in-house or from sourcing partners.



Figure 5.25 Fabric samples references

The “ideation” phase of design development provides options to designers for possible

outcomes. They develop multiple options within the timeline they are given. The designers use multiple methods depending on product type and project type. They identified four main methods that they use during ideation to materialize product features, as illustrated in Figure 5.26.

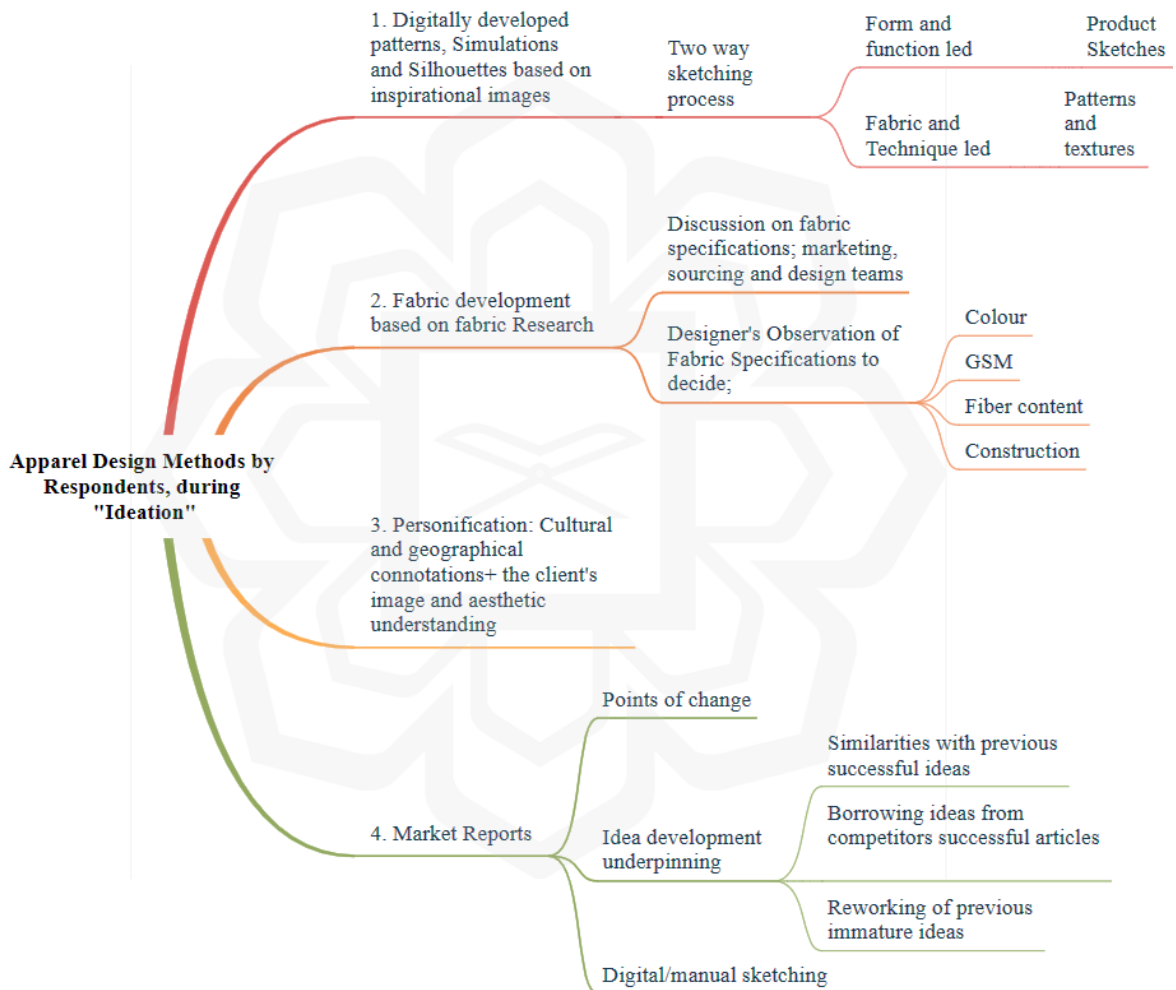


Figure 5.26 Ideation methods used by respondents.

After the ideation of design ideas, the designer has acquired multiple product ideas that can be produced. The following process into the subsequent product development phase. The

phase encompasses designing activities related to production and post-production. The method of fabrication is initiated after the selection of potential ideas. Mainly in a group or sometimes individually. The designer selects possible ideas and develops detailed designs, technical files, or prototypes of the product to finalize the planning of technical aspects of the development related to its functional properties. The product's properties the designer considers during this activity relate to production, use and service aspects.

## **5.6 THE REQUIRED DESIGNING SKILLS FOR PROSPECTIVE APPAREL DEVELOPMENTS**

Black (2015) explained that strategies for creative thinking in apparel design rely on designer's skills in aptitudes, aesthetics, conceptual understanding, craftsmanship and subconscious imagery of social and cultural context. The respondents explicitly identified the skills requirements that can lead towards improvements in new product development. Their views included cognitive, technical and technological aspects of product design besides understanding dress aesthetics according to cultural connotations. The respondents working in the fashion apparel and processed fabrics categories explained the designing skills related to aesthetics and design significance more. The designers working in activewear, and denim wear added functionality and technical knowledge besides the ability to design something essential to stand out in the market.

The respondents identified the following skills.

### **5.6.1.1 *Critical thinking and cognitive skills***

Designers should be able to think outside of the box. Should be able to bring newness within the use of already used techniques. DM2 explained that one of the prime tasks of the apparel designer is to develop designs that attract the masses amongst other available products. He enforced that during design development processes, the designer should be able to think

differently and critically. DM2 cohesively narrated the required designing skills and arranged them sequentially. He expressed that;

“...skills like drawing, fabrication, digital artwork soft wares  
the designer should be able to analyze market pulse.”

The skills identified by him are related to transferring concepts into any visual form. Digital and non-digital tools both are included in it. These skills will help designers to shape the physical features of the product. Then he talks about converting the drawings and visuals into fabrics and garments. This means that the skill to develop or select appropriate materials to be shaped is the same as the sketch. And lastly, he talks about the ability to predict what would suit the future market and what would trend. It is about the cognitive skills of a designer that enable him to guess what would attract the masses more.

FA1 and FA2 since they both design fashion apparel and work closely with personas. They both mentioned that the cognitive skills of the designers might lead towards innovative design solutions because critical thinking enables a designer to analyze and observe different lifestyles. TT2 added that other than the lifestyles and environments that influence the products' aesthetics, religious belief and other social norms also affect design ability. So she expressed that critical thinking and analytical quality push the design developments towards more suitable and competitive product solutions relatable to specific environments.

#### 5.6.1.2 *Ability to forecast market trends*

Besides identifying skills that are inevitable for the smooth transformation of ideas into prototypes, like drawing, fabrication, digital artwork software, DM1 added that the designer should be able to analyze market pulse. He considered this quality a skill and enforced that the designer can improve on it through experience and observing selling patterns and customer responses. The ability to forecast market trends was understood somewhat

differently from the ability to transform user demands into product ideas. FA1 elaborated that user demands can be function, service and comfort oriented. He differentiated that,

“Ability to forecast market trends is probably intuitive,” He showed one of his designs launched last year and pointed out, “Look! It is, in striking colour combination, not our loyal customers' image. But it sold like hotcakes...Probably we can learn this through experience, or it's a matter of taking the risk.”

The respondents gave the skill to forecast market trends importance, and almost all of the respondents claimed that it is intuitive and experience improves it over time. Only PF2 and DM1 claimed that it appears to be a skill that can be enhanced by analysing market trends.

#### 5.6.1.3 *Ability to transform user demands into product ideas.*

Sections 5.5.1.6 and 5.5.1.8 note that “user demands” are one of the concerns of apparel designers during design. The designer identifies and interprets user demands during his design development process. The techniques may signify the designer's individual or design team's collective interpretation of user demands. The designers apply different methods to understand user demands and market responses (See 5.5.3.1).

Respondents identified the ability to understand user requirements as a skill that a designer can polish through practice. AW1 expressed that designers need a good understanding of customer choices and aesthetics. Cultural and geographical affects product aesthetics and sizes. Some apparel companies hire designers from similar ethnicity as per their target market. AW1 agrees with this strategy: "A designer who has already penetrated the field would better grasp things." But at the same time, AW1 argued that local designers could be trained to develop products for the international market.

#### 5.6.1.4 *Understanding cultural aspects*

Designers are not always designing for similar ethnic groups as their own. Similarly, it is not expected that they create according to their aesthetics. Instead, any designer working in the creative industry is expected to develop for others. This requires a good understanding of the user's demographics and psychographics. FA1 and FA2 both identified that growing knowledge of cultural aspects is vital to ensure the suitability and functionality of a product for a particular market. FA1 mentioned that the lengths of dresses, fabric GSM, linings and necklines are designed keeping the cultural aspects in mind. TT2 explained that considerations of themes, motifs and patterns are different according to the ethnic and religious views of the client.

#### 5.6.1.5 *Hold to visualization tools.*

Documentation of design development processes disclosed that drawing is one of the prime tools designers use to shape ideas. The respondents used different sketching tools, from quick pencil sketches to detailed patterns. PF1, PF2, FA1, FA2 and TT2 primarily develop digital drawings. TT1 started with quick sketches and later drafted patterns with accurate geometry and measurement. Because TT1 worked closely with traditional production techniques, he focused more on handmade development processes. FA1 mentioned on the drawing skills of designers that they should be well trained for both hand and digital drawings.

#### 5.6.1.6 *Technical know-how about fabrics and processing techniques*

Whatever ideas the apparel designers develop in the form of drawings and visuals must be producible. That is why a designer's capability to foresee productivity is crucial. Most respondents explained this notion and argued that designers with the capability and

understanding of processing techniques and technical drawing tend to bring out better product solutions. For example, DM1 explained;

“Designer should be able to... alignment of design ideas with the company profile. By this, I do not mean that the designer only produces within sources. By this the ability to see limitations and respond accordingly. The know-how of denim is how it behaves. Designers should know the technicalities of denim processing. He should know what kind of effects can be produced and how they can be used. So the capacity to develop new ideas. Familiarity with techniques. Ability to use resources for the concepts he has developed. Ability to filter concepts that contradict with workable aesthetics.”

DM2 and PF2 also pointed out the importance of being technically sound. But their dimension was towards the stage of fabrication. They talked about technical know-how about fabrics and processing techniques that designers should know how to convert their ideas into fabrics and surfaces. So technological know-how resulted in a skill that is useful for designers during the fabrication of their ideas into tangible materials and during the identification phase, where the designer has to optimize for sustainable design ideas for the firm to develop.

#### 5.6.1.7 *Know how technological advancements.*

Respondents working in activewear, and denim wear identified that the designers should be aware of technological advancements and processes that can reduce environmental impacts. The designers working in fashion apparel did not identify any requirements related to the ecology, but they enforced the designer’s skill on familiarity with technological advancement in digital designing tools. FA1 made the designer's command of digital designing tools mandatory to overcome timeline challenges.

#### 5.6.1.8 *Skill development for aesthetics*

Respondents believed aesthetics could be learnt and improved through training, observations, and experience. They shared their methods of developing skills for aesthetics. Since the prime motivation for aesthetics is generated through consumer psychographics and demographics, most of the skill development suggestions by the respondents to train young designers on aesthetics were generated around an improved understanding of user aesthetics. Understanding user aesthetics is developed through observing market trends and imagining user profiles by listing the brands and products they buy from. These imaginary user profiles find their basis in rationalization by observing users' buying behaviour. The apparel designer reflects and develops aesthetics according to his understanding that he creates through these observations and imagination of user profiles. Once the product is launched, the feedback and selling reports of the product add to the designer's aesthetics.

Many respondents strongly supported that experiences improve the designer's aesthetics, particularly FA1, D1, PF1, and TT1. TT2 explained how knowledge in this regard is adequate. He clarified that designers develop aesthetics by reflecting on user aesthetics. Afterwards, evaluation and observation of the market response benefits designers to improve their aesthetics. So the experience in this regard means experiencing product development processes in a loop from product concept to the store and then back to the conception. TT2 narrated,

“We do reflect according to our observation. Our experiences have a vital role in building up a certain understanding of aesthetics and other features of design... I look into trends, and I also keep a watch on my competitors. I also look up the products my customer likes to buy besides apparel.”

DM1 and FA2 explained that the pieces of training would include observations of market behaviours on launched products. These products are being produced from different labels and through the pieces of training on enhanced understandings of potential users and their aesthetics. Activities to improve the designer's capability to visualize likings of masses and then fabricate that idea with the capacity of the industry. FA1 believed that academic

institutions tame designer's aesthetics, which is why a group of designers with similar training tend to produce similar aesthetics. FA1 narrated the importance of academics,

“University plays a vital role in shaping one's aesthetics. If you take Khaadi (a fashion label), from the owners to the employees, they are mainly graduates from similar universities. They all seem to have the same taste.”

Hence the role of universities in developing the aesthetics of designers is vital. The training on improving observations on market behaviour and identifying potential users would be beneficial in discovering new markets. The results showed that the skill development of designers to pursue innovative and competitive products is essential. The respondents stressed some skills that can enhance innovation potential during the design process. Illustrates the skill categories respondents explained as necessary for designers to produce new product solutions.

The respondents identified designing skills that enhance the design ability of a designer towards successful and innovative product development. The skills identified by the respondents can be classified as 1) technical skills such as knowledge of fabrics, body measurements or any such that assist designers in developing design ideas with a good sense of producibility and wearability of the garment, 2) visualization skills, such as drawing or any such ability that helps them shape their thoughts into product ideas 3) technological know-how to opt for efficient and new designing techniques, intelligent ways of developing products and suggesting better product features 4) Designer's skill development on aesthetics to enable them in designing aesthetics for multiple markets and personas by introducing different observation and data manipulation tools and lastly the respondents identified 5) the importance on improving designer's cognitive skills in dealing with multiple dimension of product design components. Figure 5.27 illustrates the skills identified by respondents that are necessary in pursuance of new product development.

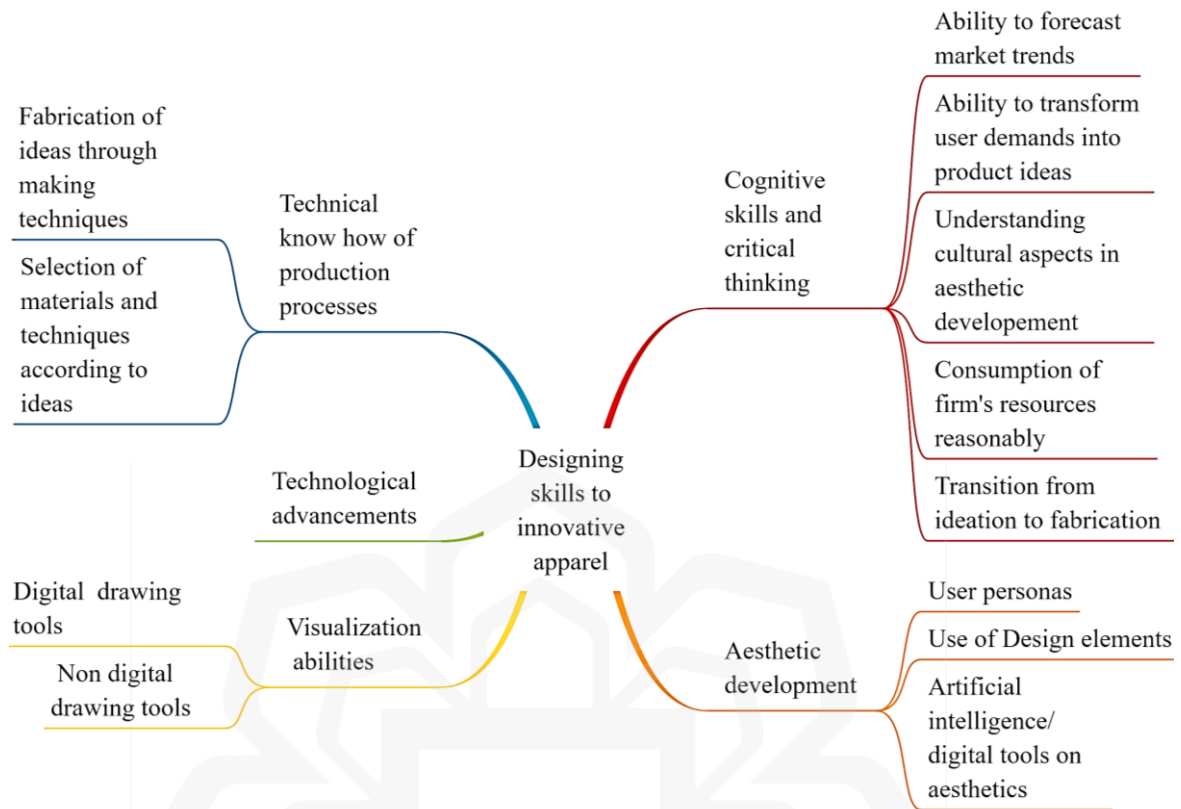


Figure 5.27 Designing skills for new product development identified by respondents.

## 5.7 CHAPTER SUMMARY

The knowledge acquired through descriptive and interpretive analysis of the data revealed multiple dimensions of apparel design innovation in Pakistan's clothing sector. The factors affecting apparel design innovation and the design practices influencing new product development are known. Focus on design identity and significance, predicting future markets during the design identification phase, introducing new and alternate materials during fabrication of design ideas, investments in design research projects, introducing design-related matters in textile policies, development of new technologies instead of introducing new technologies, participating in innovation projects and skill development of designers are the hammering factors that affect apparel design innovation.

The results of industry inventory established that the apparel sector is producing a range of apparel products. Most of the firms are manufacturers and have not well-established design departments. The design activities and designer's placements lean towards fashion apparel and processed fabrics among the product types. There is no database available on practising designers. The number and size of the firms related to traditional textiles are significantly less, and they are mostly SMEs. Though sufficient design activity happens in these firms because the scale of the firms is less, enhancement in design innovation activities is required. It was discovered that the role of designers is crucial in design innovation. The current practices in this regard are limited and focus on product interface, appearance related tasks only whereas respondents have pointed out the role of designers as change makers and influencers. This was a stimulating result because if designers are placed in the firms for their role as change-makers, they will design strategies and methods for their respective subfields of apparel design.

An in-depth discovery of required designing skills has identified that designers should be equipped with designing skills on conceptual, creative, and technical grounds. The design development processes and skills are concentrated on visual representations and drawings of the designs. Other design components related to function, identity and service are less focused within design teams. Collection planning, themes and aesthetics of the products are client and market specific and primarily based on elements related to lifestyle, culture, events, and seasons. The execution of the designs into effect is mainly handled by the production team, which works independently and is often placed in other cities. The nature of collaborations has also been discovered that can nurture apparel design innovation in Pakistan's apparel sector. Data analysis and findings led to proposing a framework for NPD, presented in the proceeding chapter. The data findings have revealed that innovation in apparel design would require the compilation of notions related to each phase of the design process. It will also be crucial to develop a framework that not only streamlines required designing activities but also directs what skills and methods should be fed into the apparel design process for new product development.

## **CHAPTER SIX**

### **FRAMEWORK FOR APPAREL DESIGN INNOVATION**

#### **6.1 INTRODUCTION**

This chapter discusses data findings to develop a framework for apparel design innovation. The arguments in the review section are constructed through; a literature review, facts compiled through data inventory, and research findings from various qualitative data collection methods. The study of results is directed to identify the dimensions and points of consideration related to new product development and innovation in apparel design. These points cohesively formulated an outline for apparel design innovation that was considered to propose a framework for apparel design innovation. The proposed framework was verified through focus group discussions. The chapter presents the Apparel Design Framework for product innovation in Pakistan's textile industry.

#### **6.2 DISCUSSION ON FINDINGS**

##### **6.2.1 An overview of designing in apparel firms in Punjab Pakistan**

The facts and figures collected during industry inventory provided an overview of the apparel firms related to; the capacity to develop product ranges, the establishment of design departments, and the design activities to create new products. Processed fabrics and fashion apparel are the other two product categories that are produced by a good number of firms. The firms producing traditional textiles and hosiery articles are few. This is so because the focus of the study is to find design activities that can enhance product design activities

towards product innovation, and innovation does not rely on the production quantity instead, it is the result of specific activities(Horne, 2011).

The results revealed that only 33% of the firms have established design departments. Within this 33%, most design departments have been verified by fashion apparel and related fields.

Figure 6.1 Comparison between product-wise apparel firms and firms that hold design departments for each type indicates the number of design departments established for each product. The ratio of design departments for each product type contrasts with the findings of the number of firms for each product type. Activewear, denim, and technical garments are produced the most, whereas the number of design departments is very few. The traditional textiles have very few setups in numbers, but the ratio to establish design departments is 100%.

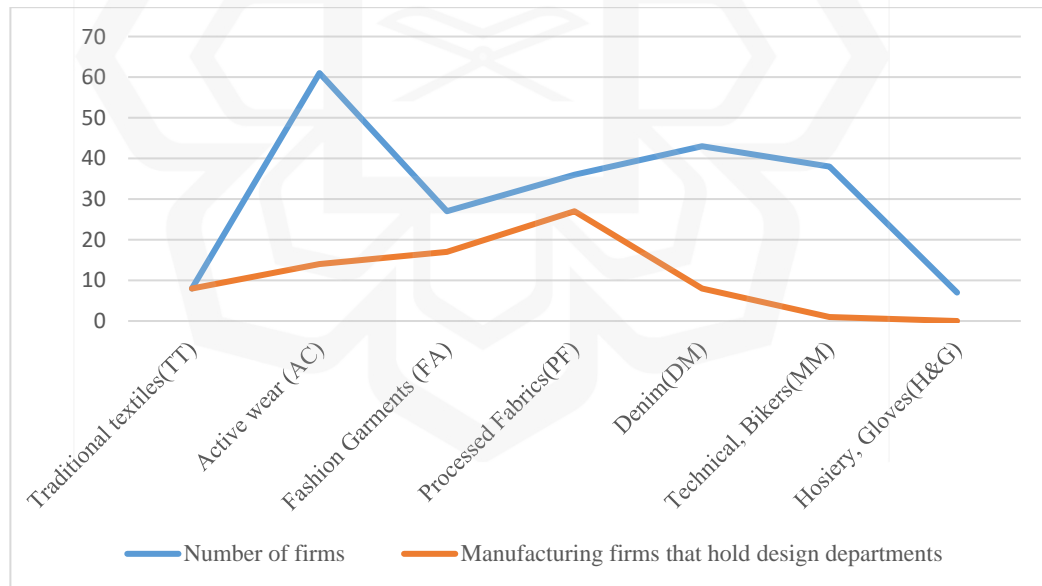


Figure 6.1 Comparison between product-wise apparel firms and firms that hold design departments for each type

Notably, products emphasizing functional, technological, and technical expertise in designing focus less on establishing design departments. According to W Wadho (2016), 38% of product innovation has happened in the apparel sector, including technological and non-technological innovation. Wadho's research claims that most of this innovation has occurred in the technology category, meaning that machinery and other services have been upgraded. Non-technological innovation that includes value addition through design and product concept (Howe, 2018) has not been enhanced drastically. So, if 38% of the invention has happened, most of it is technological innovation because the resources (design departments and design teams) for non-technological innovation are lacking in the current scenario.

Field visits discovered that some of these traditional textile SMEs have representation in the international market with their labels. It means that despite being less in number, they can contribute in value addition. The fashion apparel and processed fabric firms have a reasonable number of design departments, but very few have representation in the international market. They mostly have their labels but in the domestic market. They focus on the domestic retail market for their designer labels.

The expansion in production, advancements in technique, and establishment of design units are inclined towards cotton products as the highest number of firms produce products made of cotton and cotton blends. The synthetic and regenerated materials needed to produce finished products are mainly imported though some polyester and regenerated fibre-based materials have been created for many years. The stitching and styling accessories like buttons and zippers are also primarily outsourced. The design departments are established within the industries, and some design houses work in liaison with industrial setups for those which have envisioned finished products in their business models. The design and design development processes vary according to product type, consumer market, fibre type, and technique.

## 6.2.2 Classification of innovation factors according to product Design development processes

The research exposed apparel design innovation factors through literature review and fieldwork. It was felt essential to compile these factors concerning the design development stages so that their workflow and strategy to utilize these factors in pursuance of innovation could be drafted. Therefore, the factors that affect product innovation were classified according to the three stages of the apparel design process. The classification of innovation factors under each design process stage helped identify and sort factors that shall be embraced accordingly in the framework (Figure 6.2).

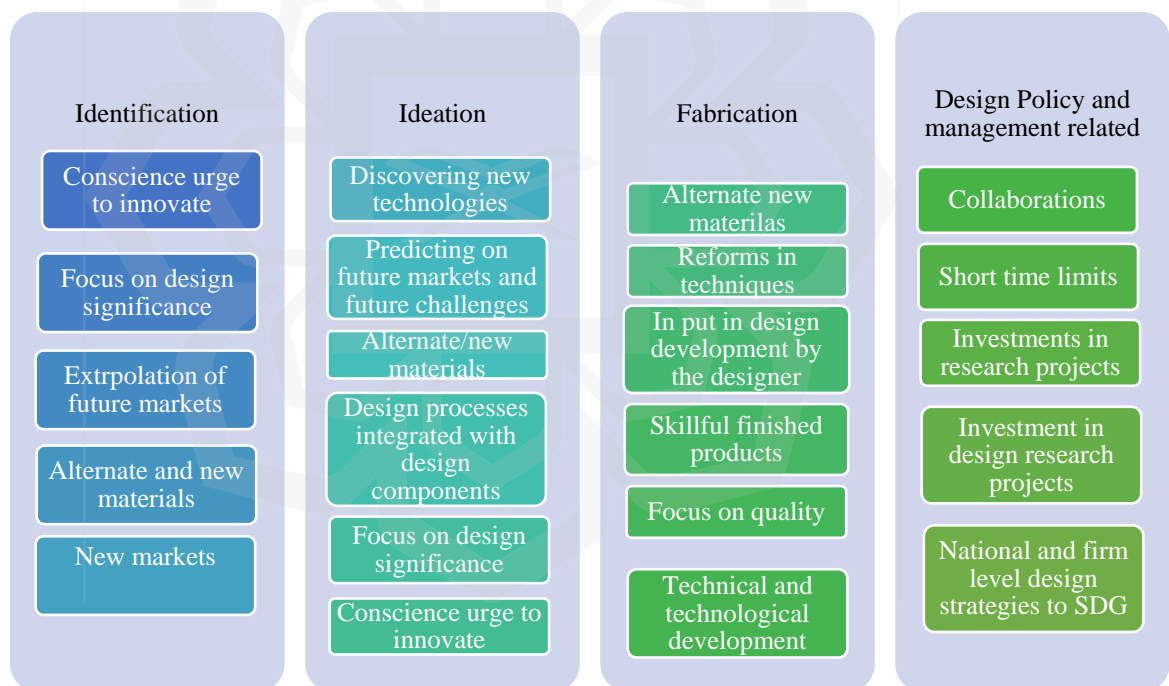


Figure 6.2 Classification of innovation factors identified through research activity

During classification, it was realized that some factors are related to design policy and design management. These factors do not directly involve design development

processes but lead the design processes. The design policies shape the choices and preferences. The procedures include planning on the national level, firm, design teams, and individual levels, which is why their implications are deeply rooted. Currently, the national design vision for creative industries shall be defined to proceed collectively toward a sustainable future of apparel and other innovative products. Likewise, it was found in Oslo Manual for product innovation, which guides its country(OECD/Eurostat, 2018). Some respondents identified the need for unified design policies for the apparel sector so that the textile sector can advance with a clear vision. Therefore considering the implications of multileveled strategies, the factors related to design management were initially sorted and summarized separately. Later in the framework, they were merged according to relevance with each design process or product design component.

### **6.2.3 The role of designers in new product development**

Matousek Robert writes in her essays that designers work as an intermediary between scientific knowledge and the production side (Matousek, 2012). The industry designers design not only the shape of the product but also direct user-product interaction as to how and when it will be used. Besides, they also consider the product's production ability to be stocked(Lucia Rampino, 2016; Papanek, 1983). The role of an apparel designer in developing new products is framed on the one hand by the company's design strategy and on the other by consumer choice(Cross, 2021). The significance of an apparel designer is that the designer identifies product features as per the requirement and can draft its implementation plan. In some industries, designers are hired for quality assurance jobs. They work as design heads who lead the design teams. In some setups, they do not necessarily design. In some arrangements, designers are only considered to be the professionals who are there to develop aesthetics, and this is their primary job.

According to (Colombi, 2016), innovation in textile and apparel design is supported through knowledge sharing, and apparel designers are the handlers of the cognitive process who shape artefacts through their expertise and experience. Nigel Cross suggested that to

pursue new product development, the designer's role should be considered an explorer of an undiscovered satisfactory solution. He further insists that design, production, and marketing development must proceed in parallel and with mutual interaction if acceptable and successful products are to reach the market on time. (Cross, 2021, p. 10,200). This means that during the identification phase and early stages of ideation, the designer's role should be realized as an explorer.

During interview sessions (see section 5.5.1.2), it was found that most designers are hired to develop the interface and appearance of products. In contrast, the design briefs and product concepts related to functionality, environmental and social aspects, user-centric future suitability or any such concerns identified in chapter two (See 2.2.2) are not in focus. If the understanding of their professional responsibilities has expanded as those who develop new product solutions, whether the appearance, functionality, usability, environmental or any other, their product-wise inductions would vary.

The fact that fewer designers are working in textile applications where functionality and meaningfulness of the product are the prime concern and that designers prioritized appearance-related matters as their prime concern during design developments support the idea of assigning the role of designers only to the product's appearance. They are not hired for the product range, which focuses more on functional and usability concerns, for example, hosiery, technical and work wear etc. Based on the industry inventory results, this is claimed that the hosiery and workwear category has no registered companies with established design departments in the list.

Section 5.5.1 identified the role of designers as utilizers of resources to convert them into meaningful products, which is a direct hit to the problem identified in section 3.6 and section 5.2.3 that the T&C industry of Pakistan is facing problems in sticking just to cotton and cotton by-products. Even if there are advancements in cotton, the complete product is mainly not produced; instead, yarn is exported. Similarly, inventory and field visits unveiled that there are fundamental developments in material, fabric manufacturing, and then stitching of the garments so that new and innovative fabric textures and styles stick to a specific kind and are not challenged in designing. The interviewees particularly

mentioned this problem regarding the incapability of the T&C industry to build up their image as the one with a diverse product range despite having raw material availability. They have explained the importance of developing complete finished products to enhance the appearance of Pakistan's T&C in the eyes of foreign clients.

Interviewees articulated that designers are the ones who utilize raw materials and shape meaningful products out of them. In this way, they are an excellent resource for developing practical and meaningful ideas for using raw materials and available resources. The observations of the designers' work processes illustrated that the management or administration mostly gives the initial design brief. However, they can identify innovative design briefs new to the firm or the market. The results on the role of designers in the apparel firms revealed the current positioning of designers in the apparel firms (Figure 6.3). They are mostly hired as aesthetic developers or translators and sometimes as moderators between production and foreign design teams for quality assurance. In the current positioning, their scope of work primarily focuses on the ideation stage. Consequently, the innovation potential that can be generated by applying design thinking and developing new concepts is compromised.

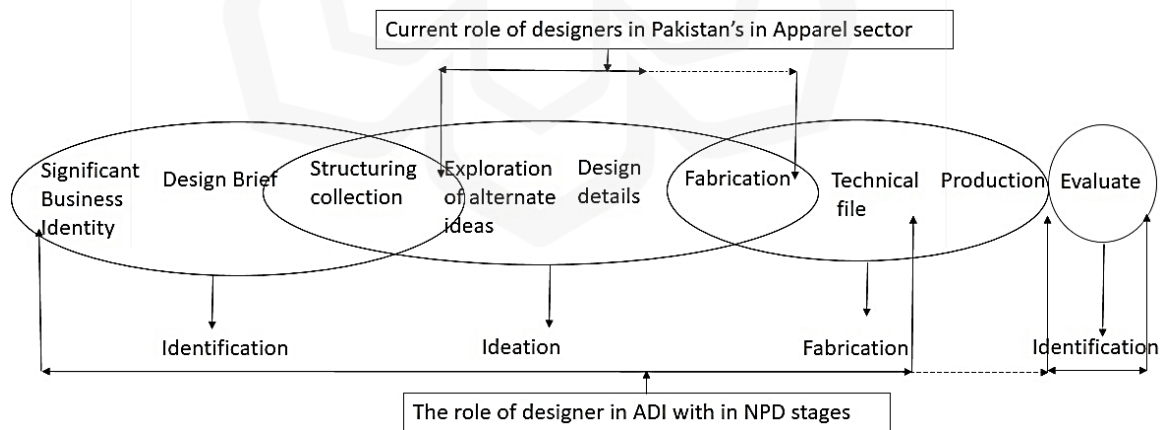


Figure 6.3 The current positioning of the designer's role in three stages of the design process

This study proposes the potential positioning of designers into diverse roles they can perform during product development processes, from intermediary planners of authentic design briefs to professionals capable of utilizing resources creatively (Figure 6.4). This potential positioning of designers in apparel firms would require specialized fields and skills to be incorporated into the next generation of designers.

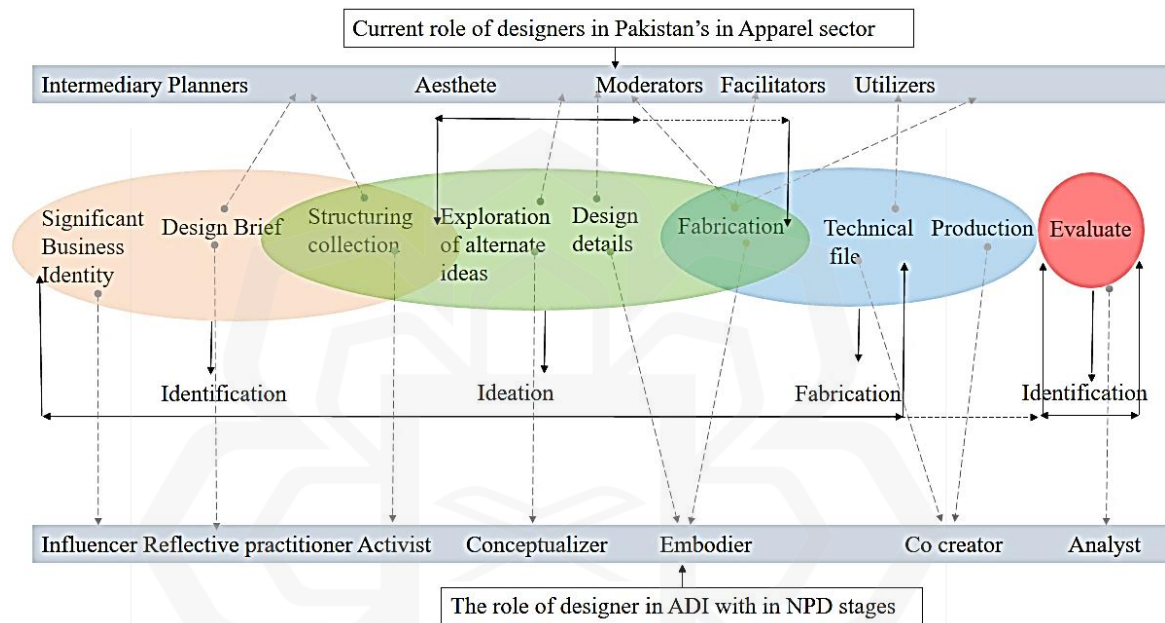


Figure 6.4 The potential designer's role in apparel design innovation

## 6.2.4 The innovative design development processes

Section 5.5.3 presents the design processes of designers working in Punjab, Pakistan's textile and clothing firms. The results illustrated that designers deal with specific methods and sub-tasks for each stage of the design development process that vary according to design problems, product types, firm's production capacity, and nature of business. The designing concerns and strategies concluded 5.45.5.2, 5.5.3, and 5.6, recorded during semi-structured interviews and field observation. The apparel design process mainly comprises three stages, and under each main stage, there are further steps that designers opt for during design development. Table 6.1 presents the generalized outline of procedures during design

development in apparel firms in Punjab, Pakistan. It has summed up design tasks that designers perform to fulfil stage and sub-stage. This activity enabled us to draft the design processes in apparel firms. Nevertheless, it has also raised the query to realize what and how it shall be revised to provide a map towards enhanced design processes and product components.

Table 6.1 Apparel product design process stages in apparel firms

I. Identification	II. Ideation	III. Fabrication
<u>A. Assortment of products</u> <ul style="list-style-type: none"> <li>• Client definition</li> <li>• Responses of the design team based on product components and gap</li> <li>• Market reports</li> </ul>	<u>A. Preliminary Ideas</u> <ul style="list-style-type: none"> <li>• All realms of possibilities</li> <li>• Doodling, line sketches, colour scheme</li> <li>• Fabric assortment</li> </ul>	<u>A. Production Refinement</u> <ul style="list-style-type: none"> <li>• Cost to produce</li> <li>• Time to produce</li> <li>• Methods of production</li> <li>• Sales Potential</li> </ul>
<u>B. Identification of Themes</u> <ul style="list-style-type: none"> <li>• Research on Textile patterns</li> <li>• Fabric textures</li> <li>• Garment Styles</li> <li>• Production technique</li> <li>• Works of contemporaries</li> </ul>	<u>B. Design Refinement</u> <ul style="list-style-type: none"> <li>• Any of the product component's constraints</li> <li>• Produce ability constraints</li> <li>• Timeline constraints</li> <li>• Meshing design constraints to develop workable ideas</li> </ul>	<u>B. Technical file</u> <ul style="list-style-type: none"> <li>• Technical drawings</li> <li>• Scale and sizes</li> <li>• Accessories and trims</li> </ul>
<u>C. Working Problem Definition</u> <ul style="list-style-type: none"> <li>• Collection structure defined</li> <li>• Design criteria established</li> </ul>	<u>D. Evaluation of Designs</u> <ul style="list-style-type: none"> <li>• Preliminary: by designer</li> <li>• Final: By design teams</li> </ul>	<u>C. Improvement/Refinement</u> <ul style="list-style-type: none"> <li>• Further development</li> </ul> <u>D. Evaluation of Designs</u> <ul style="list-style-type: none"> <li>• Preliminary design teams</li> <li>• Final by the client and other formats within firms</li> </ul>

The early stages of design development start with identifying the product type and the final product's look. Identifying new and improved product concepts relies on brainstorming sessions where designers contribute according to their observations of previous creations. Design processes that result in new and innovative designs with market value, generate sustainability and improve the visibility and viability of product and design business are required to innovate (Lommerse et al., 2011a). The firms that do not initiate their design identification tend to offer fabric quality which is already a requirement of their client. Those firms that tend to develop their design briefs happen to compile customer feedback. 66% of the setups compile customer feedback reports and consult them for new developments.

The design process is led by market review, whereas relying on market review may comprise creativity and chances of innovation (Piller & Rwt, 2011) for many reasons; designers tend to develop stereotypes with changes in aesthetics, they create what is already expected, and the risk-taking factor would be compromised, they would not explore new demands and challenges that are generated by new requirements of changing lifestyles and environments. For example, the pandemic caused the use of a mask globally and the need to use garments that protect from germs. Pollution challenges lead designers to develop ideas for unrealized eco-friendly products before environmental issues are realised.

In Section 2.2.2, some design development methods were referred to as co-design, user-centric design, etc., which bring exciting dimensions about the relationship of product type, design development methods and processes, and their impact on product innovation. These include forming innovation teams, collaborating with design and non-design teams, and creating a framework for collaborations between craftspeople and designers, which could lead to innovative product design processes (Lommerse et al., 2011). Compared to the examples in L.R., the methods of designers mostly proceed individually. Usually, the process starts with inspirational pictures of other artworks and designs. The procedures and concerns during this phase of new product development have been illustrated in Figure 6.5. The design development process of respondents was evaluated according to the innovation factors.

It was revealed that apparel designers usually follow a sequential pattern of identifying design elements through market research. Then a collection of visuals guides designers toward ideas of similar categories. Developing new ideas is any designer's preference, but according to them, to create ideas that make a change requires some drivers of innovation. Further, the respondents mentioned that during ideation putting creativity first, risk-taking, new themes, introducing new materials, bringing function first, interdisciplinary methods to develop ideas in groups, freedom to start a new idea, and working without time boundaries could break the monotony, and will bring new ideas to apparel designs.

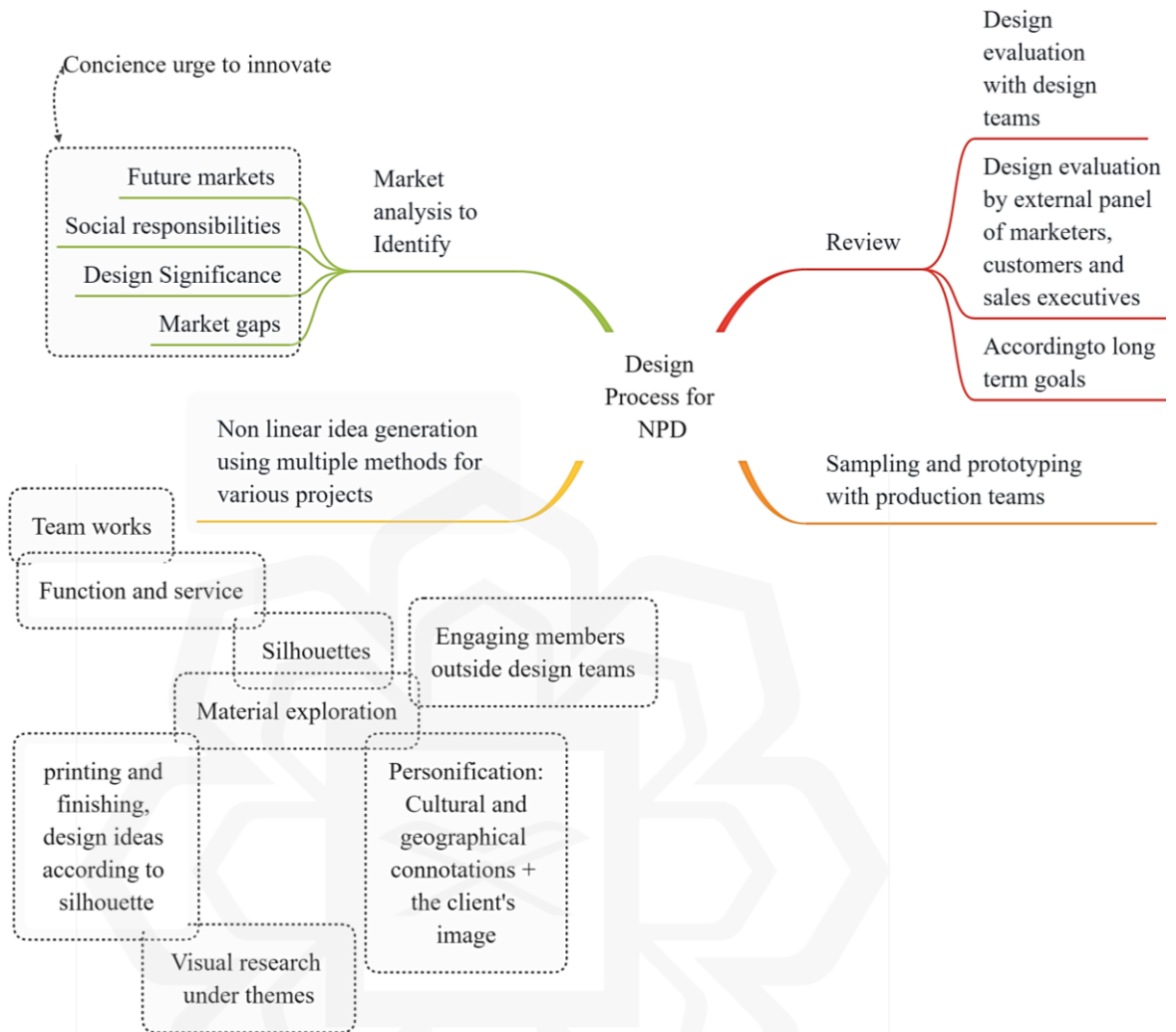


Figure 6.5 Identification of NPD aspects related to design processes.

### 6.2.5 The required designing skills for innovative apparel developments

In introducing a product innovation process, the designer's skills are critical. The appropriate designing skills would ensure the identification of design problems and the execution of innovative design solutions. The design processes drafted by different scholars have mentioned subjective judgment, deductive reasoning, objective observation, and optimization to resolve design problems as the critical ability of designers to develop new design ideas (Dorst & Cross, 2001; Pahl et al., 2007).

Designers learn to draw appropriate solutions with experience by applying knowledge exemplars; for experience designers, it is an intuitive move (Cross, 2021). That is why containing the most intelligent employees in the innovation process with technical communication abilities, diversity and inclusion, cross-functionality, and creativity affects the innovation process and supportive environment for innovation (Cortes, 2021; Lommerse et al., 2011). Hence the respondents during interview sessions identified the skills like technical knowledge about production to transform ideas into workable concepts and aesthetics creation, personalization besides diversity, inclusion, and creativity.

The findings on the role of designers in the apparel sector exposed the multidimensional parts of designers within the apparel sector. They are engaged in the apparel sector as CEOs of apparel companies, design managers, developers, and merchandisers. Their role in the apparel sector determines the skills that designers should have to develop innovative ideas and solutions. The Product development processes have been identified as four main evolutionary stages (See0) identification, ideation, fabrication, and review. The required designing skills to accomplish each step can be classified as follows;

#### 6.2.5.1 *To “Identify” innovative apparel products*

The following arguments are generated to identify innovative design briefs for new apparel product developments.

- Improving critical thinking to extrapolate future markets and trends would require the design to evaluate market trends for continuous and discontinuous innovation critically. Continuous innovation refers to reviewing produced products to develop better solutions; discontinuous innovation refers to introducing new products, services, and processes (Frumkin et al., 2011). This would also require identifying those themes, trends, and markets the apparel

sector has not explored to help the textile and clothing industry understand the value, viability, and scalability (Mazzarella et al., 2017; Smith et al., 2017).

- Supporting exploratory thinking to develop a more flexible but structured approach to product development: Apparel design or any other field of the creative industry would require technical solutions and product ability of the ideas. However, keeping a margin of exploration through allocating resources for innovation allows a degree of freedom to investigate various options.(Lommerse et al., 2011)

#### 6.2.5.2 *To “ideate” alternatives and possibilities*

The following actions can lead “ideation” of alternative solutions and the exploration of new possibilities;

- Designers interpret and reflect on their observations regarding customer requirements during design development and idea generation. The design responses and ideas developed by the designer are his manifestations of what should be available for the user. During field observation, it was identified that designers working in creative industries modify their ideas according to the available resources. So the ability to channel design components and product features in a way best suited for the user and manufacturer is spirited with the designers' personalized style of doing it. Cognitive skills to channel design components to achieve significant design identity is essential for an apparel designer to develop functional design ideas that hold significance.
- Besides reasoning to develop exciting solutions for apparel products because they have emotional and experience attachments beyond function(Desmet & Hekkert, 2007), apparel designers should develop analogical thinking. Analogical thinking

enables the skill to find connections and the parallel between apparently dissimilar themes resulting in new design options (Cross, 2021, p. 52).

- The designer identifies and interprets user demands during his design development process. The designs may signify the designer's individual or design team's collective interpretation of user demands. Respondents identified the ability to understand user requirements as a skill that a designer can polish through practice. In pursuance of NPD, the designer's skills to improve observations on market and customer responses would lead to new and alternative ideas. The user-related aspect of apparel design could be understood through personal interaction with the audience (Jane, 2005). So that means if this aspect is to be enhanced during the design development process, it would require close interaction with the user. That is why design researchers have been interested in developing models for product co-creation while working closely with the user (Carstensen, 2012; Elsbach, 2018). This may be useful for designers to investigate the possibilities of unique, innovative, rich designs, and more challenging or appealing than those that do not intentionally address the design's meaningfulness and emotional aspect (Desmet, 2007).
- During ideation, the apparel designers start with concept development. The themes and outlines are described. The conversion of thoughts into images, shapes, lines and textures, and fabrics requires good skill in design visualization tools. Drawing is one of the prime tools that designers use for shaping ideas. The designers must be well trained for either hand or digital sketches.
- Respondents believed aesthetics could be learned and improved through training, observations, and experience. They shared their methods of developing skills for aesthetics. Since the prime motivation for aesthetics is generated through consumer psychographics and demographics, most of the skill development suggestions by the respondents to train young designers on aesthetics were generated around an improved understanding of user aesthetics. Understanding user aesthetics is

developed through observing market trends and imagining user profiles by listing the brands and products they buy from. These imaginary user profiles find their basis in rationalization by observing users' buying behaviour. The apparel designer reflects and develops aesthetics according to his understanding that he creates through these observations and imagination of user profiles. Once the product is launched, the feedback and selling reports of the product add to the designer's aesthetics.

#### 6.2.5.3 *To innovatively utilize resources to develop meaningful products*

Following perspectives can lead to meaningful design developments.

- Whatever ideas the apparel designers develop in the form of drawings and visuals must be producible. That is why a designer's capability to foresee productivity is crucial. The designers should be aware of advancements in materials and techniques. Section 5.5.1 identified the role of designers as utilizers of resources to convert them into meaningful products. This is a direct hit to the factor specified in sections 2.4 and 3.7 that the T&C industry of Pakistan is facing problems in sticking just to cotton and cotton by-products. Even if there are advancements in cotton, the complete product is mainly not produced; the yarn is exported. This means that designers are a source in identifying better and more meaningful use of materials and other resources, even sticking to cotton as the primary material.
- Industry inventory (See 5.2) and field visits unveiled that there are fundamental developments in material, fabric manufacturing, and then stitching of the garments that new and innovative fabric textures and garments styles are stuck to a particular type, and they are not challenged in designing. DM2 particularly mentioned this problem regarding the incapability of the T&C industry to build up its image as one with diverse product ranges despite having raw material availability. They explained the importance of developing complete finished products to enhance the

appearance of Pakistan's T&C in the eyes of a foreign client. Interviewees articulated that designers are the ones who utilize raw materials and shape meaningful products out of them. In this way, they are an excellent resource for developing practical and meaningful ideas for using raw materials and available resources.

#### **6.2.6 The missing dimensions: Aspects to pursue design innovation.**

Product innovation refers to innovation (process or product) from idea to visualization of the usable idea into a garment. It differs from creativity because of its very nature of being functional and value addition besides being different (O'Mahony, 2011) (Hodges, Nancy, 2018)(OECD/Eurostat, 2018). It refers to a new or improved usable idea, process, or product (or combination of any) different from the previous outcomes in a similar domain (Activities, 2018; Frumkin & Weiss, 2011; Horne, 2011; Padilha & Gomes, 2016).

The findings revealed some factors of apparel design innovation that have not been concentrated at all or require further attention. During L.R., some design innovation-related factors were identified in section 2.2.2 that were not mentioned in the literature reviewed on Pakistan's apparel industry developments. These factors were affirmed during data collection to observe their presence in design practices in apparel firms of Pakistan. The three data collection methods confirmed the absence of these factors from current design practices. Respondents were aware of the weaknesses and lack of some aspects that would bring change; they identified some factors not mentioned in the literature. Figure 5.11 illustrates those factors in chapter four. During the interview sessions, they identified and confirmed the status of these factors. If these missing dimensions are incorporated into the product development processes, they can be an excellent source to develop new and innovative products and strategies. These aspects are discussed as follows;

#### 6.2.6.1 *National and firm-level design strategies to develop new innovative products*

The policies and strategies are drafted on national and international levels for nationwide planning to encounter sustainable development goals and scope of future markets and to come upon challenges through developing appropriate strategies for business models (Paper, 2019; Report et al., 2018). The textile policy of Pakistan has not produced any manual or framework for design strategies and design innovation (Government, 2015). In comparison, there are drafted manuals on product innovation that guide creation and provide directions to develop policies for product innovation (OECD/Eurostat, 2018). The Oslo Manual of product innovation is one example produced by the Norwegian national authority that provides directions and explanations for product innovation concepts (OECD/Eurostat, 2018). Similarly, during L.R., the report of WEF was also analyzed; this report provides strategies and insights into product innovation for developing member countries. Hence, cohesive national-level strategies assist in setting up innovation goals for the design firms that trickle down to the design activities and design innovation tasks in design departments. A coherent product innovation policy shall be drafted that will guide designers and other professionals to initiate design to bring change.

The industry inventory revealed that no design innovation policies are developed on a firm level. Innovation ideas exist in upgrading technology and machinery and, to some extent, in manufacturing firms to create new fabric surfaces and textures. The design departments prioritize themes based on aesthetics and effects, whereas no ongoing yearlong plans and strategies were found. Design departments either focus on developing designs on the concepts provided by the clients (mostly AW and DM firms) or follow short-term collection planning (FA and PF firms) to achieve fast fashion goals. In some product categories, no design activities and value addition happen because the firm has not set up design departments and hence does not independently engage in new product development. Instead, it relies on its clients (MM and G&G firms). TT firms are small in scale and patronised mainly by NGOs. No such collective design innovation forum exists that can draft innovation strategies for the apparel sector. The textile and garment associations

(PRGMEA & APTMA) exist without representations of designers and design firms; similarly, the association of designers exists only for fashion apparel (PFDC).

#### 6.2.6.2 *Apparel Value chain networks and collaborations2*

It was discovered during L.R. that innovation in design requires the identification of problem/s and optimization of design solution/s(Dorst & Cross, 2001)(Trott, 2012). It was also established that new product development would require design processes that explore opportunities to accumulate suitable solutions, and collaborations within and outside design firms can assist (Engel-Enright, 2016; Pahl et al., 2007; Rieple, 2009). The results presented that there are not enough collaborations within design firms to identify new problems and design briefs, so optimization of new products is not frequent.

Collaborative ventures and professional networks strengthen new product development. Collaborations for new apparel product development and innovative ideas development happen on different levels of knowledge sharing within design teams and outside design teams(Lommerse et al., 2011b). Marina has mentioned stakeholders of collaborative ventures that accelerate new product development as personnel involved on the infrastructure level, those who are not directly involved in designing but are related to the product development cycle, such as manufacturers and professionals who perform design activity. She has also involved educational and technical institutes as prospects for collaborative ventures.

The apparel industry follows trends and directions consequent of abstract notions of personification of target consumers and from reports of what target consumers have purchased in the past along with projections of their future purchases(Y. K. Lee & DeLong, 2018) (see section personification). For this reason, target consumers can also be considered potential members of collaborative teams. In the apparel firms that develop products for retailers and other international labels, the designers create products according to the features suitable for different cultures and markets. In this case, collaborative

ventures for innovative apparel can also be planned with international designers to explore perspectives of global markets.

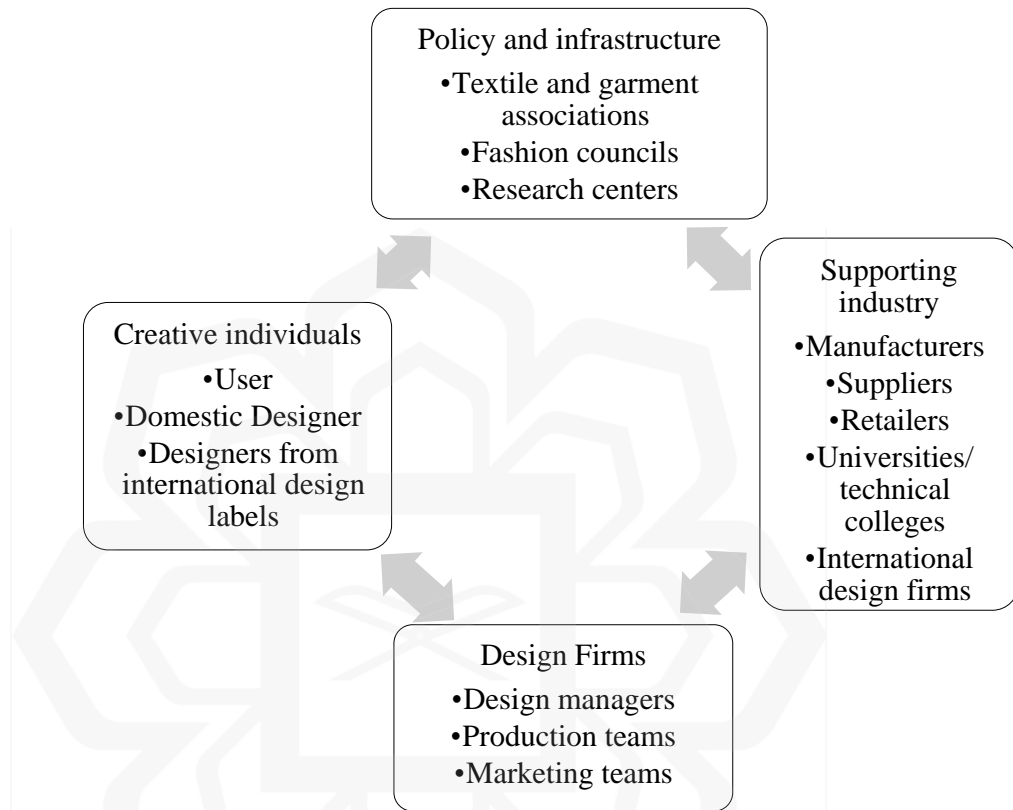


Figure 6.6 Contributors of apparel product development

The data collected during research showed that designers accumulate product ideas within design firms considering multiple aspects related to marketing, management, production, and customer aesthetics. Similarly, Paul Trott (2012) mentioned the importance of internal sources as management, production, and marketing teams in design firms that contribute to design innovation are vital because designers do not work in isolation. They do not develop according to their free will. Instead, they reflect on the knowledge they accumulate from internal and external sources. Therefore, based on the above discussion, innovation happens within a network of these internal and external contributors (Figure 6.6). The contributors in design innovation who would be potential participants in

collaborative ventures can be classified as policy and infrastructure professionals, personnel from the textile value chain, design educators, creative individuals with the expertise of different apparel product types, design firms, technological and technical experts, designers as entrepreneurs of small manufacturing enterprises and small business startups.

#### 6.2.6.3 *Evaluation of product components to identify new possibilities*

The design tasks mostly started with the design brief provided by the client or decided by the design management team, comprised of senior designers and team heads. The collection planning is mainly based on market reports developed by the marketers' team. The market reports were compiled according to the sales report. Nigel Cross has mentioned many rational methods of evaluating performance and function reports of products. Similarly, there have been models and evaluation forms to assess customer satisfaction. Then there are methods such as an objective tree to evaluate the planning of new ideas if something different than earlier developed solutions is planned.

Identifying creative design briefs is crucial, and applying different methods to optimize design briefs could lead design processes toward innovative product developments. Currently, designers' reliance to initiate their design processes is either based on client requirements in the case of foreign design houses as clients or the market reports generated by the marketing departments in firms. The market reports generated in the firms focus more on sale reports, and the design features and product styles are not in focus. Instead, the designers interpret these reports in their capacity regarding design components. Therefore, reviewing the formats of these market reports would make them more suitable for generating creative design briefs.

#### 6.2.6.4 *Evolution in product form, material, and mode of use to achieve SDG*

Previous studies explored the reforms in apparel design to achieve sustainable apparel designs. Future sustainable design approaches are considered beneficial to achieve innovation because they provide a framework to evolve a product's form, material, and mode of use (Lommerse et al., 2011). Some firms have certifications but only manufacture sustainable products according to client requirements. No such design projects were recorded during field observations and interviews representing the evolution of design developments within the sustainability framework.

Designers and apparel brands have developed sustainable design models and frameworks to develop designs that lead to new design developments in apparel. Many apparel companies have successfully launched some sustainable product designs internationally. Sustainability-related concepts provide a framework to design. The designers are challenged to innovate design components, processes, and materials. Sustainable apparel products are not a concern in the apparel sector. Sustainable development goals can be set, and multiple interpretations can be applied in design developments. It offers a vast implication for design. For example, the following few themes could be generated.

1. Working with craft persons to develop products that will benefit laboured communities
2. Developing products and concepts for slow fashion
3. Recycling and upcycling
4. Working for zero landfill, etc.

#### 6.2.6.5 *Limitations of the current role of apparel designer in the industry*

The designer's scope of work is more significant than currently practised in the apparel sector. Designers are the decision makers of each step of the product development process,

and they decide on product features; therefore, they are the ones who can be the central workforce to bring change. The designers were asked about their recent work patterns and satisfaction with their achievements. They shared that their potential and formal training is higher than transforming the aesthetics of their client into silhouettes and materials. Designers mostly start their work with the ideation phase. Usually, identification is compromised for the following reasons;

- Short time limits to complete collections.
- The product range is already defined.
- Adapting new tastes and preferences is not in practice
- The designer's role as change maker is not realized

#### **6.2.6.6 *Limitations of currently practised design methods and processes in the ideation***

Innovative products better meet the target group's needs (Frumkin et al., 2011, p. 23); therefore, design methods to understand customer behaviour and responses and processes to transform the user experience and responses into product features are vital. Research in this regard has identified techniques such as co-designing by involving the user in design processes and establishment of design innovation cells that develop product ideas by including those members of the firm that have the most direct contact with the customers, that is, the sales, marketing and customer service staff (Frumkin et al., 2011; Peterson, 2016; Zahid & Usman, 2017).

Currently, the design methods opted for by designers usually focus on interpreting the visuals they collect according to the themes they classify for their design developments. The recorded design processes explained that aesthetics and sometimes function are prioritized. Other components of apparel design are considered in later stages of ideation, and occasionally functional aspects are evaluated in the sampling stage. Designers consider technical aspects of production as criteria to assess the practicality of their ideas. Some respondents explained that while they are in their ideation phase, they filter their opinions

according to the production ability and availability of resources. So there is a chance that the ideas that can bring innovation are discarded because of the limited approach to resources. An apparel design development during ideation requires the following considerations.

- Function: Fit, mobility, comfort, protection, event
- Identity: Culture, ethnicity, significance, lifestyle
- Aesthetics: Art elements and design principles to achieve personas
- Technique: textile and garment production techniques, Alignment of production techniques with design concepts

#### 6.2.6.7 *Focus on design identity*

The significance is based on function, service, aesthetic, technic or technology, or combination. For example, an eco-friendly garment would signify that it differs from the other products in the same category. The significance of design is identified or realized in the first phase of product development, “identify.” It is the driving force of new product concept development. The significance of a product can be designed by considering universal, regional, or even personal levels of identities and expressions. Design significance has multi-layers and dimensions. A designer may identify and develop product behaviour and expression through intriguing any aspect.

Design identity refers to the unique selling point, design philosophy, and unique design expression that signifies the product of one designer or brand from the others. In previous studies, the significance of design has been elaborated in detail. The data collection findings portray that since many of the apparel firms in Pakistan focus on manufacturing and providing services to other design brands, they lack a significant identity. The designing in the apparel sector with effective styles and design expression, particularly in textile printing and fashion apparel, is essential because textile patterns and silhouettes are deep rooted in the multi-layers of user identity, brand identity, and the designer’s signature style of designing. During field observation,, it was discovered that

firms and designers focus on establishing a particular style and expression of the clothes through different tactics so that their products stand out and can be recognized amongst their competitors. Examples of such tactics from field observation are;

- The designs produced for traditional apparel tend to follow two directions: to create products using traditional techniques and to keep the aesthetics of the traditional textiles while making the products with industrial processes. Traditional apparel products are designed by restricting fabric production techniques to traditional handicrafts. The other approach appears to be similar to the 20th-century Bauhaus approach to the design profession; likewise, the product design profession was conceived as a tool to introduce aesthetics of hand-crafted finesses in mass-produced products in the 20<sup>th</sup> century. The designs with this approach are inspired by traditional art and crafts of regional identities though the production techniques are evolved according to the requirements.
- Fabric processing techniques and materials are explored to introduce unconventional surfaces. During data collection, it was observed that to establish a significant identity. Sometimes designs are developed with the conscious of utilizing such techniques or a combination of procedures that the products appear to be different from those launched earlier. The designers producing activewear and mainly denim try to bring such significance into their designs through reforms in fabrications.

It was also pertinent that the significance of design is practised at both firm and designer levels. The designers develop significant styles by considering their firm's design philosophy. Still, the designers working in the same design house also tend to produce different expressions and product ideas. The designers working in the firms that did not focus on their significant identities but focused more on the client's design brief and problem definition expressed that this affects their creativity and significant expression.

The significance of design has four levels in terms of the context that should be considered while designing, and these four perspectives may find relevance with the user

perceptions on universal, regional, and cultural levels. In contrast, personal refers to the designer's significant style of developing garment styles and looks.

1. Universal
2. Cultural
3. Regional
4. Personal

These significant identities can be practised in developing new product designs by ideating product development features such as production techniques, garment styles, particular materials or production processes and the evolution of textile patterns, colours or silhouettes. For example, the apparel product type, Denim, is a considerable global style of dress that may not be associated with one specific region compared to a Kashmiri kaftan, which is the region's identity. Similarly, the dress styles and silhouettes represent the product identities of firms and even the designer's level. An apparel designer may tend to develop specific product expressions and choices of design elements that become a particular design style of that designer or design firm. During field observation, an example of such design identity was observed in both traditional textile firms. The products produced by these two firms had regional and cultural identities. Still, at the same time, both firms were making two very different styles of products because the designers had incorporated their significance as well.

#### 6.2.6.8 ***Reliance on the client's problem definition constricts the scope of the new paradigm.***

This factor relates to the design identity discussed above regarding the limitations on developing creative and innovative design solutions by establishing significant product identities. Notably, the clothing companies, which rely on producing other labels and are not involved in retail, follow design processes that depend on design houses owned by the customer brands of either their design offices established abroad. The established design

offices abroad focus on developing opportunities for production orders. The design concepts focus on the customer brand aesthetics and events. Value addition and innovation happen to some extent, but the design gesture towards innovation is not bold. Many clothing companies have traditionally produced designs for foreign clients, and some have started with international and local design offices in the past decade. They have received good responses compared to their earlier set-up, with no design departments. So, they consider it a good opportunity, and the management heads have not realised the realisation to develop independent, original ideas. However, the designers realise there is significant room for the design department's establishment towards innovation.

#### 6.2.6.1 *Elimination of marketplace boundaries*

More than 60% of apparel setups consult published sources to familiarize themselves with international trends and themes for design directions. Their design teams then ideate designs according to the available resources. The aesthetics are developed accordingly, but in terms of the marketplace, most of them have not explored new markets, and almost no one owns their label and brand internationally.

Retail focuses on designing domestic products, whereas exports focus on manufacturing apparel. Here it is also essential that many industries focusing on exports only or with separate wings for the export sector practice two different design processes. One group of designers focus on identifying design features according to the market pulse and developing aesthetics. The other group is assigned to ideate details of designs and fabricate according to the sketch provided to them by their fellow designer. The designers engaged in the firm's design tasks, and those connected to the market and work as conceptualizers work as a team. Those who work on idea generation correspond to market pulse, work as a market surveyor, and those connected with the production team consider themselves as facilitators or translators of the information they receive from the designers sitting abroad. Designers working in retail brands have more freedom to innovate because

they are given more space and confidence to review the market and direct interaction with customers.

#### 6.2.6.2 *Integrated design processes*

It is essential to consider aspects of designs for successful outcomes. The design idea, enterprise production, and costing plan must go side by side. They cannot just work in isolation; for example, if the use of more organic materials is there that cannot be produced in bulk quality, the firm cannot plan for mass production. Therefore, SMEs have more margin to innovate than already established big multi-store brands. A sensible, creative, and technological approach is required that allows us to know where the weakness happens and then address it. The design processes should not occur in isolation in the design departments or freelance design houses. Instead, the production departments, R&D setups and design departments can be part of design development processes not only to identify themes. A network to develop connections between craftspeople, designers, government, private industry, educational institutions, suppliers, and manufacturers; and establish pathways for networking between diverse disciplines across creative industries.

#### 6.2.6.3 *Subcategories of textile and apparel design require mastery of various disciplines.*

The design concerns of an apparel designer assigned to fabrication differ from those responsible for pattern or styling. Though their everyday concerns are aesthetics according to the persona and cost-effectiveness, they have some concerns during their design processes that are different and require different skill sets. The specific skills are those related to product types and textile production techniques.

The design preferences to approach product design components and criteria to finalize product ideas during the ideation phase may vary for different apparel products

based on the designer's understanding of user choices, functional aspects, and product experience (See 2.2.2). For example, suppose an activewear outfit is considered to provide comfort as its preferred user experience. In that case, the designer may keep material choices, cut lines and finishing techniques according to that and may compromise on his ideas that he thought were more experimental and creative aesthetically. Similarly, for an outfit designed for an event of short-term wearing, such as fast fashion. The designer's creativity to experiment with surface ideas and experimental cut lines would be directed accordingly.

#### 6.2.6.4 *Product Diversity*

It was made known in previous studies that Pakistan's apparel sector should work on the product diversity and range of products it is producing right now, the product that has not been created earlier, as well as improved products. The interview session made it possible to collect insight in this regard. The interviewees had multiple views about approaching product diversity that addressed improvements in the current market, the discovery of new and innovative products for future social, economic, and environmental needs, new markets, the development of products with improved and innovative materials and the custom made or meaningful products with traditional and cultural identities. Product diversity would lead the way where distinctive identities of textile products, techniques, processes and functions can be discovered both in terms of traditional native textiles as well as industrial products. Product diversity is linked with expansion in design activities, particularly during the identification phase. Launching products that are entirely new to the market and new to the firm would require improved policies on the national, firm and design department levels. As the scope of this study was set on the functioning of designer's activities, the study related to external factors, such as product management-related policies, was limited.

#### **6.2.6.5 *Discovering new technologies and techniques***

New technologies, techniques and processes are an excellent source to add value to designs. The unconventional techniques of developing designs inflate value-addition possibilities. The technical aspects of skilled labour and garment making, for example, pattern making, stitching, finishing and post-treatments, are better. Skilled labour is available. Nevertheless, material innovations are lacking in strategies to improve techniques and incorporate new technologies to enhance production.

Technology is introduced, which is already opted for by competitors instead of being proactive. Technique and precision are by-products of skilled labour and appropriate machinery. So introducing digital tools and new technologies to develop designs and products can be a helpful incentive. Even digital tools and applications can be an excellent source to master techniques. Technique and precision can be mastered with technological improvement (DM2). Technological advancements encourage opportunities to design innovative materials and garments. New technologies are emerging rapidly though the creative process is not bound to technology. The technology works as an apparel design tool and reforms the production process. In the past few decades, technological advancements in the apparel sector have changed how products are designed and produced, particularly in digital print design.

#### **6.2.7 Summaries of the discussion**

The discussion has led to the following summary of the study.

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**The infrastructure of the apparel sector in Punjab Pakistan**

- The apparel associations do not find a balanced representation of all stakeholders in the product development processes.
- There is no database on practising designers or a database that can provide sourcing solutions to young design entrepreneurs.
- Most design-related activities happen in fashion apparel and printed processed fabrics, retail, and domestic market businesses.
- Traditional textiles are fewer in numbers compared to their potential for NPD.
- Hosiery and technical products have a minor focus on product design developments.

**Product Types**

- Fashion apparel, activewear and processed fabrics have monotony in design development. The design vocabulary focuses on certain types of textile patterns and materials. Their focus on design significance in terms of identity, branding and unique selling point, and meaningfulness is lacking.

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**Innovation planning and management**

- The role of designers in developing NPD varies within organizations.
- Integrated design processes to utilize and generate requirements for new materials and services are feeble because the role of designers is focused on the interface of the product, new materials developments are not synchronized with design departments in some setups, and some external factors exist.

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**Design Skills**

- Collaborations for NPD are leaning towards refining product features and developing suitable product aesthetics for international clients within design groups.
  - Some of the setups have certification in sustainability. They work on SDG only when the client has asked for it. The evolution of apparel design practices happens by optimizing components of apparel products according to future market challenges.
  - These future market challenges in apparel design are related to the diversity and quality of apparel product design. This can be achieved by addressing multiple factors related to design management, design processes and product features such as improved function, alternate materials, building significant product identity etc.
  - Cognitive skills to channel design components are crucial to achieving significant design identity and functionality. Design Knowledge of appropriate fittings and comfortable cuts is essential.
  - The intelligent methods to improve collaborative processes between the three stakeholders, the production department, design teams and management teams for each stage of product development, can ensure the identification, development and fabrication of new products and resolve fast fashion time management issues.
-

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**Design  
Process**

- Most of the themes are related to colours and patterns. It is rare to find any theme in the initial phase that leads the design towards usefulness, sustainability or any other social or cultural issue. Most of the themes were recorded as; Festive, bold, native, punk, luxury etc.
  - The textile patterns are developed from visual references collected through digital sources mostly. The pattern vocabulary varies from traditional motifs and abstract patterns to floral ones. The patterns are not drawn from scratch. They are downloaded, and further treatments and colour schemes are applied.
  - The cut lines and styles are taken from various resources and further manipulated. Designers identified that experimentation on the development process is not done due to time constraints.
  - Environmental concerns and the designing of eco-friendly products are not design concerns.
  - The fabric samples in all firms were mostly cotton and cotton blends.
  - 80% of the design process starts with reviewing previous collections, meaning the industry is inclined towards the upgradation of previously developed products.
  - Teaming up with different disciplines and professionals to discover and develop new markets and products
-

<b>Apparel product components</b>	<ul style="list-style-type: none"> <li>• Design components to be integrated into design development processes.</li> <li>• Functionality relatable with aesthetics and fabrication, 2) Integration between aesthetics and production technique, 3) New materials, 4) Significance and identity to design</li> </ul>
<b>Framework for apparel design innovation</b>	<ul style="list-style-type: none"> <li>• This research has observed the design activities in developing different types of apparel products. Some of the issues like material exploration, technological advancements, generating new design briefs and enhancing design significance are common for different product types of design developments where, as some issues correspond to specific product types such as brand identities in traditional textiles and fashion apparel; aesthetic technical and technological integration during the design process of activewear and denim, exploration of user profiles in processed fabrics and fashion apparel. The design strategies and framework on product design innovation would map a cohesive vision for the apparel sector and may draft concentrated sub-sections for the specialized fields, or the framework could identify key notions regarding design innovation that the designer of specialized fields can further adapt.</li> </ul>

### **6.3 PROPOSED FRAMEWORK FOR APPAREL PRODUCT INNOVATION IN PAKISTAN'S T&C INDUSTRY**

The discussion on the findings of the study enabled the draft of an apparel design innovation framework. Research objective one inquired about the factors that influence apparel design innovation in Pakistan's T&C sector. The factors were identified through a study of previous research, industry records, field observations and interview sessions. The discussion on factors of apparel design resulted in their classification into different stages of the apparel design process. This classification helped streamline the various aspects of the research problem. Research objective two inquired about the design practices that are influenced by these factors. The discussion on the effects of design innovation factors on current and prospective design practices leads towards the achievement of research objective three; apparel design framework for the T&C sector. The outline of the framework and, later, the assortment of factors under subsections of the outline concluded a proposed framework that was presented to focus group discussion for further refinement and verification. The proposed framework is as follows;

### **6.3.1 The outline of the framework for apparel design innovation**

The findings of the overall study revealed that the apparel sector of Pakistan requires a cohesive approach to pursue growth in the apparel sector. The growth of the apparel sector wouldn't only mean an increase in the production of improved clothing. Rather the growth also referred to the designing of beneficial products, opening up new horizons and potentials for apparel designers to develop new possibilities. The role of apparel designers is crucial in this regard firstly because the nature of their profession is to extrapolate future markets; secondly, their role as change makers and influencers would identify, ideate and fabricate new and innovative product solutions. The new innovative product means that any of the product components have been designed to offer improved or new services. Moreover, the product design components are processed during the design development processes, and the outcome of the design process is a new product.

The study of apparel product components, design development processes, the meanings related to innovation in apparel design and the identification of innovation factors

that influence apparel design in Pakistan's T&C sector aided the formation of a framework for Pakistan's Apparel sector. The results established that the current design practices focus on product interface and appearance-related tasks.

The data analysis explored that design components related to function, identity and production are less focused within design teams resulting in limited design possibilities. Collection planning, themes and aesthetics of the products are market-driven and mostly based on elements related to lifestyle, culture, events, and seasons. The discussion enabled proposals on apparel design innovation strategies that could be classified for each stage of the design process. During design developments, priorities to engage innovative approaches could be applied.

The listed innovation factors were analyzed to build their relevance with the three design development stages. The relevance and relationships between them established an outline for the framework. This outline abetted to comprehensively bring down all the relevant points and assured that no relevant point is missed. The summaries of rich data from each section were placed against the outline to cross-check if no point of consideration was skipped. The outline is formed according to the three segments of the apparel product design process and their relevance with apparel design components (Figure 6.7).

The underpinnings for the framework were established based on the argument developed in section 2.2. The two aspects of design as an activity demands insight; one regarding apparel product components operated during the activity and the processes opted during the activity. The design choices and methods of apparel designers during the design process are applied to four levels of the product components. The design innovation and NPD factors were streamlined and sorted within the frame of the design development process and apparel product component to find the framework for apparel design innovation.

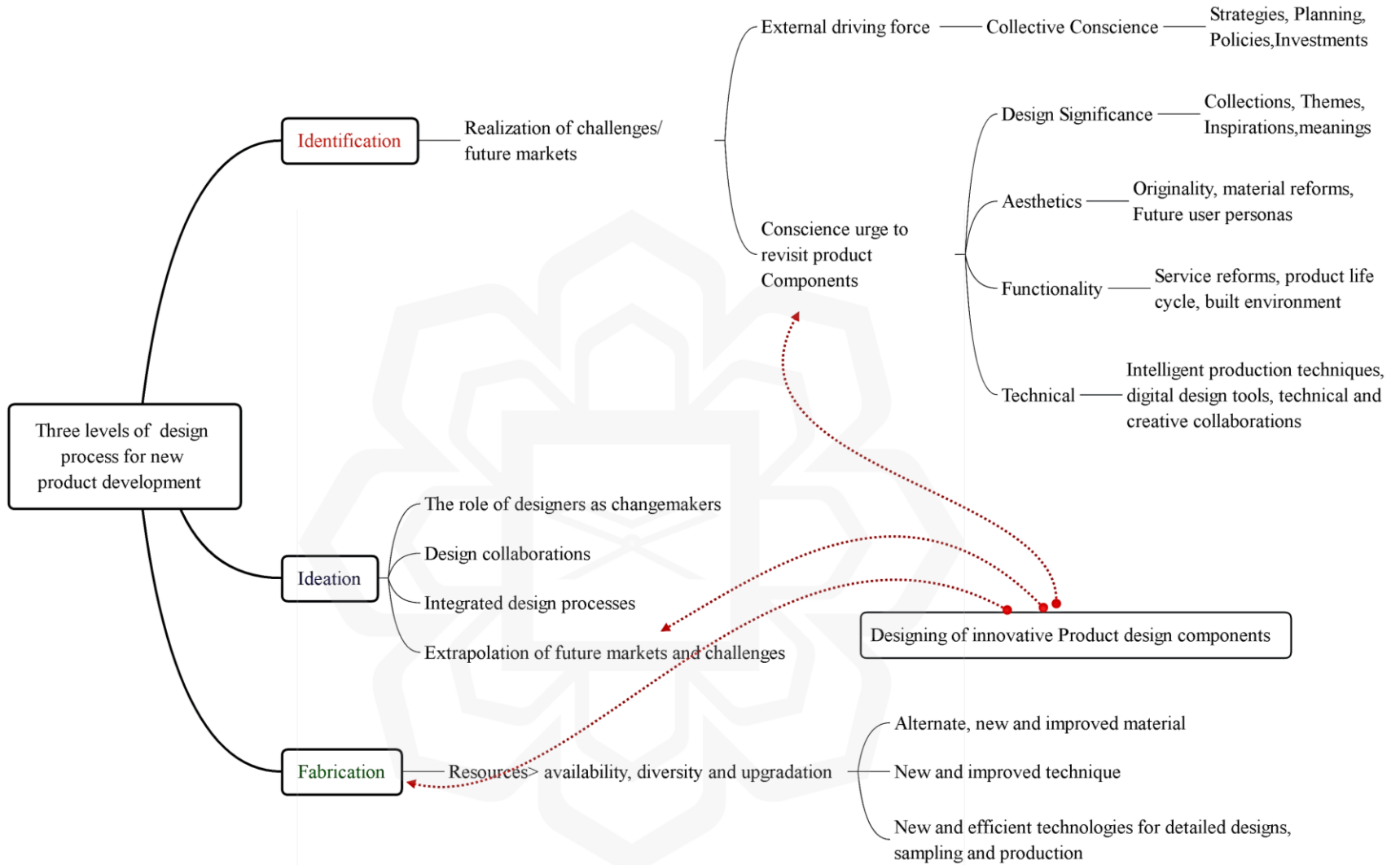


Figure 6.7 The outline of the framework for apparel new product

### **6.3.2 Proposed framework for apparel product innovation.**

The proposed framework of ADI recommended that design innovation happens during the three phases of the design development process identification, ideation and fabrication. During these stages of designing apparel products within an industrial environment, the four components of products are considered. These three stages are mostly sequential, but sometimes designers move backwards and forward depending on the feedback from clients or other influencing environments.

The product components are interlinked, and sometimes it is difficult to identify the transition of design choices for each component. Designers apply their cognitive skills during the ideation process to develop creative ideas and solutions. Depending on the problem type and nature of the design brief, the design elements within each component are utilized. The combination and proportion of each component and element ignite creativity. The apparel design innovation process is also affected by some external factors, which are 1) the availability of suitable national and firm-level design strategies and 2) the role of designers that are assigned and understood by the firm management and client. Figure 6.8 is a graphical representation of the proposed apparel product design innovation framework. These figures were presented during focus group discussions as an aid in explaining the design process for new product development and assisted in explaining functions under related design activities.

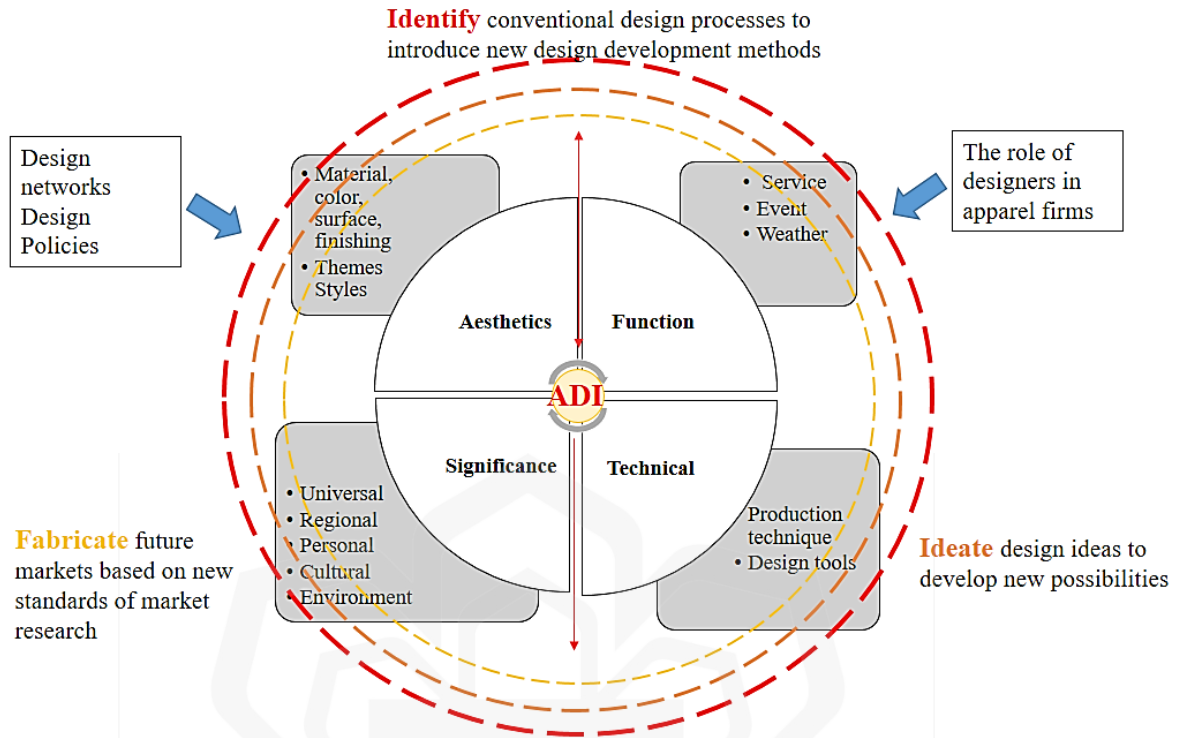


Figure 6.8 Proposed framework for apparel design innovation.

### 6.3.3 The three layers of the proposed framework for apparel design innovation for Pakistan’s T&C industry

#### 6.3.3.1 Identification

Includes identification of design-related issues and problems at the designer’s level and a holistic approach towards “identification”. The framework under this heading provides a conceptual underpinning for advancements in NPD. Designing and design activities do not happen in isolation, and neither can they be realized individually. Designers design products in response to whatever they observe, receive and acquire. So identify here would be interpreted in the following multiple dimensions. These dimensions are interrelated and

do not follow a sequential plan; identification and realization can happen at any stage and can become simulators for the other segments;

- Realization of future challenges and markets on a collective level which includes Pakistan's apparel sector collectively where all stakeholders are included.
- Identification of design briefs, themes and design ideation-related issues. This level includes all the design task-related teams.
- Identification of integrated design development processes that rationalize product features, design elements in general and apparel design components in specific.

#### 6.3.3.2 *Ideation*

Ideation is idea development in response to the strategies and conceptual underpinnings that are identified. This section leads to the opportunities and possibilities to explore within design-related activities. The study explored three main segments of design practices, the role of designers, their design development processes and their skills. Similarly, this section of the framework would guide through strategies and points of consideration that can lead to innovative product development.

- It applies to design management in exploring and assigning new roles to designers.
- Reforms in design development processes. Breaking the stereotypes and sequential approaches to apparel design
- The skill development of designers and related team members. Revisiting design and vocational.

### 6.3.3.3 *Fabrication*

“Fabrication” in the product development processes was explained as all the processes that happen to execute design ideas. This section includes the framework related to reforms in materials, techniques, technologies and workforce. Execution of product also caters to other study domains of product development, for example, merchandising, supply chain, marketing etc. The study aims to propose a framework to enhance the apparel design innovation potential of Pakistan’s textile and clothing industry, so the framework under this section focuses on design development-related issues and concepts.

The discussions under this section happen around.

- Material reforms
- Textile and apparel production techniques and their relationships with design  
Designing for any specific technique require expertise and ideation accordingly.
- Technological reforms that support designing methods, sampling solutions and innovative production processes of new developments.

The three stages of the proposed framework are presented in the following three tables.

- Proposed Framework Section 1: Identification
- Proposed Framework Section 2: Ideation
- Proposed Framework Section 3: Fabrication




Table 6.2 Proposed framework section 1: Identification

		<b>Realize future challenges and markets to identify NPD directions</b>	
Identification	Vacuum		
	Collective Conscience	<ul style="list-style-type: none"> <li>• A nationwide design policy to reach future markets</li> <li>• Representation of designer in apparel associations</li> <li>• Development of design associations that work closely with industry</li> <li>• Investments in Design research projects in the all the three steps of product developments explained in the study</li> <li>• Digital database of sourcing for design entrepreneurs and SMEs</li> <li>• The development of standards on evaluation of data that identifies product themes</li> </ul>	<p>Strategies to develop a collective conscience on product and design innovation</p>
	Designer's Role	<ul style="list-style-type: none"> <li>• Role of designer as influencer who influences not only the design development process but product development complete cycle.</li> <li>• Placement of designers within organizations and collaborations as change makers</li> </ul>	<p>Designer's role as change makers</p>
	Design Significance	<ul style="list-style-type: none"> <li>• Design firms may strategize towards Initiate &gt; originate&gt; patent</li> <li>• In house design departments should be encouraged a privilege</li> <li>• Traditional designs as globalized cross cultural products</li> </ul>	<p>Significance through Design/Brand Philosophies</p>
	Collections/ Themes	<ul style="list-style-type: none"> <li>• Diversified themes and inspirations for designing products that focus on material, function, service, user, meaningfulness of the product besides aesthetics.</li> </ul>	<p>Diversified product features</p>

Table 6.3 Proposed framework section 2: Ideation.

Ideation	Expand	<b>Expand work potentials and develop wider possibilities through</b>		
	Collaborate	<ul style="list-style-type: none"> <li>Collaborate with other disciplines to develop new ideas</li> <li>Collaborate with production teams to develop improved functionalities</li> <li>Collaborate with international design teams to bring reforms in design development processes and to develop new tastes</li> <li>Collaborations between industry and academics</li> <li>Collaborations with skilled persons</li> <li>Support of big companies to collaborate with designers as influencers who are able to develop new trends.</li> </ul>	➔	Collaborations between design teams, production teams, academics, international design forums
	Integrated design processes	<ul style="list-style-type: none"> <li>Review and redo work patterns and development processes</li> <li>Experimental design development methods such as Co-design, interdisciplinary and multidisciplinary etc.</li> <li>Utilize all components of apparel design and develop multiple design recipes</li> <li>Identify components related issues and keep the creativity wheel moving</li> </ul>	➔	Identify challenges and explore design components
	Design Skills	<ul style="list-style-type: none"> <li>Develop aptitude towards innovation and risk taking</li> <li>Cognitive skills to channelize design components to achieve significant design identity</li> <li>Improve observations on market and customer responses</li> <li>Design visualization tools</li> <li>Ability to convert ideas into materials</li> </ul>	➔	Designer's skills to utilize resources

Table 6.4 Proposed framework section 3: Fabrication

Fabrication	Realities	Materialize ideas	
	Material	<ul style="list-style-type: none"> <li>• Up gradation of available qualities</li> <li>• New alternate materials</li> <li>• Material banks and material libraries</li> <li>• Local production of materials that are imported e.g Modal, Lyocel, viscose and their utilization in design details</li> <li>• Performance fibers and materials</li> </ul>	 <b>New ,upgraded and alternate materials</b>
	Techniques & technicalities	<ul style="list-style-type: none"> <li>• Skilled force</li> <li>• Upgrade massive</li> <li>• Explore local</li> <li>• SDG focused</li> <li>• Synchronized with design departments</li> <li>• Upgraded finishing techniques</li> </ul>	 <b>Significance through technique</b>
	Technology	<ul style="list-style-type: none"> <li>• Rationalize resources and develop domestic solutions.</li> <li>• Upgrade technologies for design tools and product production.</li> <li>• Lead not follow</li> <li>• Invent possibilities</li> </ul>	 <b>Upgrade , Introduce, invent</b>

## **6.4 RESULTS OF FOCUS GROUP DISCUSSION ON PROPOSED FRAMEWORK**

The proposed framework was presented to focus group panelists on seeking verification and validation of the findings. The focus group discussion concluded with two main agendas.

- The verification of format and sections of the framework
- The verification of contents under each section of the framework

### **6.4.1 The verification of format and sections of the framework**

The panelists endorsed the following points;

- The panelists validated the outline of the “Apparel design innovation framework”; the apparel product components were acknowledged as an outcome of the design process.
- They expressed that the framework according to the development processes is comprehended. Only one panelist (SS) suggested that realizing policies and strategies can be considered a separate section instead of a sub-section under “identification.”
- No section was omitted or considered unrelated rather, the addition of “revival of textiles techniques was enforced.” The experts stressed that the cultural connotations within the significant identity of a dress and its integration with technical aspects during designing are important domains of apparel innovation. They also identified that functional aspects of product design components include consideration of events and environment besides weather and others.
- The panelists viewed the framework as applicable and beneficial for the designers working in the apparel sector for different creative tasks. They acknowledged that designers are assigned tasks as design managers, product developers, and design trainers.

## **6.4.2 Alterations in the format of the ADI framework**

The proposed framework recommends integrating apparel product innovation factors during design development. The discussion generated suggestions to review each factor within the design component so that a comprehensive framework would be concluded. This argument assisted in the reorganization and reassembling of key points from all the sections of the proposed framework (See Figure 6.8)

## **6.4.3 Alterations under each section of the framework**

### **6.4.3.1 *Identification***

The section “Collective conscious” suggested that the type of data collection gathered to evaluate market trends and the framework for evaluating the data should also be developed. The buzz on the market analysis is to identify the market pulse and what is selling more. Instead of this, the standards for market analysis should also be developed. A guide about all aspects of product design should be part of market analysis, even if the main method to start designing in the apparel sector is market reports. It would include, for example, fabric qualities, which product successfully provided function. Reaching directly to the customer can also be an option.

### **6.4.3.2 *Ideation***

Under the section “Collaborate,” Support for big companies to collaborate with designers as influencers who can develop new trends is required because that is how new ideas and product concepts can be facilitated. Under the “Role of designer” section, suggestions on integrated design methods were received. Experts suggested that the identification of stereotyped products, conventional ways of designing and market gaps related to any aspect and element of design should happen as the first step of ideation. The designer’s active

responses on identification as a preliminary step of design development would enhance creativity which is the core idea of innovative design development.

The experts also added some more components of apparel design that should be considered during design developments. These design components were personal, cultural and environmental significance. And the functionality of the product according to weather. Figure 6.9 illustrates the changes in red text to the elements within design components and their relevance with three stages of the design process. The modifications in the apparel design process after FGD were drafted. The changes to the integrated apparel design process diagram are highlighted in red.

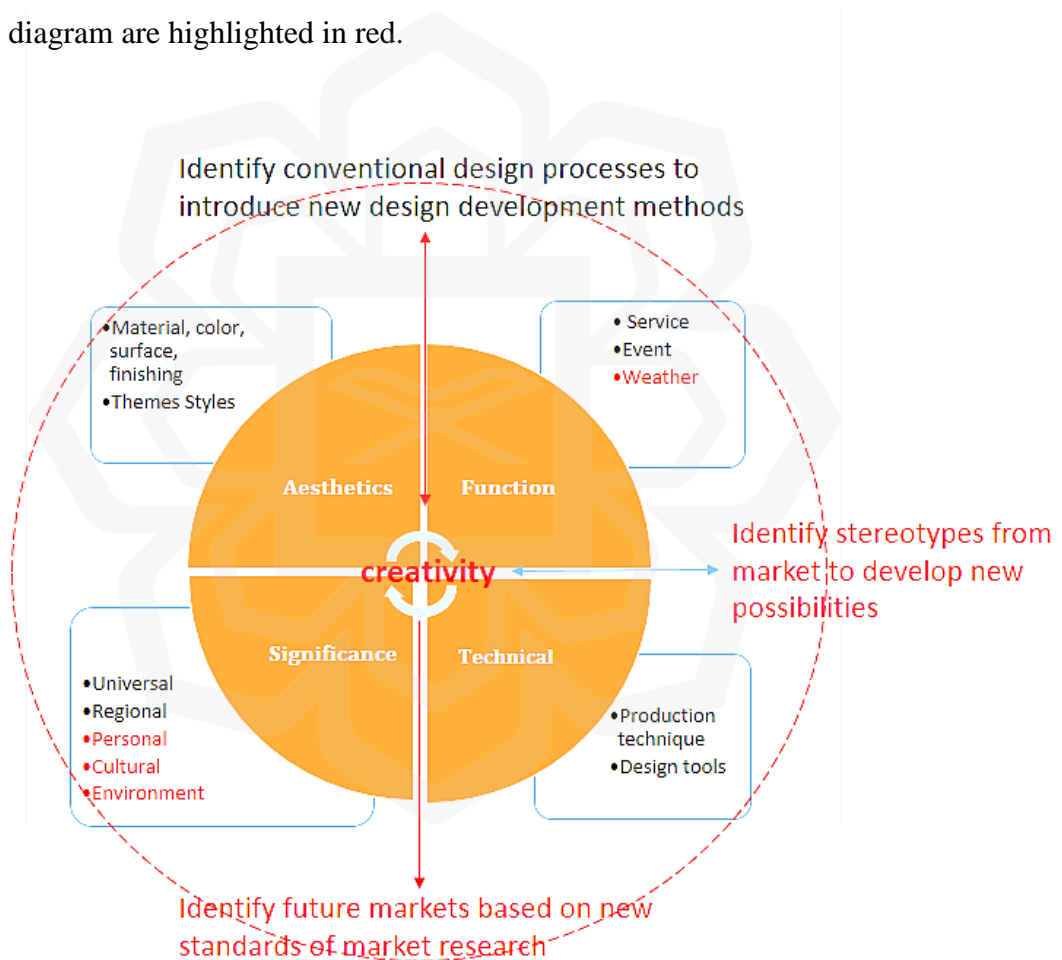


Figure 6.9 Integrated apparel design process to develop ADI framework

#### 6.4.3.3 *Fabrication*

For the role of material diversity in apparel design innovation, it was observed that material banks and libraries are vital because such platforms are part of external environments that affect the accumulation of knowledge during the identification phase and also the source of introducing new and alternate materials to designers. These material libraries can be supported by big material manufacturers and suppliers. They can stock their developments to provide young designers and design students opportunities to consume materials for experimentation. Under the section “Techniques & technicalities”, it was suggested that for the new product development, designers and technical persons who would work as team members with designers should also be trained.

### 6.5 FRAMEWORK FOR APPAREL PRODUCT INNOVATION

The apparel design innovation framework highlights segments of information and knowledge domains for each component of apparel product design that are processed during the three stages of design development, identification, ideation and fabrication. The apparel product design engages four components of the product the significance of the product, aesthetics, function of the product and technical implications of converting the product concept into a produce able idea. During the design development process, these four components are manipulated by the apparel designer interchangeably. The designer applies his cognitive skills to process these components. These four main components have multiple aspects within them that are utilized by the designer depending on the nature of the project brief and available resources. These sub-components are;

- **Aesthetics;** Material, colour, surface, finishing, themes, dress styles, textile Patterns
- **Function;** Service, Event, Weather
- **Significance;** Universal, Regional, Cultural, Personal, Environment

- **Technical;** Production technique, Design tools and technical drawings or detailed designs to realize product concepts.

During the design development process, multiple factors are involved under each design component, explained in the following sections. Some driving forces and design methods can facilitate and ignite the innovation process within apparel firms. These drivers of innovation are called drivers because they generate possibilities to innovate and affect the overall design process by affecting the designer's synthesis process and design selection criteria in all three stages. These driving forces are the knowledge domains from external and internal environments that contribute to building up a designer's potential to identify and execute innovative design solutions.

Among the external environments contributing to the accumulation of knowledge of apparel design innovation are the national and firm-level innovation strategies that guide firms and designers to proceed in a certain direction to achieve innovation as a collective conscience of Pakistan's T&C sector of Punjab. Besides national-level apparel innovation strategies that can result from collaborative ventures of all the stakeholders, design innovation networks that include all the textile value and supply chain participants are also important.

One of the drivers of innovation within design firms is the apparel designers themselves, as they are the main human resource to identify, ideate and fabricate innovative apparel products. The multiple roles of designers within firms were identified during research. The innovation process expedites if designers are trained and equipped for the technically and technologically advanced design tools. Furthermore, elaborated market reports on product design components to synthesize effective design briefs contribute to innovation because these are a main source to problem definition, evaluation and filtration of design ideas. Collaborations within knowledge accumulation environments in design firms such as design department with marketing teams, design departments with production teams and even design departments with craft persons can help develop effective design solutions and improved new products.

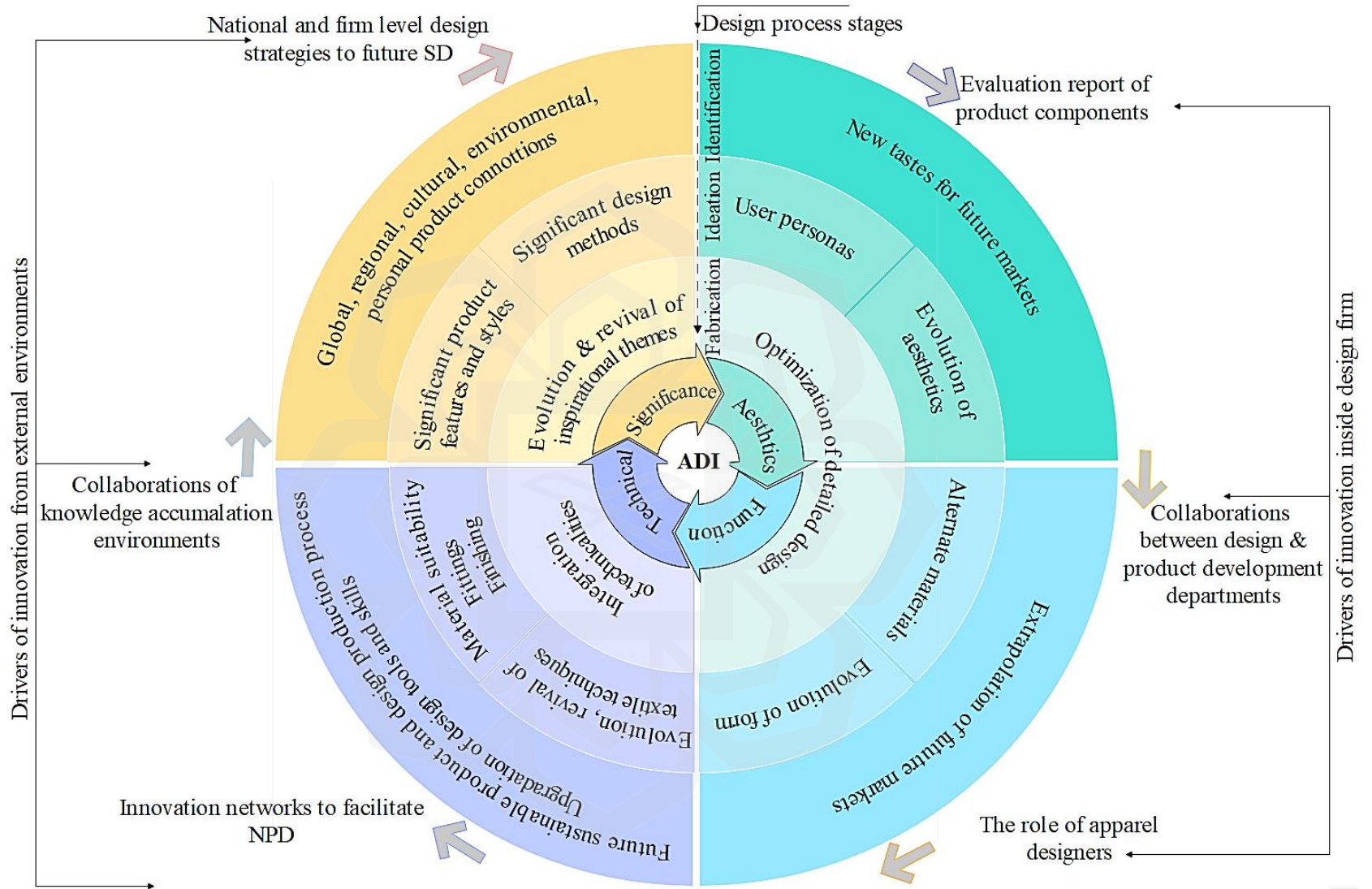


Figure 6.10 Framework for apparel design innovation

Figure 6.10 Framework for apparel design innovation has illustrated the relationship between all segments of knowledge that frame the design activities. The outer circle represents first stage of design as identification and the design processes is proceeded as the inner layers are added unless the combination of design choices for each design component are made and results in new product development (ADI).

### **6.5.1 Drivers of innovation from internal and external environments**

The first step to product design innovation is realising future challenges and markets to identify NPD directions. Identifying strategies to develop product and design process innovation is not the designer's action. The collective conscience refers to the cohesive and integrated approach to identifying innovative design briefs or identification of problem statements that can lead to innovative design solutions.

Paul Trott (2008, p. 442) highlights that new product development is a knowledge accumulation process that functions well if the inputs from various external and internal environments are efficiently communicated. Internal environments include departments related to the product production cycles, such as marketing, management, R&D and manufacturing. The apparel designer's role is established as influencing, developing, solving, and identifying product-related issues by effectively utilizing this accumulative knowledge. Trott also identified the types of external inputs within product design development (R&D) as scientific and technological environments, suppliers, customers and university departments. The interview sessions and observations of the designer's design processes affirmed that these internal and external environments contribute to identifying and generating innovative product ideas. Some more inputs within design teams contribute to knowledge accumulation for innovation in apparel design, such as fabric production teams, peers and competitors. Innovation happens within a network of these internal and external contributors; therefore, it is important to collaborate with all the role-players(Trott, 2008).

## 6.5.2 Collaborations

Collaborative processes in the apparel design processes strengthen new product development. Opportunities for young designers and small manufacturing enterprises (SMEs) to materialize their ideas would lead to new product developments. Strengthening SMEs and new design firms would enhance product innovation because SMEs have shown up high innovation performance (James Howe, Tineka Michelle Smith, 2018; Wadho, 2018).

The collaborative processes can function for each stage of product development, including identifying collection structure, ideation, and fabrication. It should involve the departments directly or indirectly related to design tasks within the industrial environment (Segonds, 2011; Segonds et al., 2014). The collaborations within the industrial environment of Pakistan's T&C sector happen as identified by the respondents and field observation notes. The scope of collaborations happening within the industrial environment be expanded for ADI;

1. Collaborations during the design ideation phase to support, expand, review, and redo work patterns and experimental design developments. Such collaborations happen between design teams, production teams, academics, and international design forums, skilled forces to develop new aesthetics, functions, and product meanings.
2. Collaborations for the technical solutions and design details during "fabrication" stage of product development. The respondents explained these collaborations through multiple tools such as emails, exchange of fabrics samples, visual boards and sketches. Collaborations during this stage happen for the following reasons/ purposes; to acquire required fabric

qualities and other materials and to transform design ideas into detailed technical drawings per the respective production technique.

3. Collaborations during the design identification stage; collaborations happen between design teams, marketing and management teams during the early phases of “identification”. The market analysis reports of the previous year are the key document used to generate discussion points within such collaborative discussions. The outcome of these collaborative processes is the planning and structuring of product categories and quantities.

The sorts of teamwork between different disciplines and professionals for ADI are as follows;

- Collaborate with other disciplines to develop new ideas
- Collaborate with production teams to develop improved functionalities
- Collaborate with international design teams to bring reforms in design development processes and to develop new tastes
- Collaborations between industry and academics
- Collaborations with skilled persons
- Support big companies to collaborate with designers as influencers who can develop new trends.

### **6.5.3 Innovation in product significance**

An apparel product holds an identity on multiple levels. The product experience, sense of belonging and the quality of the dress as second skin attaches connotations with the dress under emotional product experiences and functional meanings that generate multiple layers of product identity. The significant identity of an apparel product can be explored during the three stages of the design process as presented in Figure 6.11 ADI Framework, the segment of Significance.

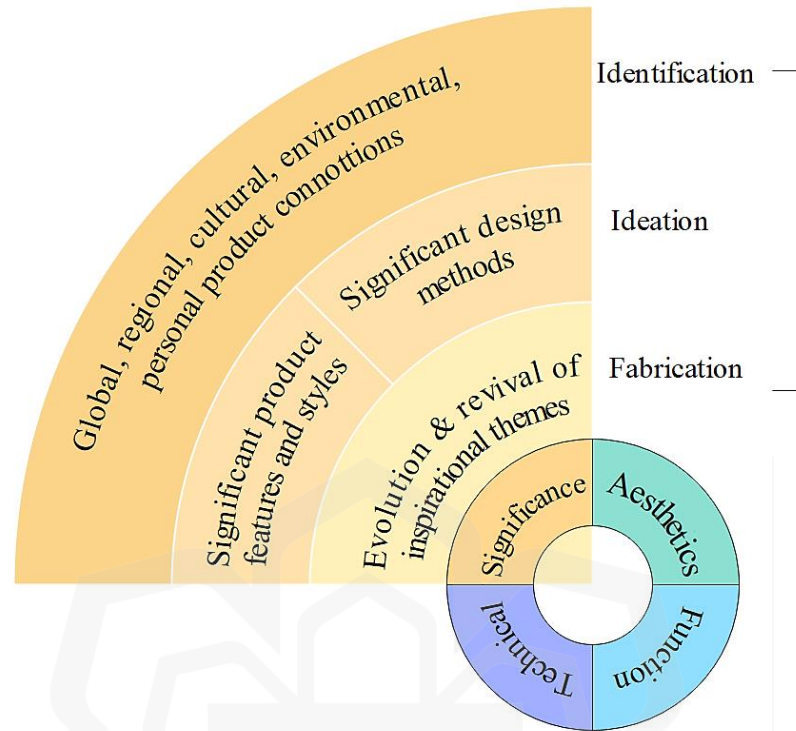


Figure 6.11 ADI Framework, the segment of Significance

The significance of a product can be discovered by identifying connotations attached to an apparel product on global, regional, cultural, environmental and individual levels. For example, the apparel product type, Jeans and denim, is a global style of dress that may not be associated with one specific region compared to a “Kashmiri kaftan”, the region's identity. Similarly, the dress styles and silhouettes represent the product identities of firms and even the designer’s level.

A designer may tend to develop certain product expression and choice of design elements that becomes a signature of designing of that designer or design firm. During field observation, an example of such design identity was observed in both traditional textile firms. The products produced by these two firms had regional and cultural identities, but simultaneously, both were producing two very different styles of products. The identification of a significant identity can assist in developing a unique selling point, brand philosophy and value addition. It can be generated by developing insight into product features related to user persona, aesthetics, materials, production process, product’s life

cycle, environmental issues, technologies, etc.

Identification also implies recognising design ideologies needed to impact environments and consumers positively. Apparel design brands with design significance deep routed into the cause of making can develop innovative products. This applies to the search for new themes, inspirations and functionalities. The themes such as sustainability, recycling, universal design, eco-design, slow fashion etc., can be a few examples in this regard.

These significant identities can be practised to develop new product designs by either ideating specific product development features such as production techniques, garment styles, specific materials or production processes and evolution of textile patterns, colours or silhouettes. Recognition of design ideologies is needed to impact environments and consumers positively. Apparel design brands with design significance deep routed into the cause of making can develop innovative products. It applies to the search for new themes, inspirations and functionalities.

#### **6.5.4 Innovation in designing apparel aesthetics.**

Actions that should be taken to drive innovation activities to develop product aesthetics relate to the extrapolation of future markets, which will be the future lifestyles and user personas. It addresses the idea of beauty, which is an abstract notion, but designers derive meaning through understanding user personas, employer's idea of beauty, and their own choices. The amalgamation of these three concepts of beauty is imparted during the identification and ideation of product aesthetics.

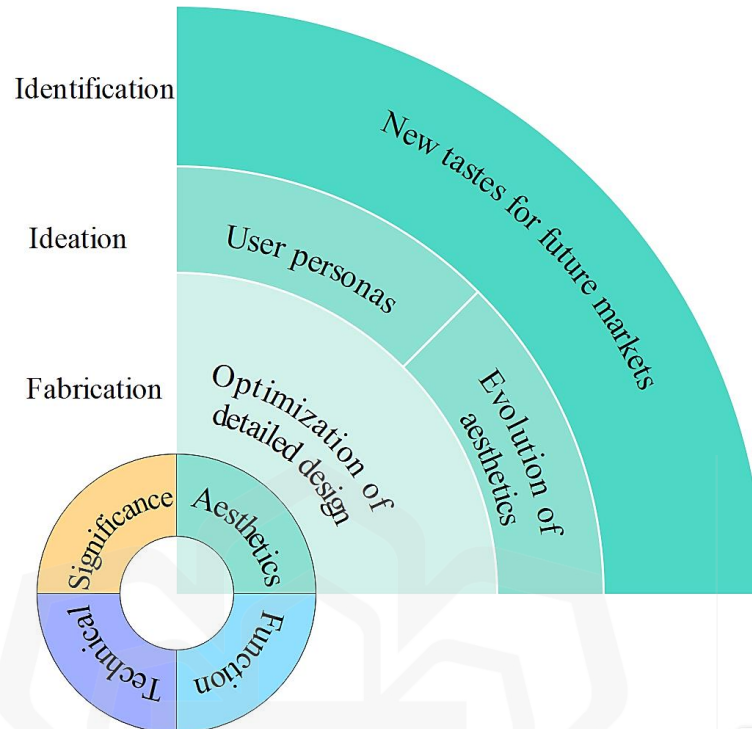


Figure 6.12 ADI Framework, the segment of aesthetics

The evolution of aesthetics during apparel design processes is generated conceptually from nature, arts, crafts or other such visual and material references. The designers interpret and extract design expressions and design elements from their visual research references. During the identification phase, they identify design elements such as textile patterns, fabric textures, colours, visual effects of textile techniques and silhouettes. During the ideation phase, they draw dress options by applying different design recipes of line quality, colour, texture and form. The variant combinations of apparel design elements and components generate new product aesthetics. These variant combinations are moved by the designer's cognition of user personas and their choices of aesthetics. The designers apply multiple methods to develop a better understanding of user personas, such as market research, recording experience of previously designed products, observations on customer profiles and regional or cultural identities of potential markets. The fabrication processes engage detailed drawings of design ideas according to the production technique, and it also involves the selection of appropriate fabric types suitable for the selected design idea.

Earlier studies and primary data have illustrated that sources of inspiration can be anything material or immaterial. For example, a product would carry the concept of developing a dress with organic materials for future sustainable environments. At the same time, it can be as abstract as designing a dress that triggers positive emotions. Apparel design uses concrete and conceptual approaches to inspiration sources for the development of product aesthetics. Successful product aesthetics can be achieved if the experimental processes and ideation methods are followed in the design process, such as co-design, interdisciplinary and multidisciplinary design approaches to expand understanding of user personas. A better understanding of user personas (identification stage), refining the ability to visualize user aesthetics, particularly for the user persona that differs from the designer's personal aesthetics (ideation) and the utilization of design elements to develop apparel design details (Fabrication) is vital to meet future challenges of NPD.

#### **6.5.5 Innovation in product function**

Innovation in product function refers to usability-related issues, for example suitability according to the weather, the fittings according to body measurements, wear ability conferring with the human activity and relevance of wearer with the environment. The innovation in apparel product function would require designing of apparel products with better services both for future users and environments. This refers to realisation of changing lifestyles, environmental challenges and identification of new or improved services that an apparel product can serve. Figure 6.13 ADI Framework, the segment of function, illustrates the knowledge domains that can align design activity related to product functionality.

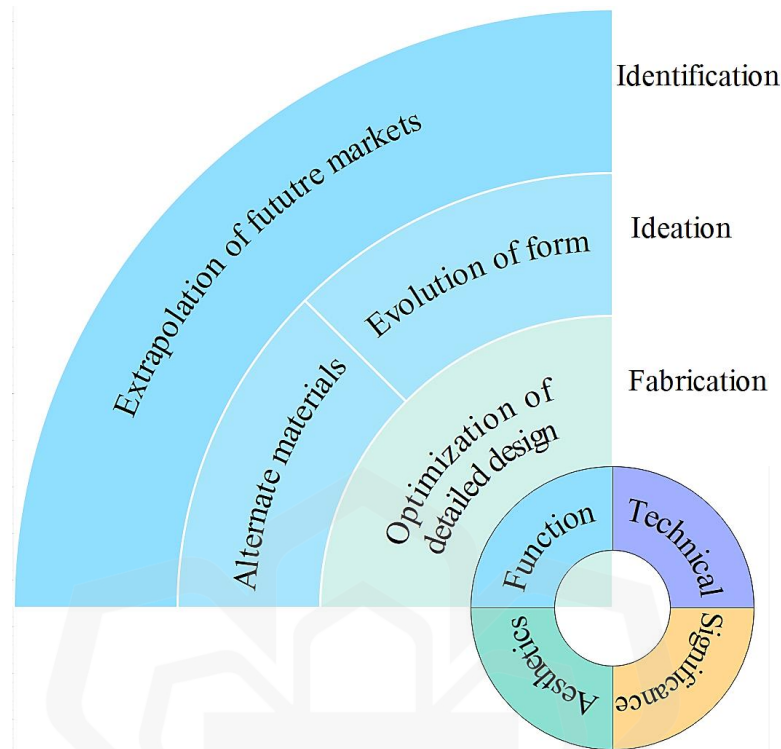


Figure 6.13 ADI Framework, the segment of function

Focus on improved services and demands related to functional experiences of product, conferring customer diversity, aligning suitable materials and surface design ideas extrapolates new design briefs. The results of research on current design practices presented that all the inspirational themes for NPD were focused on the visual impact and interface of the product, and none were found related to function, service or material innovation. It was also observed that in textile applications where the functionality of the product is the dominant component amongst all the four product design components, because of its usage type (for example, activewear and hosiery), there was less number of design activities recorded. The previous studies identified that the use of conventional textiles had reached a static level, and its manufacture has become highly competitive. Often unviable many companies are switching over to value-added technical textiles with the capability to meet functional demands for precision applications to meet the challenges of new lifestyles and environments.

Therefore, during the problem identification phase and while defining the problem definition, the regularities related to the product's functional matters for better services optimize apparel product improvement and product diversity. During the ideation phase, the limited product range can be expanded by polarizing user types and product functionalities. Thinking deeply about functionality and ideating different views for appropriate product features and functions bring together the evolution of form and material. Introducing new materials, bringing function first, using interdisciplinary methods to develop ideas in groups, having the freedom to start a new idea, and working without time boundaries could break the monotony and will bring new ideas to apparel designs.

For better product usability, designers shall fabricate new apparel forms by aligning functionalities and services with the textile materials that benefit environmental concerns or improve user experiences. Adaptation of new materials and techniques leads to new levels of functionality in textiles and clothing to design according to the needs of current society and future markets. Designers can be inspired by new materials such as alternatives to cotton, smart textile materials, fabrics that are produced with sustainable processes etc. Optimization of detailed design can be introduced at the following levels of product function and aesthetics.

- Fibres with improved performance and quality of the similar fibre group. For example, cotton being the prime material in Pakistan's T&C sector, the availability and processing of cotton
- Alternate fibres to increase designing opportunities, product diversity and quality. For example, if cotton is the prime material, any natural or regenerated fibre type that can be used as alternate material can be introduced. There are some synthetic fibres as well that can be introduced as alternate material, e.g. Coolmax.
- New fibres that are new to the T&C sector or not used commonly and available in the international market, for example, hemp, linen, modal, lyocell, milk fibre, bamboo etc.
- Yarn types and yarn blends

- Fabric constructions and textures. They can be developed by introducing new techniques. Improved technologies, engaging fabric designers in R&D, introducing function, service or any other design component to the production process.
- Evaluation and execution of garment measurements, fittings and stitching details. This can be part of detailed design, and designers can collaborate with technical persons to ensure a well-guided production process.

### 6.5.6 Technical aspects of innovative apparel design

It is important to consider aspects of product production process for successful outcomes. The technical aspects of ADI refers to the availability and improvement of skills related to design and production processes. The figure has presented both domains of required resources and their nature of utilization during design development stages.

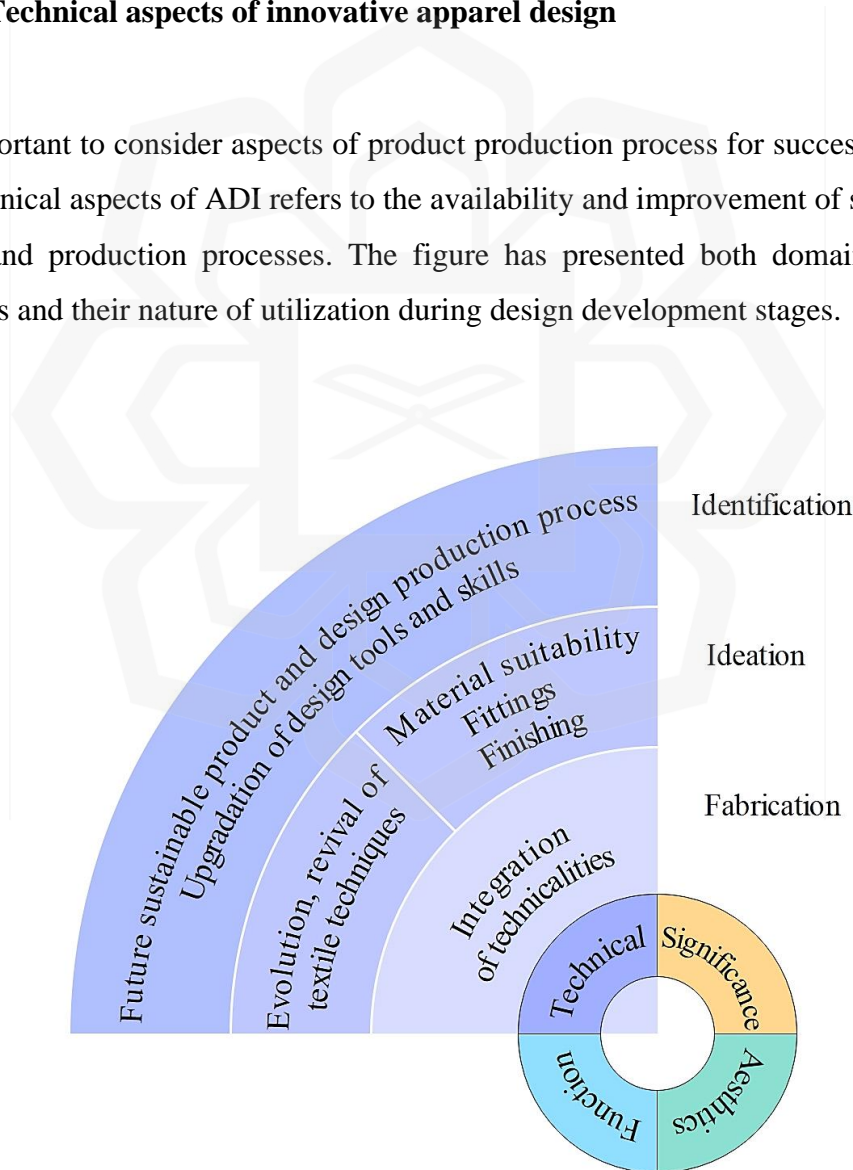


Figure 6.14 ADI Framework, a segment of technical components

The design idea, optimization of the firm's resources, production limitation, technical requirements of dress measurements concerning human anatomy and costing plan has to go side by side. They cannot just work in isolation. For example, if the use of more organic materials is there that cannot be produced in bulk quality, the firm cannot plan for mass production. Similarly, if the design concepts and ideas do not rationalize technical and technological limitations, particularly during the fabrication phase of design development, the smooth production process and product quality will be affected. Technical components of design development also refer to the skills and ability of designers to present and rationalise their design concepts. This is one of the most practised roles of designers identified in the manufacturing firms of Punjab, Pakistan, where they are assigned to ideate and fabricate design concepts for international design firms as their clients. They perform their role as moderators between international clients and the production department in such organizational setups.

A sensible, creative, and technological approach is required to identify and encounter the weaknesses related to designing tools, production techniques, skilled labour or material availability, which restrict innovative ideas' development. The study's results revealed that many design ideas that designers considered innovative smart solutions to design briefs were discarded because the required production resources were unavailable. Similarly, the research revealed that new technologies and design visualization digital tools facilitate, refine and expedite the design development process. Technology impacts designing from fibre to fabric structures to apparel manufacturing. It bridges and sometimes has made it possible to cut down some processes, which not only cut off the production cost but has also brought more sustainable solutions for production. For example, fully fashioned and seamless garments and three-dimensional knitting. Technology impacts the development and outcomes of other product components, including functionality, aesthetics, and significance. A few examples of technological and technical advancements in apparel design tools are designing software for weaving, knitting, embroidery, printing, pattern making, and draping. This software provides drawing tools to draw textile constructions and patterns and offers product simulations. Some examples of technological advancements in the production process that have offered the evolution of design

expression are digital printing, 3-D printing, laser printing, wearable technologies, and technical fibres and yarns.

The designer's skill development would improve competitiveness. Integrating production techniques and process technicalities, particularly when the designers develop technical drawings and production files, is important to achieve the required product features. Traditional craft-oriented apparel products would require the skill development of craft persons and the designers working with them as team members. Rather an evolution and revival of traditional techniques is one branch of apparel that can be flourished further to develop products with strong regional and cultural identities.

## **6.6 CHAPTER SUMMARY**

This chapter discussed the primary data results and analyzed the research findings to develop an insight into apparel design innovation factors that influence design practice in Pakistan's T&C sector. It was revealed that some more factors, such as the role of apparel designers in textile design firms, the evolution and revival of textile patterns and techniques, the evolution of product's form, collaborations between internal and external environments, and designing tools to integrate ideation with fabrication influences apparel design innovation practices. The relevance of factors with the apparel product design development process was recognized based on understanding design practices in apparel firms. The discussion on the findings validated through theoretical underpinnings led to the proposed framework for apparel design innovation. The contents of the proposed framework were verified and refined. This resulted in the formulation of a framework for apparel design innovation. The framework provided a staging, primarily for the apparel designers and other related professionals, to run through the apparel design process to create each product component.

## CHAPTER SEVEN

### CONCLUSION AND RECOMMENDATIONS

#### 7.1 INTRODUCTION

This chapter includes recommendations based on the summary of findings in accordance with research questions and objectives. It also concludes and highlights the significant framework points for new apparel product development and outlines a few recommendations to suggest future research.

#### 7.2 SUMMARY OF FINDINGS

This study aimed to recognize the apparel design processes and practices contributing to new product development so that framework can be developed for innovation in apparel design. It was considered vital to enhance the apparel design innovation potential of Pakistan's textile and clothing industry. The study established three research objectives to fulfil the aim and directed the study to three main outcomes.

##### 7.2.1 Factors of new product development in apparel design

###### *Research objective1*

To identify the factors that influence designing new apparel products in Pakistan's Textile and clothing industry in Punjab.

**Research question 1**

What factors contribute to apparel product design development for Pakistan’s T&C sector?

**Key Finding 1**

Apparel product development is affected by design-related factors and some external factors. External factors include production and marketing-related factors. The factors related to innovation in apparel products influence design developments at various stages of product development. They are linked with each other, and the frequency of their effectiveness may vary for different design problems and product types. Factors that influence apparel product design developments are as follows;

Relevance $\longleftrightarrow$		Design development stages			Design process management	
Apparel design components	Identify	Ideate	Fabricate	Identify	Ideate/ Fabricate	
	Aesthetics	Alternate design briefs and themes	New and alternate personas	Alternate and new tastes	National and firm level design strategies to future SD Collaborations of knowledge accumulation environments Evaluation of product components The role of Apparel designer Collaborations between design and PD related environments Innovation networks to facilitate design innovation	
	Function	New markets	Expressional properties exploration	Alternate and new materials		
		New tastes	Evolution of form	Optimize design details, fittings and finishing Alternate /new materials		
	Significance	Significant identities	Significant product styles	Evolution and revival of textile materials, patterns, colors and styles		
Extrapolation of future markets		Significant design methods				
Technical	Designing skills and tools to integrate ideation with fabrication	Alternate and new raw materials and surfaces	Evolution, revival and integration of technologies			

Figure 7.1 Apparel product design factors

## **7.2.2 The design practices in the Pakistani textile industry**

### ***Research objective2***

To examine current practices of apparel design for new product development.

### ***Research question 2***

What are the design practices in the Pakistani textile industry of Punjab for apparel products?

### ***Key Finding 2***

The design practices included the role of designers in apparel sectors related to the product-related tasks they perform. It was important to identify their role because that is how one could identify what they practice and find out for whom and in what capacity the framework would be beneficial. Chapter Four discovered the role of designers in apparel product development.

#### **1. The role of apparel designers**

Designers are placed into multiple roles in the apparel sector. They work as design managers responsible for design management, including timelines, directing their design teams, and concept development of product lines and aesthetics. They are working as market evaluators, in which their task is to compile market reports, market analyses, and product reviews.

Designers are also working as developers and creators of aesthetics. In this role, they are closely engaged with design tasks and shaping product features. This category of designers is the ones who work closely with design components and are mostly engaged with the ideation phase of product development.

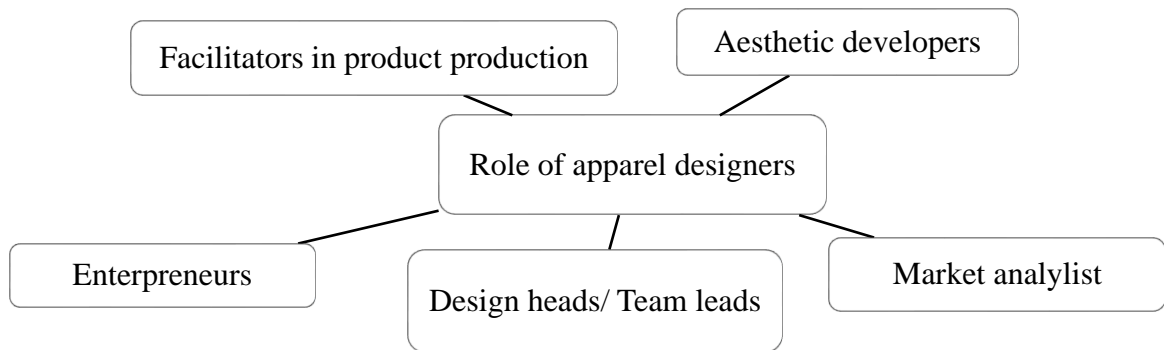


Figure 7.2 Role of Apparel Designer in ADI

## 2. Design components

Chapter Two explored components of apparel design. Chapters four and five discovered that according to product types and the designer's role, the components of apparel design are considered differently. The design of some product types focuses more on aesthetics than other design components. The design developments mostly focus on the first two stages of product development for the designers, whose role is defined as Aesthetic developers. The aesthetics of a product are affected by three levels, the personal aesthetics of a designer, his employer's brand aesthetics, and customer choices. The aesthetics of a product are affected by the three, and an apparel designer combines the three during design development.

### ***Research objective2***

To examine current practices of apparel design for new product development.

### ***Research question 3***

What design practices can strengthen new product development?

### ***Key Finding 3***

Chapters 2 and 3 identified some factors that affect innovation in apparel product design. It also identified some approaches and models that may lead to developing new product concepts and improvements in the already developed products to enhance their performance. Chapter Five identified the current design practices and experiences of designers that led them to the development of new concepts and new products. The data collected in chapter five revealed that innovation does not always happen in the apparel sector. The designers sometimes complete their design tasks to meet challenges of expected quantities and other industrial requirements. Their prime source to identify design briefs is the market report. The ideation of design originates from the amalgamation of knowledge that the designer accumulates from the market review of his employer brand and other brands, user profiles and personas, retail clients, and technical aspects related to resources and production processes.

Nevertheless, some design practices that support product innovation were identified, such as inquiry about product functions, the evolution of materials, revival of fabrication techniques, incorporation of digital tools, and challenging stereotype design aesthetics through developing user personas and introducing functionality and technology during ideation fabrication. The designer's experiences with various design projects enriched the study's findings by exploring some design practices that bring innovation to apparel design. Chapter 6 discussed the findings in light of references from other studies related to design practice, new product development, and innovation approaches. The discussion produced relationships on the apparel design innovation factors and steering of the design process that strengthened new product development. These design practices refer to the exploitation of related factors under each design component during the design development. The designers would generate apparel designs by consuming any, depending on the nature of the design problem. Hence the design practices that strengthen new product development introduce the role of designers in the identification phase as the ones involved in defining the problem besides active players in ideation and fabrication.

### **7.2.3 Novel design approaches to enhance apparel product innovation**

#### ***Research objective3***

To propose a framework for apparel product design innovation in Pakistan's textile and clothing sector.

#### ***Research question 4***

How do novel design practices enhance product innovation in Punjab Pakistan Textile and clothing sector?

#### ***Key Finding 4***

In Chapter 4, design innovation factors were identified. Chapter 5 realized and discussed that the design-related factors affect apparel innovation on different elevations of design practices, including the tasks and roles assigned to apparel designers, the management of design projects on team and individual levels, and product development processes. Apparel product design as an activity to develop new products is important in shaping the industry and society. Apparel designers are engaged in different levels of product development in the apparel sector. In each role, if the appropriate directions and strategies have been opted for, it can enhance product innovation towards a more sustainable future by encountering factors of design innovation. This can be done through practising integrated design development processes that;

1. Identifies missing dimensions to meet future challenges
2. Guides design practices to ideate suitable solutions
3. Directs methods of product execution
4. Reviews product usage and outcomes to generate new and improved solutions

This integrated design process focuses on individuals, teams, organizations, and cultures to add value to apparel design and products. All the components of product development are vital. An integrated process guide that directs designers and the design development process for each designer role performed in the apparel sector of Pakistan's T&C industry will assist in developing new ideas and production solutions. Framework for apparel design practices on new product development has framed prerequisites for clarification of creative design briefs and necessary actions during ideation and fabrication to generate and execute innovative designs.

#### **7.2.4 Conclusion**

The research aimed to propose a framework for apparel design innovation for Pakistan's textile and clothing industry. This research intended to provide a framework to improve suitable design development strategies for developing new apparel products. Chapters 2 and 4 identified that evolution in product form and mode of use to bring innovation in apparel product design for Pakistan's T&C sector would require;

1. Exploration of apparel product components to discover new possibilities
2. Integrated role of apparel designers in the complete cycle of NPD from developer to change maker.
3. Accumulation of knowledge through internal and external sources
4. Exploration of materials and techniques
5. Design significance as a design component in developing strong design briefs
6. Extrapolation of future markets
7. National and firm-level design strategies
8. Innovation is enhanced through collaborative ventures within textile value chains.
9. Introducing improved design development processes

Chapters 4 and 5 added that an integrated design process that combines all design

components of apparel products could bring innovation in the design practices and assist in achieving new product developments to encounter the above-stated points. Chapter 5 also discussed that this integrated design process would require a stratagem on three levels of product development processes. Integration of product design components with these three design development stages can drive apparel innovation. Therefore the theoretical research, in addition to primary data analysis, concluded that these three levels in the product development process should be guided for new product development are;

1. Identification
2. Ideation
3. Fabrication

An alignment in each stage of product development and suitable plan selections would lead to new product development. Apparel design that identifies design briefs according to future challenges ideates design elements with the conscious urge to improve service and processes, and rationalizes fabrication plans accordingly would bring innovation in apparel design. The framework on apparel design innovation has provided insight into the phenomenon to aid designers working in the apparel sector in their diversified roles. This aid is the collection of concerns that affect the identification, ideation and fabrication of their creative tasks. They may refer to this framework in the quest for innovative product solutions. This study has also contributed to apparel design education by mapping the design activity currently practised in the apparel sector and providing a manual in the form of a framework to the designers and design academicians to understand the activity of designing for future environments.

### **7.3 LIMITATIONS OF THE STUDY**

This research focused on exploring the apparel design practices that lead to new and innovative products. The exploratory nature of the research guided the whole research process towards accumulating the meanings that respondents derived on apparel designing in Pakistan and their practices to address the issues. Though the respondents were selected

to cover all the apparel subcategories of the field, the number of respondents for semi-structured interviews remained limited. Five product categories were investigated, and two respondents under each category were selected. It assisted in developing a holistic view but simultaneously compromised the insight into any issues that might have existed under each product category. It may have also compromised on recording fluctuations of design processes that happen because of the changing roles of designers under each product category and organizational hierarchy. Research for different product types and their design processes for innovative product designs can be conducted in the future.

During the early stages of research, it was established that the research in apparel design in Pakistan's textile and clothing sector is limited. The subjects in the limelight have been the other disciplines, such as manufacturing and engineering of textile products, merchandising and marketing, raw materials and their properties, textile policies for a sustainable future, and the recurring issues of SMEs in the textile and clothing sector. The literature on Pakistan's apparel sector was broadly considered from the mentioned subjects, and foreign scholars' research on apparel designing was consulted to develop the theoretical underpinning. It contributed to the knowledge of apparel design practices in Pakistan's T&C sector; hence, the subjects' theoretical underpinning may be further established in the context of Pakistan.

The primary data collection exposed the apparel categories that do not have design and development departments in their setups, such as hosiery, technical garments and martial arts. This study did not include these products to limit research on the ongoing design practices in the apparel sector. The design potential in these product categories and the drawing of design processes for emerging fields of apparel design were limited. Hence, previous studies identify prospective fields of apparel design related to the products mentioned above. Limiting the research to the current design practices encircled the potential of the currently designed product range. Therefore, the discovery of issues related to the identification of designing possibilities in the less explored apparel fields is yet to be explored.

This empirical study aimed at apparel design innovation in Pakistan's apparel industry, whereas data collection focused on the cities in Punjab, Pakistan. Despite the

figures collected through previous studies presented, Punjab as the hub of the clothing industry, other cities and provinces, particularly Sindh, were compromised. This phenomenon limited the potential to observe the relationship and any specific design trends that would have occurred in the design processes based on regional identities and provincial infrastructure. Future studies may consider other parts of the country.

## **7.4 RECOMMENDATIONS**

### **7.4.1 The expanded role of apparel designers in NPD**

The role of apparel designers is not bound up to the aesthetics and product styling developers. The creative process, from identification to the execution of product features, is shaped during design. How the designer understands and interprets the information he receives defines the outcome of product design. Yet their role is deep-rooted in the development of new products. Their role in new and innovative developments should be expanded to the complete product development cycle. Though the designer focuses on the concept development process the most, and that is his expertise, this cannot happen in isolation. The young designer may start with ideation only at the start of his carrier, but the role of designers in the apparel sector is much broader. Design developments and design processes cannot be focused on the ideation phase, but the identification and fabrication, which are the two compulsory phases of product development, and the role of the designer in them, cannot be departed. Therefore, the skills and placements of designers should be placed accordingly if product innovation is to be achieved.

### **7.4.2 Design investments**

The T&C industry of Pakistan is one of the main industries of Pakistan. A wide range of products are produced, but the image of the industry is leaned towards manufacturing. The

design has been understood as a steppingstone in value addition. So far, only 33 % of Pakistan's textile and clothing sector has established design departments. The establishment of design departments in the areas where design investments have not happened yet can be a good direction for innovation. Technical fabrics and garments are one of them because it has a high demand right now and as well as in future. The traditional textile can also be taken up as a good opportunity because there are a smaller number of setups. The research and design projects for the enhancement of such textile applications can proceed in the pursuit of sustainable future markets.

### **7.4.3 Intellectual property domains**

Design is considered a steppingstone in value addition. The strategies within the design to pursue new preferences and improved processes are crucial in the development of new products. Adapting new tastes and preferences and associating the brand with identity and high quality brings value addition to the product. Product innovation be achieved through developments in the concept, design and intellectual property domains. Product innovation has two main domains technological innovation and non-technological innovation. Innovation can be achieved through building up significance and design identity. This can be done by touching aspects that are either not touched in the apparel sector or have been less focused, for example, sustainable goals, traditional textiles, activewear and hosiery, functional garments, styles that break the cultural boundaries, collaborative designs including collaborations with users. These ideas can then be adapted in each stage of product development.

### **7.4.4 Infrastructure development**

Events, conferences, and orientation sessions should be arranged for CEOs and members of associations to educate them about the possibility of the design profession, the

possibilities and business models based on new design developments that can be drafted through such activities. Similarly, the nationwide programs equip young designers for design entrepreneurship.

#### **7.4.5 Establishment of design departments in all apparel categories**

The apparel sector comprises a wide range of product applications based on purpose of use, product experiences, and cultural and social connotations. The establishment of design departments and the role of designers in Pakistan is concentrated towards some of the applications leaving others less concentrated such as hosiery, work wear and even active wear. The study revealed that the designing for each type of product demands variation in choices and criteria during the optimization of design components. The framework has provided a cohesive and holistic image of the scenario through insight into design activities, and even the implications of this framework in all apparel categories can proceed further. In pursuit of innovation, it is recommended that in-depth action and experimental research shall be conducted to examine the practical implications of the innovation framework in all categories.

#### **7.4.6 Market analysis standards to evaluate apparel products for future designing**

The design teams rely a lot on the evaluation of market trends and feedback during the identification phase. Market reports play a vital role in selecting and deselecting product features of future products. Designers process the information that they receive in the form of the visuals and summaries they gather or receive. So they proceed according to the perception of successful past ideas and comments they receive research to develop standards on what and how the evaluation of apparel products should proceed is required. This would help in identifying the core concepts that should be matured in the identification and ideation phase.

#### **7.4.7 Collection planning in fashion apparel**

The compromises on innovation and creativity are made at the cost of short timelines of collections. Models can be developed to find new ideas, methods, and processes of design development and collection management. There are some design researchers who have been trying to encounter crises related to fast fashion, and such efforts are required in the T&C sector of Pakistan as well. Some of the directions were explored in literature in this regard as follows.

1. Designing and making products using digital, social media tools and advanced technologies to achieve a fast fashion future (Ballie, 2014). Such examples of technology can be collected from the apparel sector's history as well, for example, digital printing, laser printing, "fully fashion," and online marketing. These technological advancements brought reforms in the apparel sector and can be recalled as apparel innovations.
2. Working on the significance and meaningfulness of the product so the product's lifecycle is increased.

#### **7.4.8 Social networks of resources**

SMEs and design entrepreneurs tend to be more experimental and develop new product concepts and design philosophies. It was identified by respondents that while working on new product concepts, the fabrication phase is the most. Many creative and innovative product concepts cannot be materialized because of supply chain issues. The availability of resources and manufacturing skills can be improved through strong networking and such platforms where design entrepreneurs and researchers can find manufacturing personnel, technical, material suppliers, or any other resources to realize innovative product concepts.

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## APPENDIX I: APTMA REPORT

### ALL PAKISTAN TEXTILE MILLS ASSOCIATION EXPORT OF TEXTILES

COMMODITIES	UNITS		2017-18	2018-19
COTTON YARN	QUANTITY	TONS	522,396	433,583
	VALUE	000 \$.	1,371,919	1,125,419
	UNIT VALUE	\$/KG.	2.63	2.60
COTTON CLOTH	QUANTITY	000 SQ.MTRS.	2,369,361	2,762,852
	VALUE	000 \$	2,203,587	2,101,813
	UNIT VALUE	\$/SQ.MTR	0.93	0.76
TENTS & CANVAS	QUANTITY	TONS	28,842	29,628
	VALUE	000 \$	85,281	82,416
	UNIT VALUE	\$/KG.	2.96	2.78
BAGS	QUANTITY	TONS	6,730	12,034
	VALUE	000 \$	11,719	14,011
	UNIT VALUE	\$/KG.	1.74	1.16
TOWELS	QUANTITY	TONS	188,511	203,169
	VALUE	000 \$	797,381	786,120
	UNIT VALUE	\$/KG.	4.23	3.87
BED WEAR	QUANTITY	TONS	376,996	407,837
	VALUE	000 \$	2,261,069	2,261,824
	UNIT VALUE	\$/KG.	6.00	5.55
OTHER MADE UPS	VALUE	000 \$	684,811	679,971
Garments	QUANTITY	000 Doz.	40,027	53,142
	VALUE	000\$	2,577,218	2,653,720
	UNIT VALUE	\$/Doz.	64.39	49.94
Hosiery	QUANTITY	000 Doz.	105,606	121,996
	VALUE	000\$	2,711,201	2,899,877
	UNIT VALUE	\$/Doz.	25.67	23.77
Total Cotton Manufacturers	VALUE	000\$	12,692,467	12,591,160
Raw Cotton	QUANTITY	TONS	35,262	12,665
	VALUE	000 \$	58,227	20,396
	UNIT VALUE	\$/KG.	1.65	1.61
Cotton Waste	QUANTITY	TONS	50,765	38,307
	VALUE	000 \$	64,885	43,396
	UNIT VALUE	\$/KG.	1.28	1.13
Total Cotton	VALUE	000 \$	123,112	63,792
Total Export	VALUE	000 \$	23,212,007	22,958,322
Cotton Mfg. % of Total Export			54.68	54.84
Yarn % of Total Export			5.91	4.90
Cloth % of Total Export			9.49	9.15
Cotton + Waste % of Total Export			0.53	0.28

Figure 9.1 Export value of Textile products, Source:(APTMA, 2022)

## APPENDIX II:PRE-INDUSTRIAL DRESSES

Examples of pre-industrialization dress designs from the 18<sup>th</sup> and 19<sup>th</sup>-century design and manufactured by artisans.



A muslin/ cotton dress from the 19<sup>th</sup> century  
Source: Victoria and Albert Museum Gallery



A muslin dress from the late 18<sup>th</sup> or early 19<sup>th</sup> century  
Source: Victoria and Albert Museum Gallery

### APPENDIX III: SAMPLE OF INDUSTRY INVENTORY

Sr.	Company Name	Type of Business	Business Address	LHR	Sik	FSB	MLTN	Hand crafted traditional	Active wear	Fashion Garments	Finished Fabrics	Denim	Martial arts/bikers	Hoisery,socks,gloves	retail buisness	export only	export and domestic both	domestic only	vertically integrated
1	Kohinoor Textiles	Processed jacquard Fabrics	22-Km Off Ferozepur Road, Rohi Nala, Gajumatta, Lahore	1							1				0	0	1		1
2	Al-Haram Enterprises	Embroidered shawls, voil, viscose scarfs	1510 Kiri Dawood Khan, O/S Pak Gate, Multan				1				1					1			
3	Ali Murtaza Associates (Pvt.) Ltd.	Denim Apparel	22-KM Off Ferozepur Road, Rohi Nala, Mauza Dolu Khurd. Tehsil Cantt, Lahore	1								1					1		
4	Alpha Garments Industries	Knitwear	Plot#198, Street No: 1, I-10/3, Islamabad						1							1			
5	Ambition Apparel	Denim Apparels	Glaxo Town, 20-Km, Off Ferozepur Road, Lahore	1								1			0	1	0		0
6	Amin Enterprises	Denim garments, work-wears	130-S, Quaid-e-Azam industrial state kot Lakhpat, Lahore	1								1					1		
7	Aruj Industries Ltd.	Woven apparel	Aruj House, 1-Km	1							1						1		
9	Ayesha Knitwears (Pvt.) Ltd.	Knitwear	22-Km Off Ferozepur Road, Lahore	1					1					1			1		
10	Azgard Nine Limited	Denim, Jeans	Ismail Aiwan-e-Science,Ferozepur Road, Lahore	1								1					1		
11	Arfa International	jeans and hosiery products	Kamahana Attari Road, Lahore	1								1		1			1		

## APPENDIX IV: FIELD VISITS OF INDUSTRY



Figure 12.1 Automated cutting process of knitted garments



Figure 12.2 Observation of determinants of new product development during field visits, firm type DM



Figure 12.3 Demonstrations of the sampling stage of DM2



Figure 12.4 Office space of AW2 of the respondent



Figure 12.5 Respondent FA2's explanation of themes for the upcoming collection



Figure 12.6 Prototypes of TT2, placed in her office for review.

## APPENDIX V: FIELD OBSERVATION CHECKLIST

Date of Observation	
Company Name	
Address	

### Operational Aspects

		Yes/No	Remarks
1	New technology for processing has been introduced.		
2	Subscription to published research resources.		
3	Designers with professional degrees are hired.		
4	Researchers in the field of design are hired.		
5	Collaborations in innovation projects nationally.		
6	Collaborations in innovation projects internationally.		
7	Participation in international exhibitions every year		
8	Previous collection market report is accumulated.		
9	The previous market report was presented to the team.		
10	Customer feedback is accumulated.		
11	Customer feedback was presented to the design team.		
12	The company holds international certification in sustainability.		

### Product Components

1	The company launches products with its brand name.		
2	The company has a display room.		
3	Products are designed with ethnic identity.		
4	Products carry sustainability slogans.		
5	Products claim to provide excellence to users.		
6	Products are claimed to be ecological.		
7	The product life cycle is considered in the beginning.		
8	Products focus on a specific service or activity.		
9	Products focus on some specific materials.		
10	Used specific patterns and colors over the years.		
11	Products are redesigned based on customer feedback.		

### Design Process

1	Design tasks are assigned to individual		
2	Brainstorming sessions on NPD within departments?		
3	Are NPD tasks assigned Individually to employees?		
4	Developments initiated on sketches provided by the client?		
5	Developments start with previous market reports.		
6	Fabrication is proposed by the client.		
7	Is fabrication outsourced?		
8	Product is developed from the material library?		
9	Does R&D have a library of materials?		
10	Tools to analyze customer and user choices.		
11	Technical drawings are part of the design department?		

## **APPENDIX VI: INTERVIEW GUIDE**

The interviews were planned to explore the design practices of designers working in the apparel sector and to interpret their approaches and strategies for achieving new product designs. A total of ten (10) respondents were selected, two from each product type. Designers with working experience in more than one company were short-listed. Amongst them, designers with more working experience were selected.

### **List of Questions**

#### ***Section 1: The skills and role of apparel designers***

1. What is your job scope as an apparel designer?
2. Do you think that your role working for different firms varied?
3. What skills should a designer master design a successful product in terms of market shares?
4. What skills should a designer master in designing a successful product in terms of a sustainable future?

#### ***Section 2: The contributing factors of Apparel product development***

1. How do you generate a new design idea?
2. What is your step-by-step process to approach a design?
3. What design components and elements do you think should be considered while designing an apparel product?
4. How do you define aesthetics?
5. How do you decide on the aesthetics of a product?

6. Do you think that making decisions on any fragment of aesthetics is the designer's intuitive move? Or can it be learned?
7. How do you decide which idea design should be produced?
8. What other factors do you consider important in product development besides aesthetics?
9. What is your opinion about developing a product with a significant identity? Can it help an enterprise in any way?
10. What limitations exist for apparel product development in Pakistan, in terms of techniques and technology, compared to the international market?

### ***Section 3: Design Components in Apparel Product design***

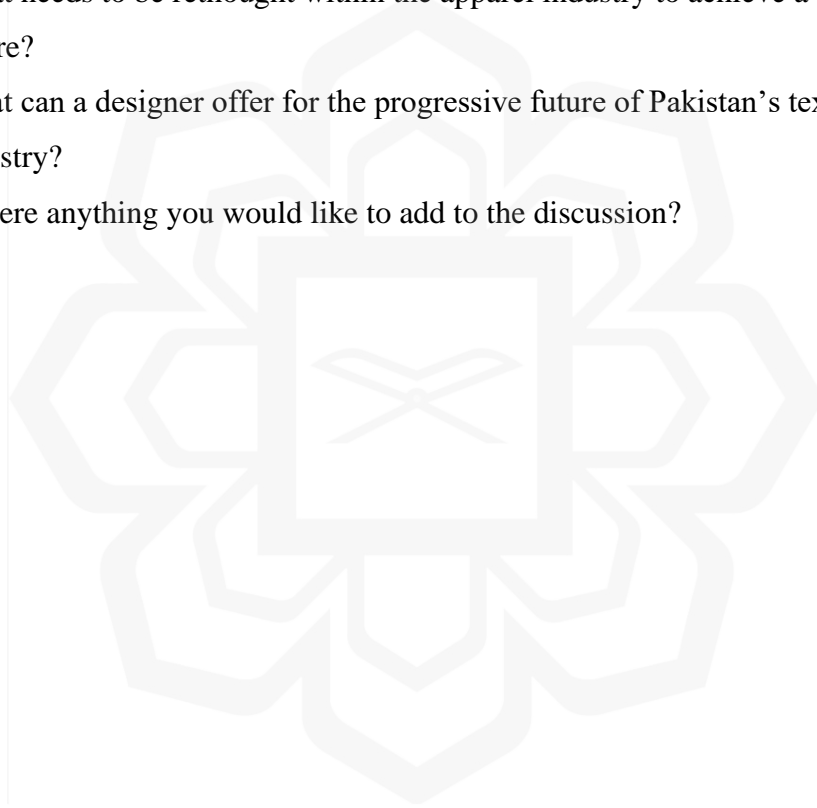
1. What is important for a designer to know before he starts designing a product?
2. What are the components of apparel products which are considered during product development?
3. What is your idea about introducing new technologies and materials into the design process?
4. During design synthesis, what do you consider as a priority among material, function, aesthetics, and other components of design?

### ***Section 4: Aspects of Apparel design innovation***

1. What does an innovative apparel product hold?
2. How do you strive for innovation in your design task?
3. How frequently do you think that innovation happens in your tasks?
4. What type of design strategies can contribute to design innovation?

***Section 5: Prospects of Textile design innovation for Pakistan's textile and clothing export industry***

1. What factors do you consider are important in product innovation for future social, economic, and environmental developments in textile design?
2. Do you think that Pakistan's apparel industry is very competitive in developing finished products for exports?
3. What can be done to improve the apparel industry of Pakistan?
4. What needs to be rethought within the apparel industry to achieve a sustainable future?
5. What can a designer offer for the progressive future of Pakistan's textile export industry?
6. Is there anything you would like to add to the discussion?



## APPENDIX VII: INTERVIEW QUESTIONS RATIONALE

Grouping of interview questions for classification of acquired knowledge, guided through research objective

### Section 1: The scope of apparel designer

#### The rationale of central themes:

- The inquiry will collect information on the current role of designers in the industry to identify what are their contributions
- The skills they carry will identify the potential of new product development

RO	Classification/ Central theme	Questions
<b>To examine current design practices for product development.</b>	The role of apparel design	<ol style="list-style-type: none"> <li>1. What is your job scope as an apparel designer?</li> <li>2. Do you think that your role as a designer working for different firms varied?</li> <li>3. What can a designer offer for the progressive future of Pakistan's textile export industry?</li> </ol>
<b>To examine current design practices for product development.</b>	The skills of an apparel designer	<ol style="list-style-type: none"> <li>1. What skills should a designer master design a successful product in terms of market shares?</li> <li>2. What skills a designer should master to design a successful product in terms of a sustainable future?</li> <li>3. Do you think that making decisions on any fragment of aesthetics is the designer's intuitive move? Or can it be learned?</li> </ol>
<b>To examine current design practices for product development.</b>	Design development process	<ol style="list-style-type: none"> <li>1. How do you generate a new design idea?</li> <li>2. What is your step-by-step process to approach a design?</li> </ol>

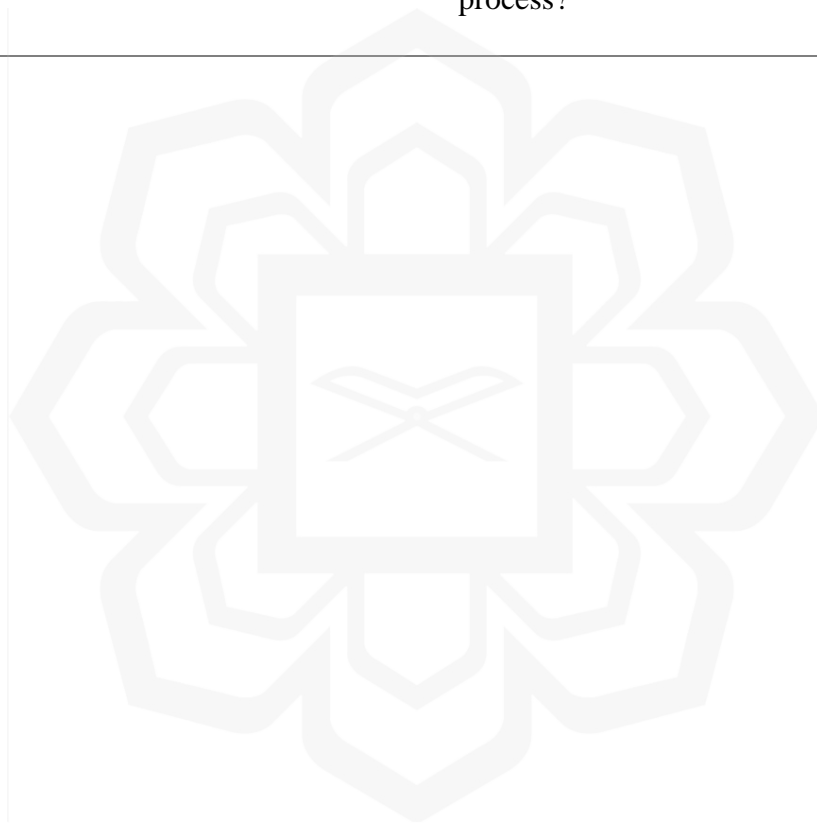
		3. How do you decide which idea design should be produced?
<b>To examine current design practices for product development.</b>	Components of apparel design	<ol style="list-style-type: none"> <li>1. What is important for a designer to know before he starts designing a product?</li> <li>2. What are the components of Textile product design which are considered during product development?</li> <li>3. What are aesthetics?</li> </ol>
<b>To examine current design practices for product development.</b>	External factors affecting apparel design development	<ol style="list-style-type: none"> <li>1. What should those fragments be considered in designing a textile apparel product for the export sector?</li> <li>2. What other factors do you consider important in product development besides aesthetics?</li> </ol>
<b>To examine current design practices for product development.</b>	Design selection parameters related to design components	<ol style="list-style-type: none"> <li>1. How do you decide on the aesthetics of a product?</li> <li>2. During design synthesis, what do you consider as a priority among material, function, aesthetics, and other components of design?</li> <li>3. How do you decide which idea design should be produced?</li> </ol>
<b>To determine the design approaches that enhance product innovation.</b>	Design development process	<ol style="list-style-type: none"> <li>1. What other factors do you consider important in product development besides aesthetics?</li> <li>2. How do you strive for innovation in your design process?</li> </ol>

		<ol style="list-style-type: none"> <li>3. How frequently do you think that innovation happens in your tasks?</li> <li>4. Do you think that sometimes striving for innovation is not the designer's priority?</li> </ol>
<p><b>To determine the design approaches that enhance product innovation.</b></p>	<p>Paths to encounter challenges</p>	<ol style="list-style-type: none"> <li>1. What limitations exist for apparel product development in Pakistan, in terms of techniques and technology, compared to the international market?</li> <li>2. Do you think that Pakistan's apparel industry is very competitive in developing finished products for exports?</li> <li>3. Are you satisfied with the developments in the apparel sector?</li> <li>4. What can be done to improve the apparel industry of Pakistan?</li> </ol>
<p><b>To determine the design approaches that enhance product innovation.</b></p>	<p>Approaches to apparel design innovation</p>	<ol style="list-style-type: none"> <li>1. What is required to materialize an idea of a new or improved apparel product with a significant identity?</li> <li>2. What is your opinion about developing a product with a significant identity?</li> <li>3. What is an innovative apparel product?</li> <li>4. What type of design strategies can contribute to innovation?</li> <li>5. What needs to be rethought within the apparel industry to achieve a sustainable future?</li> </ol>
<p><b>To determine the design approaches that enhance product innovation.</b></p>	<p>Aspects of Textile design innovation</p>	<ol style="list-style-type: none"> <li>1. What factors do you consider are important in product innovation for future social,</li> </ol>

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economic, and environmental developments?

2. What is your idea about holding a design identity to achieve design innovation?
  3. What is your idea about introducing new technologies and materials into the design process?
- 



## APPENDIX VIII: THEMATIC ANALYSIS

### Thematic Analysis of semi-structured interviews (Categorization of verbal data into themes)

Section 2: The contributing factors of apparel product development

Classification/Central Theme: Components of apparel design: Aesthetics

Sr.	Extracts of Narrative words	Meaning of words	Sub Themes
1	<p>Aesthetics are <u>likings of people. Certain colours, and cut lines.</u> (AW2)</p> <p>Something which is <u>eye-catching. The colour, the hand feel, and the texture.</u> Also, <u>the pattern</u> and motifs, if any. Aesthetics do include finesse of the product as well, besides colour or fabric type. (DM1)</p>	<ul style="list-style-type: none"> <li>• Aesthetics are the choices and combination of colour, pattern, fabric texture, silhouette, finesse, and detailing.</li> <li>• The variety in combinations produces different appeals.</li> <li>• The appeal and liking for a certain combination of these elements is called aesthetics.</li> </ul>	<p>Meaning of Aesthetics</p> <ul style="list-style-type: none"> <li>• Beauty through combining design elements</li> </ul>
2	<p>The ... <u>imagination of choices that would be liked by the persons you are looking for as your clients.</u> That would look beautiful. It is <u>the persona.</u> The choice <u>that she would make.</u> (FA2)</p>	<ul style="list-style-type: none"> <li>• The designers develop the combinations to achieve appealing results keeping in mind the choices of their customers.</li> <li>• The aesthetics in apparel design refers to the aesthetics of customers</li> </ul>	<p>Meaning of Aesthetics</p> <ul style="list-style-type: none"> <li>• User's idea of beauty and style</li> </ul>

	<p>Anything that is <u>appealing to customers</u>. (DM1)</p>	<p>and the aesthetics of designers as well.</p> <ul style="list-style-type: none"> <li>• The aesthetics of a customer means their liking of design elements and their idea of beauty.</li> </ul>	
3	<p>The <u>depiction of personality</u>. If the <u>product depicts</u> the colour, pattern, and other choices of the person who is going to wear it, the aesthetics are good. So the <u>ability to visualize a persona</u> and develop something out of that visualization <u>such that someone in the real world can relate to it</u> is "the ability to hold good aesthetics" (PF1) It is the <u>ability to visualize the final look</u> of the product (DM1)</p>	<ul style="list-style-type: none"> <li>• The aesthetics of a designer refers to the designer's ability to develop combinations of design elements that would result in the aesthetics of users.</li> <li>• The aesthetics of designers are led by the aesthetics of the user, which means that the set of apparel designers who understand aesthetics like this try to develop designs based on the choices that have been established by their customers.</li> </ul>	<p>Meaning of Aesthetics</p> <ul style="list-style-type: none"> <li>• Designer's ability to visualize the final look&gt;the user's perspective</li> </ul>
4	<p>Aesthetics is a <u>point of view on beauty</u>.(FA2) The same theme would end up in two different results. So aesthetics is the sense and</p>	<ul style="list-style-type: none"> <li>• The aesthetics of a designer are also their point of view on beauty. This point of view leads the designer's choices in sketching/ creating a</li> </ul>	<p>Meaning of Aesthetics</p> <p>Designer's ability to visualize the final look&gt;the designer's perception</p>

	<p><u>capability of designing and perceiving a product.</u> (TT1)</p> <p><u>Concerned with beauty,</u> which adds to the appeal of apparel. An <u>expression of taste or style.</u></p> <p>I think of <u>styling and aura or persona</u> .... If the aesthetics I am developing match that persona. Otherwise, I will develop further. (DM2)</p> <p>One can <u>easily be taught</u> how aesthetics work over time. But of course, an individual has their <u>own sense of aesthetics</u> too, which I believe <u>should be retained.</u></p>	<p>persona. With this understanding of aesthetics, apparel designers perceive personas of beauty and style and then rationalize their ideas by observing similar profiles from the real world.</p> <ul style="list-style-type: none"> <li>• The aesthetics of designers, their very own and the ones that they perceive as the user's, are both vital. Their own choices bring significance to design.</li> </ul>	
5	<p><u>Colour, styling, fabric, and finishing</u> (if there are any) are the components that I consider when I am designing. (DM2)</p> <p>I do try to achieve it through <u>fabrication, finishing, and styling.</u>(DM2)</p> <p>Aspects like the <u>season and function as formal or casual</u> are important. So as textile designers, we are trained on</p>	<p>The following components of aesthetics were identified by the designers;</p> <p>Colour, pattern (optional), styling, fabric quality, processing and finishing, season, and function.</p> <p>These components are comprehended as physiological and psychological aspects of aesthetics.</p>	Components of aesthetics

	<p>the <u>physiological qualities of fabrics</u>.... So primarily, <u>it is a season and then the appearance</u> of the fabric that matters for me. (DM2)</p>		
6	<p><u>University</u> plays a very <u>important role in shaping one's aesthetics</u>. If you take Khaadi from the owners to the employees, they are mainly industry graduates. <u>They all seem to have the same taste</u>. And then, over time, your <u>experience shapes up your aesthetics</u>. (FA1)</p> <p>It is inborn but can be polished... through observation and experience. (AW2)</p> <p>We do like certain things, but while designing for the client, marketing and <u>observing the market</u> can help us learn aesthetics. So it is basically <u>observing what is being produced</u>. I think <u>understanding the client</u> is important first of all. <u>Then having a good grip on trends</u></p>	<ul style="list-style-type: none"> <li>• Academic institutes tame designer aesthetics.</li> <li>• A group of designers with similar training tends to produce similar aesthetics.</li> <li>• The training would include observations of market behaviours on launched products, products that are being produced from different labels, and also through the training on enhanced understandings of potential users and their aesthetics.</li> <li>• Training to improve the designer's capability to visualize likings of masses and then being able to fabricate that idea with the capacity of the industry.</li> </ul>	<p>Skill development for aesthetics</p> <ul style="list-style-type: none"> <li>• Training</li> </ul> <p>(Also related to paths to improvement)</p>

	<p><u>and merging them with the capacity of the industry.</u>(DM1)</p> <p>Aesthetics can be learned through <u>observation of people's choices and personas</u>(FA2)</p>		
7	<p>It is through experience, I guess.</p> <p>In my previous workplace, our <u>client connected with us ...</u></p> <p>So when the design teams visited, they told us what to do. Secondly, the <u>heads travel frequently to foreign to observe market trends.</u></p> <p>(DM1)</p>	<ul style="list-style-type: none"> <li>• Visits to international fairs and exhibitions to absorb aesthetics</li> </ul>	<p>Skill development for aesthetics</p> <ul style="list-style-type: none"> <li>• Brainstorming, conversations, visits</li> </ul>
8	<p>No, they <u>can not be learned.</u> It is something really special and <u>individual,</u> but <u>with experience, they improve.</u> If we <u>practice observing</u> what we like or what is <u>more likely to be liked,</u> we can improve on it. (PF1)</p> <p>Yes, through <u>experience and observation,</u> it can be learned. (TT1)</p>	<ul style="list-style-type: none"> <li>• Aesthetics cannot be learned as dictation. The only learning of them is through experience and observation.</li> <li>• Observation of trends, collection of competitors, and other products that the target group likes other than apparel.</li> </ul>	<p>Skill development for aesthetics</p> <ul style="list-style-type: none"> <li>• Practical and project-based learning</li> </ul>

<p>We do <u>observe and reflect according to our observations.</u></p> <p>Our experiences have a vital role in building up a <u>certain understanding of aesthetics and other features of design...</u></p> <p>I look into trends, and I also keep a watch on my competitors. I also look up the other products that my customer likes to buy other than apparel. (TT2)</p>		
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## **APPENDIX IX: FOCUS GROUP DISCUSSION GUIDE**

### **Introduction to the Focus Group Discussion**

I am thankful to you all for embracing the occasion today. I am Umber Zahid, and Ms. Saleha Sammad is going to assist me during the session.

I am conducting a group discussion with the participants from Apparel Design experts/ professionals, Apparel Design Academicians, and Young design entrepreneurs involved in executing apparel products. This is a part of my Ph.D. thesis research at International Islamic University, Faculty of Applied Arts and Design/ Environment Design Kuala Lumpur. The topic is ‘Guideline for Design Innovation for Pakistan’s T&C sector.’

By innovation, we mean:

“ A new or improved usable idea, process or product (or combination of any) that is different from the previous outcomes in the similar domain” (Activities, 2018; Frumkin & Weiss, 2011; Horne, 2011; Padilha & Gomes, 2016)(Frumkin et al., 2011)

By Apparel Design Innovation, we mean:

“Innovation (process or product) of the usable idea into a garment, It differs from creativity because its very nature of being usable and value addition besides being different” (O’Mahony, 2011) (Hodges, Nancy,2018)(OECD/Eurostat, 2018)

Let me share the course of our discussion, as you are already aware that your participation is voluntary. All of the discussions here will be confidential and used for the research project. I would add that there are no right or wrong answers. Rather we are asking for your opinion and experiences, so please feel comfortable expressing yourself. It is helpful to hear different points of view, allowing disagreements and keeping respect for the views of others. We request that you just join the discussion whenever you have something to say or want to respond to someone else’s point. In order to hear everyone, it is important that only one person talks at a time so we do not miss anything.

We would also like to record the session so we do not have to worry about writing everything, and we do not miss any point during note-taking. Please do not be concerned

about the recording; we will keep the discussion confidential. Moreover, the recording will be secured and will not be accessible to anyone except the research team.

***Opening Question***

Let me share my type of work and the current study. This study adopted an apparel industry inventory of Punjab to collect facts about design departments functioning within or in association with apparel manufacturing firms. The findings of inventory led to Semi-structured interviews of apparel designers employed by the design departments.

The key findings of the study are:

Infrastructure	<ul style="list-style-type: none"> <li>• Most of the firms are manufacturers and do not have well-established design departments.</li> <li>• Most of the design-related activities happen in fashion apparel and printed processed fabrics, retail, and domestic market businesses.</li> </ul>
Design Networks	<ul style="list-style-type: none"> <li>• Their apparel associations do not find a balanced representation of all stakeholders in the product development processes.</li> <li>• There is no database available on practising designers, and neither is there any database available that can provide sourcing solutions to young design entrepreneurs.</li> <li>• Collaborations for NPD are leaned toward the refinement of product features and towards the development of suitable product aesthetics for international clients.</li> <li>• Teaming up with different disciplines and professionals to discover and develop new markets and products</li> </ul>
Product Types	<ul style="list-style-type: none"> <li>• Traditional textiles and hosiery products have the least focus in terms of new product developments and investments in established businesses to launch them on a larger scale.</li> </ul>

<p>Innovation Planning</p>	<ul style="list-style-type: none"> <li>• The role of designers in developing NPD varies within organizations</li> <li>• Integrated design processes to utilize and generate requirements for new materials and services are feeble because the role of designers is focused on the interface of the product, new materials developments are not synchronized with design departments in some setups, and also some external factors exist.</li> <li>• Components to be integrated into design development; 1) Functionality relatable with aesthetics and fabrication2) Integration between aesthetics and production technique. 3) new materials, 4) significance, and identity to design</li> </ul>
<p>Design Skills</p>	<ul style="list-style-type: none"> <li>• Skills required for a designer; cognitive skills to channel design components to achieve significant design identity and functionality. Design Knowledge of appropriate fittings and comfortable cuts is important.</li> </ul>
<p>Design Solutions</p>	<ul style="list-style-type: none"> <li>• Most of the themes are related to colours and patterns. It is rare to find any theme in the initial phase that leads the design towards usefulness, sustainability, or any other such social or cultural issue. Most of the themes were recorded as; Festive, bold, native, punk, luxury, etc.</li> <li>• Environmental concerns and designing eco-friendly products are not design concerns.</li> <li>• The fabric samples in all firms were mostly cotton and cotton blends.</li> <li>• 80% design process starts with the review of previous collections, which means the industry is inclined towards the upgradation of previously developed products.</li> </ul>

**What design strategies and approaches can strengthen new product development for Pakistan’s clothing sector?**

### ***Transitional Questions***

What are your prime considerations upon apparel product components?

What can be done to explore new design solutions for the improvement of the apparel sector?

What dimensions have been overlooked in the development of the clothing sector?

What can be done to incorporate material exploration?

How can design significance and unique selling points be identified?

What kind of design skills be implanted in designers to compete in the international market?

How the scope of apparel designers be enhanced in the apparel sector?

Would you agree with the explanation of the design process explained by the interviewees?

### ***Prime Questions***

Do the four main components of apparel design and their segments encompass core domains of product design units?

Can innovation strategies be confined within the three stages of the apparel design process?

Please review and evaluate the proposed framework for apparel design innovation.

### ***Closing questions***

Is there any other suggestion or critique of the whole framework?

### ***Conclusion***

We are now about to reach the end of this discussion. Does anyone have any further suggestions before we conclude this group discussion? I am thankful to all of you for your presence and support. Your opinions and observations are precious for refining the “Apparel design innovation framework for Pakistan’s apparel industry”.

### ***Group Composition for FGD***

Focus Group Discussion is utilized for validation of the research results, i.e., a draft of apparel design innovation framework for new product development drafted from literature review, field observation, and semi-structured interviews with designers. A total of six (6) experts participated in the discussion held for this study. It is also considered helpful by the

experts if there is a level of familiarity between the participants of the discussion. The participants have been invited from managerial positions in apparel firms, CEO of small manufacturing enterprises, design consultants, and design academicians. The researcher arranged a discussion of experts in a single session to generate a dialogue on the proposal, comprising of the following composition:

Department/ Category	Respondents (Code Name)	Designation	Experience
Design Head	Ather Hafeez (AH)	Creative director, Alkaram Textile Mills	22 years
	Asim Naeem (AN)	Creative Head, Fabrizio Pvt Creative Head Lajwanti	20 years
Design Educationist	Umar Hameed(UH)	Assistant Professor of design, National College of Arts Consultant Roots IVY University	14years
	Bushra Jameel (BJ)	Assistant professor of design, Pakistan Institute of Design Design Consultant Shubinak and Looptex Pvt	15years
Designer/ Entrepreneur	Maheen Ausaf (MA)	CEO Maheen.Kazim Ex. Senior designer generation	11years
	Saleha Sammad (SS)	CEO Saleha Sammad	8 years