Original Article

Fading knowledge of hand-stitched football production

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Abstract

This study highlights the hand-stitched football production by Pakistani artisans, called "stitchers" in the local language. Pakistan fulfils the 70% demand for hand-stitched footballs in the world. With the advent of technology, hand-stitched football production is fading away gradually. This is a qualitative study using grounded theory methodology. Semi-structured interviews of stitchers and managers were conducted at their workplaces. Informants were selected using the purposive sampling technique. It is found that manual football production requires a higher number of human resources, and getting a higher production volume is demanding. Automation is to replace the manual production processes ultimately. Moreover, the knowledge transfer & sharing of manual stitching are fading due to low socio-economic value. The art and knowledge of manual stitching might disappear if not preserved.

Keywords: Hand-stitched football production, grounded theory, Sialkot

Introduction

Many games are played in Pakistan, including hockey, cricket, football, volleyball, boxing, and squash. Pakistan has ruled the world for decades in squash, producing the legends like Jahangir Khan and Jan Sher Khan. Pakistan has won many titles in men's field hockey, but the cricket game has always overwhelmed Pakistan's crowds. Pakistanis watch football with keen interest; though the country could never make it to the final round of any world cup, Pakistani-made footballs are mostly there. Pakistan has produced football for three consecutive FIFA world cups from 2014 to 2022.

For more than a century, the city of Sialkot, Pakistan, has been an epicenter of football production worldwide (Hussain-Khaliq, 2004). As cited

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by Danish and Khattak (2021), the sports goods cluster in Sialkot, Pakistan, employs around 200,000 workers and contributes to 6% of total exports.

Pakistani workforce in Sialkot is the expert in the manual preparation of soccer balls. The fine quality of handmade balls drew the world, and Pakistani stitchers have a competitive edge in this area. Pakistan's market share in hand-stitched football making has been 60% to 80% (Fazl-E-Haider, 2019; Mehdi, 2014; Nadvi, 2011).

With the advancements in technology, new and innovative processes and materials have been introduced. Thermal footballs are the latest in the market, which are more accurate and precise. Initially, firms in Sialkot lost a significant market share to Chinese firms, but gradually they regained the position, and again Sialkot is the focus of attention and production.

Entrepreneurs of Sialkot have been innovative and resilient to face the challenges posed by the technological changes and renewed their capabilities, skills, and knowledge from manual to the latest thermally bonded footballs (Teece, 2007, 2015; Teece, Pisano, & Shuen, 1997).

According to Chattha (2011), the origins of football production date back to British rule in the sub-continent in 1889, when a British soldier asked a local cobbler to repair his punctured football. The cobbler not only fixed the punctured ball but also prepared a copy of the football, leading to the football production in Sialkot later (Chattha, 2011).

Pakistan has provided footballs for the FIFA world cups; in 1982, the soccer ball "Tango", in 2014; "Brazuca"; in 2018, Pakistan made soccer balls labelled "Telstar 18" and "Telstar Mechta", and in 2022 world cup to be held in Qatar, Pakistan made football "Al Rihla" will be used using the latest technology. For 2012 Olympic games, hand-stitched soccer balls were produced in Pakistan (Atkin, Chaudhry, Chaudry, Khandelwal, & Verhoogen, 2014).

This study is aimed at hand-stitched football production. The objective of the study is to investigate the issues of workers associated with hand-stitched football production and look into the prospects of hand-stitched football in the era of technological changes.

Literature Review

Technology is everywhere, and many tasks considered manual only have fallen prey to modern technology (Windt et al., 2020). Although automation is taking over every industry, humans remain the focal point of planning and decision-making (Sgarbossa, Grosse, Neumann, Battini, & Glock, 2020). Technology is believed to improve the accuracy of processes (Windt et al., 2020). This aspect of technology has now made it mandatory to invent new ways of producing things, and we have entered the era of machine learning. Machine learning has more accurately converted manual tasks into automated processes (Arntz, Gregory, & Zierahn, 2019).

This automation has also raised concerns among workers that they might lose their jobs (Arntz et al., 2019). These fears kept Pakistani football firms deprived of mechanization and technology upgradation. Consequently, they lost their market share to Chinese firms (Atkin et al., 2014). Atkin et al. (2014) conducted an experimental study in the football production cluster of Sialkot to check the technology diffusion rate. They found a slow diffusion rate mainly because of the resistance of the manual workers and misleading information conveyed to the owners, and it was hypothesized that "a misalignment of incentives within the firm is an important reason for the lack of adoption" (Atkin et al., 2014). One main conclusion was "in order for technology adoption to be successful, employees have to have a credible expectation that they will share in the gains from adoption"(Atkin et al., 2014). But later on, Pakistani firms embraced new technology and upgraded their processes, but they had lost a significant market share by then (Lund-Thomsen, Nadvi, Chan, Khara, & Xue, 2012).

Modern means of communication and transportation have enabled manufacturers to establish production facilities in far areas, ignoring geographical dispersion, and the ones who don't manufacture are now controlling most of the manufacturers (Gereffi, 1994). For example, Adidas and Nike don't have production facilities for football, but they are the largest brands in football; these firms are called Original Brand Manufacturers (OBMs). Other factors like global value chain (GVC) players make their contractors comply with the conditions agreed on (Nadvi, 2008). Most hand-stitched football production is overwhelmed by the sub-contractors in Pakistan, China and India, and the obvious reason is the factory overheads (Lund-Thomsen et al., 2012). These stitchers are generally paid on a piece rate system according to their expertise and skills (Lund-Thomsen et al., 2012).

OBMs provide a code of conduct to their suppliers in accordance with ILO guidelines, which include working conditions, benefits, and minimum wage (Danish & Khattak, 2021). OBMs are the lead firms that do the research and development, and branding and are generally situated in developed countries, while Original Equipment Manufacturers (OEMs) are the firms from developing countries and follow the lead firms (Danish & Khattak, 2021). Actors in the global value chain are also supposed to work for the social upgradation of the workers in light of the International Labor Organization's decent work framework, which encompasses salary and other benefits (Khattak & Stringer, 2017). However, this does not happen exactly as intended; supplier firms (OEMs) have subcontractors who hire the stitchers and pay them according to their mechanism, which may or may not follow the industry norms and government regulations (Nadvi, 2008). However, firms reported that they provide their employees with minimum wage and other benefits according to the Punjab government regulations (Danish & Khattak, 2021). But most of the firms have sub-contractors who provide them with the services of stitchers, firms don't directly hire the stitchers, and this arrangement does not guarantee the social upgrading of workers under ILO's decent working conditions (Danish & Khattak, 2021).

Research Design

This is a qualitative study, and a grounded theory approach is applied (Glaser & Strauss, 1967). Grounded theory, as explained by Gioia, Corley, and Hamilton (2013), has been used in this study. This approach is preferred because of its objectivity and pictorial demonstration of data structure (Gioia et al., 2013; Nag & Gioia, 2012).

Interviews with workers and managers were conducted. After each interview, data were analyzed and compared with previous data following constant comparison as prescribed by Glaser and Strauss (1967). Many themes emerged at the first level, called first-order concepts. Further analysis of these initial concepts provided second-order themes. Ultimately, aggregate dimensions were developed following the guidelines of (Gioia et al., 2013; Nag & Gioia, 2012).

Sampling Technique

Firms in Sialkot use multiple technologies to produce footballs, like thermal balls, machine-stitched balls, and hand-stitched balls. The purposive sampling, a non-probability approach, was used to choose the informants and

firms. This flexible sampling technique permits investigators to involve those who best serve the research purpose (Sekaran & Bougie, 2003). Only those firms producing hand-stitched soccer balls were included in the data collection.

Sample Size

Steinar (2007) proposed that a sample of 5 to 25 informants in a qualitative research study is adequate. For the current research, data were collected from 14 stitchers and 07 managers. Though the sample size was not dependent on the suggestion of (Steinar, 2007), theoretical sampling and data redundancy (saturation) guided to discontinue further data collection.

Data Collection

Semi-structured interviews have been conducted to collect data from workers and managers. Archival records and company documents, FIFA reports, SMEDA (Small and Medium Enterprises Development Authority) and Sialkot Chambers of Commerce and Industries' reports were used for secondary data.

In this study, semi-structured interviews are preferred for primary data collection due to the flexibility of the approach (Berg, 2004; Bryman & Bell, 2015; Flick, 2009; Steinar, 2007). Semi-structured interviews, unlike questionnaires, provide flexibility according to the situation. Though there are definite themes or central points to be discussed, the researcher can further probe where it feels necessary.

On average, workers' interviews lasted from 25-60 minutes. Initial discussions (interviews) of workers were of longer duration; later, this duration was reduced. The average time of interviews of managers was from 30 minutes to 90 minutes. The researcher himself conducted all the interviews.

Data Analysis

In qualitative research, data collection and analysis go hand in hand (Lincoln & Guba, 1985). While following grounded theory methodology, this is even more a natural phenomenon. Initially, a large number of themes emerged, which (Glaser & Strauss, 1967) termed categories, (Corbin & Strauss, 1990) termed open coding, and Gioia et al. (2013) labelled as 1st order concepts.

Initial data collection and analysis produced a large number of themes which were analyzed for differences and similarities to develop 2nd order

themes. At last, aggregate dimensions were created, and the data structure was constructed following the (Gioia et al., 2013; Nag & Gioia, 2012) procedures. For each question, a separate data structure has been developed and elaborated; first-order concepts, second-order themes and aggregate dimensions are discussed in detail.

There are two types of stitchers, one working in organizations and the other working at home. Generally, females work at home at their ease, and males work in firms or stitching centers.

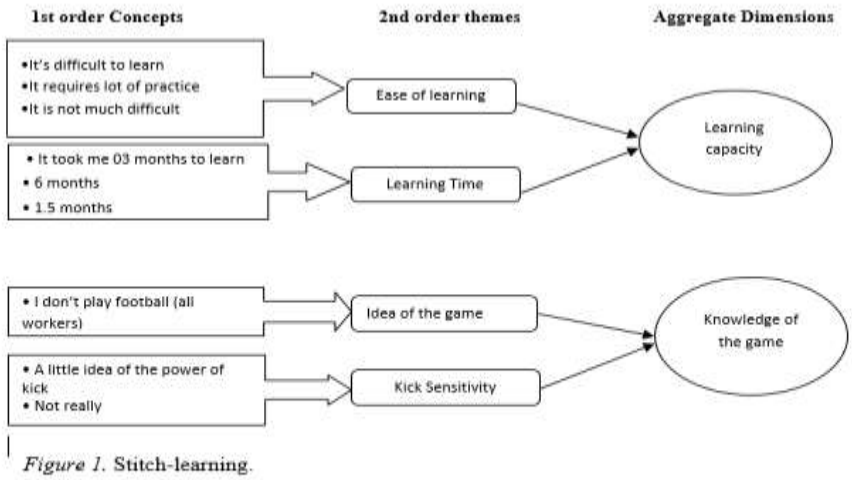

Figure 1. Stitch-learning.

Figure 1 shows the data structure of stitch learning. Two second-order themes are identified for learning capacity: ease of learning and learning time.

Ease of Learning is the opinion of the stitchers about the task difficulty and how they perceive the art of stitching a football as difficult or easy to learn. Generally, they think that stitching is a challenging task; it requires the proper working of fingers and arm muscles to pull the thread along with eyesight. One female stitcher observed that stitching a football is not that difficult for females as this is part of their lives.

Learning time is the time taken by a worker to become a good stitcher. This time duration varies from 1-6 months in general. One worker reported that he learned in two years, while one said it took him 18-20 days. But

developing expertise in this art requires six months. The most crucial task in this process is stitching the last panel, which requires experience and knowledge.

Perceived task difficulty and learning time are the components of the aggregate dimension of "Learning Capacity", which varies from person to person. The ability to learn, of course, is a unique quality that cannot be at the same level in all workers. There is also a slight difference between the male and female workers. Being part of a society where females stitch the family's clothes, females have a habit and practice of using needles which is not common among males. Females consider it much easier; however, the force required to complete a stitch is much higher than in ordinary clothes, so pulling thread is considered more accessible by males.

The second aggregate dimension that emerged from the themes is knowledge of the football game. It comprises the idea of the game and the kick sensitivity.

The idea of the game refers to the information held by the stitcher regarding football as a sport; they were asked if they played football, and almost all the workers did not play football and had no idea of the sport for which they were developing a ball. Pakistanis are cricket lovers, and all the workers knew better about cricket than any other sport.

These workers had no idea or sense regarding the force applied by a foot on the ball. They were oblivious to any such information. They never knew how much power a player like Roberto Carlos of Brazil would apply. Yet, these footballs could endure such a force. Nor did their contractors provide them with any information. This information was surprising; no one knew anything about the power to be endured by their manufactured/stitched football, yet they were stitching high-quality footballs.

An interesting finding is that workers did not know the game or the kick yet focused on the stitching and produced top-quality footballs.

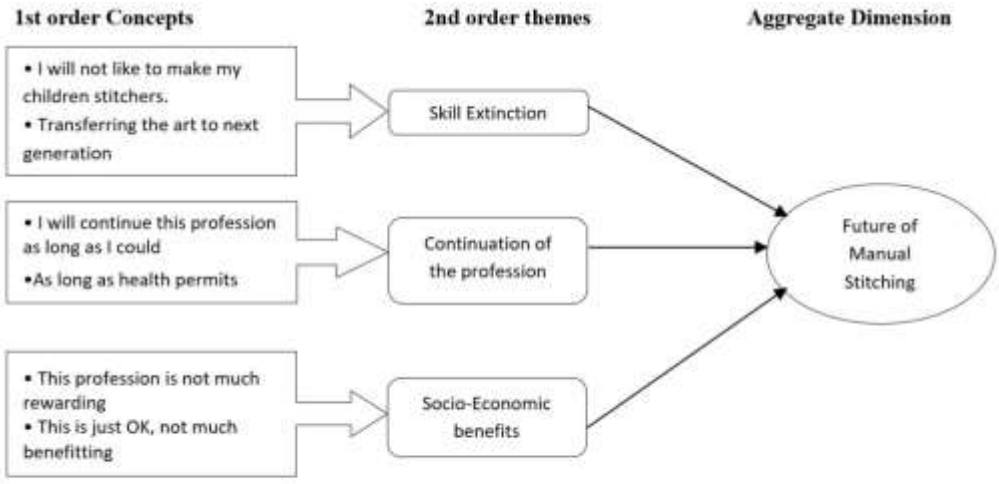

Figure 2. Future prospects of manual stitching.

Figure 2 represents the data structure of prospects of manual stitching. Three second-order themes emerged from the data when stitchers were asked whether they would like to continue this profession and transfer this art to the next generations.

Though Sialkot firms take pride in being the best in manual stitching of handmade footballs, yet this art faces the danger of "Extinction". When asked would you like your children to make stitchers, almost all the workers replied in a "blunt No".

When asked why you would not like your child to become a stitcher, one worker replied, "I would like my child to get the education and earn a livelihood through some respectable profession"—leaving an impression of disrespect for the adopted profession by the stitcher. It was also noted that young people are now not coming into this profession of stitching. This is a very demanding profession that requires physical and mental input. It was also seen that the working conditions of stitchers were not very appreciative; they sat on the floor over a wooden piece. They use their hands as well as legs. The football is held in the lap with the help of the knees. It is a difficult task.

This art has been transferred by tacit knowledge transfer among families from parents to children or from sibling to sibling, in social circles of

stitching families, and at workplaces from senior workers to junior or newcomers. But things have changed, new workers are not joining the profession, and existing workers are getting older and unwilling to transfer this art to the next generation. If this situation continues, this great art of manual stitching may disappear.

Apart from knowledge transfer and youngsters joining, technologies are also changing. Machine-stitched footballs are cheaper and better in high-volume production (but lesser in quality) and are in high demand now.

Stitchers were asked about their continuation of this profession. Almost all said they would continue, as one explained, "I will continue this profession as long as I can, as long as my health permits". These workers must continue this profession as they don't have any other option; they have developed their expertise in this area now it is difficult for them to shift their job. Acquiring new skills is difficult. Now the demand for their job is adequate; they can find reasonable work and earn their livelihood.

They were not happy with the remuneration offered to them. Many companies have abandoned directly employing stitchers; they work with contractors who get the job done. These contractors offer a piece-rate pay system, make as many balls as possible, and earn money for each ball produced. No health insurance, no medical or transport facilities available. So, their condition is not palpable; they no more find this job financially attractive. Big companies like Saga sports (closed now) used to have good salary packages and medical and transport facilities. Now many big companies in Sialkot have been closed due to specific reasons. And existing companies have also changed their policies of not having direct employment of stitchers; they rely on contractors, which has lowered their factory overheads. Due to a lack of financial benefits and social support, stitchers and their families are no more committed to this profession. Only the existing ones are stuck in this profession. Due to the lack of interest of the new generation, perceived poor economic benefits and technological changes, the future of manual stitching doesn't look bright. Though most people claim hand-stitched ball quality is far superior to the machine-stitched ball, they are not investing in manual stitching personnel. Things change with time once the most rewarding and acknowledged profession seems on the verge of extinction.

This was one side of the story; data from firms were also collected to know how firms perceive the future of hand-stitched football production, as firms are directly linked with the buyers of footballs. Pakistani firms are generally Original Equipment Manufacturers (OEMs) having no brands in soccer, and they sell their products to Original Brand Manufacturers (OBMs) like Adidas and Nike, for example. Design, technology and quality standards are set by the OBMs, which Pakistani firms follow. It is found that buyers now require thermal moulded footballs that can be mass-produced. So, change in technology is quite apparent.

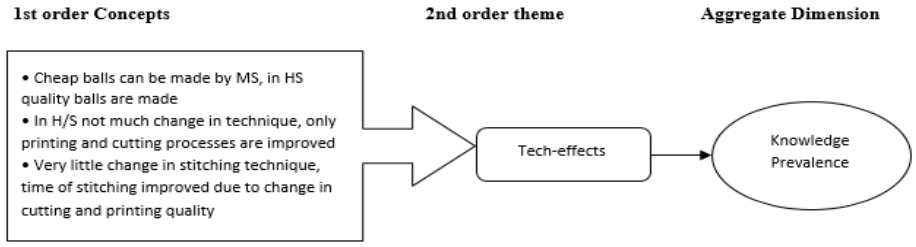

Figure 3. Effects of new technology.

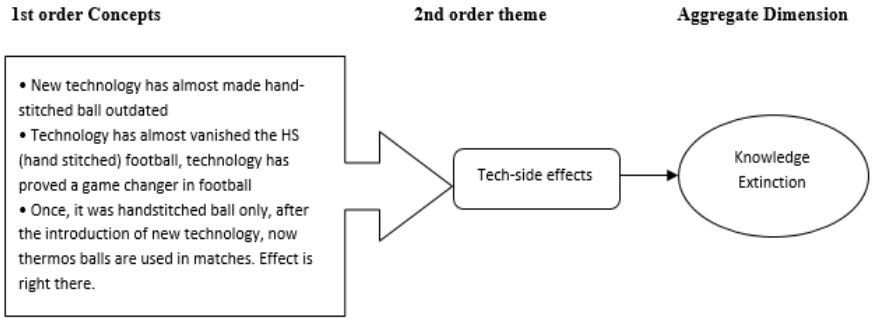

Figure 4. Side-effects of new technology.

For data collection from firms, managers were interviewed in Sialkot. Managers were asked to explain the effects of changing technologies on hand-stitched football production. Figures 3 & 4 exhibit the data structure of their responses.

Tech effects in hand-stitched balls are not much drastic, only some processes have been improved, like lamination and cutting, but central task stitching is the same in the case of hand-stitched footballs. Though better machines are available for machine-stitched footballs, the quality of machine-stitched footballs is far less than hand-stitched footballs. The same old skill and competence prevail in hand-stitched balls, termed "Knowledge prevalence" (see figure 3).

Tech- Side effects are the other side of the picture; firms believe that the era of hand-stitched balls is over or about to be over. As informed by one manager, "Technology has almost vanished the HS (hand-stitched) football; technology has proved a game-changer in the football industry." Some believe that "Hand stitch may be smaller in number but will remain there." But it seems that technology is changing, and side effects of technology may result in "Knowledge Extinction". See comments of one manager "Once, it was hand-stitched ball only, after the introduction of new technology, now thermo balls are used in matches. Effect is right there." One manager further added, "New technology has almost made hand-stitched balls outdated, thermal balls are better in quality and faster in production with being less labor-intensive." Century-old art is now at the verge of "extinction", but who knows the skills of hand stitching remain there.

Discussion

The study focused on the football industry of Sialkot, Pakistan. Pakistan is a leading football-producing country, and the city of Sialkot is the center of football manufacturing. Sialkot is the epicenter of football production, with a century-old history and legacy of British colonial rule. Figures 3 & 4 depict the impact of technological changes on the conventional hand-stitched football production industry.

As far as hand-stitched football production is concerned, there has been very little change, only lamination and cutting processes have been improved. But the quality of hand-stitched is still far superior to machine-stitched footballs. So, old knowledge prevalence is visible.

However, on the other hand, technology has revolutionized the industry in the case of thermal football production. As reported by one manager, "Technology has almost vanished the HS (hand-stitched) football; technology has proved a game-changer in football", and one manager added, "Once, it was hand-stitched ball only, after the introduction of new

technology, now thermo balls are frequently used in matches. Effect is right there", so we term this as Tech-side effects. Though thermo balls are becoming popular, hand-stitched footballs' importance cannot be undermined. Still, many firms only produce hand-stitched footballs employing thousands of stitchers. The quality of hand-stitched football is still competitive, and this art needs to be sustained. If this unique art of manual stitching is not preserved, firms relying only on hand-stitched footballs may face issues of existence and the fine art of manual stitching may disappear and we see knowledge extinction.

Aggregate dimension Future of Manual stitching shown in figure 2 is about the future of manual stitching based on the thoughts and experiences of stitchers.

The average age of stitchers is 35 years, which shows that these stitchers can work as stitchers for at least 20 more years. All of them revealed their intentions to continue this profession. They showed strong resentment toward transferring this skill to the next generation (their children, for example); they believed they would like their children to get higher education and adopt any other profession. When asked why would they not want them to become stitchers? They thought this was a very tough profession and not much rewarding. They don't see the socio-economic benefits associated with this profession. This art can become rare in 1-2 decades. Since this is based on tacit transfer, no coded knowledge regarding this manual stitching is available; hence, chances of extinction are there.

Conclusion & Recommendations

It was found that knowledge of the perfect stitch is the outcome of the century-old tradition of football making in Sialkot; this knowledge of manual stitching is facing the danger of extinction for two reasons. First, stitchers are not passing this art to the next generation; they want their children not to adopt this profession due to low economic benefits; second, technology has changed. Now thermal footballs are the most preferred and used balls in the world. Hand-stitched footballs are labor- intensive and lack volume production, while thermal footballs are less labor-intensive and more automated.

It is recommended that the government of Pakistan must take concrete steps to safeguard the future of thousands of workers involved in hand-stitched football production. Government should focus on the well-being of the

workers in the football industry. Special plans for the health and education of these workers and their families need to be implemented.

There is also a dire need to codify all the hand-stitched football production processes, as this relies only on tacit knowledge of the workers. Formal training and lucrative remuneration can attract the new generation to join the industry as stitchers.

If football also becomes a popular sport in Pakistani, this will increase the demand for football locally, further boosting the industry. Currently, footballs are being exported, and very few sales are local.

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