INDIVIDUAL, ORGANIZATIONAL, TECHNOLOGICAL AND INDUSTRY FACTORS EFFECTS ON INNOVATION CAPABILITY OF DAIRY SMES IN PAKISTAN: KNOWLEDGE SHARING AS MEDIATED

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ABSTRACT

Existing literature reveals a gap in the empirical knowledge on innovation capability in the dairy sector of Punjab, Pakistan. Innovation capability is a key player in the growth and success of a business. Therefore, the major objective of this study was to examine the mediating role of knowledge sharing on trust, motivation, training & development, supervisor support, ICT use, and industry cluster resources with innovation capability of the dairy sector. This research contributes to the growth of GDP through the dairy sector. The research framework in the study was based on the diffusion of innovation and the resource- based view theories. The data were collected from dairy farm owners and managers in the study locality, i.e. Punjab, Pakistan. The study instrument was 410 self-administered questionnaires which were distributed to the dairy farm mangers/owners through the simple random sampling technique. 254 valid questionnaires were used for the analysis. The SPSS and SMART PLS 3.0 were used for the basic screening of the raw data and testing the hypothetical statements. The study found that motivation, training & development, supervisor support and industry cluster resources have positive significant impacts on knowledge- sharing. Furthermore, motivation, training & development, ICT used and industry cluster resources also have positive impacts on innovation capability; and knowledge- sharing mediated the relationship between motivation, training & development, supervisor support and innovation capability. The results of the study provide important insights to outcome, policy- makers and researchers to further understand the effects of the innovation capability of dairy SMEs (small medium enterprises) in Pakistan. This study suggested that managers and owners of dairy farms must provide motivation, training & development and supervisor support to enhance the innovation capability of dairy workers.

Keywords: Innovation capability, knowledge sharing, dairy sector, Punjab Pakistan.

ABSTRAK

Tinjauan terhadap kajian yang sedia ada menunjukkan adanya jurang dalam pengetahuan empirikal tentang keupayaan inovasi dalam sektor tenusu di Punjab, Pakistan. Keupayaan inovasi adalah pemain utama dalam pertumbuhan dan kejayaan sesebuah perniagaan. Oleh itu, objektif utama kajian ini adalah untuk mengkaji peranan pengantara bagi perkongsian pengetahuan ke atas amanah, motivasi, latihan dan pembangunan, sokongan penyelia, ICT dan sumber industri kelompok dengan keupayaan inovasi sektor tenusu. Kajian ini memberi sumbangan yang besar kepada pertumbuhan KDNK melalui sektor tenusu. Rangka kerja penyelidikan dalam kajian ini adalah berdasarkan kepada penyebaran inovasi dan teori berasaskan pandangan - sumber . Data telah dikumpulkan daripada pemilik ladang tenusu dan pengurus daripada kawasan kajian iaitu Punjab, Pakistan. Instrumen kajian adalah sebanyak 410 soal selidik yang direka sendiri dan diedarkan kepada pengurus ladang tenusu / pemilik melalui teknik persampelan rawak mudah. Sebanyak 254 soal selidik yang sah telah digunakan untuk dianalisis. Perisian SPSS dan SMART PLS 3.0 telah digunakan untuk pemeriksaan asas data mentah dan ujian penyata hipotesis . Kajian ini mendapati bahawa motivasi, latihan dan pembangunan, sokongan penyelia dan sumber industri kelompok mempunyai impak positif yang besar kepada perkongsian pengetahuan. Tambahan pula, motivasi, latihan dan pembangunan, penggunaan ICT dan sumber industri kelompok juga mempunyai kesan positif ke atas keupayaan inovasi, manakala perkongsian pengetahuan telah menjadi pengantara antara motivasi, latihan dan pembangunan, sokongan penyelia dan keupayaan inovasi. Hasil kajian ini penting kepada hasil, penggubal dasar dan penyelidik untuk terus memahami kesan keupayaan inovasi IKS (industri kecil dan sederhana) tenusu di Pakistan. Kajian ini mencadangkan agar pengurus dan pemilik ladang tenusu memberi motivasi, latihan dan pembangunan serta sokongan penyeliabagi meningkatkan keupayaan inovasi dalam kalangan pekerja tenusu.

Kata kunci: keupayaan inovasi, perkongsian pengetahuan, sektor tenusu, Punjab Pakistan

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TR Trust

MO Motivation

TD Training & Development

SS Supervisor Support

TE Technology Factor

IN Industry Cluster Resources

KS Knowledge Sharing

IC Innovation Capability

ICT Information Communication Technology

GII Global Innovation Index

UHT Ultra High Temperature

PDDC Pakistan Dairy Development Corporation

PDA Punjab Dairy Association

SME Small Medium Enterprise

SMEDA Small Medium Enterprise Development Authority

FAO Food Agriculture Organization

IT Information Technology

KM Knowledge Management

GDP Gross Domestic Products

HRM Human Resource Management

HR Human Resource

RBV Resource Based View

SEM Structural Equation Modeling

SPSS Statistical Packages for Social Sciences

PLS Partial Least Square

CR Composite Reliability

CA Cronbach's Alpha

VIF Variance inflation Factor

AVE Average Variance Extract

GOF Goodness of Fit

SD Standard Deviation

SE Standard Error

KMO Kaiser–Meyer–Olkin

TOL Tolerance

UL Upper Limit

LL Lower Limit

PES Pakistan Economic Survey

EPS Enterprise Survey

BCIP Business Climate in Pakistan

WB World Bank

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

In the 21st century, innovation capability is viewed as an important component to survive in the global business world (Yeşil, Koska, & Büyükbeşe, 2013; Corrocher & Solito, 2017; Strobel & Kratzer, 2017). Innovation capability is now taken place as the success of firms and growth for any country (Mawson & Brown, 2017; Woschke, Haase, & Kratzer, 2017; Zou, Guo, & Song, 2017). It is clearly stated that innovation capability provided more benefits to the firms such as eliminating the cost of the firms, product differentiation from competitors and produce a better quality of the existing products and uplifting the services (Eren, Kabadayi, & Sahin, 1999; Hult, Hurley, & Knight, 2004; Kilelu, Klerkx, & Leeuwis, 2013; Ngo & O'Cass, 2013; Dutta & Lanvin, 2016; Johnston & Marshall, 2016). In the study of Lin (2007) mentioned that if the firms do not practice their capability for the development then no firms can survive in the current competitive environment. It is argued that the innovation is a capability through which managers can find the solution of their business-related problem (Porter, 1990; Henard & Szymanski, 2001; Hult, Hurley, & Knight, 2004).

Therefore, innovation capability has become generally recognized as a major source to competitive success and for the economic growth (Sena, 2004; Francis & Bessant, 2005).

In other words, innovation capability is taking place as a key factor for the success of the firms (Patterson, 1998; Cho & Pucik, 2005; Yang, 2012).

Few researchers have conducted the research on enhancing the innovation capability (Çakar & Ertürk, 2010; Awan & Akram, 2012; Akhavan & Mahdi Hosseini, 2016). Additionally, researchers feel that establishing and extending business in this century needed innovative ideas for rapid growth and developed their role in the country growth (Badawy, 1993; Marsh & Stock, 2006; Kandybin, 2009; Dhewanto *et al.*, 2012; Cantwell, 2017; Pfeffermann, 2017). Further stated that growth and development of a country are attached with the innovation capability (Canals, 2001; O'Connor, 2006). Drucker (2014) one of the administration scholar in management and entrepreneur research, states that innovation capability is the main source in economic development and further provides help to reduce turbulence in an economic environment. In the current business environment, organizations with no innovation capability will early eliminate from the business (Börjesson, Elmquist, & Hooge, 2014; Chaochotechuang, 2016). Hence, to survive with the innovation capability in the business is a sign of the success in the business (Yang, 2012).

Additionally, innovation capability takes more importance for the extension of business and to achieve sustainable competitive advantages (Damanpour & Gopalakrishnan, 2001; Zollo & Winter, 2002; Lin, 2007a; Svetlik, Stavrou-Costea, & Lin, 2007; Börjesson & Elmquist, 2011; Börjesson, Elmquist, & Hooge, 2014; Jaakkola, Luoma, & Frösén, 2015). It was discussed that innovative firms have greater capacity to comply with changes and is flexible. Innovation capability can provide shelter to small firms when the business climate is unstable (Danneels, 2011; Akhavan & Mahdi Hosseini, 2016). Small firms can develop new opportunities and create a greater extent and differences from their competitors (Drucker, 1985; May, 1998; Hult, Hurley, & Knight, 2004; Burki & Khan, 2011; Mohd & Rosman, 2012; Ahmad, 2015). In the era of knowledge economy, very quick changing technology and doubtful, risky and turbulent business environment are big challenges for the small firms and survival of the business in the existing era is not easy (Lawson & Samson, 2001; Rabelo & Speller, 2005;Yang, 2012). Furthermore, countless researches have observed that innovation capability is the most important weapon to sustain success in small business (Rabelo & Speller, 2005; Börjesson, Elmquist, & Hooge, 2014; Akhavan & Mahdi Hosseini, 2016). In other words, sustainable development delivers an opportunity to enhance competitiveness and growth, as it can become a source of inspiration for innovative efforts of the small firms (Garner, Nam, & Ottoo, 2002; Hall, 2003; Carbonell & Rodríguez-Escudero, 2009). In Pakistan, overall SMEs organizations have weak association with industrial resources as well as limited input from the human resources such as trust, motivation and supervisor support (Wadood, Shamsuddin, & Abdullah, 2013; Ullah, Kamal, & Arfan, 2016; Ullah, Kamal, & Shahzad, 2016).

In addition, there was a time when production was considered a major factor in boosting economy but the trends have changed recently and now more focus is given to knowledge management, this shift from production-based economy to knowledge-based economy requires a lot of changes for small as well as large organizations (Drucker, 1985;

Lamond, Huang, & Jim Wu, 2010). It is very important to gather, manage, share and transfer knowledge for an economy to become knowledge based (Khalique, Shaari, & Abdul, 2011). The study of Drucker (1999) stressed that in the 21^{st} century, knowledge management would be the biggest challenge for organizations and industry, as it would be the only effective way of achieving competitive advantage through innovation capability. Knowledge sharing is the asset and intangible resource which is not limited to company databases, important documents, work plans, strategies, employee's experience and intellectual capital (Zack, McKeen, & Singh, 2009).

Many researchers agree that innovation capability is not achieved without knowledge sharing. Knowledge sharing is more important and valuable for enhancing the innovation capability (Persaud, 2005; Lin, 2007a; Wang & Noe, 2010; Hislop, 2013; Yeşil, Koska, & Büyükbeşe, 2013). Moreover, knowledge sharing is a painstaking factor in literature that can most stimulate innovation capability (Yeşil, Koska, & Büyükbeşe, 2013). Few studies have put forward theoretical explanations for the relationship between knowledge sharing and innovation capability (Cummings & Teng, 2003; Persaud, 2005; Lin, 2007a; Yang & Wu, 2008; Wang & Noe, 2010; Al-bahussin & El-Garaihy, 2013; Hislop, 2013; Yeşil, Koska, & Büyükbeşe, 2013; Bhatnagar, 2014; Radaelli, Lettieri, & Mura, 2014; Donate & de Pablo, 2015).

Knowledge sharing is a difficult task for firms in today's highly competitive atmosphere (Hau, Kim, & Lee, 2013). In the study of Liu and Phillips (2011) highlighted that encouraging employees to share their knowledge and expertise across the firms can be helpful in the success and growth of firms. Various researches on knowledge sharing provide evidence that employee knowledge sharing improves innovation capability (Rahab, 2011; Akhavan & Mahdi Hosseini, 2016). It is further argued that knowledge sharing is essential for innovation capability, which is essential for the growth of firms and for the increase in the production of firms (Choi, Lee, & Yoo, 2010; Hau, Kim, & Lee, 2013). Different researchers provide evidence that knowledge sharing for innovation capability can be enhanced through trust and motivation of employees (Ardichvili, Page, & Wentling, 2003; Fulk & Yuan, 2013; Hau, Kim, & Lee, 2013). People in the current era don't live and act in blankness, the organizations can't investigate the innovation capability. In this situation, trust and motivation of employee can be effect on employee behavior and attitudes for sharing their knowledge (Yeşil, Koska, & Büyükbeşe, 2013).

Furthermore, supervisor support plays a significant role on employee behavior in sharing their knowledge with other employees (Cabrera, Collins, & Salgado, 2006). According to the study of Ramus and Steger (2000), innovation capability of the firms relies on the supervisor support, which has a key role in enhancing the knowledge sharing activities for developing innovation capability (Ramus & Steger, 2000; Cabrera, Collins, & Salgado, 2006). Supervisor in the firm plays a key role by which firms can develop, shape and improve the skills of the employee. The supervisor has a great influence on the behavior and attitude of the employees in sharing their knowledge, thus enhancing the innovation capability for the country's development (Pfeffer, 1998; Mendelson & Pillai, 1999; Collins & Clark, 2003). Previous studies have paid little attention to the connection of supervisor support regarding knowledge sharing as the outcome of innovation capability (Delery & Doty, 1996; Ichniowski, Shaw, & Prennushi, 1997), but the thoughtful considerations need to be boosted and enhanced to the innovation (Laursen & Foss, 2003; Hossain, 2015).

In addition, training would enable the employees' exposure to the change of knowledge in innovative ideas (Jaw & Liu, 2003). Small firms may provide numerous training programs to the employee to develop and equip with new skills, and participating in innovation capability for better performance at their job (Mumford, 2000; Chen & Huang, 2009; Fazlzadeh & Khoshhal, 2010). Additionally, innovation capability needs involvement and participation of the employee (Chen & Huang, 2009; Fazlzadeh & Khoshhal, 2010). Training would create conditions to encourage an employee to bring new ideas and share knowledge in the ongoing innovation capability (Tsai, 2002; Jimenez-Jimenez & Sanz-Valle, 2005; Jones & Grimshaw, 2012).

Earlier, a similar opinion was offered by other researchers in which individual, organizational, technological and industrial factors also become very important in enhancing the innovation capability with knowledge sharing (Svetlik, Stavrou-Costea, & Lin, 2007; Hau, Kim, & Lee, 2013; Hu & Randel, 2014; Akhavan & Mahdi Hosseini, 2016; Ullah, Kamal, & Shahzad, 2016). Expanding business world and more demanding customers were the main armies to stimulate innovation capability (Dundon, 2002; Zeng, Xie, & Tam, 2010; Murat Ar & Baki, 2011; Yang, 2012). In the current business atmosphere, information communication technology (ICT use) plays a significant role in creating competitive advantage for the firms (Rayport & Jaworski, 2001). ICT uses a significant impact on enhancing the innovation capability by using knowledge sharing (Svetlik, Stavrou-Costea, & Lin, 2007). Many authors have studied innovation in the organization by adapting the role of ICT used in the innovation capability of a firm (Wheeler, Waite, & Bromfield, 2002).

Small and medium enterprises play an important role in the economic growth in developing as well as developed countries. This is mainly due to a lack of resources; people belonging to developing countries generally prefer operating a business on small level (Kapurubandara & Lawson, 2006). According to previous researchers 99% of Japan business consists of small and medium enterprises and it generates up to 71% of employment positively contributing up to 55.3% of GDP. China is yet another Asian country with 99% of its business coming from small and medium enterprises which generate up to 75% of total employment opportunities and these organizations collectively contribute 56% of GDP and 99.7% of business in Indonesia comprises of SMEs, which produce 99.6% jobs every year and add up to 57% of the country's GDP (Hafeez, Shariff, & bin Mad Lazim, 2012; Mohd & Rosman, 2012).

The facts show that economic growth of any country highly depends on small and medium enterprises which cannot be denied. This is particularly true for south Asian region where the growth of every country is chained with SMEs that not only generate employment opportunities and boost business in the region, but also contribute significantly to the GDP of the country (Ullah, Kamal, & Arfan, 2016). For instance, SMEs in Bangladesh create 82% of total job opportunities in the country and half of the country's GDP comes from it (Hussain *et al.*, 2010). Furthermore, 98% of total business in Nepal comprises of SMEs. India a fast-growing economy also has a large number of small and medium enterprises which collectively add up to 30% of GDP (Hussain *et al.*, 2010).

Pakistan's economy is improving day by day mainly due to the SMEs as majority business consist of small and medium enterprises some of which are run by young entrepreneurs. Moreover, 30% of the country's GDP comes from SMEs. According to (Hussain *et al.*, 2010), 58% of total small and medium enterprises in Pakistan deal in wholesale and retail business, 20% consist of manufacturing business and 22% provide social and personal services. The same study revealed that SMEs in Pakistan also create up to 80% of non-agricultural labor force. A few small and medium companies also export their products to foreign countries which accounts for up to 25% of the total exports (Hussain *et al.*, 2010).

Above mentioned facts are the main reasons behind the present study. Small firms especially dairy SMEs are increasingly much important for economic development in some countries (Ullah, Kamal, & Arfan, 2016), and have carried significant contribution to employment and economic growth (Johannessen & Olsen, 2010; Prajogo, McDermott, & McDermott, 2013; Prajogo, McDermott, & Christopher, 2014). As per literature, studies on small business especially in dairy SMEs have also expanded in the past few decades, with one of the basic concentrations being the identification of sources of competitive advantage in small firms (Ullah, Kamal, & Shahzad, 2016). Innovation has been perceived as the key foundation of competitive advantage in small business firms and takes more importance in dairy sector (Therrien, Doloreux, & Chamberlin, 2011; Hafeez, Shariff, & bin Mad Lazim, 2012; Ullah, Kamal, & Arfan, 2016). Indeed, innovation capability in small dairy firms has contributed greatly in economic activity and growth (Ullah, Kamal, & Arfan, 2016). Although innovation capability has mostly been studied in the context of large firms, it has often been neglected in small and medium enterprises (Low, Chapman, & Sloan, 2007; Laforet, 2009; Madrid-Guijarro, Garcia, & Van Auken, 2009; Clark & Goodwin, 2010; Li, 2011; Lin *et al.*, 2011; Ahmadani, Shaikh, & Shaikh, 2012; Jack, Mary Rose, & Darabi, 2012; Blommerde & Lynch, 2015). Many researches show that SMEs have significant contribution in the economic growth and development of the many countries which is very true but the painful thing is that the small and medium enterprises are still not generating enough revenue especially in developing countries (Arinaitwe, 2006; Rammer, Czarnitzki, & Spielkamp, 2009; Clark & Goodwin, 2010; Alegre, Sengupta, & Lapiedra, 2013; Blommerde & Lynch, 2015).

Many researchers pointed that innovation capability is much more important and helpful for small scale businesses especially in dairy firms (Humphreys, McAdam, & Leckey, 2005; Keskin, 2006; Lee *et al.*, 2010; Ullah, Kamal, & Shahzad, 2016). Due to this, the present study was conducted on small scale dairy farms in Pakistan. Pakistan is an agrarian based country and the 50% population of Pakistan is attached to dairy sector in different small sector businesses (agriculture, livestock, fishery, poultry, homemade products, manufacturing) (SMEDAP, 2014).

A recent survey conducted on the world wide SMEs reported that innovation capability of Pakistan's SMEs is very low as compared to other countries. According to Figure 1.1 the countries Brazil, South Africa, Thailand, India and Egypt are in better ranked as compared to Pakistan due to innovation (EPS, 2015). In Pakistan overall SMEs organizations have weak association with industrial resources especially when we look at the dairy SMEs, the performance of dairy SMEs is against the expectation and even dairy sector in Pakistan is not satisfied the basic need of their residence and also not provide the efficient revenue to their owners (Ullah, Kamal, & Arfan, 2016; Ullah, Kamal, & Shahzad, 2016)

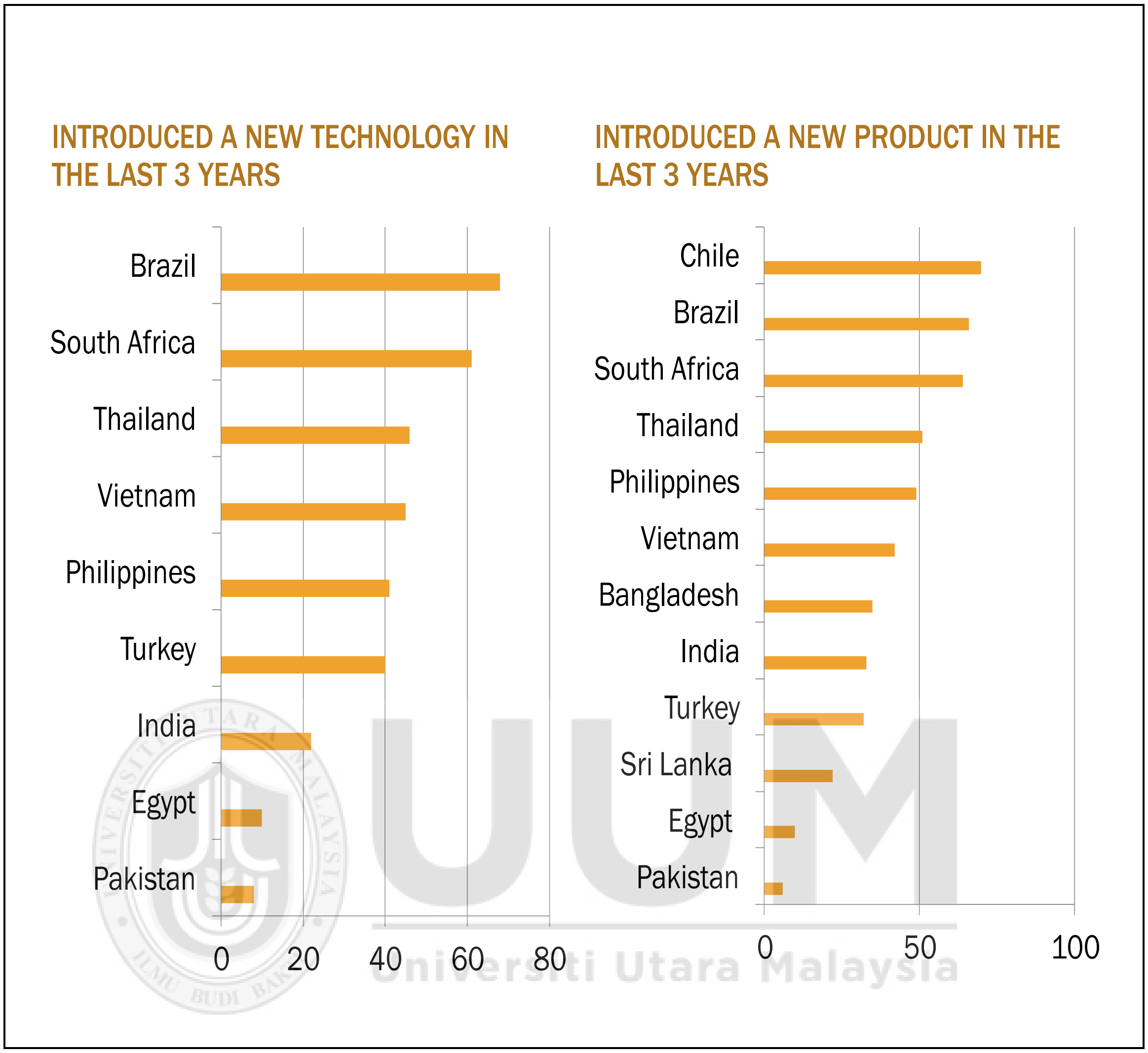

Figure 1.1
Share of firms that have introduced New Product in the last three years

Source: *Enterprise survey (EPS) 2015*

Above Figure 1.1 shows that Pakistan is on the last position in the list of countries that have developed new technology or product (EPS, 2015). It is important to note that other developing countries like India, Turkey and Sri Lanka are far away from Pakistan due to its innovation activities. Countries like South Africa and Brazil are on top due to focus on innovation. It means that innovation capability in Pakistan is an ignored activity.

Table 1.1
Innovation ranking of Pakistan

Index	Ranking	Total Countries	Source	Date
Global Innovation Index	**131**	141	**INSEAD**	2015
Global Competitiveness Innovation Pillar	**129**	144	**World Economic Forum**	2015
Innovation Capacity Index	**102**	130	**European Business School**	2015

Source: *Enterprise Survey 2015*

Above-mentioned table 1.1 shows the innovation index of Pakistan and provides strong evidence and reason to conduct the present study. The method of calculating innovation index may vary but the important thing to consider is that there is a lot of room for improvement. All these three innovation indexes were measured taking into all those factors that affect the innovation capability of a country (EPS, 2015).

Dairy sector also comes in small business category and majority of people in Pakistan are interested in dairy farm business. Currently, small dairy farm owners and managers of the existing business get disappointed after seeing a slow growth rate despite all the efforts. The truth is, small dairy farms in Pakistan have a very short life; the dairy businessmen have to put in extra effort to survive the business (Ullah, Kamal, & Arfan, 2016; Ullah, Kamal, & Shahzad, 2016). According to recent statistics, 19% of total dairy SMEs in Pakistan are less than 5 years old and only 4% of total dairy SMEs are able to survive more than 5 years, most of them dissolute within a year of starting operations (PES, 2014; SMEDAP, 2014). This is happening due to low innovation capability in the dairy sector (GOP, 2009; FAO, 2011; Ullah, Kamal, & Arfan, 2016).

Keeping in view the importance of knowledge sharing with respect to individual factors (trust, motivation), organizational (training & development, supervisor support), technological factors (ICT used) and industrial factor (industry cluster resources), it is imperative to test the mediating effects of knowledge sharing on the relationship between individual, organizational, technological and industrial factors and innovation capability empirically. In the SAARC (South Asian Association for Regional Cooperation) region country Pakistan, however, least attention has been paid by researchers in providing a comprehensive and analytical study in Dairy sector of Pakistan. However, the present study was conducted on Dairy SMEs of Pakistan on enhancing the innovation capability.

1.2 Problem Statement

SMEs play an important role in the economy of developing as well as developed countries (Kuratko & Hodgetts, 2004; Minniti, Bygrave, & Autio, 2006; Ahmad, 2015). In other words, SMEs is the most important weapon and main stay for any country to attaining and growth in the GDP (Lee & Choi, 2003). In addition, SMEs create opportunities to maximize any country's abilities to fulfill the needs of their residence and provides better solution to the problems. SMEs are the life blood of any country's growth (Mustaffa, Ibrahim, & Mahmud, 2011; Wignaraja & Jinjarak, 2015).

Global Innovation Index (2014) reported that the failure rate of SME's in Pakistan is very high. According to a survey 90-95% dairy businesses fail in the initial stages of the business. It is clearly mentioned that SME's face major problems that cause their failure due to lack of innovation capability as well as weak knowledge management approaches

(Ullah, Shah, & Hassan, 2011; Iturrioz, Aragón, & Narvaiza, 2015). Few researchers mentioned that most of the SME's do not adopt the latest technologies, whereas there are certain other factors such as weak organizational factors for the training and development and lack of industrial cluster resources are the major reasons behind the failure of SME's at their initial stage in Pakistan (Memon, Rohra, & Lal, 2010).

Nowadays, business life has become very fast, for which businessman has to come up with new ideas of learning and earning. Innovation capability is the most overrated and overused word in the business world today. According to recent news published in Dawn newspaper, Pakistan has focused on innovation and development of new processes for dairy sector, because now the business world is changing very quickly by using innovative ideas in business. Without innovation, survival in this era is very tough and hard for future life. Due to this, in today's business world, innovation becomes an important part of the business. In developed countries, innovation is very popular and most practices activity in SME because SMEs are directly reflected in the country's GDP growth (Kropff, 2015), but in Pakistan it is mostly neglected in SME firms mostly in dairy sector (Ullah, Kamal, & Arfan, 2016). Pakistan is an agrarian based country but the policy makers and economists do not focus on agricultural sector as well as on innovation capability in agriculture (WES, 2013; Ullah, Kamal, & Arfan, 2016).

Dairy is the main sub sector of agricultural sector. The dairy SME's in Pakistan fail in their early age due to a lack of innovation capability and technology adaption (Ullah, Kamal, & Shahzad, 2016). Furthermore, the managers in dairy SMEs firms are also not well equipped with training and support from the owner for knowledge sharing (Mustaffa, Ibrahim, & Mahmud, 2011; Abbasi, Tarhini, & Elyas, 2015; Ullah, Kamal, & Shahzad, 2016).

The problem is faced by many small firms largely in dairy SMEs in Pakistan. They do not have significant contribution in the economy of Pakistan and also do not generate enough revenue to satisfies the owners of small businesses and dairy sector (Hafeez, Shariff, & bin Mad Lazim, 2013; Ullah, Kamal, & Arfan, 2016). There are a lot of factors that influence on this conditions of SMEs in Pakistan, some of them factors are mentioned here like poor economic conditions, lack of innovative products, technology adoption, lack of support from management, financial issues, weak organizational strategy and operating cost (Okpara, 2007; Clark & Goodwin, 2010; Ullah, Kamal, & Arfan, 2016). Unfortunately, Pakistan being a developing country also comes in the same category. It is believed that small and medium enterprises in Pakistan are facing low growth trap as their growth rate is very low (Khan, Khawaja, & Waheed, 2006).

Lack of access and minimum understanding of the technical knowledge on feeding, animal health, milk seasonality and breeding coupled with the dearth of training institutions, are also an important productivity constraint faced by the dairy sector of Pakistan (Zafar, Aslam, & Nasir, 2008). The main problems for dairy SMEs are low productivity, less motivated employee, lack of availability of good quality fodder and nutrients, weak and frail organizational practices such as training and development and weak industry resources. Furthermore, adoption rate of new technology in Pakistan is relatively low as compared to developed countries in the dairy sector (Shahid, Shafique, & Shokat, 2012).

Knowledge sharing leads to innovation (Chatterji & Fabrizio, 2014b, 2014a). Knowledge sharing practices that are used in the organizations to share their knowledge to get a competitive edge and enhancing performance (Svetlik, Stavrou-Costea, & Lin, 2007; Villar, Alegre, & Pla-Barber, 2014). Pakistan is very low in innovation (Speakman, Afzal, & Yuge, 2012) which calls for a need to investigate the issue and measure the factors that can lead to an increased innovation capability in Pakistan. In addition, the small and medium enterprises need an efficient knowledge sharing system which is only possible if the organization is able to get maximum output from its employees (Khalique, Shaari, & Abdul, 2011).

It was found that the supervisory support, training and development are also contributing factors to the failure of SME. Akhtar, Ali, and Sadaqat (2011) explained that lack of skills employees which needed to compete at national and international level also acted as a serious problem as not everyone can take risky decisions and do innovation. In the study of (Khalique *et al.*, 2011; Ventura, Cruz, & Landeira-Fernandez, 2011; Kajanus, Heinonen, & Eskelinen, 2012) point out that lack of innovation is an important factor in the failure of SME's. Furthermore, it has been explained that there is no proper platform in Pakistan to provide training or formal education to those employees who are willing to start a new business venture (Bhutta, Khan, & Omar, 2008; Saleem, 2011; Ahmadani, Shaikh, & Shaikh, 2012; Shahzad *et al.*, 2012).

Additionally, prior investigations have been tested the numerous factors to enhance the innovation capability. For instance, it is claimed that attributes of individual factors (TR, MO) are significant contributing factors towards increasing the innovation capability for the firm's success (Robertson, Gockel, & Brauner, 2012; Ansari, Malik, & Shehla, 2017). Moreover, the previous studies directed that lacks organizational factors such as SS and TD lead toward the failure of firms. Some of the studies conducted on the SME's, clearly stated that SS and TD have significant effect on the knowledge sharing toward the innovation capability (Mary MacNeil, 2004; Noe, 2010; Dermol & Cater, 2013; Bhatnagar, 2014; Jayakumar & Sulthan, 2014; Kim & Ko, 2014; Chang, Liao, & Wu, 2017). In addition, the extant literatures show that scholars appeared to focus more on the role of SS and less on TD in their empirical investigations on the influence of knowledge sharing towards the innovation capability. Consideration of both as dimension of organizational factors are important as scholars have directed that both of these dimensions are not in encounter with each other but they tend to supplement one another (Chang & Lee, 2007; Gooderham, 2007; Svetlik, Stavrou-Costea, & Lin, 2007; Lau, McLean, & Hsu, 2017; Zheng, 2017).

It is argued that lack of innovation capability occurs due to less use of ICT (information communication technology), defective work systems and operations, the technological perspective has a different viewpoint. This perspective postulates that lack of innovation capability occur because of reluctant from the use of ICT (Shih *et al.*, 2006; Svetlik, Stavrou-Costea, & Lin, 2007; Ahmed, Shahzad, & Khilji, 2010; Fidell *et al.*, 2013; Abbasi *et al.*, 2015). Thus, if proper implementing the procedures and knowledge for the use of ICT are provided to dairy business, the reluctant of ICT may be reduced and dairy farms can share their knowledge for augmenting the innovation capability (Svetlik, Stavrou-Costea, & Lin, 2007; Presbitero, Roxas, & Chadee, 2017). Hence, the current study employs the ICT use in its attempt to explain knowledge sharing towards enhancing the innovation capability in the Pakistani dairy sector.

Furthermore, prior researches argued that the industry cluster resources is also the major factor which contributing in enhancing the innovation capability (Anderson, 1994; Caniels & Romijn, 2003; Malmberg & Power, 2005; Lai *et al.*, 2014). An industry cluster resource has the capacity to address threats and situations that contribute to the occurrence of high expenses and low quality products by raising the failure of SMEs in the business. The industrial cluster also has a significant impact on knowledge sharing and innovation capability. An industrial cluster resource has also been applied in past studies (Xu, 2005; Connell & Voola, 2013; Lai *et al.*, 2014) to explain the lack of innovation capability as potential causes of SMEs failure.

Moreover, the findings of past studies focused on examining the relationship between TR, MO, SS, TD, TE, IN are however unpredictable and not tested with innovation capability. Several studies on the innovation capability have significant and positive relationships TR, MO, TE and IN (Lee, 2001; Lin, 2007; Nawaz, & Khatoon, 2015; Valdez-Juárez, de Lema, & Maldonado-Guzmán, 2016) but few studies have an inconsistent results with TE and IN (Lawson, & Samson, 2001; Tamer Cavusgil, Calantone, & Zhao, 2003; Chen, & Huang, 2009). Furthermore, different researchers like

Lin, (2007) discussed in the article that the theoretical models formulated in developed countries cannot be fully tested and imitated in under developed countries. He deeply felt that innovation capability relationship must be tested in the context of under developed countries. Edison, Bin Ali, and Torkar (2013) mentioned that the innovation capability is considered a key to success in order to enhance productivity and economic output. A number of studies carried out that KS is an essential for enhancing the role of innovation capability in the success and growth of the firms (Calantone et al., 2002; Scarbrought, 2003, Lin, 2007; Jeevan Jyoti, Pooja Gupta & Sindhu Kotwal, 2011; Edison et al., 2013).

The current body of knowledge believes that innovation capability is the only way through which organizations can improve their performance and productivity (Roberts & Amit, 2003; Jansen, Van Den Bosch, & Volberda, 2006; Carbonell & Rodríguez-Escudero, 2009; Lin, Chen, & Chiu, 2010; Gao & Zhang, 2011; Speakman, Afzal, & Yuge, 2012; Yang, 2012; Breznik & D. Hisrich, 2014). The existing literature supports the notion that employee knowledge sharing abilities are affected by individual, organizational, industrial and technological factors, each of which help the employee in sharing the information (Connelly & Kevin Kelloway, 2003; Lee & Choi, 2003; Taylor & Wright, 2004; Lin, 2007a; Rahab, 2011).

The present study was filling this gap by measuring different factors (individual, organizational, Technological and Industry) that can increase innovation capability in the Dairy SMEs sector. Furthermore, the present research was conducted in the dairy SMEs sector of Pakistan as studies of (Prajogo, McDermott, & McDermott, 2013; Prajogo, McDermott, & Christopher, 2014) claim that the benefits of innovation are greater in SMEs as compared to the service sector. A research highlighted (Tanvir et al., 2012; Mansoor, 2011) that innovation capability need to be tested in the context of Pakistan. Nawaz, Khatoon (2015) emphasized on the implication of innovation capability in the context of SMEs in Pakistan. It is argued in the study of (Hult, Hurley, & Knight, 2004; Lin, 2007) that innovation capability association need to be tested. They further directed that knowledge sharing and trust may be mediate with the innovation capability in developing countries.

The underpinning theory of this research is resource based view theory (RBV) (Barney, 1991). The RBV indicates that when an organization used their resources in efficient and effective way that can benefit every organization, the requirement for future interchange or mutual relationship is created, resulting in enhancing the innovation capability designed to benefit the firms in term of success (Barney, 2001; Barney & Clark, 2007; Agostini, Nosella, & Filippini, 2017; Buenechea-Elberdin, Kianto, & Sáenz, 2017). This study examines individual (TR, MO), organizational (TD, SS), technological (ICT use) and industry (IN) factors as independent variables, knowledge sharing as mediating variable that creates their significant role in enhancing the innovation capability in dairy SMEs.

1.3 Research Questions

The research questions for the current study are drawn from the problem statement after review the literature. The research questions pose a relationship between variables but phrases the relationship in terms of some question (Bryman, 2007). The above-mentioned research problem that guided the present study was broken down into the given research questions:

I. What is the impact of individual factors (trust, motivation), organizational factors (supervisor support, training & development), technological factor (ICT used), and industry factor (industry cluster resource) on knowledge sharing?

II. What is the impact of individual factors (trust, motivation), organizational factors (supervisor support, training & development), technological factor (ICT used), and industrial factor (industry cluster resource) on innovation capability?

III. Does knowledge sharing have a significant impact on innovation capability?

IV. Does knowledge sharing mediate the relationship between individual factors (trust, motivation), organizational factors (supervisor support, training & development), technological factor (ICT used), industrial factor (industry cluster resource) and innovation capability?

1.4 Research Objectives

The present study is intended to examine the relationship between individual factors (trust, motivation), organizational factors (training & development, supervisor support), technological factor (ICT use) and industry factor (industry cluster resources) with knowledge sharing and innovation capability of dairy SMEs in Pakistan. Unambiguously, the current study attempts to meet the following research objectives:

I. To examine the impact of individual (trust, motivation), organizational (supervisory support, training & development), technological (ICT used) and industrial factors (industry cluster resources) on knowledge sharing.

II. To analyze the impact of individual (trust, motivation), organizational (supervisory support, training & development), technological (ICT used) and industrial factors (industry cluster resources) on innovation capability.

III. To analyze the impact of knowledge sharing on innovation capability.

IV. To investigate the mediating effect of knowledge sharing on the relationship between individual (trust, motivation), organizational (supervisory support, training & development), technological (ICT used) and industrial factors (industry cluster resources) and innovation capability.

1.5 Scope of the study

This study was conducted in small dairy farms in Pakistan. The current research focused on the development of model that supports the dairy industry Pakistan in alliance of evidence on its individual factors (trust, motivation), organizational factors (training & development, supervisor support), technological factors (ICT use), industry factor (industry cluster resources) and knowledge sharing to enhance the innovation capability. The nature of this study is quantitative. The respondents of the current study were managers who are responsible for the innovation capability in dairy farms of Pakistan.

The dairy industry of Pakistan was chosen for the current study due to following reasons:

1. Due to lack of innovation capability, technology adoption and industrial resources the growth of dairy sector in Pakistan is very low (PES, 2014).

2. Dairy sector in Pakistan is the most neglected sector by the Government of Pakistan (Yaseen, 2015).

3. Dairy sector is the main player in the economy of Pakistan. This sector covered the 45% labor force of the country (Burki, Khan, & Bari, 2004; Shahid, Shafique, & Shokat, 2012).

1.6 Significance and Contributions of the Study

1.6.1 Theoretical Contribution

This study has valuable contribution in the both theoretical and practical contexts. The findings of this research have contributed to literature by providing first empirical evidence of the relationship between knowledge sharing and innovation capability in Pakistani context, especially from the Dairy SMEs sector of Pakistan.

The research framework proposed in the current study is unique in its own self as it not only examine the impact of individual (trust, motivation), organizational (training & development, supervisor support), technological (ICT) and industrial factor (industry cluster resources) on knowledge sharing but it also examine the relationship between knowledge sharing and innovation capability of the organization. Therefore, the current study contributed to the literature by applying diffusion innovation theory in understanding the innovation capability.

Furthermore, the current study adds to the present literature with the empirical evidence on the mediating effect of knowledge sharing between individual factors (trust, motivation), organizational factors (training & development, supervisor support), technological factors (ICT), and industrial factor (industry cluster resources) and innovation capability. The present study has theoretical contribution related to innovation capability. Even though, the past researchers have associated with lack of innovation capability Pakistan (Adams, Ahmed, & Evans, 2014; Khan, Sarwar, & Malik, 2014), yet none of them linked it to knowledge sharing, individual factors (trust, motivation), organizational factors (training & development, supervisor support), technological factors (ICT) and industry factors (industry cluster resources) collectively. The other important aspect regarding theoretical contribution is that the present study has tested industry cluster resources with knowledge sharing and innovation capability for the first time in context of Pakistan.

There is a very limited body of knowledge that exists on innovation capability in dairy SME's of Pakistan despite the fact that SME's play a vital role in the development as well as also in the economy (Hanif & Manarvi, 2009), in the context of SME's. This study is a small contribution in this regard.

1.6.2. Practical Contribution

This study has provided several practical contributions to the dairy industry for enhancing the innovation capability. This study has suggested the determinants of knowledge sharing and innovation capability to the dairy sector. This study has also highlighted the important factors to the effective knowledge management and by focusing on these factors in dairy farms for improving their knowledge management system and innovation capability in the dairy sector as well as also the agriculture sector of Pakistan.

The current study has investigated the impact of knowledge sharing on innovation capability which has definitely helped the dairy SMEs in the long run. The findings of this study are most helpful for the dairy industry, if they are enhancing the innovation capability without investing a lot of money on the implementing knowledge management system. This study has provided a clear framework to dairy sector for implementing knowledge sharing which has definitely increase the life of dairy farms. This study has not only helped the farms but it has also helped to increase GDP of the country by enhancing the productivity of dairy farms.

1.7 Key Terms

This section provides the explanation of terms frequently used in this study.

1.7.1 Individual Factors

In this study, individual factors refer to all those factors related to employees that affect the knowledge management practices. Though, there are various individual factors that may affect the knowledge sharing of any organization yet this study has just taken two most important factors namely trust and motivation.

1.7.1.1 Trust

Trust is a strong association between two parties whereby one party fully has full confidence on the other party expecting that the other party would never disappoint him or do anything to harm him (Mayer, Davis, & Schoorman, 1995). When the employees trust that the organization cares for them and is doing everything for mutual benefit then they automatically start taking interest in knowledge sharing practices.

1.7.1.2 Motivation

Motivation is an employee's enthusiasm to perform well in the organization; it is a force that pushes him to do his best. When employees know that knowledge management will also enhance their skills and they will be rewarded for developing and sharing knowledge, they automatically start taking interest in it. Motivation is the intangible resource for the sustaining the in the business. This is exactly what RBV theory suggests that intangible resources are more important for the firms. Organization must use trust and motivation as intangible resources so that they can in return to develop knowledge sharing abilities.

1.7.2 Organizational Factors

Two main organizational factors namely supervisory support and training and development are examined in this study. Supervisory support is defined as the degree to which employer or entrepreneur values his employees and contribute towards their success and overall wellbeing (Ramus & Steger, 2000). On the other hand, training and development is one of the core functions of human resource management that aim to enhance the skills of employees so that they can perform better in the organization (Noe, 2010).

It is believed that these two factors play an important role in managing and sharing knowledge (Connelly & Kevin Kelloway, 2003). The supervisory support and training and development automatically increase knowledge sharing ability of the firms which overall improves the innovation capability of the company.

1.7.3 Technological Factors

Technology plays a strong role in developing knowledge sharing ability among employees. Information and communication technology is used as a technological factor that affects innovation capability of an organization. Information and communication technology refers to all means of technology used for rapid search, retrieval, managing and sharing of knowledge and information among employees within the organization (Svetlik, Stavrou-Costea, & Lin, 2007).

1.7.4 Industry Factor

Industrial factors are discussed in the current study as industry cluster resources. The number of organization present in the industry affect the level of competition, highly saturated industries require an extra effort to develop and generate new ideas as other companies have already worked on different ideas. Industry cluster is an array of interlinked industries, businesses, suppliers, distributers and other stakeholders with similar interests, goals and competencies that work together to attain mutual benefit and to decrease the expenditure (Xu, 2005).

1.7.5 Knowledge Sharing

Knowledge sharing refer to all those practices adopted by an organization to share their expertise, data and information with their employees, the knowledge it received efficiently and effectively in order to get maximum benefit (Akhavan, Rahimi, & Mehralian, 2013).

1.7.6 Innovation Capability

Innovation capability refers to the ability of the organization to generate, test and implement new ideas that are never used by any other company (Akhavan & Mahdi Hosseini, 2016). Innovation capability can help the organization to increase its profitability and ensure its survival.

1.8 Organization of the thesis

The current study is divided into six chapters and ordered according to the research process employed in the present study.

Chapter Two: Dairy Sector of Pakistan

In this study, chapter two discussed the definition of SMEs according to different countries. After this, detailed discussion on the dairy sector of Pakistan. Furthermore, it is also highlighted the role of dairy SMEs in the economy.

Chapter Three: Literature Review

This chapter discusses the underlying theories of the innovation capability of dairy SMEs. The relevant contents of this chapter include underlying theories, and review of existing literature with reference to the innovation capability, knowledge sharing, individual factors (trust, motivation), organizational factors (training & development, supervisor support), technological factors (ICT use) and industry factor (industry cluster resources).

Chapter Four: Research Methodology

This chapter expands a few important concepts that relate to the development of theoretical model for the current study. The various contents in this chapter comprise of research model, conceptual framework, research hypotheses, research design, sampling techniques, questionnaire design and distribution, pilot study results and statistical tools for analysis.

Chapter Five: Analysis and Findings

This chapter discusses in detail the methods used to analyze data. The contents of the chapter include data screening, validity and reliability of the research instrument and hypotheses testing, predictive relevance and effect size.

Chapter Six: Discussion, implications and recommendations

Chapter Six summarizes the overall study. Findings of the study have been elaborated in detail and compared with past studies. In addition, it highlights the contribution of the study to the literature and to the existing theories. It also entails theoretical and practical implications. In the end, recommendations for future research have been debated followed by concluding remarks.

CHAPTER TWO

DAIRY SECTOR OF PAKISTAN

2.1 Introduction

Small and medium enterprises have important role in every country's economy in the world, but the role of SMEs in developing countries cannot be denied and more specifically in those economies with income distribution and employment challenges. SMEs are now the engine of country growth, importantly for developing the efficient markets and poverty reduction mostly in developing countries (Fan, Fang, & Zhang, 2003). Small and medium-sized enterprises are subsidizing a lot to employment growth at a higher rate than larger firms. In the European Union (EU) economy about 99.9% of the businesses are SMEs of which 93 % are from micro enterprises (EU, 2003). Additionally, micro firms are also a big source of skilled workforce and have a great role in developing competitive industrial base (EU, 2003).

2.2. Definition of SMEs

It is not possible but very tough to explain the exact definition of SMEs. It is tough because the definition of SMEs changes with time, and most importantly it varies from country to country (Xie, Zeng, & Tam, 2010). Generally, the definition of the SMEs is based on country economic and industrial structure. Payrolls, revenue, number of employee and total assets of businesses, are main indicators for the definition of micro, small, medium and large firms (EU, 2014; SMEDAP, 2014; Inan & Bititci, 2015). The most common and major indicator of SMEs is number of employees as shown in Table 2.1.

Table 2.1
Definition of SMEs on employee based

Country	Medium	Small	Micro
	Up to	**Up to**	**Up to**
USA	500	100	N/A
EU	250	50	10
Turkey	250	50	
India	250	50	05
China	2000	300	N/A
Australia	200	20	5
UK	249	49	9
Pakistan	250	50	05

Source: (SMEDAP, 2014; Inan & Bititci, 2015)

Small and medium Enterprises have been recognized by the developing and developed countries for the important role they play in building and developing the national economy (Abdullah, 2000; Wadood, Shamsuddin, & Abdullah, 2013). Approximately 95 to 99% of the world's business population is heavily invested in economic development via SMEs (Abdullah, 2000). Statistics have found out that aside from the 1% business population that is involved in large corporations, the rest of the 99% is embodied by SMEs (Meyer-Stamer & Haar, 2008). On the basis of employment rates, 70% of the work force can be accounted by SMEs in South Korea (Kang & Lee, 2008). In terms of manufacturing, Malaysian SMEs are approximately 48% accountable (Abdullah, 2000b). Almost 98% of the total 118,648 SMEs in Thailand are involved in the manufacturing industry (Lu, 2017). Occasionally the rise of the Chinese economy is accredited to almost

99% of the firms that are SMEs which are employing almost 70% of the skilled labor force (Wang & Jing, 2017; Zhou, Fang, & Yang, 2017). On the basis of these model economies, many developing countries have started giving serious thought and attention to the development of SMEs (Liedholm & Mead, 1987; Sulistiyani & Harwiki, 2016; Valdez-Juárez, de Lema, & Maldonado-Guzmán, 2016; Corrocher & Solito, 2017; Hanifah, Halim, & Ahmad, 2017; Lu, 2017; Strobel & Kratzer, 2017).

Additionally, the role of Small and Medium Enterprise Development Authority (SMEDA) cannot be neglected as it is the only government body in Pakistan that helps small and medium enterprises. Unfortunately, it does not get enough resources to work efficiently which is yet another reason behind lower innovation capability among SMEs in Pakistan (Ministry of Finance, 2012). Pakistan has an agriculture based economy; dairy industry is the main pillar of agricultural economy and has a significant part in it (Burki, Khan, & Bari, 2004; PDDC, 2006; Forest Europe, 2011; Dar, Shafique, & Ahmed, 2017). It is assessed that there are 30-35 % masses involved in bringing up animals, producing milk stock and they earn 30-40 % of their survival from this (PDDC, 2006; ACO, 2010).

Milk productions trend has been increasing the survival and has become an emerging trend in the profit-making industry in urban and sub urban centers (Calantone, Garcia, & Dröge, 2003; FAO, 2011). But the people that are attached with dairy sectors do not have enough resources to fulfill their basic needs and requirements (FAO, 2011). Evident changes have taken place immediately in the fresh milk supply which has fostered problems for milk producers and processors in Punjab and Sindh (PDDC, 2006; FAO, 2011). This kind of changes have been produced owing to the commercialization sprinkled by better farm management, improved transportations and communications means, use of cold chains, fluctuations in the consumption and long-lasting policy of government to renovate dairy industry (PDDC, 2006; Middleton, Fyall, & Morgan, 2009). Pakistan Dairy Sector loses its contribution and share in national market day by day due less innovative products. This problem is due to inappropriate and inefficient utilization of resources (Hussain *et al.*, 2010). The popular theory suggests that it is very important to utilize all tangible and intangible resources efficiently and effectively for a company to achieve a competitive edge, success in the long run and build a comprehensive share in global market (Kraaijenbrink, Spender, & Groen, 2010; Bloodgood, 2014; Ullah, Kamal, & Arfan, 2016).

A large number of researchers are taking interest in innovation, its determinants and consequences and this trend has particularly increased in the last decade (North, Smallbone, & Vickers, 2001; Freel, 2005; Ullah, Kamal, & Shahzad, 2016). Despite the rising trend, there is little focus given to innovation capability in the dairy sector, which points out a need for more research in this particular area as dairy SMEs play an important role in the economic stability of developing nations (Gudmundson, Tower, & Hartman, 2003; Hausman, 2005; Ullah, Kamal, & Arfan, 2016). Innovation capability is a vast term that may refer to a new product or service, a new production technology, a new manufacturing process, a new administrative system, a new action plan or a program (Damanpour & Evan, 1984; Xie, Zeng, & Tam, 2010; Wu *et al.*, 2015). Nonetheless as most of the country does not focus on the innovation capability at small firms (Xie, Zeng, & Tam, 2010).

In the case of Pakistan, researches related to dairy SMEs are still very new (Khalique *et al.*, 2011; Ullah, Kamal, & Shahzad, 2016). According to Bashir, Khan et al. (2010) Pakistani SMEs faces failure due to lack of innovation capability. Additionally, a very rare survey conducted on innovation in SMEs. So, there is a dire need to conduct comprehensive survey on SMEs especially in Dairy SMEs. Essentially the government is required to provide a stable and novel atmosphere for any industry to set up and grow. However, in the case of Pakistan, there exists no exhaustive governmental procedure or policy that promotes modern and novel business ventures (Sohail, Sabir, & Zaheer, 2011). Therefore, based on the current state of SMEs in Pakistan, there is a dire need for thorough analysis and investigation to identify and rectify the issues pertaining to the low performance and development of SMEs. As a result, this research will focus on and account for the dearth of scientific evidence and highlight the significance of innovation in the success of SMEs in Pakistan.

The working performance and capacity of SMEs is still below average regardless of the support and development that they have brought about in the developing nations economy (Arinaitwe, 2006). Issues like corruption, undesirable economic conditions, contradictory governmental policies, inadequate infrastructure, excessive operational costs and financial restraints, all account for inadequate performance levels (Ihua, 2009). All these can be found in Pakistani SMEs as they are caught in below average growth levels (Khan, Khawaja, & Waheed, 2006). Performance is largely calculated on the bases of longevity and developmental sustainability in Pakistani SMEs. Statistics point out that approximately 19% Pakistani SMEs are only about 5 years old and only 4% of this manage to keep running beyond a quarter of a decade (Hussain et al., 2010). Preceding researches (Tanveer, Rizvi, & Riaz, 2012; Khan, Sarwar, & Malik, 2014) have identified dearth of novelty and modernization as the most important reasons behind the depreciating performance of Pakistani SMEs. This is primarily because in terms of SMEs, there is hardly any research done on innovation (Hanif & Manarvi, 2009) and knowledge management (Khaliq *et al.*, 2014).

2.3 Influence of Innovation on SMEs

SMEs are basically totally different from large organizations and firms in innovation (Garengo, Biazzo, & Simonetti, 2005). Innovation capability is an antecedent of growth of the firm (Rhee, Park, & Lee, 2010), but small firms generally have some flaws and less focused regarding innovation capability as compared to other sectors. These include, for example, dependency on customer, shortage of finance and lack of resources i-e skill, knowledge, cluster networking and training (Laforet & Tann, 2006; Rhee, Park, & Lee, 2010). Innovation capability become a very crucial for the small firms in the current business environment to sustain in the business world (Rhee, Park, & Lee, 2010; Akhavan & Mahdi Hosseini, 2016). The performance of SMEs is more and more rely on the innovation capability. Additionally, innovation capability is now one of the major and basic elements in the growth of SMEs. According to Janaratne and Nissanka (2014) mentioned that the SMEs allocating themselves to experienced their innovation capability have healthier prospects to succeed in the business future. But the SMEs firms still face the several challenge of ruling an inexpensive framework that can easily enrich their innovation capability (Nada *et al.*, 2012; Apak & Atay, 2014).

SMEs create a potential role in the economy to develop the innovation capability. On the ground of the special features of SMEs, the great potential for SMEs innovation capability is perceived as valuable as the commercial end. The shortage of resources, containing financial capital, human capital (both personnel & management), security and time has been deliberated the features of SMEs (Apak & Atay, 2014; Janaratne & Nissanka, 2014; Vukšić *et al.*, 2015). Additionally, the strengths of small firms are in the form of behavioral characteristics (motivation, trust, flexibility, entrepreneurial dynamism, efficiency, cluster resources) (García-Morales, Lloréns-Montes, & Verdú-Jover, 2007).

Furthermore, small firms have benefits over large firms i-e having a flexible, informal environment and being close to customers (Laforet & Tann, 2006). This flexibility may cause small firms to be even more innovative and improve performance more by adapting to market changes and improving and having shorter and faster decision chains. SMEs have a greater capacity for customization and are capable of learning quickly and adapting routines to improve performance and also seeking the role in development (García-Morales, Lloréns-Montes, & Verdú-Jover, 2007). On the other hand, small firms often have the courage to take risks and are always ready to try new ways of working (Laforet & Tann, 2006).

According to Kanter (1984) innovation is said to be the establishment, adoption, and implementation of unique and unusual concepts, practices, goods and even services. In SMEs innovation capability has been found to improve organizational performance (Subrahmanya, 2005; O'Regan, Ghobadian, & Sims, 2006). Furthermore, innovation capability is the ability of firms to continuously transform ideas and knowledge into new systems, products and processes in lieu the advantage of the SMEs firm and its stakeholders. Innovation is a now more important capability with different aspects like a capability that allows the SMES firm to reconfigure, integrate and build internal and external competences to report rapidly changing in the business world (Saunila & Ukko, 2014). According to prior researcher view firms innovation capability as a firm's ability to oriented toward the future, proactive and open to change, be always ready to take risks and eliminated the uncertainty, and always be creative (Saunila, Ukko, & Rantanen, 2012; Saunila, Pekkola, & Ukko, 2014; Ullah, Kamal, & Arfan, 2016; Zawawi *et al.*, 2016). Due to this, innovation capability is always in a better position to increase the overall performance of SMEs and create an also helpful to creates a significant role in the GDP (Saunila, 2016). Moreover, adopting innovative practices and systems can also help them take control of uncertainty in the market (Hafeez, Shariff, & bin Mad Lazim, 2012). Increased flexibility also allows them to easily adopt and learn strategies to bring about changes that will help enhance company performance (Ullah, Kamal, & Shahzad, 2016).

Many studies (Avermaete *et al.*, 2004; Freel & Marke, 2005; Yap, Chai, & Lemaire, 2005; Allocca & Kessler, 2006; Oke, Burke, & Myers, 2007; Dibrell, Davis, & Craig, 2008; Saunila, Ukko, & Rantanen, 2012; Saunila, Pekkola, & Ukko, 2014; Saunila, 2016) on SMEs concluded that help to evaluate and understand different factors done to enhance innovation capability in SMEs. Some studies on SMEs have stressed upon innovation while others by (Avermaete *et al.*, 2004; Freel & Marke, 2005; Leiponen, 2005; Murat Ar & Baki, 2011) believed that primary focus should be on good and useful innovation capability in SMEs mainly in Dairy SMEs.

2.4 Role of Dairy in the economy of Pakistan

The global dairy market has experienced fundamental changes in the last twenty years as the production of milk has increased almost 2%. Research suggests that more than half of the total world's milk production is done in developing countries. Other than the obvious economic growth, other factors like increased population and urbanization have augmented the demand for finished dairy products in developing countries. Moreover, dairying holds an important place in food security especially for the rural population as it accounts for a secured source of income as well (Ohlan, 2012).

In the economy of Pakistan, agriculture is one of the most important sectors which contribute 21% to GDP and 45% employing in the labor force. Pakistani dairy sector contributes only 11% to the GDP; while agriculture sector of India contributes to more than 30% in GDP and its dairy sector contribute 15% in GDP of India (Shahid, Shafique, & Shokat, 2012; Ullah, Kamal, & Arfan, 2016). As compared to India's dairy GDP, the contribution of dairy sector in Pakistan's GDP is low. In addition, dairy sector of Pakistan is very much volatile, as the sector is unstable due to low dairy innovative products and less interest in the implementation of relevant technology (PES, 2014).

Pakistani dairy SME's are not adopting the new technologies, due to which, most of the dairy SME's cannot survive for long time in the business (Yaseen, 2015). Therefore, there is a need to provide motivation and build trust within the employee in order to enhance the innovation capability of dairy SMEs to build their role in GDP and country's development (PES, 2014; MOF, 2015).

Pakistan's economy is largely dependent on livestock and dairy farming. This is primarily because the livestock and dairy industry contributes to almost 11.5% of the total national GDP (Ullah, Kamal, & Arfan, 2016). During the 2008 and 2009 time period, gross value addition of livestock alone reached approximately Rs. 1287 billion. Roughly 30 to 35 million farmers in the rural areas are involved in raising livestock out of which bovines that consist of 35.6 million cattle and 31.7 million buffaloes play an integral part in milk (around 44 billion liters) and meat (almost 1.5 million tons) production (Akbar *et al.*, 2014).

Although Pakistan ranks at number 4th in the world's largest milk producer's list, there isn't enough milk produced to fulfill the population's growing needs. The issue lies in the fact that the population and production of milk are not increasing at a steady rate. The population and consumption rate is increasing at 3% annually while the milk production is lacking significantly behind (GOP, 2009). Therefore, controlling the population growth and increasing the production of milk must be tackled side by side (Ahmad *et al.*, 2012).

Major source of milk production in Pakistan is through buffaloes at 66% while cows account for 32% and sheep and goats at 2% only. Dominant buffalo breeds involved in milk production are Nili-Ravi and Kundhi. On the other hand, Sahiwal and Red Sindhi are major cow breeds. 80% of the Pakistani dairy industry is based on the efforts of small holding farmers of which 43% farmers have a small herd consisting of 1 to 2 animals while 37% of the farmer holdings keep larger herds of 3 to 5 animals each. While 90% of the total country's milk production is based on the efforts of these small holding farms, marketing is a major concern when it comes to selling their product. Almost 97% of the producers are not connected properly and formally to the national dairy market which in turn effects their economic growth (PDDC, 2014). Without the adequate adoption of novel and modern technologies, Pakistani dairy SMEs not growing and hence perish subsequently (Yaseen, 2015).

Pakistan is a rural country situated in the heart of south Asia and adjacent to the Arabian Sea. Having the population of 193 million, it is considered one of the sixth largest populated country in the world, in addition to this, it has 63% rural and 37% urban population respectively (WB, 2012). Agriculture is the main constituent of the economy contributing 21% of the GDP, thus this sector is accommodating 43.7% of the country's manpower. To get flourished in the rural part of the economy there must be priorities in the agricultural sub parts which have remarkable potential growth for varying trends and opportunities in the agriculture sector (GOP, 2008).

In the study of Younas and Schlecht (2013) highlighted that important changes have taken place in the subsectors of agriculture that is the inclusion of livestock and dairy, particularly in the field of processing and advertising profitable products to enhance the competitiveness of the industry. Governments have focused over the various sub sectors of agriculture to increase the growth of dairy SMEs (GOP, 2009). Dairy is considered to be one of the most profitable and productive source for the economic growth. Nevertheless, it has been perceived unanimously by the all spheres including public and private that dairy SMEs needs to blend with innovative and inclusive approach like improvement in breeding, better feed availability and resources, animal health care, marketing and extension services for improving economic development and poverty alleviation (FAO, 2011; Younas & Schlecht, 2013).

It has been estimated that during the fiscal year of 2012-13 dairy SMEs contributed 55.4% of the agriculture GDP and 11.9 % of the national GDP (GOP, 2014-15). Thus dairy SMEs are the third biggest sector in the economy of Pakistan. An increase of 44% of cattle and 34% of the buffalo has been observed in the comparison to the 1996 and 2006 livestock (ACO, 2010). Dairy industry grabs initial materials from the livestock thus this sector possess the sole important commodity in form of milk. Commercial potential and its harnessing have been recognized by the several official documentations in Pakistan despite that the structure of the informal milk economy is larger (FAO, 2011; PDDC, 2014).

Pakistan has been rated as the fourth largest country of milk producer in the world while the province of Punjab produces 75% of the present fresh milk (PDDC, 2006; Burki & Khan, 2011). It has been observed that 62% useable milk is obtained from the buffalos, cows produce 34% and sheep, goats and camels yield 4% (FAO, 2011).Where as in the year 2013-2014 total production of fresh milk was 50.99 million tons of which 41.13 million facilitated the consumption demand.

The following table 2.1 depicts the milk productions in Pakistan.

Table 2.2
Milk Production in Pakistan

Species	**2011-2012**	**2012-2013**	**2013-2014**
	Milk (Gross Production)		
Camel	829	840	851
Buffalo	29473	30350	31252
Goat	779	801	822
Sheep	37	37	38
Cow	16741	17372	18,027
	Milk (Human Consumption)		
Camel	829	840	851
Buffalo	23579	24280	25001
Sheep	37	37	38
Goat	779	801	822
Cow	13393	13897	14421

Source: (Yaseen, 2015)

Dairy has changed its status from the conventional to the commercial entrepreneurship (PDDC 2006). In the conventional dairy production system there was less producer having the small market oriented systems (García *et al.*, 2003; FAO, 2011). Economic and commercial dairy market is relevant to the rural and urban commercial systems and commercial production (García *et al.*, 2003; FAO, 2011).

Conventional dairying includes the multi objective model having the small scale of inputs and out puts, poor labor and communication channels and the intensive market structure run by the middleman (García, Fernández et al. 2003). While contrary to this, commercial dairying model has the single objective endeavor model, improved dairy management activities, modern processing in technology and various milk products (Morgan, 2009).

Consumption priorities, urbanizing area, and the demand enhancing indicators of the market are expected to increase enterprise model in the dairy industry. It has been strongly endorsed that the local market in Pakistan is facing the vital increase in the usage of fresh milk and the various dairying products likewise UHT milk, increased family income, population explosion, new patterns of diet, and awareness of masses regarding the dairy products (PDDC, 2006; FAO, 2011).

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

The chapter one of the present study has provided the background of the research and highlighted the research problem related to dairy SMEs in Pakistan. The importance and scope of the present study have been justified as well. The current chapter three further addresses the current state of research and the existing knowledge on management and practices based on empirical studies conducted on innovation capability. This chapter aims to facilitate deeper understanding of a variety of variables examined with innovation capability. The chapter starts with a review of several concepts of innovation capability and then provides an overview of related studies on innovation capability. The different factors that effect on innovation capability are also highlighted. The second part reviews the empirical studies on individual factors (trust, motivation), organizational factors (training & development, supervisor support), technological factors (ICT use), industry factor (industry cluster resources) which have been discussed as the predictor. Further, the current study also discusses knowledge sharing as the mediating variable, as well as the underpinning theory also discussed at the end of chapter.

3.2 Innovation Capability

In the 21st century, the way of businesses are conducted has been completely redefined. To be in the game, businesses need to give extra consideration to innovation capacities and capabilities (Garcia-Morales, Matias-Reche, & Hurtado-Torres, 2008; García, Sanzo,

& Trespalacios, 2008) because these tools help organizations survive succeed and grow (Bassus, Ahrens, & Zaščerinska, 2014). This is because, innovation is responsible for establishing worth, flexibility and competition (Günday *et al.*, 2009; Rubera & Kirca, 2012). In the study of Gao and Zhang (2011) highlighted that innovation capability considered as determinant of the growth.

In today's fact paced business world, innovation has become the foundation for the growth of every company and firm. In reality, universal economic growth depends on rapidly growing innovation through the fast evolving technological advancements, shorter product lifecycles and increased speed for product development (Yang, 2012; Jaakkola, Luoma, & Frösén, 2015; Akhavan & Mahdi Hosseini, 2016). But because of the increased pressures of staying ahead in the game, organizations have to continuously keep updating their business strategies to ensure that they are innovative enough to give them a competitive advantage over their counterparts (Kafetzopoulos & Psomas, 2015; Tuan & Yoshi, 2016). For this reason, innovation itself has become a highly complex phenomenon based on evolving customer desires and wants, high competitive pressure and technological innovation (Kafetzopoulos & Psomas, 2015).

The complex nature of innovation has increased because of the easy availability of rich knowledge that on which factors innovation depends (Cardinal, Alessandri, & Turner, 2001; Darroch & McNaughton, 2002; Pyka, 2002; Adams & Lamont, 2003; Shani, Sena, & Olin, 2003; Wang, Jie, & Abareshi, 2015). Innovation capability has been defined by the many researchers. For instance, (Chen, Zhu, & Yuan Xie, 2004; Suradi, Omar, &

Shahabuddin, 2015) claims that innovation is a combination of new vital aspects of production integrated into the production system. The concept of innovation capability can be inferred which refers to the ability of putting into practice research and progress for the initiation of up to date technologies and products that reflect the market's needs at the time. Similarly, (Cardinal, Alessandri, & Turner, 2001; Ozkaya *et al.*, 2015) believes that practical, substantial and knowledge centered activities form the basis of the innovation process which leads to forming modern product development practices. Researchers (Harkema, 2003; Blommerde & Lynch, 2015) substitute innovation for a knowledge process that work towards generating latest knowledge to help develop commercial and realistic explanations. Hence innovation, in simple terms means acquiring knowledge from which new knowledge is created for the development of products and services. Sometimes when an organization adopts a new idea or behavior, (Fernández-Mesa & Alegre, 2015; Mariano & Walter, 2015) believes, can also form the basis for innovation.

Innovation capability is the main element in improving economic conditions for the large and the small, the developed and the underdeveloped countries. Innovation capability is also important aspect in the long-term success for all types of organizations (Passey, Chai, & Galanakis, 2003; Chang, Liao, & Wu, 2017; Pfeffermann, 2017; Ullah, Kamal, & Shahzad, 2017; Zou, Guo, & Song, 2017). The role of innovation capability for the organizations and the changes in the contemporary organizations environment, the particular changes in competition, complex customer's needs, products life cycle shortage and the increasing technologies, has changed bases and rules of competition supporting the view that innovation capability is the competitive force for achieving the success of the organizations (Panayides, 2006; Lin, Chen, & Chiu, 2010; Rahab, 2011; Fainshmidt *et al.*, 2016; Verganti & Shani, 2016).

According to literature review about innovation capability from the past decades revealed numerous definitions of innovation capability. Many of the definitions are slight variations built on common themes. The current chapter explains and highlights the concept of innovation capability and its mechanism mechanisms, it is important to have a working definition of innovation capability. According to Welch and Thompson (1980) study that innovation is as the generation, acceptance, and implementation of new ideas, processes, and products or services. Innovation is the adoption of an idea or behavior new to the adopting organization (Damanpour, 1996). In the study of Slappendel (1996) defined that innovation as the process through which new ideas, objects, and practices are created, developed, or reinvented. In the research of Coopey, Keegan, and Emler (1998) innovation defined as a particular form of change characterized by the introduction of something new. Additionally, Cortese and McDonough (2001) explained innovation as the processes by which firms get into practice product designs and manufacturing systems that are new to them. In the study of Stoker and Van der Heijden (2001) innovation is discussed as any idea, practice, or material artifact perceived to be new by the relevant unit of adoption. Further, Edwards, Kumar, and Ranjan (2002) revealed that innovation as a series of processes that are designed and managed to create and apply ideas and knowledge. Table 3.1 lists a definition of innovation capability definitions.

Table 3.1
Definitions of Innovation Capability

Study	Definition
Thompson, 1976	The generation, acceptance and implementation of new ideas, process and services
Damanpour, 1996	The adoption of an idea or behavior new to the adopting organization
Slappendel, 1996	The process through which new ideas, objects and practices are created and developed.
Coopey, Keegan and Emler, 1998	A particular form of change characterized by the introduction of something new.
Stoker, Looise Fisscher & deJong, 2001	Any idea, practice and material artifact perceived to be a new by the relevant unit of adoption.
Tsai, Huang, and Kao, 2001	Innovation is the procedure of developing and modifying in existing system and procedure.
Edwards, Kumar and Ranjan, 2002	A series of processes that are designed and managed to create new idea and knowledge.
Leonard and Swap, 2004	The combination and synthesis of knowledge in novel relevant, valued new product or services.
West, 2004	The process by which firms master and put into practice, product design and manufacturing systems that are new to them.
Perdomo-Ortiz, González-Benito, and Galende, 2006	Innovation capability is the source of competitiveness for the small firms.
Liao, Fei, and Chen, 2007	Eliminated of risk in new product and development.
Çakar, and Ertürk, 2010	The ability of small firms to mobilize the knowledge through the existing system and employee and summarize it to create new knowledge and system.
Lin, Chen, and Kuan-Shun Chiu, 2010	It is the tool through which firms and organization satisfied The un-pleasant needs of the customer.
Kin and Lee, 2012	Innovation capability is the valuable in turbulent economic environment.

McAdam, Reid, and Shevlin, 2014	It is a business capability associated with introducing something new.
Akhavan and Mahdi Hosseini, 2016	Innovation capability is the set of organizational characteristics that facilitate and support in business growth.

The literature is well supplied with work covering common innovation aspects, such as being innovative, managing innovation, and sources of innovation (Utterback & Afuah, 1998; Borins, 2001; Birkinshaw, Hamel, & Mol, 2008). There is important literature examining innovation that focuses on organizational characteristics that foster the ability to be innovative (Carrero, Peiro, & Salanova, 2000; Salavou, Baltas, & Lioukas, 2004). The literature contains studies researching a variation of effects on innovativeness, such as cultural characteristics, management techniques, and administrative processes. More specifically, there is a plethora of studies and discussions in the areas of organizational innovation and innovativeness, leaders' management and influence on fostering innovative cultures and innovations, individual innovativeness, and innovation-supportive cultures. However, the current research believed that there is a gap in the published research on senior executives' support of innovation, particularly in the dairy sector. In the study of Wilson, Ramamurthy, and Nystrom (1999) stated that innovations are heavily dependent on executive leaders' interests and beliefs.

From the above-mentioned definition of innovation capability is that innovation has two common means: something new and processes. Synthesizing the two-common means from the referenced literature, the working definition of innovation for present study is a system designed and managed to create and apply new ideas that result in new products (goods and services) and processes with the success of business. Thus, innovation capability is among the main requirements in the contemporary management where adopting the traditional managerial methods is not enough and could lead to failure (Hadjimanolis, 1999, 2000). Organizations are thorough for success should be characterized by innovation capability, invention and change (Blommerde & Lynch, 2015; Love & Roper, 2015; Pieskä, Kaarela, & Luimula, 2015; Blommerde & Lynch, 2016; Landoni *et al.*, 2016; Tufail, Ismail, & Zahra, 2016; Chang, Liao, & Wu, 2017; Pfeffermann, 2017; Radzi, Shamsuddin, & Wahab, 2017; Ullah, Kamal, & Shahzad, 2017).

Studies have been concerned with innovation capability according to new trends dealing with the concept and nature of the innovation capability in dairy SMEs. Furthermore, Lin (2007a) identified that innovation capability is finding new methods and procedure in thinking and learning changing the organizatin operations and outputs. The researchers designated the innovators as those who are not only able to find new things according to new designs, but able to find new ways for satisfying their customers. The researchers confirmed that contemporary innovation is not a design for a certain product but find new ways or present new things for the customers who never think of obtaining such things. In the study of Akhavan and Mahdi Hosseini (2016), stated that innovation capability is the process for changing something new in existing system, and added that innovation is the process where innovative thoughts could be transferred into commercial products or operations contributing in presenting things not expected by the customers.

It is viewed in the study of Slater, Mohr, and Sengupta (2014) that innovation capability provides the best way for solution of the problems and making decisions provided that knowledge of the problems is available. Drucker (2007) stated that innovation is the tool and the means through which changes are revealed and this facilitate new works or activities. Further, (Zippel-Schultz & Schultz, 2011; Al-Saudi, 2012) explained innovation as thinking far from the traditional contexts with adopting all forms of adventure including change to achieve innovative transformations within the organizations environment and their outputs.

The approach adopted by the researcher in determining innovation capability is due to the importance of innovation capability in the contemporary environment. Such environment enforces pressures that oblige the organizations to pay more devotion to innovation capability because new administrative concepts entails that innovation should be existed to successfully apply such modern concepts, in particular TQM, continuous improvements, innovation drivers and managing organizations inside the works globalization (Berthon, Mac Hulbert, & Pitt, 2004; Deshpandé & Farley, 2004; Jin, Hewitt-Dundas, & Thompson, 2004). Another study also described innovation as the organizations ability to present innovated administrative methods and approaches motivating the employees to invest their skills to realize the organizational goals (Saunila, Pekkola, & Ukko, 2014). Additionally, very few studies have quantitatively examined the impact of top management on innovation capability (Papadakis & Bourantas, 1998; Svetlik, Stavrou-Costea, & Lin, 2007; Camelo-Ordaz *et al.*, 2011; Akhavan & Mahdi Hosseini, 2016; Ansari, Malik, & Shehla, 2017).

In general, innovation is described as an innovated administrative leading activity to direct the organization abilities towards the organizational goals and then communicating its message. Innovation within this trend is called organizational innovation according to what is called the administrative trend. As for the organizational innovation, according to the technical innovation is an activity aiming at presenting a product either as a good or as a service, finding new process or developing an existing one contributing in presenting cheaper products. Studies are mainly concerned with innovation capability according to such aspects. In the study of Hogan and Coote (2014) discussed that innovation capability now as the development made on the industrial operations, products and services to meet the customer's needs and desires in order that the organization will be best in the competitor's market. Another study described innovation as the individual, collective and organizational activity leading to a product characterized by originality, value and experience (Omer, Asaad, & Mohamed, 2010).

The researcher added that innovation capability could be regarded as the integrated unit for a group of subjective and objective factors leading to new and valuable product by a confident individual or a group. It entails that innovation capability is based on certain subjective and objective factors. Subjective factors are associated to conditions, attitudes, values, norms and thinking patterns and the objective factors includes resources and facilities. All these factors lead to new product provided that originality and utility are existing besides novelty (Omer, Asaad, & Mohamed, 2010). In the study of (Faraj & Sproull, 2000; Lundvall, 2010; Rahab, 2011) described innovation capability as something perceived as unique and distinguished whether new or not. It is new for those who react with that thing.

Presenting innovation capability in such a way differs from other trends entailing novelty in the innovative product. The writer confirmed that innovation capability is something not existing before, could be something new for our personal or the ability to newly use at time that thing is perceived to be old. Thus, we perceived that this new thing used in new way is not different from the usual but could be better than other similar things. Assessing things as good or worse requires valuable judgments that others might not agree with. It is clear for everyone that not everything new should be necessarily good and at the same time not all the good things should be known (Spence, 1994). Anything that is characterized as innovative could sustain and survive and then widely spread where other things disappeared (Yukl & Becker, 2006).

The researcher has added another condition for innovation namely the innovative product spread (Phonkaew, 2001). The study confirmed that innovations that seem new will make changes in some of the personal conditions of the individuals. Any change could have risk and not all the individuals are ready to have risks (Yukl & Becker, 2006). Some are willing to have the unique while others could be suspicious in accepting the new or only after deep examining of the new. Others resist the new that could be innovative despite the utility possibilities for those. The study thus confirmed that individual's decisions are affected by some various factors (Phonkaew, 2001).

Innovation capability is in form of new good or service or developing new features related with an existing products or service. Furthermore, innovation capability is including new activities in the curriculum, adopting innovative methods in learning or adopting new administrative methods in managing the employees to direct their powers towards the organizational goals. Innovation could be in any form affecting the people as it is not restricted to certain direction or form but could be in the form of various forms and applications (Deshpandé & Farley, 2004). Innovation capability, according to the current study, is a tool and activity which is strengthens and gives more power to business in building their role in the country growth. Such activity will lead to presenting something new in various forms and result in many benefits providing that the suitable environment is available (Saunila, Pekkola, & Ukko, 2014).

In the current era, the situation of the business environment (uncertainty and high risk) involves that firms need to develop innovations in order to maintain their competitiveness. The capacity to innovate is among the most important factors that impact business growth (Hjalager, 2010). Innovativeness provides flexibility for firms to take different options to satisfy their customers on a sustainable basis so that this will provide a help for the survival (Rubera & Kirca, 2012). In the study of Yeşil and Dereli (2013) stated that innovation capability is the multidisciplinary skills of the firms that improve and develop the role of the firms. Innovativeness is a process of turning opportunities into practical use (Tidd, Bessant, & Pavitt, 2002, 2005; Du Plessis, 2007) and is such only when it is really adopted in practice (Nelson & Winter, 1982).

It is an interactive process in which firms interact both with customers and suppliers and with knowledge institutions (Akhavan & Mahdi Hosseini, 2016). Innovation has been recognized as a key element of forceful efficiency and competition of markets since the work of Schumpeter (Urgal, Quintás, & Arévalo-Tomé, 2013). Innovators should share the market with non-innovators and grow at their expense. In general, innovator will grow faster, be more efficient and more profitable than no innovators (Mansury & Love, 2008). For this reason, innovativeness is a competitive instrument essential for firms' long-term success and survival (Gao & Zhang, 2011).

The degree of innovation reflects the extent of new knowledge embedded in an innovation (Urgal, Quintás, & Arévalo-Tomé, 2013). Firms with innovation capability will achieve a better response from the environment, obtaining more easily the capabilities needed to increase role in economy and consolidate a sustainable competitive advantage (Calantone, Garcia, & Dröge, 2003; Assink, 2006; Guan *et al.*, 2006; Wang, Lu, & Chen, 2008). For this reason, it is necessary to improve the innovative culture of the enterprise so that all its stakeholders search new product and services. If an enterprise wants to increase its innovations capability that it is a necessary high level of creativity (Çakar & Ertürk, 2010). It is considered that creativity is necessary so that firms can resolve problems related with knowledge generation and absorptive capacity. Creativity is the generation of novel and appropriate ideas (Amabile, 1996). The management of the flow of information technological is an important part of an organization's innovative capacity (Cohen & Levinthal, 1990) and leads to effective generation of ideas.

Moreover, Koc and Ceylan (2007) considered that if companies wish to become and remain innovative, they should pay special attention to variables as technology strategy, quality of ideas, as well as technology acquisition and exploitation. The conversion of technical ideas into new business, products or services can be based on the understanding of the synergies and interactions between the different knowledge possessed by the firm, their technologies, their organizational learning process, and their internal organization (Guadamillas, Donate, & Pablo, 2008).

A capability is usually considered a bundle of resources that can be used to perform business activities (Menon, 2008). Capabilities serve as a key to the transition from formulating a mission, vision, or value to taking action (Caniels & Romijn, 2003). All firms have capabilities, yet a firm will usually focus on certain capabilities that are consistent with its strategy (Mitch Casselman & Samson, 2007). For example, a firm focusing on a low-cost strategy would focus on improving manufacturing process efficiency while a firm pursuing a differentiation strategy would focus on new product development (Crossan Mary, Fry Joseph, & Killing Peter, 2005). The study of Miller and Shamsie (1996) distinguished between knowledge based resources and property-based resources by the barriers for imitation. Their finding suggests that knowledge resources have more valuable and supportive for firms' adaptation, renewal and hence their survival in an uncertain environment.

Similarly, Oladunjoye and Onyeaso (2007) distinguished between resources and capabilities and argued that, in order to obtain competitive advantage; firms need to create capabilities to collect, integrate, and allocate valued resources. Innovation capability refers to an ability to generate and generalize innovations in a fast rate that gains the organization competitiveness (Lawson & Samson, 2001; Cummings & Teng, 2003; Liao, Fei, & Chen, 2007; Yeşil & Dereli, 2013). A similar concept was described by Buganza and Verganti (2006), whereby innovation capability is the ability to generate innovations in responding to contextual changes and opportunities without organizational disruption, excessive time and costs. As such, the concept stresses not only the ability to create new ideas, but also the ability to implement new ideas (Buganza and Verganti 2006). Several studies described that successful organizations become known by the innovation capability (Calantone, Cavusgil, & Zhao, 2002; Koc & Ceylan, 2007; Börjesson & Elmquist, 2011; Awan & Akram, 2012; Dhewanto *et al.*, 2012; Breznik & D. Hisrich, 2014; Camisón & Villar-López, 2014; Amores-Salvadó, Martin-de Castro, & Navas-López, 2015; Blommerde & Lynch, 2015; Dost *et al.*, 2016; Tufail, Ismail, & Zahra, 2016; Agostini, Nosella, & Filippini, 2017; Radzi, Shamsuddin, & Wahab, 2017; Ullah, Kamal, & Shahzad, 2017).

Australian and Belgium dairy farms, for example, embraced the capabilities of innovation as its trademark (Mitchell & Bruckner Coles, 2004). The Australian farms was highly effective in lean operations to reduce its operating costs while manage to retain valuable employees. This is made possible by a positive work environment that encourages creativity and fun on the job (Mitchell and Bruckner Coles 2004). Since the resource-based view of the firm first emerged in the 1980s, there have been calls for empirical tests of this concept for both corporate and business strategies (Barney, 2001; Peteraf &

Bergen, 2003; Erakovic & Goel, 2008; Menon, 2008). Over the years, the empirical studies have been growing increasingly rich. Their conclusion is that firms achieved competitive advantages through innovation capability and knowledge sharing activities.

In spite of the growing importance of small dairy farms to the households and the economy, the growth of dairy sector has been hindered by a various number of issues and challenges (Asante, Villano, & Battese, 2017). Ullah, Kamal, and Arfan (2016) stated that lack of improved diseases, inadequate fodder and breeding's stock. Other researcher also stated that poor market and lack of industrial cluster resources also has a contributed in the lack of innovation capability (Duku *et al.*, 2011). As pointed out by the prior researches that lack of innovation capability is the major reasoned behind the early failure of dairy farms (Ullah, Kamal, & Arfan, 2016). As consequences, the dairy farms are faces with high transaction cost that prevent them from partaking actively in the markets (Amankwah *et al.*, 2013). Productivity of dairy farms can enhanced through the innovation capability by effective role of dairy farms in the country economy. More importantly, innovation capability aims to enhance the agricultural productivity to shrink poverty and increase food security using the sustainable crops and production of dairy farms (Asante, Villano, & Battese, 2017). Innovation capability of dairy SMEs is defined as the brings of new ideas, system and technology for lift up the role of dairy farms in the GDP and economy (Ullah, Kamal, & Arfan, 2016; Ullah, Kamal, & Shahzad, 2016, 2017).

The success of dairy farms totally depends on the innovation capability (Fainshmidt *et al.*, 2016; Ullah, Kamal, & Shahzad, 2016). An organization's success is positively related to its ability to innovate (Francis & Bessant, 2005; Mäkimattila, Kallio, & Salminen, 2012). The capacity to innovate is not just limited to the information and knowledge an organization has, but also constitutes for its ability to apply it in the right areas (Martín-de Castro *et al.*, 2011). This management of innovation is further explored in different sets of research focused primarily on innovation capability (Lawson & Samson, 2001).

For SMEs to compete at a leading position in the national and international markets, it is important that they adequately internalize different factors of innovation capability. Therefore, managers at SMEs are encouraged to endorse and encourage different innovation capabilities (Çakar & Ertürk, 2010). However, SMEs are unable to competently develop their innovation capabilities as there are no techniques and structures to provide any detailed and concrete solutions and directions for them to innovate (Agostini, Nosella, & Filippini, 2017; Buenechea-Elberdin, Kianto, & Sáenz, 2017).

Innovation capability, in the developed countries, has become most practiced activity by early organizations and established specialized sections to facilitate and provide the suitable environment to support and encourage innovation capability to reach the creative remedies for the different obstacles (Hadjimanolis, 1999; Mani, 2006). There are certain reasons for such trend including the challenges and barrier faced by the firms that are continuous warning and threats (Singh, 2009). Innovation capability is the predominant element in making better economic environments for all stakeholders in the business. In addition, innovation capability is also play an important role in the success for all classes (small and large) of businesses (Tidd, Bessant, & Pavitt, 2002; Passey, Chai, & Galanakis, 2003; Omer, Asaad, & Mohamed, 2010) . Limited empirical studies have focused on innovation capability and give more importance to innovation capability (Xie, Zeng, & Tam, 2010; Zeng, Xie, & Tam, 2010; Rahab, 2011). Innovation capability depends on communications between individuals, groups, organizations because such communications increase knowledge (Pfeffermann, 2011).

Yet, past researches also indicate that innovation capability can be promoted through proper forms of measurement (Saunila, Pekkola, & Ukko, 2014). Then again, measuring innovation capability is hardly ever done in SMEs (Saunila, Ukko, & Rantanen, 2012). In conclusion, innovation can be understood as a capability associated with the inception of any new product, service or technology (Du Plessis, 2007; Chen & Huang, 2009). Therefore, innovation can basically be referred to as the implementation of different interventions and inventions for the instigation of new products, systems or processes (Gloet & Terziovski, 2004; Du Plessis, 2007).

Additionally, innovation capability creates ability for existing and for new business (O'case, 2013). After reviewing the literature, it is concluding that maintaining a business in the existing era is very attentive and difficult activity (Ta-wei Tang, 2015).

To the best of researcher investigation, very limited researchers have highlighted the importance of innovation capability regarding to establish a new business and maintaining existing business. Additionally, in the context of Pakistan there is very rare study have been conducted with an aim to highlight factors that increase the innovation capability. The present study tries to strengthen the Resource Based View (RBV) theory and diffusion innovation theory to demonstrate that in different circumstances related to innovation capability.

In summary, the aforementioned studies found innovation capability to be interconnected to survival and success in the current business environment In addition, innovation capability was discovered to play an important role in the growth of dairy SMEs. Numerous studies directed a positive relationship between innovation capability and other variables. Table 3.2 is about the prior studies that were conducted on innovation capability.

Table 3. 2
Summary of the Studies Related to the Innovation Capability

Name of Author	Year	Dependent Variable	Independent Variables	Mediating/ Moderating Variable	Findings	Conclusion and Recommendation
Halit Keskin	2006	Performance	Market Orientation, Learning orientation	Innovation Capability	Market and learning orientation have positive and significant influences on performance with innovation capability	Entrepreneurial orientation, knowledge transfer at working place and individual trust need to be tested with innovation capability
Abdul Razak Ibrahim, Ali Hussein Saleh Zolait, Sivadasan Subramanian and Ahmed Vazehi Ashtiani	2009	Organization Innovative	Product Innovation, Market Innovation, Strategic Innovation, Process Innovation, Behavioral Innovation	N/A	External measure of the firms is not easy to implement and internal measures can easily be implemented for the innovation	Survey method used to test the measure of the innovation
Jaehoon Thee, Taekyung Park, Do Hyung Lee	2010	Innovativene ss	Market Orientation, Entrepreneurial Orientation, Firm Size, Age	Learning Orientation	Findings showed that innovation is a strong antecedent of firm performance	Future study may be conducted to get more benefits. Contextual, environment factors, industry types also used to test their relationship with innovation.

John Skardon	2011	Innovation	Trust	N/A	social capital helpful for innovation	Employee level trust needed for clarification and also may testing in developing countries
Dr. Alper Erturk	2012	Innovation Capability	Psychological Empowerment	Trust in Supervisor	The finding indicated that the psychological empowerment and innovation capability has positive relationship with supervisor trust.	Concluded that more research needed with new variable like justice perception, rewards, self-efficacy, leadership, and management support and innovation capability.
Jie Yang	2012	Corporate Growth	Innovation Intent, Innovation Infrastructure	Innovation Capability	Innovation success achieved through commitment to learning, risk taking and corporate culture.	SEM can used, takes data from different respondents, sample can be taken from Small firms.
Ailing Chen, Liping, Li, Xingsen Li, Jun Zhang and Lei Dong	2013	Innovation Capability	optimization of Creative environment	N/A	innovation is the only single tool in 21st century to handle with the contradict problems	Need to test the empirical study
Salih Yesil, Selcuk Ferit Dereli	2013	Innovation Capability	Organizational Justice, Knowledge sharing	N/A	Organizational justice has positive impact on innovation capability.	The future research may also test with individual, organizational factors with knowledge sharing and innovation capability.
Salin Yesial, Tuba Buyukbese, Alaeddin Koska	2013	Performance	Enjoyment in Helping other, Self Efficacy, Top Management Support, ICT,	Innovation Capability	Knowledge sharing has positive and has insignificant with some variable.	Advised to further research in new context with new variable trust, motivation, industry relationship etc.

			Organizational Culture			
Fahad Al. Othman, Igor Hawryszkiewycz, Kyeong Kang	2014	Innovation Capability	Socio-Technical Factors, diffusion of Innovation	Knowledge sharing Process		
Lingyan Hu, Amy E. Randel	2014	Team innovation	Social Capital, Extrinsic Incentives	Implicit and explicit Knowledge	Findings revealed that social capital has significant effect on team innovation but knowledge sharing don't have mediate relationship	Future research gives more batter result with new relationship
Minna Saunilla, Juhani Ukko	2014	innovation Capability	Support Culture, Employee Skills, Employee Welfare, Leadership Practices	Size of Industry	The findings give the evidence that capability and resources of the firms necessary for the success of innovation	Innovation can tackled with technology in service sector
Yung-Lung Lai, Maw-Shin Hsu, Feng-Jyh Lin, Yi-Min Chen, Yi-Hsin Lin	2014	Innovation	Industry Cluster	Knowledge Management	Industry cluster resources have a significant role in enhancing the innovation capability by using the knowledge management.	Model need to tested in developing countries and more awareness can built for industry cluster resources and innovation performance

Cesar Camison, Ana Villar Lopez	2014	Firm Performance	Organizational Innovation	Innovation Capability	The results shows that organizational innovation and technological innovation capabilities significant role in enhancing the firm performance	Further mix method may be applied, Incremental and Radical innovation
Ihsen Ketata, wolfgang, sofka, Christoph Grimpe	2015	Innovation	Business Environment, Absorptive capacity	N/A	Absorptive capacity and business environment have significant effect on innovation	Absorptive capacity and knowledge sourcing play a role in enhancing the innovation. Both are the fuel for the development of innovation. Motivation and training also needed to test the relationship with innovation capabilities. Social, regulatory and political factors will be testing for the increasing the innovation capability.
Tang, Wang, Tang	2015	Service Innovation Capability	Social Capitals (shared vision, Network Ties, Trust Culture)	N/A	Findings of this study extended the positive relationship of social capitals with service innovation capability	To enhance the service innovation capability social capitals have a role and also further testing will be needed
Cristina Quintana	2015	Innovation Capability	Gender Diversity, Top management team	N/A	Have a significant relationship	Capital Market, External Quality Signals, Human Capital

Reza Ansari, Azar Barati, Ali Akbar Abedi Sharabiani	2016	Innovation	Intellectual Capital	Dynamic Capability	Dynamic capability and intellectual capital have positive effects on innovation performance.	Dynamic capability and intellectual capital with innovation is the symbol of success. Further research also encouraged dynamic and intellectual capital variables with other variables like market capabilities, individual trust etc.
Faisal Iddris	2016	Innovation capability	Supply Chain	N/A	Supply Chain has a positive influence on innovation capability	Need to more investigation of innovation capability with others variables
Pantea Foroudi	2016	Innovation Capability	Loyalty and reputation of Customer	N/A	Positive relationship	Brand Loyalty can be tested with innovation Capability

3.3. Knowledge Sharing

As like innovation capability, knowledge sharing is also a key source and factor that directly effects on the productivity of the organization. In addition, it gives a competitive edge to the companies (Chen & Huang, 2009). Globalization, rapidly changing technology, changes in market and customer demands as well as tough market conditions have made it essential for the organizations to use knowledge sharing activity in order to sustain in the long run, this is what on which researchers are agreed (Darroch, McNaughton, & Bontis, 2002; Johnson, 2005; Du Plessis, 2007).

Knowledge sharing can be defined as the sharing of common purpose, exchange of ideas, information and experiences among the people for solving the problem (Lin, 2007b). Knowledge sharing is consisting of shared understanding of the employees related to the access to the relevant information and understanding the knowledge network within the organization (Hoegl, Parboteeah, & Munson, 2003). Furthermore, knowledge sharing occurs at the organizational as well as on the individual level. At individual level knowledge sharing is sharing of information to solve the problem or to get done something better. At organization level knowledge sharing is transferring and capturing experienced based information and transferring it and makes it available to other within organization (Calantone, Cavusgil, & Zhao, 2002). Moreover, the process of knowledge sharing is consisting of both willingness of employee to actively communicate with co-worker (Darroch & McNaughton, 2002; Darroch, 2003).

Past literature describes the relationship of different factors with the knowledge sharing activities. These factors include individual, technological and organizational (Lee & Choi, 2003; Lu, Leung, & Koch, 2006). With reference to the individual dimension, knowledge sharing depends on the individual characteristics their values, belief and motivation. According to the study of Wasko and Faraj (2005) employees are motivated when they perceive that knowledge sharing activities would be helpful for solving problem and helping colleagues. Similarly, with reference to the organizational dimension, organizational climate is usually made to capture efficiently the benefits of innovative supportive culture. In term of organizational climate there are many factors that lead towards the knowledge sharing for example trust and motivation (Saleh & Wang, 1993). Similarly, Information technology dimension ICT also leads towards the integration, dissemination and codification of organizational knowledge (MacNeil, 2003). In the previous years, Knowledge sharing is taken as a key component for the effectiveness and for better performance of SMEs Since knowledge is one of the most effective resource for sustaining a competitive advantage (Siemens, 2014; Wang, Noe, & Wang, 2014; Evans, Dalkir, & Bidian, 2015). Organization Strategic decisions and strategy formulation depends on different processes that attain, distribute and generate knowledge known as knowledge management (Zack, 2002).

Innovation and Knowledge sharing is all about implementing ideas (Borghini, 2005; Donate & Guadamillas, 2015) through the search, invention, testing and progression of new technologies, products, services and structures. However, innovation processes are always dependent on knowledge (Gloet & Terziovski, 2004; Donate & Guadamillas,

2015) because novel knowledge is generated and transformed into specific knowledge for the development of different goods, services and practices (Choy, Yew, & Lin, 2006; Martín-de Castro *et al.*, 2011).

Any knowledge sharing system that enhances creativity is said to improve innovation since there is easy and faster access to novel knowledge (Majchrzak, Cooper, & Neece, 2004; Lindner & Wald, 2011). Knowledge sharing plays an integral role in launching new products because it is stirred by prospect of resulting benefits on the basis of innovation and creativity (Darroch, 2005; Alegre, Sengupta, & Lapiedra, 2013; Cohen & Olsen, 2015; Pak, Ra, & Lee, 2015). Although, innovation is produced through knowledge sharing (Borghini, 2005; Sigala & Chalkiti, 2015). Therefore, innovation is seen as one of the most highly valued by products of KS (Majchrzak, Cooper, & Neece, 2004). Support for this comes from the empirical evidence provided by (Darroch, 2005; Sigala & Chalkiti, 2015) who also believe that any firm with KS capacity is more likely to be highly innovative. Moreover, Barker (2015) also give evidence of a company that achieved progression by implementing a KS strategy on the basis of innovative capability. Hence, it can be concluded that knowledge sharing, innovative and creative capacity of any organization are positively related (Borghini, 2005; Weaven *et al.*, 2014; Barker, 2015).

Since knowledge sharing leads to innovation capability, a lot of organizations are using it to have a better grip over their respective capabilities (Peng Wong & Yew Wong, 2011; Awan & Akram, 2012; Blommerde & Lynch, 2015; De Souza, de Almeida Falbo, &

Vijaykumar, 2015; Hariharan, 2015; Zumitzavan & Michie, 2015; Agostini, Nosella, & Filippini, 2017). Knowledge sharing is said to help enhance an organization's productive capacity in terms of services as well as output, increase their overall efficiency and induce innovation for their customers. Hence, the contributions of KS have been greatly acknowledged by many organizations especially for it adds to their overall success (Chinying Lang, 2001; Ojeda-López, Mul-Encalada, & Barrera-Canto, 2015).

Knowledge sharing (KS) is a combination of an objective as well as a process. In terms of a positive outcome or goal, KS focuses on the effective and efficient sharing of knowledge within the organization and in terms of a process KS is responsible for bringing about a strategic advantage to the organization by working together and enhancing the sharing of knowledge (Bollinger & Smith, 2001). As a result, KS is in its true essence, responsible for making implicit knowledge, from a larger collective pool, easily accessible within the organization's framework (Clarke & Rollo, 2001; Ab Rahim & Ibrahim, 2015).

In the existing business environment, this knowledge management plays a key role as it is concerned with the management of intangible assets in organizations, the majority of these types of assets involve practices that entail, in one way or another, the reception, structuring and transmission of knowledge (Mehta, 2008). Knowledge sharing of employee at SMEs is the reasoned to increase the innovation capability for sustaining the competitive advantages of the firm (Rammer, Czarnitzki, & Spielkamp, 2009; Clark & Goodwin, 2010).

Research shows that in recent times knowledge sharing (KS) has started to play an integral role in improving an organization's effectiveness and functioning (Zack, McKeen, & Singh, 2009; Kim *et al.*, 2014). Furthermore, this culture has significantly risen with the importance of KS in organizations because of the advancements in technology and the constant need for sharing updates and best practices with the rest of the business community (Obeidat, Al-Dmour, & Tarhini, 2015; Ojeda-López, Mul-Encalada, & Barrera-Canto, 2015). Therefore, the practices and processes applied by any firm for effective management of knowledge in turn accounts for their strategic advantage in the industry along with a sharp eye for using the best of their resources at hand (Zollo & Winter, 2002; Lin, Wu, & Yen, 2012).

Past literature are focusing on developing knowledge-based presumption of organizations which would create their basis on generation, incorporation, and the deployment of knowledge (Nonaka, 1994). The knowledge-based view has been derived from the resource-based view (RBV) of the organization which concentrates primarily on the material goods that are of competitive advantage to the organization (Amit & Schoemaker, 1993). Thus, knowledge can easily be considered an important strategic resource through which a firm can obtain cultural, social, intellectual and social value overall (Zack, McKeen, & Singh, 2009). Hence, this perspective clearly highlights knowledge resources as the basis for any company's products and services which they make use of and at the same time also works towards the generation of new knowledge resources for future use (Nonaka, 2007).

In layman terms, KS consists of a number of processes which facilitate the generation, application, and sharing of knowledge by any organization to improve its overall performance (Grant, 2002; Zack, McKeen, & Singh, 2009). But on a much deeper level, Grant (2002) explains two characteristic forms of knowledge management for everyone. The first has to do with the identification of explicit and implicit knowledge which separately have different implications for an organization. The second is concerned with managing knowledge processes that are concentrated on the generation and application of knowledge. Keeping these in mind, knowledge seems like the most important strategic resource of any organization that leads to competitive advantage (Zack, McKeen, & Singh, 2009; Akhavan, Rahimi, & Mehralian, 2013; Akhavan & Mahdi Hosseini, 2016; Ansari, Malik, & Shehla, 2017).

But to be at the top, a company must quantify its knowledge requirements under all spheres of requirement, application and environmental conditions where business activities take place (Grant, 2002). Once, the knowledge requirements have been identified, specific measures can be taken that will consist of acquiring new knowledge while at the same time using the knowledge already present in the databases to formulate proper strategies. Once at this point, infrastructures in the form of IT systems and human resource need to be taken into account for the proper implementation and application of KM strategies (DeTienne *et al.*, 2004; Mehta, 2008; Awan & Akram, 2012).

In summary, the above-mentioned studies found that knowledge sharing have a significant impact on innovation capability. As well, knowledge sharing was showed to play a great role in the success of dairy SMEs and the helpful where the economy is unstable.

3.4. Knowledge sharing and innovation capability

Knowledge sharing has been emerged as important antecedent of innovative activities in the organizations (Awan & Akram, 2012; Meihami & Meihami, 2014; Barker, 2015; Carmeli & Paulus, 2015; Akhavan & Mahdi Hosseini, 2016). Therefore, it is important to study the determinants of the effective knowledge sharing and innovation (Martín-de Castro, 2015). In the study of (Jiang & Li, 2009; González-Ramos, Donate, & Guadamillas, 2014) highlighted that knowledge sharing is very important for the long-term survival of an organization especially if it runs its business on small scale and this is exactly what resource based view. As per resource based view, it is the internal resources of the company that gives it a competitive edge and ensures its long-term survival to remain successful in the long run (Ho, 2011).The researches directed that (Chang, Liao, & Wu, 2017; Presbitero, Roxas, & Chadee, 2017; Zheng, 2017) knowledge sharing leads to innovation and innovation increases the productivity of the organization that is why researchers give an extra weight to the innovation capability of the company with knowledge sharing (Lieberman & Montgomery, 1998; Fagerberg, 2004; González-Ramos, Donate, & Guadamillas, 2014; Saunila, Pekkola, & Ukko, 2014; Akhavan & Mahdi Hosseini, 2016; Agostini, Nosella, & Filippini, 2017).

Innovation capability is an intangible factor and to build the improvement in the success of the organization (Lawson & Samson, 2001). Innovation capability is collection of the main factors within the organization and cannot be side out from the main vision because innovation capability is the only single way to survive in this competition era (Neely *et al.*, 2001). It is widely observed that innovation capability is in conjunction with the ability to share, manage, create and maintain the knowledge (Subramaniam & Youndt, 2005; Lin, 2007b).

Different researchers have different point of view as to how innovation can be increased in company which creates problem for businessmen as they do not know which study to follow to enhance the innovation in their company (Lin & Zhuang, 2014). A large number of researchers have tried to highlight the relationship between knowledge sharing and innovation capability of the organization and some of them believe that knowledge sharing is a strong determinant of innovation capability of any firm (Calantone, Cavusgil, & Zhao, 2002; Omar Sharifuddin Syed-Ikhsan & Rowland, 2004; Van den Hooff & de Leeuw van Weenen, 2004; Bock *et al.*, 2005).

However, organizations and firms itself not share a knowledge, there are some other critical role and factors in innovation processes and knowledge sharing (Nonaka & Takeuchi, 1995; Ipe, 2003; Awan & Akram, 2012; Akhavan, Rahimi, & Mehralian, 2013; Akhavan & Mahdi Hosseini, 2016; Ansari, Malik, & Shehla, 2017; Chang, Liao, & Wu, 2017; Zheng, 2017). Innovation capability and knowledge sharing should be implied as a method through which the knowledge captive by individuals is internalized and expanded by a part of firm's knowledge sharing (Nonaka & Takeuchi, 1995; Barker, 2015; Esfahani, Safari, & Mirzaei, 2015; Kim & Yun, 2015; Mittal & Dhar, 2015; Tong, Tak, & Wong, 2015; Rahman *et al.*, 2016; Sulistiyani & Harwiki, 2016; Tufail, Ismail, &

Zahra, 2016; Chang, Liao, & Wu, 2017). The idea of this concept is that knowledge held by individual should be transmitted to the levels of the organization and group as a whole, so that it can be implemented to raise the innovation capability (Ipe, 2003; Kant & Singh, 2008; Yang & Wu, 2008; Barachini, 2009; Foss *et al.*, 2009; Wang & Noe, 2010; Yusof & Ismail, 2010; Camelo-Ordaz *et al.*, 2011; Liu & Phillips, 2011; Paliszkiwicz, 2011; Rahab, 2011; Casimir, Lee, & Loon, 2012; Ho, Kuo, & Lin, 2012; Kumar & Che Rose, 2012; Zhou & Li, 2012; Chen *et al.*, 2013; Cyril Eze *et al.*, 2013; Setyanti *et al.*, 2013; Yeşil, Koska, & Büyükbeşe, 2013; Hu & Randel, 2014; Radaelli, Lettieri, & Mura, 2014; Zhang, 2014).

Most of the theoretical framework provides the fundamentals to explain the importance of innovation capability being based on knowledge sharing if it is to become a source and capability of competitive advantage for the business (Barney & Ouchi, 1986; Teece, Pisano, & Shuen, 1997). Other studies also recognized that knowledge sharing is an important factor for the innovation capability (Alavi & Leidner, 2001; Gold & Arvind Malhotra, 2001; Lawson & Samson, 2001; Alegre, Sengupta, & Lapiedra, 2013; Hislop, 2013; Fidalgo Blanco *et al.*, 2014; Caiazza, Richardson, & Audretsch, 2015; Wang & Rajagopalan, 2015). Most of the previous authors used qualitative methods in their research. Empirical studies have also provided suggestion of a meaningful association within knowledge sharing and innovation (Alavi & Leidner, 2001; Gold & Arvind Malhotra, 2001; Lawson & Samson, 2001; Svetlik, Stavrou-Costea, & Lin, 2007; Alegre, Sengupta, & Lapiedra, 2013; Hislop, 2013; Yeşil, Koska, & Büyükbeşe, 2013). What literature has not clarified is which types of knowledge sharing practices increase or inhibit innovation capability. In order to investigate this, the researcher used the knowledge sharing for enhancing the innovation capability (Svetlik, Stavrou-Costea, & Lin, 2007).

In other style, individual knowledge sharing of the firm with necessary raw materials enhancing the innovation and knowledge sharing (Carrillo *et al.*, 2007). However, individual knowledge is shared with others groups and individuals within the firm, the individual knowledge will remain in the area of individual and will have no or little effect on the innovation capability of the firm (Ipe, 2003; Lin, 2007b).

The prior literature explains knowledge sharing as the like of placing knowledge haunted by an individual at the temperament of the others within the firm, in this way that it can be utilized and absorbed by them. Knowledge sharing refers about knowledge receiving and giving, so, it polishes both the absorption and transmission, granting the individual to build new knowledge and experience on the basis of that possessed knowledge by other (Van de Ven, 1986; Ipe, 2003; Van den Hooff & De Ridder, 2004; Liao, Fei, & Chen, 2007; Lin, 2007b; Yang, 2007a; Yang & Wu, 2008; Foss *et al.*, 2009; Paliszkiwicz, 2011; Sewdass, 2014; Carmeli & Paulus, 2015; Kim & Yun, 2015; Tong, Tak, & Wong, 2015; Sulistiyani & Harwiki, 2016; Ullah, Kamal, & Arfan, 2016; Ansari, Malik, & Shehla, 2017; Chang, Liao, & Wu, 2017; Zheng, 2017). Hence, knowledge sharing allows connecting prior isolated views, ideas, information and facts, which develop the footing for new knowledge and for innovation capability (Kogut & Zander, 1992; Carrillo *et al.*, 2007; Lin, 2007b; Camelo-Ordaz *et al.*, 2011).

Knowledge sharing is relevance for the innovation capability has been theoretically composed in many studies (Liao, Fei, & Chen, 2007; Camelo-Ordaz *et al.*, 2011; Kumar & Che Rose, 2012; Hu & Randel, 2014; Radaelli, Lettieri, & Mura, 2014; Akhavan & Mahdi Hosseini, 2016; Chang, Liao, & Wu, 2017). The study of Cohen and Levinthal (1990) reveals that the communication among individuals who have various knowledge and experiences improves the ability and knowledge of the organization to innovation capability. Furthermore, Tenkasi and Boland Jr (1996) argued that innovation capability of the firm is the outcome of the interaction among individuals who have various kinds of knowledge, information and experiences. Correspondingly, a lot of authors state that knowledge sharing between employees develops a fundamental way in the process of firm knowledge creation, in such approach that if knowledge is not properly performed, knowledge can develop bad barrier to the development of this process and as a consequence to effective innovation capability (Chang & Lee, 2007; Camelo-Ordaz *et al.*, 2011).

In the various past literature, knowledge sharing and innovation capability also have a significant relationship (Ullah, Kamal, & Arfan, 2016; Agostini, Nosella, & Filippini, 2017). Firms that promote knowledge sharing activities are more effective role in the innovation capability (Seidler-de Alwis & Hartmann, 2008). In the article of Svetlik, Stavrou-Costea et al. (2007), the factors that influence innovation capability in the manufacture, banking, transportation, real estate and health industry found a positive and significant association between knowledge sharing and innovation capability developments. At the end, Carrillo, Brachos et al. (2007) executed that when the essential factors for inspiring the individuals to transfer and share knowledge are present than innovation capability must be promote and improve.

It is evident that many researchers stated that KS has significance relationship to increasing the innovation capability (Lin & Chen, 2006; Lu, Leung, & Koch, 2006). According to research of Davenport and Prusak (1998) argues that knowledge is a personal attitude. Firms are ready to manage knowledge resources if employees of certain firms are ready to cooperate with each other and also ready to share their knowledge with firms. The objective of knowledge sharing is to seek personal expertise to become group and ultimately becomes firm's knowledge over period of time, which heights the standards of knowledge accessibility of a firm. A particular organization if that encourages employees to render knowledge in an organization and groups are more likely to start new business, new ideas, opportunities and they are simplifying the innovation activities (Sewdass, 2014). The process of knowledge sharing is a consistent process to collect information and ideas for internal and external bases. So, the practice of knowledge sharing by an organization becomes individual and group knowledge which also involves socialization and internalization of knowledge (Awan & Akram, 2012; Kumar & Che Rose, 2012; Hu & Randel, 2014; Akhavan & Mahdi Hosseini, 2016; Chang, Liao, & Wu, 2017).

Knowledge sharing is a key feature of successful established business, specifically for those organizations that are indulged in important innovation projects. The development of ideas, new business and development of firms in new innovative products due to absorption capacity and can improve innovation and performance (Hogan *et al.*, 2011; Hogan & Coote, 2014). Specially, an organization with ability in sharing knowledge is to be expected too rare, difficult and unique for competitor to imitate and therefore it has the ability to increase the level of firm's innovation capability. The current study further expects to explore that employee encouraged to share knowledge with other employees is likely to gain innovation, hence better placement of firm's competitive advantage.

Moreover, Parlby and Taylor (2000) believe that supporting innovation, generating new ideas and adequately exploiting an organization's thinking capacity is linked to knowledge sharing. However, knowledge sharing is more than that and also includes encapsulating experience and insight so as to make it available for specific circumstances and people later on. Such expertise may be encapsulated on a formal hard drive or simply be on a person's mind, either way, it leads to collaboration, knowledge sharing, learning and continual improvement (Guadamillas-Gómez & Donate-Manzanares, 2011). Through these factors it allows for better decision making on the basis of the effectiveness and exploitation of the valued contributed intellectual assets (Koh & Kim, 2004). However, on a basic level, knowledge sharing is merely a planned process that manages the generation, distribution, collection and usage of knowledge to enhance and increase a company's capability when it comes to products and services but at the same time staying in line with the company's business strategy (Liao, Fei, & Chen, 2007; Kant & Singh, 2008; Camelo-Ordaz *et al.*, 2011; Awan & Akram, 2012; Yeşil & Dereli, 2013; Radaelli, Lettieri, & Mura, 2014; Ritala *et al.*, 2015; Sulistiyani & Harwiki, 2016). In theory and practice, knowledge sharing happens on three levels; individual, team and organizational level. Although it is a comprehensive approach including views from all three levels in the form of people, processes, technology and overall culture carrying equal weight age(du Plessis & Boon, 2004), it is just not only centered on innovation but also works towards creating an environment that encourages innovation to take place.

Therefore, it can be deduced that knowledge sharing use innovation as a means for earning a suitable competitive vantage point. However, information and knowledge sharing systems are not the primary core factors that lead to a sustainable competitive advantage but in fact, by combining other competencies and resources to knowledge sharing systems, reaching and maintaining a sustainable competitive advantage would be more favorable especially in terms of product and process innovation. Hence, in this capacity, knowledge sharing systems play an important part in turning learning capacities and core competencies into long lasting results by facilitating and invigorating organizational learning and resource development processes (Adams & Lamont, 2003; Adams, Ahmed, & Evans, 2014). In all, Knowledge sharing and innovation work towards capitalizing and generating updated knowledge in an organization by providing background for upcoming product developments and designs (Shani, Sena, & Olin, 2003).

Knowledge sharing leads to fulfilling countless functions relating to innovation capability. Firstly, knowledge sharing in innovation facilitates the distribution and codification of implicit knowledge. Implicit knowledge distribution is an important function when it comes to assessing an organization's innovative capacity (Bontis, Chua Chong Keow, & Richardson, 2000; Abdullah & Sofian, 2012). Although the knowledge collected from higher up the chain through research and discoveries is predominantly implicit, the knowledge lower in the chain is mostly explicit and gradable. For such a system to work properly, organizations must construct resources and faculties that will allow them to easily encapsulate and codify knowledge and product development routines, thus making sure the transfer of knowledge is not hindered in any way (Cardinal, Alessandri, & Turner, 2001; Scarbrough, 2003).

Although innovation is a process that works with knowledge in many capacities, knowledge sharing particularly focuses on the availability of overt knowledge for recombination into up-to-date and innovative ideas. This is done through the many tools, process and platforms that knowledge sharing provides such as structuring the knowledge base for easy availability and accessibility to knowledge. Moreover, Knowledge sharing can also gather explicit knowledge internally and externally to be used in innovation. Furthermore, it also makes sure that knowledge gathered is of immense importance and also helps reveal the gaps in the overt knowledge of any firm which might adversely affect their innovation program (Svetlik, Stavrou-Costea, & Lin, 2007).

When it comes to tacit knowledge, knowledge sharing ensures the generation distribution and collection of influential knowledge. Since tacit knowledge plays a key part in the innovation process, knowledge sharing makes sure that this knowledge is adequately shared in collaborative contexts and also effectively codified into explicit knowledge for reuse in different circumstances (Gold & Arvind Malhotra, 2001; Tamer Cavusgil, Calantone, & Zhao, 2003; Seidler-de Alwis & Hartmann, 2008; Cohen & Olsen, 2015).

Knowledge sharing is also responsible for managing a variety of activities for the sufficient running of the innovation process. These activities consist of different phases in the generation, collection, leveraging and distribution of knowledge. With the help of these activities, knowledge sharing ensures that the knowledge is sufficiently integrated within an organization through structural and organizational contexts that would allow knowledge sharing and leveraging to take place (Pérez & Mesías, 2015; Ritala *et al.*, 2015). In light of this, Chen, Zhu, and Yuan Xie (2004) believes that knowledge integration is the process whereby information and knowledge is made available on timely basis to be extracted and applied at the right moment i.e. the distribution, exchange, evolution and refinement of knowledge for application in the right capacity and time frame (Herstad, Sandven, & Ebersberger, 2015; Revilla & Knoppen, 2015; Agostini, Nosella, & Filippini, 2017; Ansari, Malik, & Shehla, 2017; Buenechea-Elberdin, Kianto, & Sáenz, 2017; Chang, Liao, & Wu, 2017).

It is believed that any organization that has ineffective information and knowledge sharing systems is at a higher risk when it comes to exploiting knowledge for innovative purposes. Without knowledge integration, the impending advantages of knowledge cannot be completely understood since it would then not be able to bear insight or deep representation (Wang & Kourouklis, 2012). Hence, without knowledge integration, the complete potential of any data gathered for innovation cannot be understood nor can it be applied without the capabilities of adapting and linking to particular scenarios and contexts in the business realm (Casimir, Lee, & Loon, 2012; Wang & Kourouklis, 2012; Carmeli & Paulus, 2015; Akhavan & Mahdi Hosseini, 2016).

Another responsibility of Knowledge sharing is to ensure that the precise knowledge sharing required for innovation is easily accessible and available. According to Wade-Woolley and Heggie (2015) knowledge sharing helps gather implicit knowledge; both internal and external to the organization through various processes so that it can be available for innovation teams. On this note, Adams and Lamont (2003) notes that knowledge sharing tools like environmental scanning, benchmarking, intranets, firm-wide databases and communities help collect and make knowledge available and easily accessible around the organization. Other researchers like (Alegre, Sengupta, & Lapiedra, 2013; Noordin & Karim, 2015; Ritala *et al.*, 2015) as well agree that there is a significant positive relationship between knowledge sharing practices and innovation performance which means that organizations should work on an integrated approach for knowledge sharing that would help build a corporate culture and maximize innovation for having a competitive advantage.

In all, knowledge sharing creates structure where the value and application of knowledge is clearly identified and conveyed. Such a structure, therefore leads to various knowledge based processes and programs such as innovation capability. Moreover, it also brings about behavioral changes within an organization for the adequate generation, dispersion and leveraging of knowledge, e.g through performance measurement (Quinn, 1999;

Alegre, Sengupta, & Lapiedra, 2013; Gobble, 2013; Barker, 2015; Boh & Wong, 2015; Kim & Yun, 2015; Tong, Tak, & Wong, 2015). Hence, it can be concluded that knowledge sharing constructs a culture which encourages innovation capability.

When it comes to the association between human resources (HR) practices (training, supervisor support etc) and KS, managers have to carry out effective and efficient knowledge exploration process. Humanistic study is a branch within the academic portfolio that concentrated with HR practices that apply to particular knowledge management (KM) policies. Similarly, an information technology (IT) approach to knowledge sharing is centered upon encouraging the use of IT, the humanist approach is basically centered upon the creation of an adequate environment which is focused upon knowledge distribution (Gloet & Berrell, 2003). However, most authors are more comfortable with the integration of both approaches together (Haesli & Boxall, 2005)

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Moreover, the study of Gold and Arvind Malhotra (2001) concentrates on the study of HR practices and KS activity. HR management works as the infrastructure that proposes KS activities for attaining a competitive advantage over other firms. Therefore, organization must know the proper way to create and exploit knowledge, and HR practices that support KS activity (Wiig, 2012). Moreover, organizations should develop such an environment Gold and Arvind Malhotra (2001) that supports constructive opinions towards knowledge distribution, socialization plans and team performance appraisal to gain competitive advantage (Cabrera & Cabrera, 2005; Brewer & Brewer, 2010). On a similar note, the study of Currie and Kerrin (2003) highlights the need for

HR policies that focus on teamwork to overcome cultural barriers and lead to an easy flow of knowledge sharing. Likewise, the study of Arthur and Kim (2005) enlightens the importance of management support which led to a sharing conducive environment in term of submitting higher risk ideas and also increased productivity.

After analyzing studies from both KS and HR practices, we can see that there exists a positive relationship among KS activities and HR practices. Deducing from this point of view, this paper suggests knowledge oriented HR practices along with culture and leadership for innovative outcomes (Camelo-Ordaz *et al.*, 2011). On a comparable note, Chen and Huang (2009) positive and significant relationship has been found between knowledge sharing capacity, like knowledge sharing, in relation with certain strategic HR practices, like training and appraisals. Such practices will support and increase the contact between people and ideas, distribution, use, sharing and transfer of knowledge (Evans, Dalkir, & Bidian, 2015).

Similarly, (Laursen & Mahnke, 2001; Cabrera & Cabrera, 2005) research study acknowledges knowledge centered HR practices as those practices which play an important role towards building an atmosphere that let the organization to take advantage of knowledge investigation and exploration initiatives, such as interdisciplinary teamwork, planned job rotation, collection of employee proposals, delegation of responsibility, internal and external company training. Such exercises will encourage and increase the contact between people and ideas, distribution, use and transfer of knowledge (van Wijk *et al.*, 2012; Torugsa, 2013).

KS activities that involve investigation and exploitation are seen to enhance innovation and bring about organizational improvements, as extracted through many studies (Van den Hooff & de Leeuw van Weenen, 2004; Lin, 2007b; Miller, Bierly III, & Daly, 2007; Zack, McKeen, & Singh, 2009) however, the effects of these interactions with HR practices vary as Chen and Huang (2009) show in their research by making a clear distinction between knowledge achievements from exploitation.

Knowledge sharing has become an essential factor in management practices and seems to be an essential reserve for organizations and economies (Bock *et al.*, 2005). It is the collection, dispersal, generation and evaluation of knowledge. Study of (Bounfour, 2003; Bock *et al.*, 2005; Svetlik, Stavrou-Costea, & Lin, 2007) believes that, knowledge sharing is a combination of actions, infrastructures and mechanical and administrative tools, intended for the making, distributing, leveraging information and knowledge within and across organizations. It is also known as a methodical way of putting together worldwide organizational activities of obtaining, making, collecting, distributing, dispersing and deploying knowledge individually and collectively to meet organizational objectives. Although this is a multidimensional concept, there are three known components regularly discovered in research papers known as knowledge acquisition, knowledge sharing and responsiveness to knowledge application (Zhou & Li, 2012).

Since knowledge sharing is known to be an important variable when it comes to achieving a competitive advantage, many organizations have come to employ knowledge sharing practice in order to increase their overall competencies. Regardless of all, in order to generate novel knowledge or bring to use pre-existing knowledge, it is important for organizations to create an atmosphere that encourages risk taking, innovation and trust (Molina-Morales, Martínez-Fernández, & Torlo, 2011; Wang, Yeung, & Zhang, 2011; Olander *et al.*, 2015). Furthermore, despite the fact that many governmental and private organizations have employed the use of knowledge sharing, the concept is still very young and only limited to a few in the industry (Khilji, 2004; Van den Hooff & de Leeuw van Weenen, 2004). Hence, there is a serious dearth of scientific evidence regarding the cultural factors that encourage knowledge sharing processes and a knowledge prone culture (Oliver, Dostaler, & Dewberry, 2004; Oliver & Reddy Kandadi, 2006).

Moreover, there is also need to focus on scientific issues relating to societal aspects which then leads to poor and neglected knowledge sharing practices. But in fact, there is a serious dearth of adequate scientific evidence on the literary variables that encourage knowledge sharing processes (Oliver & Reddy Kandadi, 2006). Hence making it a top priority mission to understand and research upon the factors that lead to the success and failure of knowledge sharing practices. Since most of the present studies have been carried out in America or Europe, they cannot be fully applied to developing nations. Hence to overcome this issue, it has been conducted with a collective sample to provide empirical evidence over the different factors that inhibit or support knowledge sharing activities.

Today, management sharing revolves around an array of knowledge centered practices such as knowledge recognition, generation, novelty, distribution and development of talent. Moreover, even economic competition has evolved drastically over the years due to inevitable globalization, increase in information technology, the easy accessibility to knowledge and changing organizational structures (Alegre, Sengupta, & Lapiedra, 2013). The importance of knowledge is as such that today the economy is singularly knowledge centered where there is a trade of information, innovation and other types of knowledge generation (Supyuenyong & Islam, 2006).

Different schools of thought have categorized knowledge in different ways. For example, in academic literature the concept of cognitive and constructionist point of view is very dominant in knowledge based research. Moreover, there are also the ontological dimension and the epistemological dimension where the former focus on individual collective knowledge and former is focused on explicit and implicit knowledge (Wang & Han, 2011).

However, when it comes to knowledge sharing, different researchers have defined the concept in very diverse ways. For instance, Roberts and Amit (2003) describes knowledge sharing as "The design, review and implementation of both social and technological processes to improve the application of knowledge, in the collective interest of stake holders". On the other hand, Nonaka (2007) believes knowledge sharing to be "knowledge-based management" where the connection between different people or people to information leads to competitive advantage. In reality, knowledge sharing is actually a human resource management activity more than being a skill based resource hence not just being a high-tech reserve which improves the efficiency of knowledge but in fact it is a complete activity which leads to motivating people to make the best use of their knowledge and creativity with the help of modern technology (Jaakkola, Luoma et al. 2015).

Many researchers have focused specific processes and activities within the area of knowledge sharing Lee, Lee, and Kang (2005) brought forth the Knowledge Circulation process that can be determined by knowledge generation, collection, distribution, operation and internalization. Similarly, researchers like Thomas, Sussman, and Henderson (2001) introduced four stages of knowledge sharing that take place within an organization. These include the creation, acquisition and sharing of knowledge and the interpretation and application of knowledge to reach organizational goals. On the other hand, Darroch (2003) believes that knowledge dissemination and responsiveness are much more important components of knowledge sharing rather than the creation and acquisition of knowledge.

On the contrary, knowledge sharing is as important as any other since it deals with many kinds of knowledge like implicit or overt by supporting positive interrelations between people from various backgrounds (Lee, Lee, & Kang, 2005). On a similar note, even Nonaka (2007) believes that innovated organizations are a hub of generating and processing knowledge. For example, the interaction of different environments leads to a healthy absorption of information which when converted into knowledge and applied alongside experience, values and rules becomes a strong threshold to beat. Moreover, Nonaka (2007) also hypothesizes that knowledge creation is similar to an upward spiral process where it begins on an individual level and moves upwards to a collective group level, hence reaching an organizational level and sometimes even going beyond towards an inter-organizational level. However, Gold and Arvind Malhotra (2001) is of another view supports his argument with empirical knowledge where he believes that knowledge sharing is due to a vibrant knowledge infrastructure via technology, culture and various other processes. But other researchers like (Adenfelt & Lagerström, 2006; Svetlik, Stavrou-Costea, & Lin, 2007) believe that knowledge sharing is solely dependent on individual activities whereby implicit and overt knowledge is distributed and later put together and refined for the development of knowledge.

In summary, knowledge sharing was found to be significantly associated with innovation capability to sustain in the business and creative role in the country GDP of dairy SMEs. The above mentioned studies indicated that the innovation capability cannot increased without knowledge sharing.

3.5. Individual factors (trust, motivation)

HR management has to make all the policies and practices that will influence employee performance, approach and presentation (Gloet & Berrell, 2003). When it comes to KM projects, HR initiatives help getting employees involved so that the access and generation of knowledge could become easier (Alavi & Leidner, 2001; Cabrera, Collins, & Salgado, 2006). Individual factors like trust and motivation among employees create an urge in them to enhance the innovation capability of the organization by gathering, managing and sharing the knowledge. Several studies highlighted and discussed the individual factors like top enjoyment in helping other, self-efficacy, attitudes (Svetlik, Stavrou-Costea, &

Lin, 2007; Rahab, 2011). But the most importantly that trust and motivation is also come under the umbrella of individual factors. The prior studies totally neglected these individual factors (Svetlik, Stavrou-Costea, & Lin, 2007). There are very few studies that investigated the impact of different individual factors on knowledge sharing and innovation capability.

3.5.1 Trust

Trust, is said to be the most important factor that determines the basis of any knowledge based relationship built on the norm, reliability and the explicit truth. Research by (Lorenzen, 2005, 2007; Fleig-Palmer & Schoorman, 2011) concludes that for the abundant production of any knowledge or the adequate use of already present knowledge, there is a need to be a safe and trustworthy environment that would eventually lead to innovation based on research and development which are the very basis of knowledge itself. Trust, in its true essence is a system of beliefs and norms that threads a whole society together in a cooperative and consensual manner between different parties within the community (Fukuyama, 1995).

However, some believe that trust is associated with a degree of professionalism which is beyond the realm of individualism (Wang, Ashleigh, & Meyer, 2006). Moreover, as mentioned before, trust is said to be an important precursor to knowledge (Lee & Choi, 2003) while communal or mutual trust is linked to gaining knowledge (Politis, 2003).

On the same note, one can say that trust acquisition is positively linked to the interpersonal relationship a group of people have; this way a sub group will adequately honor the wishes of the other without imposing or suffering any degree of control to or from the other party in question (Zhang *et al.*, 2008). Nonetheless, trust an important key in all spheres of life as it establishes close relationship (Gibbons, 2004), make possible healthy discussions and agreements (Olekalns & Smith, 2005), reduce negativity within firms (Bharadwaj & Matsuno, 2006), and also plays an important role in putting an end to international political instability (Kelman, 2005), all of which is very important for knowledge sharing and innovation. In short, trust plays an imperative part when it comes to the creation of organization. Similarly, even in organizational settings, trust is said to play an important role in enhancing cooperation among employees (Shockley-Zalabak, Ellis, & Winograd, 2000), organizational citizenship behavior (Finkelstein, 1926; Latham, 2000), commitment to the company (Aryee, Budhwar, & Chen, 2002) and also individual loyalty. Although, building a trusting relationship with employees is high on the employer's to-do list, it is usually a very challenging task, especially when it comes to preserving an employee's trust in the organization in the long run.

Distribution of knowledge or knowledge sharing is also highly dependent on trust among employees and with employers. Trust is an intricate phenomenon whereby employees place their faiths in organizational goals and leader on the pretext that every deed done by the organization will in the end be profitable for the employees (Renzl, 2008). This kind of belief is largely associated with the concept of interpersonal trust where one party is in a comparatively weaker position than the other (Mayer, Davis, & Schoorman, 1995).

Researchers like Von Krogh (2002) believe that other than clear direction oriented organizational objectives and vision; the organization should also invest in encouraging knowledge sharing activities among employees on the basis of trust and confidence. The more trust there, the more encouraged employees would be to share knowledge with each other (Chow & Chan, 2008). By trusting the organization, employees develop faith that they will not lose their unique worth in the firm which then further encourages motivation to document all the shared knowledge as well (Renzl, 2008). Research and insight from former SME employees suggests that knowledge sharing is increased when there are adequate levels of trust among one another which would also help the organization to grow and become highly competitive in the trade.

3.5.2 Motivation

Motivation is the individual skill to represent knowledge base related action (Rothschild, 1999). Past research indicated that motivation is encouraging the employee to generate novel ideas and sharing the knowledge for enhancing the performance of SMEs firms (Amabile, 1996). According to Shalley, Zhou, and Oldham (2004) motivation is the good predictor for creative performance. In the study of Bright (2013) highlighted that the importance of individual motivation, motivation is not the matter of organization and individual, it also has a significant role between individuals and job performance (Amabile *et al.*, 1996; Utman, 1997). Empirical evidence suggests that the motivation is related to knowledge sharing and innovation capability (Shalley, Zhou, & Oldham, 2004).

Motivation is an individual willingness to act (Rothschild, 1999; Siemsen, Roth, & Balasubramanian, 2008). Motivation is the emergence of individual behavior which is based on the knowledge sharing and generation within the networks of an organization (Stevenson & Jarillo, 2007). The knowledge sharing, Organizational networks and behavior play an important role between individual beliefs, values and attitudes or rewards for doing so (Zahra, 1993; Zahra & Covin, 1995). In the organizational context motivation is a tool to promote work and exchange the information with other fellows, leading to innovation capability (Spender, 1996; Hornsby, Kuratko, & Zahra, 2002; Morris, Kuratko, & Covin, 2010).

Research revolving around HRM and KM shows that rewards and compensation seem to be an important factor for KS. For instance, research done by Mohrman, Finegold, and Klein (2002) claims that human resource management activities for compensation and advancement ought to be aimed towards increasing employee motivation which would then in return enhance their performance and lead to knowledge creation, sharing and transfer. By adequately redefining employee and employer relationship, the employees will start considering this as an essential part of their jobs (Rothschild, 1999).

Researcher like, Cyril Eze, Guan Gan Goh et al. (2013) believe that motivation is synonymous to the concept of willingness where an individual exercises effort to achieve collective firm goals which are in turn able to satisfy and gratify needs on a personal and individual level. Motivation can be broadly divided into two categories. Motivation deals with goal directed behavior where the end result is material rewards or profits (Geisler &

Wickramasinghe, 2015). On the other hand, motivation is more personal in nature whereby the goal directed behavior leads to implicit rewards like pleasure or satisfaction after completing a task (Wasko & Faraj, 2005).

According to many researches, employee motivation is the root cause of adequate knowledge sharing that takes place within an organization (Svetlik, Stavrou-Costea, & Lin, 2007). Similarly, knowledge sharing is the prerequisite of innovation capability. Previous studies show that employees with high levels of motivation are in fact very pleased and happy with their companies hence, being more willing to impart knowledge and share ideas and experience openly with other members of the organizations for the combined benefit of the firm (Burke *et al.*, 2011). Therefore, it is assumed that employees working in SMEs would show higher levels of motivation thus, is more willing to share knowledge and experiences to other colleagues.

3.5.3 Relationship between individual factors (trust, motivation), knowledge sharing and innovation capability

DeTienne, Dyer et al. 2004, Mehta (2008) believes that human and technical resources are important factors that determine the effectiveness of KS. As proposed by (Bollinger & Smith, 2001), they believe that human behavior to be the important factor that determines whether KS would work out in an organization because it places a lot of importance on the overall organizational culture which consists of sharing and teamwork collectively. To motivate employees to willingly transfer their knowledge and expertise for the effective running of the organization, managers should be properly trained and coached in stimulating leadership roles and exercises (Roth, 2003; Yang, 2007b).

3.5.3.1 Trust, knowledge sharing and innovation capability

The researcher argued that trust is much important that employee share their expertise, skill and knowledge for the fruitful innovation (Svetlik, Stavrou-Costea, & Lin, 2007; Camelo-Ordaz *et al.*, 2011). In spite, recognition the aspects that allow employees to share their expertise and knowledge is matter that has not much discussed in the past literature (Nonaka & Takeuchi, 1995; Shih *et al.*, 2006; Chang & Lee, 2007).

Many researchers conclude that significant relationships of individual trust to increase the knowledge sharing activities (Schaufeli, Bakker, & Salanova, 2006; Smith *et al.*, 2006). Moreover, trust on employee is basic fundamental for increased communication level and approachability as well as for knowledge sharing (Willem, Buelens, & Scarbrough, 2006; Willem & Scarbrough, 2006; Akhavan & Mahdi Hosseini, 2016). Trust can reduce the level of uncertainty, motivated risk taking employee and cultivate a constructive environment which are used to increases the willingness of employees to knowledge sharing with colleagues (Svetlik, Stavrou-Costea, & Lin, 2007). In the prior study, trust was used as the facilitators and supported factor of knowledge sharing (Hau, Kim, & Lee, 2013). According to Akhavan and Mahdi Hosseini (2016), various researchers believe that when managers trust on employees, people and employees are more active to offer useful knowledge. Furthermore, whereas trust exists, employees are more willing and motivated to accepted and listen each other knowledge at working place (Witt, Andrews, & Kacmar, 2000; Smith *et al.*, 2006).

In the previous studies and literature, trust is considered as an awful variable that effects on organizational efficiency, effectiveness and performance. In the study of (Nyhan, 2000) trust as the hope of an individual and behavior of individual person or a group would be personally and selfless beneficial. Trust is the tool in organization that measure evaluation of employee working in organization (Huemer, 2004).

From this perspective, trust is an extent of employee's own feelings and perceptions that further refers to the belief that will action for the subsidy of employees. Furthermore, in trust environment employees would have less fear and anxiety of making wrong decision and mistakes. Thus, employee feel more relaxed and become more innovative. Inventiveness is to occur in high level of trust environment, because lack of trust reduces innovation capability. When there is no mutual trust between the organization and the employee, organization tend to have effective control systems based on procedure and rules, which prevent creativity and inventiveness (Çakar & Ertürk, 2010).

In low trust, organizational environment, high uncertainty avoidance culture would be the dominant culture, in which risk-averse attitudes imply not taking avoidable risks and only adopts innovations if its effectiveness and value have already been proven (Waarts & Van Everdingen, 2005). Scholars have recently utilized trust and it has been proposed that only creating an atmosphere of trust in the organization can enhance organization's efficiency and innovation performance (Shockley-Zalabak, Ellis, & Winograd, 2000). Further, Nicholson *et al.* (2005) also suggested that a non-threatening environment with high trust allows decision makers and employees to pursue more innovative strategies.

The existence of trust would probably increase the willingness of an individual employee to accept responsibilities and shared their expertise, which improves the ability of becoming innovative and creative. Edwards *et al.* (2001) proclaims that a rich culture which has trust is the only way to benefit management from knowledge sharing. Furthermore, Xiao *et al.* (2010) argues that lower level of trust increases the probability of failure of a firm, which forbids the personal empowerment efforts and knowledge sharing activities to result in success. Xiao, Zheng et al. (2010) further claims that the relationship of trust between employees and manages can create an atmosphere for sharing knowledge and ideas to obtain certain goals.

Kim and Ko (2014) also highlighted that the results of effectiveness of knowledge sharing not only depends on assessment of individual but it is also relying on individual work tasks and contextual factors such as interactions of employees and level of trust between subordinates and superiors. Employees seek trust that if they take risk, initiative, and making mistake or introduce new way doing their task will not face fear. In order to produce positive results of knowledge sharing, employees have to trust their organization that their organization wants to empower them. The employees must show willingness to exploit the knowledge sharing activities given to them to harvest new opportunities. Given this scheme, we suggest that the relationship between the trust and knowledge sharing will be stronger for employees who have stronger trust in their organizations. Thus, we predict that higher level of employee trust in the managers is likely to strengthen the effects of knowledge sharing.

In summary, very limited studies indicated a positive relationship exists between trust, knowledge sharing and innovation capability. A trust may help dairy SMEs to gain the maximum chance of the success in the dairy business.

3.5.3.2 Motivation, knowledge sharing and innovation capability

In the past literature, several studies have tried to recognized motivation that is most effective and valuable in supportive employees to knowledge sharing (Wasko & Faraj, 2005; Hung *et al.*, 2011; Hung, Lai, & Chang, 2011). The motivation literature offers a different perspective that an organization can used to build the relationships with its employees. In one hand, motivation can build strong relationships between employees and firms to enhance the knowledge sharing practices (Hau *et al.*, 2013). On the other hand, motivation involved employees to knowledge sharing which represent a more innovation capability (Collins & Clark, 2003). A growing discussion on literature provides the evidence that motivation play a significant role in knowledge sharing activities (Hau, Kim, & Lee, 2013). Additionally, Stenmark (2001) argued that knowledge sharing scarcely developed without individual motivation. Motivation is the most important and studied factor directing employees to share their expertise and knowledge (Lin, 2007a; Hau *et al.*, 2013).

Knowledge becomes more valuable and powerful tool in current business environment for the quality and maximum production of the firms. To gain high level of production, firm must sustain and develop its motivational factors or implemented motivational factors in the organization (Ipe, 2003). The concept of "motivation" is used to define as the firm resources that are used to bring an innovation capability through the knowledge sharing (Rahab, 2011; Setyanti *et al.*, 2013). In other word, motivation is therefore considered as intangible resources that are pertaining to increase the innovation capability (Sulistiyani & Harwiki, 2016). Motivation factors can allow the employee of the firms to share their expertise and knowledge to develop more understanding around the need of the firms and able to perform more tasks in the organization (Utami, 2013).

Several studies indicated that motivation factors can improve the outcomes and commitment of the firms (Ahmed, Nawaz, Iqbal*, et al.*, 2010). Motivation and knowledge sharing have a significant relationship (McDermott, Mordell, & Stoltzfus, 2001; McDermott & O'dell, 2001). Moreover, motivation can facilitate the sharing of knowledge and can influence on the innovation capability of the firms. Researchers stated that the absence of motivation, employee of the firms feel pain to share their knowledge and expertise (Dyer & Nobeoka, 2000). In the study of (Stenmark, 2001) mentioned that employee in the organization not share their knowledge and ideas without providing the motivation. Motivation factor is the perceived power that influenced on knowledge sharing (Dayan & Balleine, 2002). Knowledge sharing is an opportunity to improve the innovation capability by using the motivation (Bartol & Srivastava, 2002).

In summary, motivation and trust revealed positive results when associated with knowledge sharing, both specifically and generally. Motivation and trust often helps enhance innovation capability and prevent failure and hurdles because it raises the degree of confidence to participative role in the success of SMEs. Additionally, alerts dairy SMEs how to survive in the business. On this basis, a positive relationship theoretically exists between motivation, trust, knowledge sharing and innovation capability.

3.6 Organizational factors

The role of organizational factors in knowledge sharing and innovation cannot be denied. There are various organizational factors that can lead to increased innovation capability but this study has taken into account only two factors namely supervisor support and training and development. The limited studies have been tested the relationship of supervisor support, training and development with innovation capability and knowledge sharing (Freel & Marke, 2005; Çakar & Ertürk, 2010; Büschgens, Bausch, & Balkin, 2013).

3.6.1. Supervisory Support

For the adequate generation and distribution of organizational knowledge, top management support is considered highly important (Connelly & Kevin Kelloway, 2003). Support for this comes from many studies and researches where it has been found that top management helps develop an encouraging climate and also open doors to many new sources (MacNeil, 2003; Lin & Lee, 2004; Lin, 2006), on separate accounts, both have highlighted the importance of top management support system as it encourages a knowledge sharing environment in every firm.

Another incentive that organizations give for knowledge sharing is organizational rewards. Through monetary incentives like salaries and non-monetary incentives such as promotions, organizations are able to adequately highlight their values and norms which in turn determine employee behavior patterns. Rewards systems are well accounted for in many companies, for example, Buckman Laboratories are known for holding an annual resort conference where they acknowledge their top 100 knowledge contributors. Another example can be derived from a division of IBM known as Lotus Development whose one fourth of employee evaluation is based on the degree of knowledge sharing activities (Bartol & Srivastava, 2002).

3.6.2. Training and development

Any firm with a clear-cut knowledge strategy understands the need for appropriate training and development for it is the direct means for enhancing KM through sufficient employee efforts (Scarbrough, 2003). Moreover, KM advocates firmly believe that adequate HRM practices are the precursors of knowledge processes (Grandori, 2001; Foss, 2007; Foss & Minbaeva, 2009). Similarly, KM plays an important role in the HRM department of any organization especially when it comes to knowledge sharing (Scarbrough 2003).

Knowledge sharing and generation can be instilled in employees through both tangible and intangible incentives. Moving on, another factor determining KM is career systems which through training and sufficient education helps retain invaluable employees when they are on the verge of leaving the organization (Scarbrough 2003).

3.6.3 Relationship between organizational factors (training & development, supervisor support), knowledge sharing and innovation capability

The best way to include KM processes of sharing and creating knowledge in the workings of any organization is through effective HR exercises like training and cooperative teamwork (Currie & Kerrin, 2003; Cabrera & Cabrera, 2005; Chen & Huang, 2009).

Through training and development, firms can develop the best organizational expertise in terms of knowledge sharing for innovation (Weisberg, 2006; Chen & Huang, 2009). Investment in training can develop and bound the employee to share their expertise at all levels of the organization which is likely to provide ideas for enhancing innovation (Torraco & Swanson, 1995).

Researchers have effectively grouped KM practices into two distinct categories, exploration and exploitation (Grant, 2002). Exploration practices have to do with gaining new knowledge which would in turn help produce new practices or products. On the other hand, exploitation practices have to do with the adequate utilization of preexisting knowledge (Grant, 2002; He & Wong, 2004). However, many strategic scholars are still very skeptical about the exclusive or complementary workings of these processes depending on many issues faced within the organization such as environmental conditions and so on (Gupta, Smith, & Shalley, 2006; Revilla, Prieto, & Prado, 2010).

For boosting KM initiatives within any organizations, it is highly important that factors such as knowledge transfer and sharing of innovative ideas should be applied (Jansen, Van Den Bosch, & Volberda, 2006; Singh, 2008). Therefore, organizational innovation capability will be considered as a dependent variable in this study because it is a proven result of KM effectiveness and also happens to be important to knowledge sharing companies for obtaining a competitive edge in the industry (Nonaka, 2007). Also, today many studies on knowledge sharing and intellectual capital consider innovation to be an organizational end result already (Subramaniam & Youndt, 2005; Chen & Huang, 2009). The study of Cui, Griffith, and Cavusgil (2005) believe that knowledge management capacities are rooted in three combined practices of knowledge creation, management and sharing (Gold & Arvind Malhotra, 2001). Since knowledge sharing is highly imperative variable in achieving competitive advantage, it is of much importance to any firm (Yew Wong, 2005).

Training is known as well establish practice which is developed by organization in order to guide its employee in process of learning for skill and knowledge (Noe, 2010; Wang & Noe, 2010). Training plays an important role in facilitating knowledge sharing (Psarras, 2007). Training and development is basically an opportunity given by an organization to their employee for improving their skills and expertise to knowledge sharing (Ipe, 2003).

In the previous research, training and development was the taken as the most influence factors on knowledge sharing (Branine, 2005; Asgharian *et al.*, 2013).

Therefore, KM capabilities are in fact a new way of referring to knowledge sharing processes that effectively generate and apply knowledge within an organization (Gold & Arvind Malhotra, 2001; Yew Wong & Aspinwall, 2005). In the study (Gold & Arvind Malhotra, 2001; Cui, Griffith, & Cavusgil, 2005), claim three main processes of attainment, reconstruction, and operation in relation to knowledge sharing activities held within an organization. Even though there are many more perspectives of KM, this study will primarily be focusing on only three classifications in relation to organizational capabilities.

In summary, training & development and supervisor support showed positive results when associated with lack of innovation capability, both precisely and commonly. Training & development often helps of SMES to enhance the innovation capability and provide the better success and growth of the dairy SMEs in the business. In addition, supervisor support also have vital role in enhancing the innovation capability through knowledge sharing. On this basis, a positive relationship theoretically exists between training & development and supervisor support and innovation capability.

3.7 Technological Factors (ICT use)

Technological frameworks are IT functions and systems that assist an organization with the gathering, structuring, application and transfer of knowledge through different means such as document repositories where explicit knowledge is converted to implicit or the other way around and similarly transferred or shared through different applications such as multimedia or discussion forums and so on (Mehta, 2008). After the inception of KS, technological advancements that could assist have been diversely examined (DeTienne *et al.*, 2004; Yang, 2007a). Even though people management and human-related supporting factors for KS have recently been seriously focused upon, even then there is a strong requirement for sufficient empirical facts to properly help KM (DeTienne *et al.*, 2004; Yang, 2007a; Matzler *et al.*, 2011).

However, KS research is still limited to only focusing on those aspects that promote or delay knowledge sharing processes of generation and distribution (Alavi & Leidner, 2001). For instance, research by DeTienne *et al.* (2004) deduces that any work atmosphere with KM implementation that does not encourage the sharing of knowledge and does not provide incentives and expectations will inevitably lead to the failure of an organization. In the light of these, (Earl, 2001; Garavelli, Gorgoglione, & Scozzi, 2004) believe that the development of KM strategies becomes relatively easy when taking place in an environment where ''knowledge culture'' is predominantly present which makes execution along with other essentials like human resource practices, leadership and so on easy. Similarly, Gold and Arvind Malhotra (2001) claims that there exists an association between ''knowledge infrastructure capacities'' of the organization, KM capabilities and organizational efficiency. These writers propose that companies with an open and trust oriented atmosphere is more likely to develop behaviors that are inclined towards sharing of knowledge thus leading to innovation. Moreover, Olander *et al.* (2015) believes that trust and collaboration may initiate generation, sharing and application of knowledge, there are many other factors that also encourage these processes such as individual power and competition which lead towards autonomy and hence encourage knowledge processes. Similarly, (Jarvenpaa & Staples, 2001; Pan & Leidner, 2003) also believe that common organizational principles lead to more sharing of knowledge within the organizational members.

The Resource - Based View of the firm (Barney & Ouchi, 1986; Barney, 2001; Kor & Mahoney, 2004) has influenced a lot of extant research on the business value of ICT used. Earlier, ICT used was treated as a resource that created significant differences between firms. Many factors influence the firm's innovativeness. However, many researchers highlighted that the ICT is most powerful factors for the SMEs firms since 1980 (Clemons & Row, 1991; Barney, 1999). ICT is a considered as most supportive tool for business world. However, with the passage of time technological has increase the productivity of SMEs firms (Lee *et al.*, 2012). This pattern of growth is due to the technology advancement. Technological diffusion or infusion is attributes of the information that ICT introduce into an organization creates a further technological need and encourages product and policy innovation to fulfill such needs (Ahmed, Nawaz, Ahmad, *et al.*, 2010; Tong, Tak, & Wong, 2015).

3.7.1 Relationship between technology factors (ICT use), knowledge sharing (KS) and innovation capability

Information communication technology (ICT) within the firms increases the firm's capabilities and skills, and this would be a way going towards the effectiveness and for better performance of the firms (Svetlik, Stavrou-Costea, & Lin, 2007). Also, debating the relationship between innovation capability and ICT established on the RBV Theory viewpoint strongly explains this type of relationship. It is well known; resources are leads to capabilities (Amit & Schoemaker, 1993). Consequently, the major idea is, ICT used in the different firms give different types of resources, whether it is tangible or intangible; tangible or intangible resources help to give and build skills, capabilities that can be connected to innovation contained by the firms. Due to this, applying a group of practices that are from ICT like group ware, intranet and data base management supports the organization with various resources, such as knowledge, communication system, experiences and skills, systems among others. In the presence of these resources, helpful to construct the organization capabilities in satisfied aspects. Furthermore, it will help to improve the working capacity, effectiveness of the firms and increase in the production level. Increasing these capabilities leads to support, enhance and improve the innovation capability. In addition, the effect of ICT on innovation capability may be the reason to grow up of the firm.

Information and communication technologies are said to be facilitators of organizational knowledge processes and this assertion has been supported by much literature which claims that ICT systems are important tools in knowledge sharing. For instance, Adams and Lamont (2003) assert that knowledge sharing practices or broadly known as Technological information systems which are a combination of hardware, software and other means that assist with communication and information handling, play an integral role in developing a competitive advantage in the industry (Nguyen, Newby, & Macaulay, 2015; Tong, Tak, & Wong, 2015).

After doing an in-depth analysis of ICT in organization based KM ventures, Davenport and Prusak (1998) came to a conclusion that IT helps with two main functions. The first consists of the generation of knowledge archives which includes both internal (e.g research reports) and external knowledge, and secondly by helping improve different knowledge accessible portals and network by establishing various directories.

Other researcher like Alavi and Leidner (2001) believe that knowledge sharing systems can be used to formulate many different forms of KM support with the help of different ICT resources. They also point out four different ICT capacities that can be employed. The first one has to do with knowledge creation whereby combing new sources of knowledge with time efficient sharing systems so that intra-knowledge sharing within the organization can be greatly improved. Second, capacity of and ICT system has to do with effective retrieval and storage of invaluable knowledge gained by any organization. Thirdly, by providing many different communication channels, an ICT system encourages knowledge sharing within the organization. And lastly, an ICT system incorporates knowledge into the daily routines as a means of supporting knowledge application. In all, by using ICT systems (Nguyen, Newby, & Macaulay, 2015; Tong, Tak, & Wong, 2015), KS can be effectively facilitated the innovation capability with ICT use.

In the research of Zuboff (1988) discussed an organization's production processes and the three major impacts of information technologies on them in her book ''in the age of the smart machine: The future of work and power''. The first one is automaton of various processes whereby information technologies takeover human labor activities. The second one is improved information whereby decision making becomes much more methodical and effective. The third one is transformation which allows the firm to upgrade their systems to attain maximum levels of output or efficiency (Dedrick, Gurbaxani, & Kraemer, 2003). While information technologies are well known for their primary role as production technologies, however, their greatest contribution is the effective coordination between different processes (Dedrick, Gurbaxani, & Kraemer, 2003; Tanriverdi, 2005) which therefore allows significant exchange of information and knowledge across the organization.

Most studies have been conducted on performance of ICT in the payoff literature (Dedrick, Gurbaxani, & Kraemer, 2003; Devaraj & Kohli, 2003) which highlights the monetary benefits of setting up ICT systems. While most of the studies have led to contradictory findings, recent critical reviews Devaraj and Kohli (2003) emphasize on the usage of information technologies in link to managerial structures and plans (Dedrick, Gurbaxani, & Kraemer, 2003). Such reviews draw attention to factors other than the financial spending on the installment of these systems such as their initial goal of facilitating knowledge and their efficiency on the basis of the organization's strategies and managerial practices. If these factors are duly included and accepted, then a constructive trend between ICT and organizational functioning came in to exist. When linked to Knowledge sharing, ICTs can be specifically seen in the light of facilitating knowledge work processes rather than the individual importance placed to their mere existence. However, ICT systems for knowledge work should be developed keeping in mind the user's needs, easy to use platforms, concentrating on all knowledge based platforms whether they are tacit or explicit and giving enough training to users as well as maintaining the ICT systems too (Hasanali, 2002).

While ICT systems are regarded as crucial players when it comes to knowledge work processes and organizational performance, there exists very little investigation on the link between knowledge sharing and performance other than the usual case studies. Similarly, Zaim, Tatoglu, and Zaim (2007) also believes ICT tends to improve KS functioning. Moreover, Gloet and Terziovski (2004) found a positive relation between increased innovation and ICT that focuses primarily on quality and productivity especially when applied to a KS activity.

On the other hand, after studying the relations of KS, knowledge generation practices, organizational ingenuity and functioning, (Hendriks, 1999; Lee & Choi, 2003) came to a conclusion that the ICTs only improve the transformation stage of knowledge sharing without having any significant effect on other variables. This therefore in turn suggests that the lack of proper research done on the associations between ICTs for knowledge sharing and performance does not completely support the theoretical claims on the input of ICT to knowledge-based value generation (Svetlik, Stavrou-Costea, & Lin, 2007; Nguyen, Newby, & Macaulay, 2015).

Therefore, there is still a need for more research on the subject at hand. However, based on the present theoretical deliberations, it can be concluded that ICT play an integral role in sharing knowledge as assets of any organization while empirical evidence supports its role in increasing an organization's innovative streak. Thus, ICT manage an organization's knowledge effectively and efficiently which adds to its competitive standing in the market.

In summary, information communication technology is allied to innovation capability and knowledge sharing, s illustrated by many studies, suggesting that information communication technology use is important factors that influence the issue of innovation capability in organizations and enhance the role of organization in the GDP.

3.8 Industry Factor

Many scholars have diverted their research ventures towards exploring the relationship between industrial cluster resources, knowledge sharing and innovation in the last few years (Arikan, 2009; Phelps, 2010; Casanueva, Castro, & Galán, 2013; Connell & Voola, 2013; Gnyawali & Srivastava, 2013).

3.8.1 Industry Cluster Resources

Knowledge sharing has proven itself to be one of the most necessary variables for any company. And because of its ever-increasing demand, large scale firms come across issues regarding the sharing of knowledge for corporate innovation activities. For innovation capability, firms usually look towards cooperating with other firms to encourage in cross-organizational learning due to the complex nature of knowledge sharing and their limited resources (Casanueva, Castro, & Galán, 2013).

Regional development has greatly improved because of a recent organizational form called industrial clusters. These vibrant connections are known to lower any firms' investment costs and help acquire cheap professional labor, up-to-date knowledge and various other techniques that improve and encourage competitiveness (Casanueva, Castro, & Galán, 2013; Connell & Voola, 2013).

Recent literature on industrial clusters discusses the relationships and effects of it on competitive advantage (Bell, Tracey, & Heide, 2009; Zhang & Li, 2010), innovation capability (Phelps, 2010; White & Bruton, 2010; Gnyawali & Srivastava, 2013) and the knowledge sharing of cluster firms (Arikan, 2009; Casanueva, Castro, & Galán, 2013). Even though, knowledge sharing is said to be the most important thing when it comes to innovation capability in any industrial cluster (Arikan, 2009; Belso-Martínez, Xavier Molina-Morales, & Mas-Verdu, 2011). However, knowledge sharing in terms of innovation capability has been ignored (Connell & Voola, 2013).

The existing literature fails to answer very basic questions in this regard. It is still unknown how well is knowledge sharing in relation to cluster firms recognized in the industry especially, due to the recent increase in the awareness and significance of knowledge sharing and innovation? And, is corporate knowledge sharing and performance significantly affected due to the special features and factors of cluster firms? This study has investigate theories and variables that measure the effects of industry cluster knowledge sharing on innovation capability and substantiation in order to contribute to existing literature and practical management (Casanueva, Castro, & Galán, 2013).

Statistically, according to WEF (World Economic Forum, 2007–2009), Taiwan ranks at the top in terms of its industry cluster development. Despite many economic reforms in China, Taiwan is still leading when it comes to economic development. Due to this very reason, China, along with 200 more economic zones, have adopted the Taiwanese Export Processing Zones model.

In relation to the effect of industrial clusters, knowledge sharing and information exchange networks by firms would lead to successful innovation capability (Breschi & Malerba, 2001). Therefore, highly developed knowledge and information sharing cluster zones are regularly pursued by companies because of their ability to strengthen capabilities and knowledge bases of local industries (Maskell, 2001b). This is because the knowledge economies have the ability to improve different company's capacities and encourage knowledge creation due to the exchange of information and knowledge intra-cluster wise (Arikan, 2009; Casanueva, Castro, & Galán, 2013).

On the basis of these conclusions, this study implies that for the adequate formation of knowledge, the sharing and exchange inside any industrial cluster is imperative. By using the right resources of clusters and depending on the relationships that firms have for sharing knowledge, has a direct positive effect on innovation capability. This is because industrial clusters play an important role in inducing completion and cooperation within many industries through networking and enhanced performance (Ren *et al.*, 2015).

According to the RBV theory, developing cluster resources improves transactions because constructive interactions are certain aspects that lead to maintaining a competitive advantage over companies (Bell, Tracey, & Heide, 2009). This perspective is duly supported by many other theorists and researchers like (Phelps, 2010; White & Bruton, 2010; Zhang & Li, 2010; Gnyawali & Srivastava, 2013) who believe that innovative performance is a byproduct of industry clusters. Hence, it can be concluded that industrial clusters cut down on many costs as they help companies obtain many assets. Therefore, this approach encourages industrial clusters which lead to innovation capability.

3.8.2 Relationship between industry cluster resource, knowledge sharing and innovation capability

Industrial clusters and resources, if employed as a policy tool can help enhance economic development by cutting back on investment costs, through easy access to suppliers and by developing a high-tech work force that functions on the basis of many information and knowledge exchange and sharing channels (Tallman *et al.*, 2004). Knowledge sharing reinforces organizational alliances Lissoni (2001) by imparting important business management skills through industrial clusters (Lijun & Binbin, 2010). In support of this, Yli-Renko, Autio, and Sapienza (2001) also found out that networking can lead to powerful sharing of information and adequate utilization of knowledge that has be acquired for innovative performance. Due to this process, shared knowledge is sufficiently diffused inter and intra organizationally.

Moreover, this literature also highlights the importance of industrial clusters as it enhances an organization's knowledge creation and distribution capacity which in turn affects their innovative performance (Arikan, 2009; Connell & Voola, 2013). Hence, governments, frequently employ this process into policies to enhance economic development regionally as it helps firms to gain easy access to skilled work forces. Moreover, other techniques that accelerate innovative tendencies through industrial clusters it becomes very easy for firms to obtain factors that enhance innovative performance.

In summary, the above mentioned studies revealed that this study concurs that there exists a relationship between knowledge sharing, industrial clusters and innovation capability. Additionally, the industry cluster resources play an important role in enhancing the innovation capability with knowledge sharing. It is noted that the chances of the success in the business enhance through the cluster resources.

3.9 Literature Gap

A review of literature shows empirical findings on innovation capability is still very rare. This was addressed by Akhavan and Mahdi Hosseini (2016) when they stated that a entrepreneurs from various countries agreed to make an effort to enhance the innovation capability, particularly knowledge sharing may implemented to enhance the innovation capability in SMEs. An earlier study by Blommerde and Lynch (2015) showed that knowledge sharing has a significant role in enhancing the innovation capability but most of the entrepreneurs ignored the knowledge sharing with innovation capability. To compound the matter further, Svetlik, Stavrou-Costea, and Lin (2007) claimed that the individual, organizational, technological and industry factors also contributed in the failure of firms. Furthermore, it is indicated that these factors may have a great role in knowledge sharing leading towards the innovation capability. This evidence further endorsed by Ullah, Kamal, and Arfan (2016) claimed that the trust, motivation as individual factors have a great role in enhancing the innovation capability, he further directed that the prior research ignored this relationship with knowledge sharing and innovation capability.

Additionally, in contrast with intangible resources which require direct implementation on the firms, evidence of intangible resources (training & development, supervisor support) in rare resources of the firms which play also significant role in the innovation capability (Çakar & Ertürk, 2010; Breznik & D. Hisrich, 2014; Akhavan & Mahdi Hosseini, 2016; Foroudi *et al.*, 2016; Chang, Liao, & Wu, 2017). In other words, there is a lack of empirical researches that specifically discusses the training & development, supervisor support, knowledge sharing in increasing the innovation capability in SMEs (Svetlik, Stavrou-Costea, & Lin, 2007; Blommerde & Lynch, 2015; Ullah, Kamal, & Arfan, 2016).

Other authors like (Kalemci Tuzun & Arzu Kalemci, 2012; Frear *et al.*, 2017) concluded that literature relevant to supervisor support were very rare and limited. This issue was also raised by Ullah, Kamal, and Shahzad (2017) mentioned that supervisor support is most important for the knowledge sharing in enhancing the innovation capability of dairy SMEs. Furthermore, claimed that the innovation capability is achieved with the help of supervisor support in SMEs (Lu, L. Cooper, & Yen Lin, 2013). Additionally, industry cluster resource is a new industry form which is used to less expensive products. Industry cluster resources is also taken place in the domain of innovation capability as a success forces (Lai *et al.*, 2014). They further directed that the industry cluster resources has significant role in knowledge sharing going towards the innovation capability (Connell & Voola, 2013; Lai *et al.*, 2014) More importantly, only few studies are dedicated to examining the role of industry cluster resources in knowledge sharing obtained from innovation capability to success in the SMEs business.

3.10 Theories Discussed in the Study

3.10.1 Diffusion Innovation Theory

Diffusion of innovations theory is about the investigation of the methods and procedures that are communicated to the employee that can force to the use of innovation for the growth of the firms (Bass, 1969; Schmittlein & Mahajan, 1982; Jain, Mahajan, & Muller, 1991; Mahajan, Muller, & Wind, 2000; Assink, 2006). It is note ably by many researchers that innovation capability is a good, practices or new idea and services that people can observed as new (Van de Ven, 1986; Van de Ven & Rogers, 1988). This newness may be valuable for the firms to fulfill their customer needs and much necessary for solving the problems. Newness of the firms is also refers to employee having a response to using the thing for the growth of the firms(Schulman, 1969).

The studies of (Freeman, Carroll, & Hannan, 1983; Freeman & Soete, 1997) speaks about the innovations that inspects the practice through which information is communicated to customer over time that can lead to the use of an innovation capability. An innovation can be a good, service, practice, or idea that people perceived to be new (Miller, Olleros, & Molinie, 2008; Zott, Amit, & Massa, 2011).

Additionally, innovation capability is regularly observed as an uncontrollable phenomenon. Innovation capability is taken as place of hope for the firms that will pay off for the losers. Innovation capability is manageable when owners and managers of small firms move to global business perspectives and distinguish that dissimilar rule and practices apply in many contexts. Our main effort to convince is that both managers and employees need to learn from the new realities and importance of the innovation capability (Miller, Olleros, & Molinie, 2008; Teece, 2010; Boons & Lüdeke-Freund, 2013). Many researchers highlighted that owners of the small firms think that innovation capability in 21st century is the main key of success and growth of the business. Innovation capability may reduce the uncertainty and risk in the existing and establishing businesses (Sorescu *et al.*, 2011; Boons & Lüdeke-Freund, 2013).

Moreover, various researches argue that innovation capability can enhance through the communication and sharing of the employees. Innovation is not possible without communication and sharing of the employee and management (Cua & Garrett, 2009; Rogers, 2010). Theory argued that innovations are amended for organization in different ways like restructuring, agenda settings, matching and routinizing. These ways are achieved by the organization for the betterment and growth of the firms.

Innovation is all about to new logics of the firm and new methods to create and added more values for all stakeholders of the firms. Innovation focuses mainly on searching new methods and procedures to generate revenues and express value propositions for partners, employees, customers, and suppliers (Amit & Zott, 2001; Magretta & Stone, 2002; Zott & Amit, 2007; Casadesus-Masanell & Ricart, 2010; Markides & Oyon, 2010). According to result from the past study indicated that innovation a lot effects on the enterprise (Roberts & Amit, 2003).

Capabilities are a set of advanced, cultured, modeled, constant practices that any firm can carry out better compared to other countering companies (Nelson & Winter, 1982; Winter, 2003). Organizational practices are those that describe a firm's repetitive behavior in terms of selling a particular product and introduced a new product in a fixed amount to a particular audience over a prolonged period (Winter, 2003).

Innovation capability is a useful method to cultivate new value schemes by introducing new products and services, embracing new operating practices, technologies, organizational routines, and market-oriented skills and competencies (Schumpeter, 1934; Miles *et al.*, 1978; Miles, Miles, & Snow, 2005). Innovation capability is both content related as well as process related. Content wise, a firm can introduce new market offerings. Process wise, a firm can develop novel ways of conducting business, such as, a new operational procedure in quality control, new work flow design, and achieving new competencies in identifying and attracting valuable customers. The definitive objective of innovation is the creation and delivery of customer value in the form of new products and services.

In the theory of diffusion innovations, it is examining the methods through which information is communicated to employee that can lead to the use of an innovation. The best managers actively pursue innovations and always searching new solutions that can help them to solve their problems and perform more effectively. So, innovation capability can help company/firm/organizations in establishing a strong competitive existence in the market through the creating and generation of new methods, ways, and resource base.

3.10.2 Resource-Based View Theory (RBV)

RBV is most important part in the literature of management because it focused on the firm resources for sustaining a competitive advantage. The present study used the RBVT to discuss the individual (trust, motivation), Organizational (training & development, supervisor support), technological (ICT use) and industry factors (industry cluster resource) as a resource of the firms. Resource base view (RBV) theory in the current business environment is one of the famous and renowned theory regarding to firm growth. The pioneer of the RBV theory can be sketched hind to latest works that highlighted on the significance of resources in the growth of firm as well as also in the success of firm (Kor & Mahoney, 2004). According to many researchers, RBV is the prominent theory within the area of management (Wernerfelt, 1984; Barney, 1991; Barney & Clark, 2007). The RBV claims that the root for competitive advantage of a firm relies on the firm's ability to make use of the resources (intangible and tangible resources) (Rumelt, 1974; Wernerfelt, 1984; Conner, 1991; Dhanaraj & Beamish, 2003; Barney & Clark, 2007; Bloodgood, 2014).

It is further directed that tangible and intangible resources of firms must be VRIN means valuable, rare, inimitable and non-substitutable resources (Barney, 2001; Barney & Clark, 2007). To be more specific, the RBV theory developed as the theory that describes the growth of firms and performance, which is determined by firm resources that are heterogeneous rather than market power. As per to Hafeez, Shariff, and bin Mad Lazim (2012), business firms are packages of resources that are helpful of the firms to sustain a competitive advantage. The RBV is basically invented from the work of Penrose (1959) which explains a firm as a arrangement of resources. Late, Barney (1991) delivers a more better picture of RBV, describing a firm's resources as capabilities, procedures, characteristics, knowledge and assets that can be used by the firm to survive in the in the business. Firm resources are assets or entities that can be used by the firm to sustain in the business with the success (Darroch, 2005; Barney & Clark, 2007; Urgal, Quintás, & Arévalo-Tomé, 2013). The latest studies in line further that utilization of the firms resources is the sign of success and growth in the business (Ullah, Kamal, & Arfan, 2016; Kiss, Fernhaber, & McDougall-Covin, 2017; Saridakis, Lai, & Cooper, 2017).

Thus, firms can gain success and growth in the business advantage when the resources of the firm are properly in line and used (Barasa *et al.*, 2017; Chuang & Lin, 2017; Yang, Bossink, & Peverelli, 2017). The resources of the firms are not simple way to be transferred from one firm to another and cannot be possible to duplicated before or after implementation (Peteraf & Bergen, 2003). The RBV theory tries to catch the factors that effect on the growth and success of the firms (Crook *et al.*, 2008). There are two basic fundamental affirmations of the RBV theory. Firstly, knowledge, characteristics, procedures, assets and capabilities controlled by the firm are different from its competitor in the business. The second affirmation is the difference may be for a long time, i.e., rigidity of the firms resources is continued for a long time (Barney, 2001). The RBV theory has many classifications for a firm's resources. Similarly, resources are classified as organizational, physical and human resources.

Moreover, physical resources are a firm's tangible resources that are land, machinery and equipment, raw materials for the product manufacturing; while human and organizational routines routine matters are intangible resources that are individual trust, motivation, training & development, supervisor support, ICT use and industry cluster resources (Godfrey & Hill, 1995; Galbreath, 2005; Surroca, Tribó, & Waddock, 2010). Additionally, Barney (1991) provides more detail explanations about the firm's resources, i.e. human, organizational and physical, resources. Human and organizational resources are intangible resources of the firm while physical resources are tangible resources of the firm. Human resources are person-specific of employee, which include trust, motivation, training, skills (ICT use) and execution individual abilities in the firm. Organizational resources, on the other hand, are firm-specific, which include cluster relationship, support to employee methods, and relationships among members of the firm and its environment (Barney & Clark, 2007). Furthermost RBV study has focused on intangible assets, which include skills and information (Bettis & Sampler, 1998; Cheng, 2017; Wiedemann, Gewald, & Weeger, 2017). Consequently, trust (TR), motivation (MO), training & development (TD), supervisor support (SS), ICT use (TE) industry cluster resources (IN), knowledge sharing (KS) and innovation capability (IC) are intangible and important resources that will lead to the firm going towards the success in the business. TR and MO are observed as a unique abilities and complex behavior of the employee (manager).

These types of resources can likely give a firm more strengths and better opportunities in different competitive environments and is a potential source of success in the business

(Ullah, Kamal, & Arfan, 2016; de Castro Hilsdorf, de Mattos, & de Campos Maciel, 2017; Diana *et al.*, 2017; Jogaratnam, 2017; Sainaghi, Phillips, & Zavarrone, 2017). As per Ullah, Kamal, and Arfan (2016), TD is a firm's VRIN resource since a firm with high degree of TD could sign and symbol be more innovative. Firms that are given more training to the manager and employee have the possibility of meeting maximum chance in the growth of business. They are more active in business in terms of exploring new way, products design that may be the cause of product differentiation to the competitor and implementing new ideas in the business to lift up the role in GDP. SS as a firm's VRIN resource can be benefited for the firms to better perform from competitor. It enables the firm to understand and respond to employee needs to bring more innovation (Ullah, Kamal, & Shahzad, 2016). This is in consistent with Barasa *et al.* (2017) TD is a specific and unique firm resource that provides skills employee with great interest in the values of firm. In addition, TD is a firm's more valuable resource that is not easy to copy and capable of generating a competitive advantage for the growth of business (Ullah, Kamal, & Arfan, 2016; Agostini, Nosella, & Filippini, 2017). As per RBV, SS is a firm's resource that is likely to give support to employee of the firm for growing role in the business, because it is based on the firm's environment and structure which make its strategies different, unique and rare (Barney & Clark, 2007). Additionally, information communication technology (ICT) use is great hope to enhance the knowledge within the business firms, since its path dependence makes it exceptional and not easy for competitors to imitate (Wheeler, Waite, & Bromfield, 2002; Svetlik, Stavrou-Costea, & Lin, 2007; Akhavan & Mahdi Hosseini, 2016).

In addition, industry cluster resources is also come under the umbrella of intangible resources of the organization (Aslesen & Pettersen, 2017). Firms growth and survival is totally based on internal and external resources (industry cluster resources) (Arikan, 2009; Duarte Alonso & Duarte Alonso, 2017; Tyaglov *et al.*, 2017). Industry cluster resources is an external resource of firms which is used to reduce the expenses and produce better quality product (Dhewanto *et al.*, 2012; Lai *et al.*, 2014). Therefore, it complements other resources by attempting to satisfied the needs of customer in due timeby using the cluster resources and technological solutions (Hakala & Kohtamäki, 2010; Kohtamaki *et al.*, 2015). Accordingly, the use of ICT is an ability of the firm constitutes the essential elements to achieve the success and growth in the business (Aragón-Sánchez & Sánchez-Marín, 2005). Prior researches argued that due to the rapid changes in technology, short product life cycles and increase the competition among competitors need to be shared their knowledge (Akhavan & Mahdi Hosseini, 2016; Martínez-Román, Tamayo, & Gamero, 2017). Knowledge sharing is the only intangible resources to give more benefits to the firms in hard time and in critical situation (Ardichvili, Page, & Wentling, 2003; Awan & Akram, 2012; Akhavan, Rahimi, & Mehralian, 2013).

So, the all above arguments and justifications based on the VRIN nature of these resources, the present study implement the RBV theory (Barney, 1991; Barney & Clark, 2007) that stated a firm's sustained a success and growth in the business to creative role in the country GDP indeed results from a complementary package of prized internal and external resources. Thus, individual, organizational, technological and industry factors is an organizational method of utilizing its resources to build a small firm uniqueness and the image of SMEs that can used to gain a competitive advantage for the maximum chance of the success of the of the firms.

3.11 Summary

The chapter gives an overview of the previous literature and also review of related theories for the current study. The literature highlights the review of Trust, Motivation, Training & Development, Supervisor Support ICT and Industry Cluster resources with Innovation Capability of Pakistani SMEs. It also involves the mediating effect of Knowledge Sharing between independent and dependent variable on Dairy SMEs in Pakistan. The resultants of this chapter will help to construct hypotheses between independent and dependent variable with mediating variable of SMEs dairy sector in Pakistan.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

The previous chapter has critically reviewed the existing literature related to trust, motivation, training & development, supervisor support, ICT used, industry cluster resources, knowledge sharing and innovation capability. Then, this chapter covers an overview of research methodology that is used to find the solution of the problem. The current chapter has six sections. The first section is about the theoretical framework of the study, further followed through the second section, which shows the hypotheses for this study. The research design of this study includes unit of analysis, population, sample and its techniques. Further, a measurement of variables with operational definition is also discussed. In addition, it is also described data analysis techniques in which reliability, validity as well as with explanation of SPSS and SMART-PLS 3.00 for the present study. At the end of this chapter, the results of pilot study also discussed.

4.2 Research Framework

The theoretical research framework is a foundation of the relationship between independent, mediator and dependent variables that are identified via literature review and theories to arrive at best solution to the problem statement. Furthermore, research framework provides a solid base for developing the hypotheses and the measurement of the instruments that are used in the research (Sekaran, 2006; Sekaran & Bougie, 2011).

In the current era, organizations and firms have been moved from old-style to modern style. Nowadays, innovation capability is the only way to survival in the modern style. Innovation capability has a major source for firms to sustain and growth in the business (Feng, Sun, & Zhang, 2010; Villar, Alegre, & Pla-Barber, 2014). Under the uncertainty environment, innovation capability for the firms is not easy without knowledge sharing (Svetlik, Stavrou-Costea, & Lin, 2007; Morgan, Katsikeas, & Vorhies, 2012). It means that innovation capability is not enough for the success of the firms. Academics research is also demanded that most needed investigation of knowledge sharing in enhancing the innovation capability (Nielsen *et al.*, 2011; Villar, Alegre, & Pla-Barber, 2014).

Diffusion Innovation theory, significances that innovation is the practices that can help full in the success and establish a new business. Likely, innovation capability regarded as the practices that facilitate the firm's knowledge to exploit new ideas, new market opportunity in order to survive. In addition, knowledge sharing, trust, motivation, training & development, supervisor support, ICT used and industry cluster resources considered as a platform on which organization can survive, stand and satisfied their customer. As per resource based view, trust, motivation, supervisor support, training & development, ICT used and industry cluster resources are the intangible resources of the firms to achieve and gain the business growth (Barney, 1991; Katsikeas, Leonidou, & Morgan, 2000; Abimbola, 2001; Dhanaraj & Beamish, 2003; Ho, Kuo, & Lin, 2012; Ansari, Barati, & Sharabiani, 2016).

After going through the past and recent literatures review in chapter 3 and based on the theories such as diffusion of innovation and resource based view (RBV) was developed the research framework for the current study. In figure 4.1, showed the research framework based on the relationships between independent variables such as individual factors (trust, motivation), organizational factors (training & development, Supervisor, support), technological factor (ICT used), industry factor (industry cluster resources), and innovation capability as dependent variable with mediation effect of knowledge sharing. In below figure 4.1 showed the following research framework for the present study.

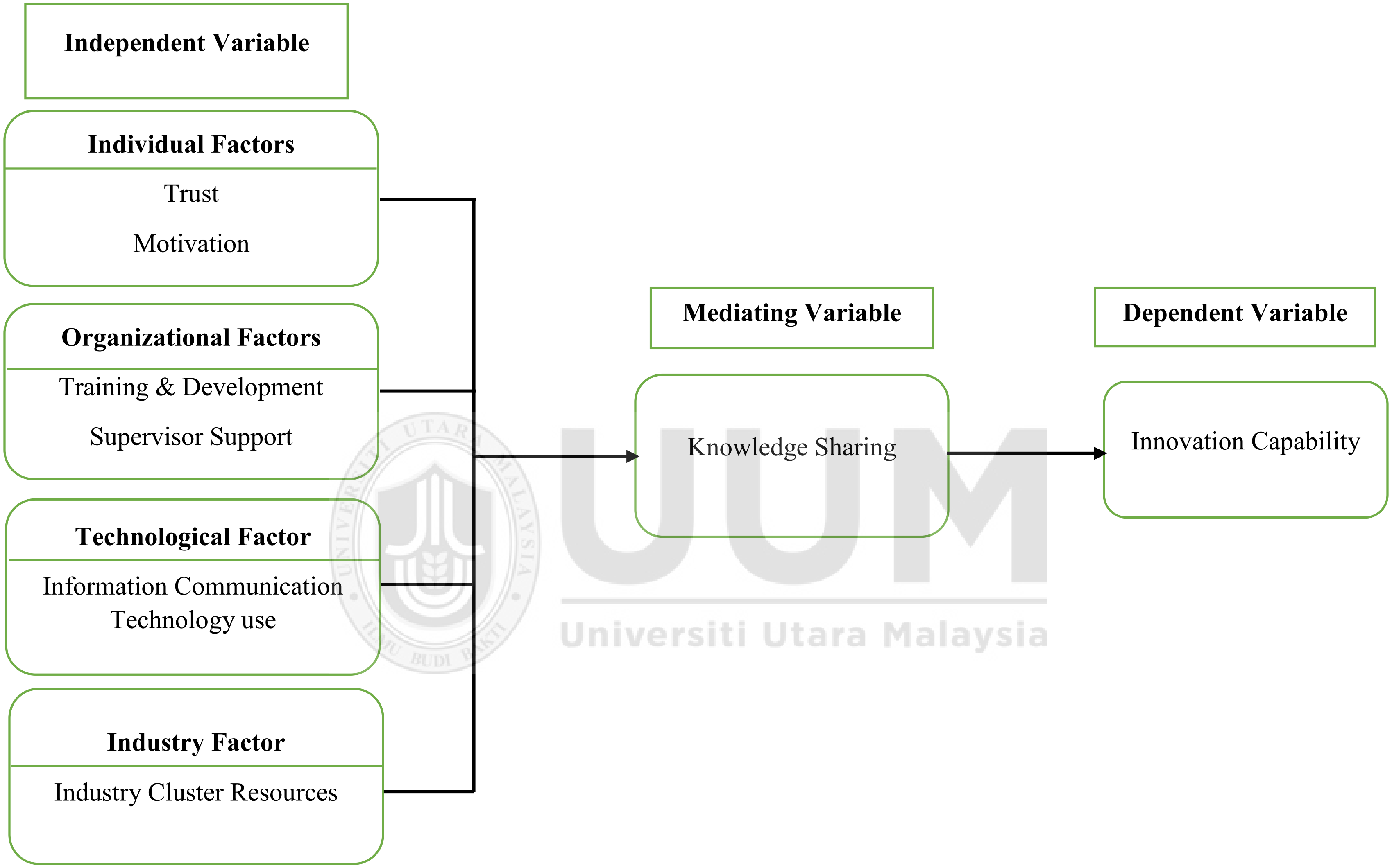

Figure 4.1
Research Framework of the Current Study

Literature review has widely highlighted in Chapter 3 that innovation capability is the important resource that facilitates SMEs to achieve the maximum role in the country growth and development. Therefore, sustaining and improving the innovation capability should be the main consideration part of SMEs (Lawson & Samson, 2001; Çakar & Ertürk, 2010). The literature indicates that the previous research frameworks are on a general level and the have been designed largely for large firm. However, SMEs have different features that make differentiate it from larger firms (Garengo, Biazzo, & Simonetti, 2005; Singh, 2008; Akhavan & Mahdi Hosseini, 2016; Agostini, Nosella, & Filippini, 2017; Chang, Liao, & Wu, 2017).

The research framework of the present study will provide instructions and help on how small dairy farms specifically can develop their innovation capability through knowledge sharing. There have also been limited efforts to use individual factors (trust, motivation), organizational factors (training & development, supervisor support), technological factor (ICT use), industry factor (industry cluster resources) approaches in the improvement of innovation capability within small firms. However, small firms could benefit from knowledge sharing and from different factors when enhancing their innovation capability.

The present research has examined the effects of individual factors (trust, motivation), organizational factors (training & development, supervisor support), technological factor (ICT use), industry factor (industry cluster resources), but only a few have studied the effects of knowledge sharing on innovation capability (Svetlik, Stavrou-Costea, & Lin, 2007; Rahab, 2011). Knowledge sharing is seen as a major factor and foundation, which show that all things happening in the firm are considered to have an effect on the innovation capability of the organization. Thus, knowledge sharing is not conflicting within innovation capability (Neely *et al.*, 2001; Saunila, Ukko, & Rantanen, 2012; Saunila, Pekkola, & Ukko, 2014), but can be used as an instrument for developing innovation capability. Further, the extant study only concentrates on either the relationship between individual factors (trust, motivation), organizational factors (training & development, supervisor support), technological factor (ICT use), industry factor (industry cluster resources) and innovation capability with effects of knowledge sharing. There seems to be a research gap regarding individual factors (trust, motivation), organizational factors (training & development, supervisor support), technological factor (ICT use), industry factor (industry cluster resources) and innovation capability through knowledge sharing in dairy SMEs. Thus, the present study attempts to address this research gap.

4.3 Hypotheses of the Study

4.3.1 Relationship of individual, organizational, technological and industry factor with knowledge sharing

4.3.1.1 Relationship of individual factors (trust, motivation) with knowledge sharing

The present study focused on individual factors that enhance the knowledge sharing behavior, further individual factors has classified into trust and motivation. In the previous studies highlighted that employees in SMEs are motivated to participate in knowledge because delightful in the intellectual recreation and also solving problems because they trust their other fellows (Wasko & Faraj, 2000; Wasko & Faraj, 2005; Gooderham, 2007; Zack, McKeen, & Singh, 2009; Skok & Tahir, 2010; Chang, Gong, & Peng, 2012; Donate & Guadamillas, 2015).

Honesty in one's speech and demeanor helps build trust among colleagues. However, trust is not limited in capacity and can also co-exist vertically in an organization's hierarchy when it comes to supervisors and their lower ranking workers (Cook & Wall, 1980; McCauley & Kuhnert, 1992). But at the same time, it's not necessary that trust would exist in both vertical and horizontal circumstances therefore both vertical and horizontal scenarios must be considered separately and independent of each other. Research highlights that trust within members of the same firms is dubbed as a prerequisite for the adequate distribution of knowledge. For example, the study done by Nelson and Cooprider (1996) clearly shows that trust between employees will help them go after similar goals in a cohesive manner. At the same time employees will be open to distributing and sharing knowledge easily and eagerly hence leading to enhanced organizational performance. Moreover, another study by Staples and Webster (2008) yielded similar results where trust and knowledge sharing along with effective team outcomes were all linked with each other.

Renzl (2008) study also managed to derive a positive relationship between knowledge sharing and trust which automatically leads to enhanced performance of both the employee as well as the company overall. Further found out that an employee's worst fear of being undermined and oppressed during knowledge sharing, is the main reason behind hindered knowledge sharing. However, trust helps conceal this fear and turn it around towards knowledge sharing strategies (Gefen, Benbasat, & Pavlou, 2008; Renzl, 2008).

Preceding literature strongly supports the ideology that the motivation for initiation of innovation, healthy contests and joint collaborative ideas with lead to enhancing the creativity capacity within employees due to easily flow of communication and support from supervisors and colleagues (Amabile, 1996). Moreover, according to the academic point of view, motivation has been aid to precede creativity in employee's performance (Shalley, Zhou, & Oldham, 2004). Also, more recently studies on person–work environment fit (PE fit) have shown increased importance for individual motivation between individuals and their job (Bellé, 2013; Bright, 2013).

However, motivation is said to highlight an individual's interest in doing a particular task especially for the sole purpose attributed to the task itself (Utman, 1997). Therefore, on the basis of this Amabile (1996) claim that even though inducing creative environments to internalize fundamental task motivation will lead to creative outcomes in some cases, it is not a concrete solution for predicting such outcomes despite the scientific evidence that has come to surface (Shalley, Zhou, & Oldham, 2004). Therefore, in light of this notion, it can be argued that other than intrinsic task motivation, there are other mediating variables in a work setting that can be attributed to the combined outcomes of support and creativity.

Since, motivation is known as an individual's readiness to act to any situation or circumstance (Wiggins, 2004; Siemsen, Roth, & Balasubramanian, 2008), it is in fact an important aspect that precedes the kind of behavior that is required of an employee for the adequate creation and distribution of knowledge within any organization (Stevenson & Jarillo, 2007). An employee's ability to connect through networking and process of organizational knowledge distribution highly depend on the employee's viewpoint, thoughts and principles; a strong sense of competition and reward circulation (Zahra, 1993; Zahra & Covin, 1993, 1995).

To enhance the innovation capability, key factors like motivation for knowledge sharing within an organizational setting help to promote a circulation of ideas that prove beneficial for everyone (Hornsby, Kuratko, & Zahra, 2002; Lin, 2011; Saperstein, Fiszdon, & Bell, 2011). The previous studies elaborate that the innovation capability is catalytic in pushing the performance of SMEs firm and also helpful in achieving the competitive advantages. The other studies pinpointed that innovation capability plays a key role in boosting the role of SMEs firm in GDP (Dana, Bajramovic, & Wright, 2005; Mansury & Love, 2008; Jiménez-Jiménez & Sanz-Valle, 2011). On the other hand, the studies on innovation capability examined the positive relationship of individual factors with knowledge sharing (Gloet & Berrell, 2003; Svetlik, Stavrou-Costea, & Lin, 2007; García, Sanzo, & Trespalacios, 2008; García-Morales, Jiménez-Barrionuevo, & Gutiérrez-Gutiérrez, 2012). Therefore, based on the literature discussed above, the present study proposed the following hypothesis:

Hypothesis 1a: There is a significant relationship between trust and knowledge sharing.

Hypothesis 1b: There is a significant relationship between motivation and knowledge sharing.

4.3.1.2 Relationship of organizational factors (training & development, supervisor support) with knowledge sharing

Organizational factors play a definite role in knowledge sharing and innovation capability. Although there happen to be many organizational factors that play an important role in enhancing an organization's innovation capability. However, this study will focus only on the two organizational factors; supervisor support and training & development.

Supervisory support is taking one of the key important factors on the knowledge of organization. Few researches have indicated that supervisory support is necessary to creating a supportive climate with sufficient resources (Connelly & Kevin Kelloway, 2003; Mary MacNeil, 2004; Lu, Leung, & Koch, 2006). On the other hand, Kim and Ko (2014) singularly give credit to the positive relationship between a supervisor and his subordinate which they claim that the important factor in knowledge sharing since it helps reasonable flow of knowledge sharing and innovation capability.

The role played by supervisory support has found to play a significant role in the creation and sharing of knowledge (Connelly & Kevin Kelloway, 2003). Many researchers have supported this claim and acknowledge the part of supervisory support which has shown to create a positive system and climate for different causes (Lin & Chen, 2006). The importance of knowledge sharing in any organization has also been highlighted by the studies done by (Lin & Lee, 2004; Mary MacNeil, 2004).

A firm that clearly supports knowledge strategies knows and believes in acquiring adequate training and development which play a vital role in improving employee performance and knowledge sharing (Bresnen *et al.*, 2003; Scarbrough, 2003; Yew Wong & Aspinwall, 2005). Furthermore, supporters of knowledge sharing strongly understand and support the role played by HRM practices for the running of knowledge sharing activities (Grandori, 2001; Foss, 2007; Foss *et al.*, 2009; Minbaeva, Foss, & Snell, 2009). Therefore, based on the discussed literature, the present study proposed the following hypotheses:

Hypothesis 1c: The relationship exists between training & development and knowledge sharing.

Hypothesis 1d: The relationship exists between supervisor support and knowledge sharing.

4.3.1.3 Relationship between Technological Factor (ICT use) with knowledge sharing

The collection, configuration and sharing of knowledge through different organizational channels like document repositories which are known for converting candid information to implicit one which is then adequately distributed throughout the organization via multimedia or discussion forums, is known as technological frameworks (Lawson & Samson, 2001; Mehta, 2008).

Many technological improvements that help with knowledge sharing have been scrutinized since the establishment of KS (DeTienne *et al.*, 2004; Yang, 2007a). Despite the recent focus centered on human related supporting and management factors, there still exists a dire need for hard scientific facts by KS facilitators (DeTienne *et al.*, 2004; Yang, 2007b; Matzler *et al.*, 2011).

Moreover, the knowledge sharing of an organization also enables ICT developers to come up with new and innovative applications like intranet and groupware that ultimately help expand networks beyond geographical boundaries for successful initiatives (Pan & Leidner, 2003). For better understanding regarding the specific roles played by knowledge sharing systems, Zack (1999) gives the following three points: (1) Knowledge acquisition, (2) Classifying, collecting, indexing, and connecting knowledge-related digital matter, (3) Probing and classifying related content.

On another account a renowned researcher, Yeh, Lai, and Ho (2006) also believes that ICT systems play an integral role in the execution of successful knowledge sharing since ICT systems provide adequate mode of exchange of ideas for the sharing of knowledge, methods for fixing flow channels and in distinguishing the petitioners and carters of knowledge. Therefore, based on the above mention literature, the present study proposed the following hypothesis:

Hypothesis 1e: There is a significant relationship between information communication technology (ICT use) and knowledge sharing.

4.3.1.4 Relationship between industry factor (industry cluster resources) with knowledge sharing

The importance of knowledge to Small firms and organizations has grown over the years which have led to an ever increasing demand that hence leads to issues based on the sharing of knowledge for innovation capability. The ever growing competition and want for the sharing of knowledge leads firms to collaborate with each other. Hence, encouraging a sharing and supportive environment that enhances innovation capability (Casanueva, Castro, & Galán, 2013).

This idea about industry clusters leading to increasing innovation capability are supported many theorists and researchers like (Bruton, Dess, & Janney, 2007; Phelps, 2010; Zhang & Li, 2010; Gnyawali & Srivastava, 2013). Therefore, it can be easily deduced that industry clusters cut down huge costs for organizations while at the same time add to their overall tangible and intangible assets. On a macro level, forming industrial clusters not only brings together people from different companies together with their expertise and ideas but also helps enhance overall corporate innovative performance and capacity (Porter, 1990; Anderson, 1994; Kotler & Armstrong, 2010).

According to (Maskell, 2001a; Bathelt, Malmberg, & Maskell, 2004), the collaboration between upstream and downstream firms not only cuts costs but also helps in developing role in the development through innovation capability. This practice may have positive interaction then leads to developing competitive advantage over other firms (Bell, Tracey, & Heide, 2009). Many researchers like (Feldman & Florida, 1994; Audretsch & Feldman, 1996; Yang, Phelps, & Steensma, 2010; Gnyawali & Srivastava, 2013) believe that industrial clusters leads to knowledge sharing activity (Tallman *et al.*, 2004).

Furthermore (McEvily & Zaheer, 1999; Lissoni, 2001) believe that alliance networks become strengthened through the distribution and sharing of knowledge. On a much deeper note by Swap *et al.* (2000), claimed that things common among all highly competitive industry clusters are intricate business management skills or knowledge sharing techniques. Similarly, the research done by Yli-Renko, Autio, and Sapienza (2001) also concludes that industrial clusters lead to establishing networks those open doors to critical information and access to knowledge sharing which ultimately enhances innovation capability.

In the end, the information and knowledge sharing by individuals through the innovative process disperses within organizations and even among organizations leading to a win-win situation for all Knowledge based economies all towards knowledge exchanges that in turn enhance the organization's innovative capacity and overall performance (Connelly & Kevin Kelloway, 2003; Bathelt, Malmberg, & Maskell, 2004; Arikan, 2009; Connell & Voola, 2013). In light of this preexisting literature, industry clusters can be seen as important tools for organization especially in developing regional economies. This is because, through the formation of industrial clusters resources become strengthened and it also helps attract talent from within the economy.

Therefore, the establishment of industrial clusters allow for an abundant supply of skilled workforce, up-to-date knowledge and methods that add to innovative performance (Baptista & Swann, 1998; Morosini, 2004; Tallman *et al.*, 2004; Malmberg & Power, 2005). On the basis of the already acquired literature, this study claims for there to be a positive relationship between industrial clusters resources, knowledge sharing and innovation capability.

Knowledge sharing is known for establishing effective knowledge and information exchange centers along with cutting costs. According to (Porter, 1990; Utterback &

Afuah, 1998) innovative activities are well best utilized and accounted for when new knowledge is always circulating in different business management processes like commercialization that increase corporate value. Innovation activities is the name giving to the process of positive and abundant contribution of intangible techniques and skills by the workers in creating and enhancing new products to increase corporate value. Since the knowledge that has been acquired by individuals in adequately distributed within and among organizations, uncertainties in the knowledge sharing processes become less especially when improving systems and structures (Nonaka, Takeuchi, & Umemoto, 1996; Carrillo & Gaimon, 2004).

When knowledge sharing activities are restructured and improved, they inevitably lead to revolutionizing innovation capability. This view is strongly supported by (Nonaka & Takeuchi, 1995; Koskinen, 2000; Koskinen, Pihlanto, & Vanharanta, 2003; Oliver, Dostaler, & Dewberry, 2004; Arikan, 2009; Belso-Martínez, Xavier Molina-Morales, & Mas-Verdu, 2011; Casanueva, Castro, & Galán, 2013). Based on the deep analysis of this literature, it can be concluded that innovation capability encourages knowledge sharing through industrial cluster resources which in turn lead to enhanced innovation capability. Therefore, this study is also in support of industrial cluster resources for the enhancement of innovative capability of organizations and the overall corporate world. Therefore, based on the previous studies, the current study proposed the following hypothesis:

Hypothesis 1f: There is a significant relationship between industry cluster resources and knowledge sharing.

4.3.2 Relationship between individual, organizational, technological and industry factors with innovation capability

4.3.2.1 Relationship of individual factors (trust, motivation) with innovation capability

Trust and motivation are two important variables that have a significant effect on the innovation capability of any organization. In other words, trust and motivation play a significant role in enhancing the firm's innovation capability. According to a study conducted in 2011, trust among employees increases innovation capability of the organization (Wang, Yeung, & Zhang, 2011). In another study, it was revealed that trust strengthens the innovation capability of any organization as a result of which its performance also increases (Panayides & Lun, 2009). In a study, it was found that trust result in an increase in the innovation capability of the organization (Ertürk, 2012).

In the same way, motivation among employees also acts as a contributing factor in enhancing the innovation capability of the organization (Cadwallader *et al.*, 2010). Companies who give emphasis on motivating employee yield higher profit returns as a result of innovation. According to a few studies, employee motivation leads to knowledge sharing which increases the innovation capability of the organization (Saperstein, Fiszdon, & Bell, 2011; Hafeez, Shariff, & bin Mad Lazim, 2013; Barasa *et al.*, 2017). Thus, the above review literature proposes the following hypotheses.

Hypothesis 2a: The relationship exists between trust and innovation capability.

Hypothesis 2b: The relationship exists between motivation and innovation capability.

4.3.2.2 Relationship of organizational factors (training & development, Supervisor support) with innovation capability

A large number of organizational factors boost innovation capability of an organization but the current study has taken into account two major organizational factors namely supervisory support and training & development. The existing literature is full of studies that have proved that supervisory support results in positive organizational outcomes. For instance, in one study it was found that support from supervisor increases the innovation capability of employees who share their ideas with the management openly (Ertürk, 2012). In an another study it was found that when employees receive supervisory support they automatically start taking an active part in innovation capability (Bhatnagar, 2014). According to a recent study, supervisory support plays a key role in the generation and implementation of innovative ideas (Škerlavaj, Černe, & Dysvik, 2014).

In addition, training & development is also believed to have a strong impact on the innovation capability of an organization. According to the prior research companies who invest in training and development of their employees are more likely to perform well in terms of innovation (Roffe, 1999; Psarras, 2007; Noe, 2010). This is mainly due to the learning practices adopted by the employees as a result of training and development (Sung & Choi, 2014). A large number of studies proved that different human resource practices like training & development can have a strong positive impact on innovation capability (Williamson, Lounsbury, & Han, 2013; Shipton *et al.*, 2016). Thus, this discussion from the literature review leads to the following hypotheses.

Hypothesis 2c: The relationship exists between training & development and innovation capability.

Hypothesis 2d: The relationship exists between supervisor support and innovation capability.

4.3.2.3 Relationship of technological factors (ICT used) with innovation capability

In this digital world, information technology plays a vital role in the success and long term survival of any organization. Information and communication technology has been proved to be an important part of knowledge sharing system which helps to increase the innovation capability of an organization by providing employees with tools and communication channels needed for efficient working (Nguyen, Newby, & Macaulay, 2015). ICT not only boosts production but also coordinates different processes (Tanriverdi, 2005).

Moreover, the several studies indicated that ICT used has a significant impact on firm's innovation capability. Many researchers stated that ICT used is an important technique in enhancing the innovation capability of the firms (Liao, Fei, & Chen, 2007; Svetlik, Stavrou-Costea, & Lin, 2007; Orfila-Sintes & Mattsson, 2009). ICT use in the development of organization activities can be a strong source of competitive advantage for firm in enhancing the innovation capability (Morrison, Roberts, & Von Hippel, 2000; Orlikowski & Barley, 2001; Bond & Houston, 2003; Tatikonda & Stock, 2003). Consistent with the current assessment, ICT used is in essence with doing something new and this may be considered as a form of the innovation capability. Based on these findings and arguments, the following hypothesis is recommended.

Hypothesis 2e: The relationship exists between ICT used and innovation capability.

4.3.2.4 Relationship of industry factors (industry cluster resources) with innovation capability

A large number of academicians are paying attention to different industry factors that have a direct impact on the innovation capability of business firms. One of the industry factors gaining popularity lately is industrial cluster resources. These resources are proved to be helpful in generating innovative ideas by increasing the innovation capability of the organization (Phelps, 2010; Casanueva, Castro, & Galán, 2013; Connell & Voola, 2013). An increase in global competition has resulted in the development of closer bonding among companies who support and help each other to gain mutual benefits. The development of industry cluster resources enables companies to boost their innovation capability (Casanueva, Castro, & Galán, 2013; Gnyawali & Srivastava, 2013). Industry clusters decreases investment costs and increases competitive advantage which boosts innovation capability (Gnyawali & Srivastava, 2013). Following these findings and advices, the next hypothesis is suggested.

Hypothesis 2f: The relationship exists between industry cluster resources with innovation capability.

4.3.3 Relationship between knowledge sharing and innovation capability

Different research studies have been conducted to highlight the relationship between the knowledge sharing and innovation capability. For example, research study of Svetlik, Stavrou-Costea, and Lin (2007) stated that there is a positive relationship between the knowledge sharing and innovation capability of the firm. In the same context the study of Liebowitz (2002) portray that knowledge sharing is positively and significantly related the innovation capability of the organization. In addition, Guadamillas-Gómez and Donate-Manzanares (2011) stated that innovation and Knowledge sharing is all about implementing ideas through the search, invention, testing and progression of new technologies, products, services and structures. However, innovation is always dependent on knowledge because novel knowledge is generated and transformed into specific knowledge for the development of different goods and services. Similarly, (Lin & Chen, 2006; Lin, 2006) empirically investigated the relation between the knowledge sharing and innovation capability of the firms. Results from these studies depicted that innovation capability is positively and significantly related to the knowledge sharing within the organization. Based on the above discussed literature the following hypothesis has been formed.

Hypothesis 3a: The relationship, exist between knowledge sharing and innovation capability

4.3.4 Mediating role of knowledge sharing

Prior research studies have been conducted to study the relationship of different factors with the knowledge sharing activities. These factors include individual, technological and organizational (Lin & Lee, 2004; Lu, Leung, & Koch, 2006). With reference to the individual dimension, knowledge sharing depends on the individual characteristics their values, belief and motivation. According to the study of Wasko and Faraj (2005) employees are motivated when they perceive that knowledge sharing activities would be helpful for solving problem and helping colleagues. Similarly, with reference to the organizational dimension, supervisor support is usually made to capture efficiently the benefits of innovative supportive culture. In term of supervisor support there are many factors that lead towards the knowledge sharing (Saleh & Wang, 1993). Similarly, Information technology dimension ICT also leads towards the integration, dissemination and sharing of knowledge (Mary MacNeil, 2004).

Furthermore, the study of Donate and Guadamillas (2015) stated that innovation capability and knowledge sharing is all about implementing ideas through the search, invention, testing and progression of new technologies, products, services and structures. However, innovation capability is always dependent on knowledge sharing (Gloet & Terziovski, 2004; Donate & Guadamillas, 2015) because novel knowledge is generated and transformed into specific knowledge for the development of different goods, services and practices. In addition, the sharing of knowledge within an organization is closely related to ICT systems since it is because of these systems that every factor related to the sharing of information such as searching and acquisition enables interaction and teamwork among employees (Huysman & Wulf, 2006). Based on the literature review, it can be concluded firms encourages knowledge sharing through industrial clusters resources which in turn lead to enhanced innovation capability (Lai *et al.*, 2014). Based on the above mentioned literature following hypotheses have been developed.

Hypothesis 4a: Knowledge sharing mediates the relationships between trust and innovation capability.

Hypothesis 4b: Knowledge sharing mediates the relationships between motivation and innovation capability.

Hypothesis 4c: Knowledge sharing mediates the relationships between training & development and innovation capability.

Hypothesis 4d: Knowledge sharing mediates the relationships between supervisor support and innovation capability.

Hypothesis 4e: Knowledge sharing mediates the relationships between information communication technology (ICT) and innovation capability.

Hypothesis 4f: Knowledge sharing mediates the relationships between industry cluster resources and innovation capability.

4.4 Research Design

Research design is about the outline for the collection and analysis of data (Bryman, 2007). In the study of Sekaran and Bougie (2011) describe that research design is a way of gathering and analyzing data to find the solution of the problem. The current research follows a quantitative techniques methodology. Quantitative data is a measurement where numbers are used to represent the phenomenon being studied (Hair, 2010). The present research adopts a survey method. A survey method is used when a research is trying to take opinions about a given situation by collecting primary data from the respondents (Sekaran & Bougie, 2011). The survey method permits the researcher to collect quantitative data and analyze it through descriptive and inferential statistics. Now, possible reasons for particular relationships between variables can be suggested and models of these relationships can be produced

(Saunders, 1987; Mark, Philip, & Adrian, 2009). Survey research provides a fast and accurate assessment and information about a given population of the study (Zikmund *et al.*, 2013). Additionally, survey research using questionnaires compared to observation, secondary data and interview is inexpensive and easy, especially when collecting data from a large sample. In an interview, the nature and characteristics of the interviewer may influence the answers of respondents compared to the questionnaire. Observation, may not give a better understanding of certain behaviors because people may behave differently when they know they are being observed (Zikmund *et al.*, 2013). Similarly, secondary data may be inappropriate for study like this one, because of record keeping problem of the respondents. In the event were records are available, the information may be outdated, since the data was collected many years ago. Also, the information may refer to the entire country when this study aimed to study a specific region. Hence, the quality of the secondary data may not be guaranteed (Mark, Philip, & Adrian, 2009). Therefore, a survey method using questionnaire as the research instrument for data collection is found to be more appropriate for the present study. This is because the study involves collection of data from owner-mangers of dairy farms in Punjab (Pakistan) in order to determine the mediating role of knowledge sharing on the relationship between trust, motivation, training & development, supervisor support, ICT used, industry cluster resources Pakistan. In other words, this study makes use of quantitative data in order to describe the characteristics of the dairy farms and summarize the information and testing of the developed hypotheses in this study. The study gathered data and describes the characteristics of the population of the study at one time and not over a long period of time; therefore, this study is a cross- sectional study.

4.4.1 Unit of Analysis

Unit of analysis refers to the type of unit a researcher employs during variables measurements. In the current study, the main purpose is to examine individual (trust, motivation), organizational (training & development, supervisor support), technological (ICT used) and industry factor (industry cluster resources) on innovation capability of Dairy farms with mediating role of Knowledge sharing. As the unit of analysis is the Dairy farm of Punjab in Pakistan. The present study treated managers/owners as key informants that are working in dairy farms. The reason to collect data from the manager/owner for the current research because the manager/owner is involved in the decision making and have significant information for the innovation capability. In context of SMEs of Pakistan, most of the SMEs owner's paly dual role, they act as manager while they are also owners of the firm. Therefore, because of this dual role owner/managers are treated as the respondent of this study.

4.5 Population, Sample and Sample Technique

This section explains population, sample procedure and sample size consideration.

4.5.1 Population

As per Cavana, Delahaye, and Sekaran (2001) population is about the entire group of people, events or things of interest that the research efforts to examine. The population in the present study is the dairy farm operating in the Multan division, Lahore division, DG Khan Division and Faisal Abad division of Punjab Pakistan. Punjab has the highest number of dairy farm because the Punjab state of Pakistan is almost agrarian based states (SMEDAP, 2014). As well, the Punjab states recorded the highest population in the Pakistan. Multan, Lahore, DG Khan and Fasial Abad divisions are the largest and agrarian based division of Punjab, Pakistan. Additionally, Lahore, Multan, Faisal Abad and DG khan are the most populated area in the country with highest number of dairy farms in the Punjab, Pakistan. Thus, the researcher on dairy farms in these areas which is about 70% of dairy farms lie in these divisions of Punjab. Punjab also has a very long history of the dairy farms activities, especially Lahore, Multan, Faisal Abad and DG Khan Divisions.

The state Punjab is the hub of Pakistan's economy. Punjab has the maximum weightage in the country GDP and great impact on economy (PDA, 2014). Unbelievable, the Punjab still has the under developing region and their people faces a lot of issues regarding unemployment and not have resources to easy survival. The other main reason behind the selection of Punjab is that the data about dairy farms is available and also has access to the respondents and their willingness in the present study. For the purpose of the present study which is focusing on the effect of individual (trust, motivation), organizational (training & development, supervisor support), technological (ICT used) and industry factor (industry cluster resources) on innovation capability with mediating role of knowledge sharing in Pakistan dairy industry, the target population for the present study is Dairy farms Punjab, Pakistan. The population size for the current study showed in the table 4.1 as below

Table 4.1
Total Number of Dairy Farms Population (Punjab)

	Population
Dairy Farms	562

Source: *Yaseen, (2015)*

Regional studies may have biased due to regional bias, specifically if there are dissimilarities within the regions (Barkham *et al.*, 1996). For that reason, the sample for present study is selected from the population of dairy farms in Multan, Lahore and Faisal Abad divisions. On the other hand, studies have clearly point out that regional studies are not affected by regional bias; the relevance of region-specific factors in dairy farms studies are strained upon (Storey, Watson, & Wynarczyk, 1989; Audretsch & Keilbach, 2004; Fritsch & Franke, 2004; Hoogstra & van Dijk, 2004).

4.5.2 Sample Size

It is impossible for research that scrutinizes large number of elements to collect data, test every element (Sekaran & Bougie, 2011). Thus, a sample is selected for examination which is a sub-set of the population of the study (Cavana, Delahaye, & Sekaran, 2001). Sample size can be defined as the subset of a population required to ensure significant results (Sekaran & Bougie, 2011). The sample size refers to the number of units required to obtain accurate findings (Lacan & Fink, 2002).

Sampling is usually preferred instead of data collection from every element of the population because of the former’s practicality (Sekaran, 2003). The selection of a sample will result in a more successful outcome because of the reduction in fatigue and in potential errors from the data collected, especially when a large number of elements are involved (Sekaran, 2003). The Gay and Diehl (1992) stated that determining the correct sample size is crucial for generalization purposes. As sample size increases, the likelihood of the error generally decreases.

In the study of Pallant (2013) also mentioned that although the consensus among scholars about the sample size is limited, a larger sample is proven to represent the population better. Meanwhile, a small sample tends to conclude unreliable correlation coefficients and thus defeats the purpose of the study. Therefore, relatively huge samples are always inclined yield statistically significant results. Based on the rule of thumb, a sample size between 30 and 500 can be considered effective depending on the sampling design and on the research question investigated (Roscoe, 1975). A sample size that is several times larger (ten times) than the number of variables in multivariate studies is often required (Curran-Everett, Taylor, & Kafadar, 1998).

Based on the findings by Krejcie and Morgan (1970), the present study identified a sample size of 227 firms of Dairy farms in Punjab, Pakistan who met the population inclusion criteria set forth in the current study. As mentioned previously, in multivariate analysis, the sample size should be several times larger than the number of predictors. With 07 predictors in the present study, the required sample size for this study should be at least 70. In addition, with other justification, the samples of the current study are dairy farms selected from the entire population of dairy farms operating in Punajb, Pakistan. The sample size for the current research is 228.42 or approximately 228 dairy farms. This is obtained from the sampling formula by (Dillman, 2000, 2011). The sample was increased to 254 due to non-response problem and sample size error (Salkind & Salkind, 1997).

Actual Sample Size (Ns) = $\frac{Np(p)(1-p)}{(Np-1)\left(\frac{B}{C}\right)2+(p-p*2)}$ ……………………………….(1)

Where:

Ns = The actual sample size

Np= Size of population which is 562

P= the population proportion expected to choose among the two response categories is 0.5

B = Sample error at 0.05 (5%)

C = Confidence level at 0.05 is 1.96

Therefore, the sample of this study is calculated as follows

Actual sample Size (Ns) $=\frac{562(0.5)(1-0.5)}{(562-1)\left(0.\frac{05}{1}.96\right)*2+0.5(1-0.5)}$……………………….(2)

$$Ns=\frac{140.5}{561(0.0006507)+(0.25)}$$

$$Ns=\frac{140.5}{0.6151}$$

$$=228.42$$

4.5.3 Sampling Technique

The simple random sampling was used for the collection of data for the present study. Sample will be collected randomly from the dairy farms of the diary sectors Punjab, Pakistan. Through this sampling methodology we will attain the true depiction of the Pakistani dairy industry.

The researcher is taken into account various factors to clinch the sample size for producing statistically valid outcomes. There is need for the appropriate sample size in the condition of various variables in research framework, in this way it will assist to acquire the accurate significance level (Hair *et al.*, 2009).

Furthermore, the population is 562 dairy SMEs firm. The sample size of 227 firms is determined based on Krejcie and Morgan (1970) formula and 228 based on (Dillman, 2011) formula. The adoption of this technique implies that one dairy farms, which must be randomly selected. To choose one firm out of 562 firms, simple random sampling method was used. Through simple random sampling, the dairy SMEs firm was selected. Data was collected from managers of the firms that met the definition of the population.

4.6 Data Collection Methods

The relationships of above mentioned hypothesis were tested by using data collection through structured questionnaires enclosing close-ended questions. As we have indicated earlier, the questionnaire will be distributed for collecting primary data. It was take long time span to investigate the documented information of Pakistan dairy farms in the field of dairy.

The proposed questionnaire is consisted of various parts; demographic information is the first part of it. Each part of the questionnaire comprises of the scales items which are useful in measurement of organizational capability for the mutual innovation. Every concept includes several items to enhance reliability, alleviates the error in measurement and enhances the reaction and response verities of the participants. Five point Likert scales were used to enumerate the response.

4.7 Data Collection Strategy

In the present research, the data collection was started in the mid of January, 2016 after conducting the pilot result. To be precise the data collection took place between the periods of 15^{th} January 2016 to 22^{nd} May 2016. The data was collected for the present research via personally administered questionnaire and through courier services. The nature of the dairy farms in Pakistan made it compulsory for the current research to use some places personally-administered and some for courier method in order to achieve the required number of responses. Consequently, this was ensured that the non-response bias did not affect the results. It is explain that personally-administered questionnaire helps the researcher to establish greater understanding with the respondents when introducing the survey (Sekaran & Bougie, 2011).

It also serves as one way of making clarifications to the respondents immediately, and the response rate can be high since the collection of the questionnaires is immediate. As well, all completed responses can be collected within a short period of time. Initially, an official letter was collected from the Othman Yeop Abdullah Graduate School of Business (OYAGSB), introducing the researcher and also explain the purpose of the research. Therefore, this letter was used to get cooperation from the respondents. The questionnaire used in this research was on six pages including the cover letter, items of each variables and a University Utara Malaysia (UUM) logo in the current research survey. The cover letter clearly highlights the background and purpose of the study and also provides instructions on how to answer the questionnaire. To further increase the willingness of the participants to partake in the survey, their secrecy and confidentiality were confirmed in the cover letter (see Appendix 1).

The survey period for the present study was divided into two parts as follows. Firstly, all questionnaires collected within the period of February 22^{nd} to 3^{rd} March 2016 were considered early respondents. Specifically, 90 usable questionnaires were collected in early response period. Considering the time frame, a follow-up phone calls and SMS were also sent to the respondents as reminder. Moreover, extra effort was made in distribution and collection of the questionnaires per day. Therefore, this effort produced a good result and 164 usable questionnaires were collected. Also, these questionnaires were collected within the period of April (Last week) 2016 and were considered late respondents. These two groups of collected questionnaires were used in conducting nonresponse bias on the study variables.

4.8 Measurement of variables and instrumentation

Measurement of variables is tool for describing the specific properties of the variables of interest of the study in a reliable manner (Sekaran & Bougie, 2011; Creswell, 2013). The measurement of variables for the present study showed below.

4.8.1 Innovation Capability

To measure innovation Capability in the participants, a six items scale was adapting from (Calantone, Cavusgil, & Zhao, 2002). These items include; new ideas, new ways, operating methods, first to market new products, innovation is restricted and new products in last few years. For measuring these items, a five-point Likert scale was used where '1' stands for "strongly disagree" and '5' represents "strongly agreed". At the same time, participants had to specify the incidence of these events occurring. The items are shown in Table 4.2.

Table 4.2
Measurement Items of Innovation Capability

No.	Items	Source

1	Our company always tries for new ideas	Calantone et al., (2002)
2	Our company try to find new ways of doing things	
3	Our company is creative in its operating methods	
4	Our company is commonly the first in the market to give new products and services	
5	Our firm always paid for creativity and take suggestions in the innovation domain	
6	Our new product introduction has increased during the last five years	

4.8.2 Knowledge Sharing

Six items were adapted from the study done by (Sveiby & Simons, 2002; Bock *et al.*, 2005).for the measurement of knowledge sharing. For the adequate measurement of these items, the participants had to indicate on five-point Likert scale, where '1' stands for "strongly disagree" and '5' stands for "strongly agreed". Participants were asked to indicate how frequently these events occurred. The items are shown in Table 4.3.

Table 4.3
Measurement Items of Knowledge Sharing

No.	Items	Source
1	In our firm employee shared their work reports and documents with other employees.	(Sveiby & Simons, 2002; Bock *et al.*, 2005).
2	In our firms employee shared their experience with other organization members.	
3	In our organization knowledge sharing with colleagues is an enjoyable experience.	
4	Our employee provides knowledge at the request of other colleagues.	
5	When our colleagues learned something new, they share with me and all of us.	
6	In our firm employee shared their work reports and documents with other employees.	

4.8.3 Individual Factors (trust, motivation)

Three items from the instrument of Yusof and Ismail (2010) adapted in this study to account for individual factor for trust precisely known as; trust on expertise, believe to colleagues, employees are loyal with each other and employees help when needed. Three items from the instruments of (Rothschild, 1999; Siemsen, Roth, & Balasubramanian, 2008) are adapted in the present study to account for individual factors for Motivation. A five-point Likert scale helped measure these items on the basis where "1" accounted for "strongly disagree" and '5' accounted for 'strongly agreed". In all, the participants had to point out the frequency of these events occurring for the adequate generation of results. The items for Individual Factors are shown in Table 4.4.

Table 4.4
Measurement Items of Individual Factors (Trust, motivation)

No.	Items	Source
1	Our firms have fully trust on the expertise of employee that they have.	Ismail, & Yusof, (2010).
2	Our firms believe that our employee do not exploit for their own interest.	
3	Our firm trust on employee that would help us in innovation.	

Motivation

No.	Items	Source
1	Our firm would like more opportunities to share information	Rothschild (1999); Siemsen et al. (2008)
2	Our firms motivated to share best practice knowledge	
3	In our firm exchanging information would be motivate and encourage	

4.8.4 Organizational Factors (training & development, supervisor support)

Organizational factors have two dimensions which is Training & Development and Supervisory support. For the purpose of measuring organizational factors, six items for training and development were adapted from Jayakumar and Sulthan (2014) and five items were adapted from the study of Vukšić *et al.* (2015) for supervisor support measurement. These consist of, multiple career path, training, sponsor company social events, orientation program, job rotation, mentoring system, personal development and future advancement. Besides measuring on the basis of frequency for the occurrence of these events, the items were also measured using a five-point Likert scale where raging from '1' accounts for "strongly disagree" and on the other hand '5' stands for "strongly agreed". The items for Organizational Factors are shown in Table 4.5.

Table 4.5
Measurement Items of Organizational Factors (Training and Development)

No.	Items	Source
1	Our Company provides multiple career path opportunities for employees to move across multiple functional.	Jayakumar, & Sulthan, (2014)
2	Our company provides training for developing innovative ideas.	
3	Our company sponsor social events for employees to get new knowledge.	
4	Our company offers an orientation program that trains employees on the history and processes of the organization.	
5	Our company use job rotation techniques to develop new skills of employees.	
6	Our company use performance appraisals techniques for skill development and training for future advancement	
	Supervisor Support	
1	Our supervisor encourages us to develop new ideas, new development and be creative	Vukšić *et al.* (2015)
2	Our supervisor provides equal opportunities at work place for new idea	

3	Our Supervisor actively supports our new development at work.
4	Our firm always feel that supervisor give respects and makes use the expertise and knowledge for innovative ideas
5	Our needs and goals are important for supervisor in firm

4.8.5 Technological Factor (information communication technology use)

For the measurement of technological factors, four items were adapted from the study of Choi, Lee, and Yoo (2010). These consist of, electronic storage, knowledge networks and use of technology and have been measured using a five-point Likert scale, where '1' stands for "strongly disagree" and '5' means "strongly agreed". Moreover, like on other measures, participants had to account for the frequency that these events occurred in. The items technological factors are shown in Table 4.6.

Table 4.6
Measurement Items of Technological Factors (ICT)

No.	Items	Source
1	Employees make extensive use of electronic storage (such as online databases and data warehousing) to access knowledge.	Choi, Lee, and Yoo (2010)
2	Employees use knowledge networks (such as groupware, intranet, virtual communities, etc.) to communicate with colleagues.	
3	Our company use technology that allows employees to share knowledge with other persons inside the organization.	
4	Our company use technology that allows employees to share knowledge with other persons outside the organization.	

4.8.6 Industry Factor (industry cluster resources)

The research done by (Lai *et al.*, 2014) led to the adapted of five items for the current study. These items were used to measure industrial factors like, obtain individuals, company obtain experience, and company retain technical talents and technical interaction from employees' flow. While participants had to indicate the level of frequency at which these events had occurred, at the same time they also indicated on a five-point Likert scale, varying between '1' as "strongly disagree" to '5' as "strongly agreed". The items are shown in Table 4.7.

Table 4.7
Measurement Items of Industry factor (Industry cluster Resources)

No.	Items	Source
1	Our Company use cluster to obtain individuals with talent and with high educational levels.	Lai, et al., (2014)
2	Our company use to obtain experienced and required core technique talents.	
3	Our company can retain professional technical talents	
4	Our company use cluster to obtained technical interaction and innovation from the employees' flow.	

4.8.7 Operational Definitions

In Table 4.8 showed the variables which are used in the current study are measured and explain with the operational definition as well as source of the variables.

Table 4. 8
Operationalization of the Variables

Serial No.	Variable Name	Operational Definitions	Alpha	Source
1	Innovation Capability	Innovation capability is the tool of acceptance, generation of new ideas, processes, products or services	0.89	Calantone, Cavusgil, and Zhao (2002)
2	Knowledge sharing	Knowledge sharing is the willingness of individuals in the firm to share with others the knowledge they have acquired or created. Further, knowledge sharing can be done directly via communication or indirectly via some knowledge archive.	0.91	(Sveiby & Simons, 2002; Bock *et al.*, 2005).
3	Trust	The degree to which an individual believes and loyalty another party to be trust worthy	0.73	Yusof and Ismail (2010)
4	Motivation	An individual or Unit's willingness to act	0.97	(Rothschild, 1999; Siemsen, Roth, & Balasubramanian, 2008)
5	Supervisor Support	Supervisor support is open for initiatives, encourages employees to coherent their own concerns, ideas and initiations to investigate novel views and solutions to problems and promotes ideas further.	0.88	Vukšić, Professor Mirjana Pejić Bach et al. (2015)
6	Training & development	The method mainly deals with obtaining or transferring knowledge, skills and attitudes.	0.87	Jayakumar and Sulthan (2014)

7	ICT (Information Communication Technology) use	ICT support means the degree to which knowledge sharing is supported by the use of information technology tools.	0.86	Choi, Lee, and Yoo (2010)
8	Industry cluster Resources	It is a new organization form that enhances the depth and breadth of cooperation and competition and brings together various industries to form a cluster relationship networks.	0.86	Lai *et al.* (2014)

4.9 Questionnaire Design

The questionnaire was prepared for the current study in booklet form. The questionnaire of this study had 37 items, which were presented in five main sections, the first section of the questionnaire is about demographic information, and other sections is about Innovation Capability, Knowledge sharing, Individual factors, organizational factors, technological factors and industry factor, a booklet questionnaire prevents pages from being misplaced. In addition, the respondent feel relaxed and easily turn the pages (Sudman & Bradburn, 1982). The respondents were asked to encircle the appropriate response for questions that are related to their profile. For multiple-choice questions related to variables of current study, respondents were inculcated to encircle all appropriate responses. In a highly constructional questionnaire, a cover letter must be on the first page (Sudman & Bradburn, 1982). The cover letter assists to ensure that the respondents provide correct answers by explaining the importance and the objectives of the current study, which is in the context of innovation capability of Dairy farms in Pakistan.

4.10 Measuring the Validity and Reliability of the Measurements

4.10.1 Validity Analysis

A fair amount of reliability in contrast to validity will only account for good measurement but neglect or create hindrance when pointing out goodness of measure (Churchill Jr, 1979; Sekaran, 2003). Preceding data collection, measurement validity will adequately test for the current study. On account of this, Nunnally and Bernstein (1994) highlight validity is the measure that measures what it sets out to measure. Methodological studies are also known for taking into account many other different kinds of validity measures as well. Studies focused on behavioral science are said to most specifically and usually account for content and construct validity (Nunnally & Bernstein, 1994; Kerlinger & Lee, 2000; O'Leary, 2004).

Since content validity accounts for the level at which the measure tends to what is generally set out to measure. Therefore, it can be concluded that content validity in reality is based on the researcher's expert eye to identify measures that would eventually account for the collective measurement of the whole construct (Lynn, 1986; Haynes, Richard, & Kubany, 1995). Hence, to establish and retain content validity for this particular study, items from preexisting measures have been take on that have also been reported to have strong psychometric properties. Furthermore, different scholars and professionals have been brought together for further validating the items and the questionnaires have been distributed to prospective candidates to get their feedback and reviews. Also, Varimax rotation for factor analysis has been used to determine construct validity in this study. By employing factor analysis, we are able to identify the exact items that explain the construct and furthermore, factor analysis is being run for each construct individually.

4.10.2 Reliability Analysis

To measure the amount and exact level of stability within constructs, reliability has been used (Hair, 2010). To measure for consistency in the study, a reliability measure has been employed. It is the capacity of this reliability measurement to generate the same results repetitively. Sekaran and Bougie (2011) identifies four methods commonly used by researchers for establishing reliability in their instruments. These methods are called, test-retest methods, alternative form methods, split-half method, and the Cronbach's alpha coefficient method which is said to be used most extensively. Hence, Cronbach's alpha coefficient will be used to test the reliability of instrument that is used in the current study. Due to its practicality and functionality, one can strongly identify with its prominent place in social science studies (Santos, 1999; Brown, 2002; Tavakol & Dennick, 2011).

In the Cronbach's alpha coefficient method, the alpha coefficient identifies the level of stability of a construct on the account that it is tested over and again. Therefore, a higher coefficient is linked to higher consistency of the construct items. The concept of minimum standards was put forth by (Nunnally, 1978; Tavakol & Dennick, 2011) to establish an appropriate cut off point. For example, 0.7, 0.8 and 0.9 coefficients account for exploratory, basic and critical issue-based researches, respectively. At the same time, Cortina (1993) rule of thumb is also widely used where the 0.9 coefficient as excellent, 0.8-0.9 as good, 0.7-0.8 as acceptable, 0.6-0.7 as questionable, 0.5-0.6 poor and anything lesser than 0.5 is considered unfavorable.

4.11 SMART-PLS SEM

SMART-PLS SEM is a well-known statistical approach used to establish and test statistical models (Hair, 2010). The present study used PLS-SEM to examine the casual relationship between the individual, organizational, technological and Industry cluster, knowledge sharing and innovation capability. Existing literature has established Structure equation modeling as a powerful second generation multivariate technique that is good for analyzing data. This is by allowing the evaluation of measurement properties and theoretical/structural relationships with multiple relationships simultaneously in the same analysis (Hair, 2010). SEM also allows the researcher to use a combination of confirmatory factor analysis, regression and path analysis.

The structural equation model (Multi variable analysis by suing latent variable) was used in the present study to confirmed the hypotheses with reference to the relationships between latent and observed variables (Hair, 2010). The date was analyzed by using SMART-PLS whereby data screening was do to meet the requirement of PLS to generate structural model and be able to produce the results of hypotheses through standardized regression weight.

Specifically, the SEM method of innovation capability measurement has the potential to provide results that are easy to interpret (Lieberman, 2010). Largely, due to its powerful modeling capabilities and easy to understand graphical output, SEM gives lucid visual evidence to dairy firms about what is truly driving capability to its innovation (Lieberman, 2010).

4.12 Pilot Study

4.12.1. Overview of the pilot study

A pilot study is a basic test used to assess the goodness of measure, that is, reliability, before administering the final questionnaire (Sekaran & Bougie, 2011; Zikmund *et al.*, 2013). Furthermore, a pilot study is significant because it improves the format and the content of the questionnaire (Trochim & Donnelly, 2006). Pilot study is a method used to describe a process and technique by which a feasibility study or trial run is directed in preparation for the scale reliability. It is considered a crucial component of a good study design. However, pilot study itself cannot promise the accomplishment of a successful scale study, pilot study however does enhance the likelihood that the main research would certainly be effective. Rahal *et al.* (2004) define that conducting the pilot study, to confirm an effective instrument prepared, as an improperly design instrument and survey is likely to generate data that will be of few value. On the side from developing and testing the appropriateness of a study instrument, the very first phase of the pilot study was to assess the feasibility of a studying scale. The first step taken was to administer the questionnaire to the pilot subjects in exactly the same manner we would administer in the main study. The pilot study of this research was conducted on a managers and owners of the dairy farms in Pakistan. The 53 managers in this study was response to this pilot study. Pilot study was personally administered by the researcher to encourage dialogue with the managers and owners for their feedback on the issue that highlighted from the survey instrument such as unclear and problematic questions. The questionnaire of the current study normally took of 20 to 30 minutes to answer of the all items in the questionnaire, which was not pain full and headache for the respondents.

Feedback from the managers and owners of the pilot study uncloak the need to further polish and advance the instrument, with all pointless, difficult or unclear questions be rejected. The respondents in this research also provided feedback on the competence in the range of responses provided in the pilot questionnaire. The further investigation on the responses provided, assisted the researcher to relook the specific items that were not clear as expected. A further check on the responses provided, enabled the author to re-word or re-scale specific questions that were not answered as expected. As a result of the feedback given by author, the researchers were capable to make changes the mistakes and errors, revise and improve the measurement of questionnaire until no more correction were considered necessary. Prior to administrating the finalized questionnaire to the intended respondents, there was a need to determine the size of the sampling frame, sampling units and elements.

The measurement instrument required self-completion by the pilot subjects. It is imperative that the questionnaire items accurately address the research questions. The pilot study tested the appropriateness of the questionnaire and how comprehensible it was. It also tested whether the studying questions were well defined, clearly understood and presented in a consistent manner. The pilot survey was taken by a total of 53 pilot subjects comprising of manager and owner participating in innovation capability activities, as part of their growth.

The pilot survey was carried out to elicit information with regards to the perception of the pilot subjects with regards to the factors that helped or hindered their innovation capability. The questionnaire utilized a 1-5 Likert-scale format to measure the extent to which the managers and owner perceived the impact that innovation capability had on their reflective trust, motivation, training & development, supervisor support, ICT used and industry cluster resources on the resulting knowledge sharing. The questionnaire was divided into 02 parts that related to a) socio-demographic characteristics of the respondents; b) innovation capability, knowledge sharing, trust, motivation, training & development, supervisor support, ICT used, industry cluster resources with items seeking information from dairy sector.

The research framework employed in the current study is mentioned in Figure 4.1 above. The current research investigates the impact of trust, motivation, training &

development, supervisor support, ICT used and industry cluster resources on innovation capability and the mediating impact of knowledge sharing between trust, motivation, training & development, supervisor support, ICT used, industry cluster resources for enhancing the innovation capability.

4.12.2 Data entry and analysis

Data from the 53 managers and owner of dairy farms were entered directly into the Statistical Package for Social Sciences (SPSS) software, with the codes of variables that are in the items of questionnaire. After this, data were then analyzed by using the SPSS version 20.

4.12.2.1Factor analysis and reliability

In order to test the reliability of the used questionnaire and validate the developed instrument, an exploratory factor analysis was calculated. Factor analysis is a data reduction method that attempts to identify the underlying variables, or factors, that explain the pattern of correlations within a set of observed variables. It is often used in data reduction to identify a small number of factors which explain most of the variance observed in a much larger number of manifest variables. Factors analysis is also used to generate hypotheses regarding causal mechanisms or to screen variables for subsequent analysis. The results of the factors analysis are discussed in the following section.

4.12.2.1.1 Factors Analysis and Reliability for Innovation Capability

Table 4.9
Factors Analysis and Reliability for Innovation Capability

	Component
Variable	Innovation Capability
IC1:Our company always tries for new ideas	0.77
IC2:Our company try to find new ways of doing things	0.849
IC3:Our company is creative in its operating methods	0.568
IC4:Our company is commonly the first in the market to give new products and services	0.52
IC5: Our firm always paid for creativity and take suggestions in the innovation domain	0.834
IC6:Our new product introduction has increased during the last five years	0.842
EIGENVALUES	3.13
Cumulative Percentage of Variance (%)	52.163
Cronbach's Alpha	0.786
KMO Measure of Sample Adequacy	0.793

4.12.2.2 Factors analysis and reliability for knowledge sharing

Table 4.10
Factors Analysis and Reliability for knowledge sharing

	Component
VARIABLE	Knowledge sharing
KS1: In our firm employee shared their work reports and documents with other employees.	0.799
KS2: In our firms employee shared their experience with other organization members.	0.743
KS3: In our organization knowledge sharing with colleagues is an enjoyable experience.	0.844
KS4: Our employee provides knowledge at the request of other colleagues.	0.598
KS5: When our colleagues learned something new, they share with me and all of us.	0.736
KS6: In our firm employee shared their work reports and documents with other employees.	0.778
EIGENVALUES	3.408
Cumulative Percentage of Variance (%)	56.795

Cronbach's Alpha	0.847
KMO Measure of Sample Adequacy	0.826

4.12.2.3 Factors analysis and reliability for trust

Table 4.11
Factors Analysis and Reliability for Trust

	Component
Variable	Trust (TR)
TR1: Our firms have fully trust on the expertise of employee that they have.	0.829
TR2: Our firms believe that our employee do not exploit for their own interest.	0.836
TR3: Our firm trust on employee that would help us in innovation.	0.762
EIGENVALUES	1.967
Cumulative Percentage of Variance (%)	65.583
Cronbach's Alpha	0.737
KMO Measure of Sample Adequacy	0.672

4.12.2.4 Factors analysis and reliability for motivation

Table 4.12
Factors Analysis and Reliability for Motivation

	Component
Variable	Motivation
MO1: Our firm would like more opportunities to share information	0.918
MO2: Our firm motivated to share best practice knowledge	0.753
MO3: In our firm exchanging information would be motivated and encouraged	0.863
EIGENVALUES	2.155
Cumulative Percentage of Variance (%)	71.83
Cronbach's Alpha	0.784
KMO Measure of Sample Adequacy	0.625

4.12.2.5 Factors analysis and reliability for Training and Development

Table 4.13

Factors Analysis and Reliability for Training & Development

	Component
Variable	Training & Development
TD1: Our Company provides multiple career path opportunities for employees to move across multiple functional.	0.732
TD2: Our company provides training for developing innovative ideas.	0.705
TD3: Our company sponsor social events for employees to get new knowledge.	0.802
TD4: Our company offers an orientation program that trains employees on the history and processes of the organization.	0.728
TD5: Our company use job rotation techniques to develop new skills of employees.	0.512
TD6: Our company use performance appraisals techniques for skill development and training for future advancement	0.631
EIGENVALUES	2.865
Cumulative Percentage of Variance (%)	47.751
Cronbach's Alpha	0.769
KMO Measure of Sample Adequacy	0.72

4.12.2.6 Factors analysis and reliability for supervisor support

Table 4.13

Factors Analysis and Reliability for Supervisor Support

	Component
Variable	Supervisor Support
SS1: Our supervisor encourages us to develop new ideas, new development and be creative	0.913
SS2: Our supervisor provides equal opportunities at work place for new idea	0.843
SS3: Our Supervisor actively supports our new development at work.	0.731
SS4: Our firm always feel that supervisor give respects and makes use the expertise and knowledge for innovative ideas	0.821
SS5: Our needs and goals are important for supervisor in firm	0.669
EIGENVALUES	2.826
Cumulative Percentage of Variance (%)	56.524
Cronbach's Alpha	0.757
KMO Measure of Sample Adequacy	0.67

4.12.2.7 Factors analysis and reliability for ICT used

Table 4.15
Factors Analysis and Reliability for ICT used

	Component
Variable	ICT use (TE)
TE1: Employees make extensive use of electronic storage (such as online databases and data warehousing) to access knowledge.	0.598
TE2: Employees use knowledge networks (such as groupware, intranet, virtual communities, etc.) to communicate with colleagues.	0.725
TE3: Our company use technology that allows employees to share knowledge with other persons inside the organization.	0.641
TE4: Our company use technology that allows employees to share knowledge with other persons outside the organization.	0.859
EIGENVALUES	2.033
Cumulative Percentage of Variance (%)	50.831
Cronbach's Alpha	0.654
KMO Measure of Sample Adequacy	0.443

4.12.2.8 Factors analysis and reliability for industry cluster resources

Table 4.16
Factors Analysis and Reliability for Industry Cluster Resources

	Component
Variable	Industry Cluster Resources
IN1: Our Company use cluster to obtain individuals with talent and with high educational levels.	0.767
IN2: Our company use to obtain experienced and required core technique talents.	0.803
IN3: Our company can retain professional technical talents	0.763
IN4: Our company use cluster to obtained technical interaction and innovation from the employees' flow.	0.677
EIGENVALUES	2.273
Cumulative Percentage of Variance (%)	56.83
Cronbach's Alpha	0.74
KMO Measure of Sample Adequacy	0.693

4.13 Factor analysis and Cronbach's alpha

4.13.1 Factor analysis

Factor analysis is a statistical modeling technique that was developed by an English psychologist, Charles Spearman, in the study of unobservable existing variables (Raykov & Marcoulides, 2006b, 2006a). Same like to path analysis, available literature has revealed that factor analysis also has a relatively long history in business research (Hair, 2010). As mentioned by (Spearman, 1904; Raykov & Marcoulides, 2006b), proposed that the ability scores of known individuals are expressions of general ability or general intelligence and of several other abilities, such as verbal or numerical abilities. These general and specific factors are combined to produce the currently known ability performance, which is an idea that was later labeled as the two-factor theory in human ability. As an increasing number of researchers became interested in the factor approach, the theory was later expanded to other factors. The corresponding analytic approach is called factor analysis.

Factor analysis consists of a set of statistical methods aimed at explaining the underlying structure of a data matrix (Hair, 2010; Pallant, 2013). The core objective of this type of analysis is to categorize factors into more manageable categories (Sekaran, 2003). Factor analysis has two most commonly used approaches, namely, the exploratory approach (EFA) and the confirmatory approach (CFA). EFA is performed when the researcher is uncertain of the number of factors that exist in a set of variables, whereas CFA is performed when the researcher has theoretical expectations about the number of factors and the association between variables and factors. Therefore, CFA is appropriate for the checkup of construct validity because it tests how well a researcher's theory about the factor structure fits actual observations (Zikmund *et al.*, 2013).

The aim for conducting factor analysis in the proposed study is to obtain a summary of the structures of different variables and to know underlying dimensions of the variables. Therefore, EFA is selected. Second, the need for factor analysis lies in the need to assign goodness of fit for the scales used because these scales are all modified from other research. Finally, factor analysis is also conducted to decrease the number of items used in the measurement of variables to minimize loss of information (Hair, 2010). Statistical measures that help assess the factor ability of data include the following:

1. The result of Bartlett's analysis of sphericity should be significant ($p < .05$) to determine the appropriateness of the factor analysis. In a given scenario, when the associated probability is more than .05, a threat is present on the manifestation of the identified matrix that can make it useless for the next step in the analysis (Gray & Kinnear, 1994).

2. Kaiser–Meyer–Olkin (KMO) is a test that measures the adequacy of the sample, with index ranges from 0 to 1. For an effective factor analysis, then lowest KMO value should be 0.6 (Trochim & Donnelly, 2006; Tabachnik & Fidell, 2013). If the index is lower than 0.6, KMO becomes irrelevant. Similarly, Gray and Kinnear (1994) indicated that the value of KMO should be higher than 0.05 for the result to be suitable for further factor analysis. Hair et al. (2010) have a standard in interpreting KMO values: 0.90 indicates a marvelous result, 0.80 indicates a

meritorious result, 0.70 indicates a middling result, 0.60 indicates a mediocre result, and .50 is acceptable but not recommended. A KMO value of below 0.50 is unacceptable.

4.13.2 Reliability Analysis

Reliability analysis assesses the degree of consistency between measurements of a variable (Hair, 2010). Reliability can be described as the extent to which a variable or a set of variables is consistent in the terms of the item that it intends to measure (Hair 2010). If multiple measures are taken, consistency on the measures is achieved. Therefore, reliability is an indicator of a measure's internal consistency. According to Zikmund, Babin et al. (2013), reliability can only be measured when different measures yield the same result. Generally, reliability is inversely related to measurement error. When reliability increases, the interconnection between a construct and an indicator also increases. Thus, the construct explains more of the variance in each indicator (Hair , Hopkins, & G. Kuppelwieser, 2014).

Normally, internal consistency is measured by a coefficient alpha. The most commonly applied estimate of reliability for a multiple-item scale is the computation of the average of all possible split-half reliability values (Zikmund *et al.*, 2013). Coefficient alpha ranges in value from ―0‖ as ―no consistency‖ to ―1‖ as complete consistency (Pallant, 2007; Hair, 2010; Zikmund *et al.*, 2013). All items yield corresponding values. The scales that have a coefficient alpha between 0.80 and 0.95 are considered to have very good reliability, whereas those with a coefficient alpha between .60 and .70 are considered to have fair reliability. In cases where the coefficient alpha is below .60, the scale is considered to have poor reliability

(Zikmund *et al.*, 2013). As recommended by Nunnally (1978), the minimum level of reliability is 0.70. Values below 0.70 indicate a lower limit of acceptability (Hair, 2010), whereas higher values indicate higher reliability (Pallant, 2013).

The above all tables provide the results of a factor analysis conducted on the numerous constructs in the survey. Factor analysis attempts to detect the underlying variables, or factors, that describe the configuration of correlations contained by a set of observed variables. The emerging constructs from the data reduction process of factor analysis are mention in Table. The response of respondents was measured by the constructs made up of trust (03 items), motivation (03 items), training & development (06 items), supervisor support (05 items), ICT use (04 items), and industry cluster resources (04 items) which remained after factor analysis was conducted. For the innovation capability and knowledge sharing constructs, there were a total of 12 items in which 06 items for innovation capability and 06 items for knowledge sharing respectively, which remained after factor analysis was used. The constructs are all reliable as shown by their respective Cronbach's Alpha values in Table, which are all well above the minimum requirement of 0.7 (Nunnally, 1978), suggesting that the items within these constructs have relatively high internal consistency reliability. The KMO valued from the factor analysis of for all construct of each variable shows a good level of data reduction adequacy.

All items in the constructs were found to be effectively correlated as their highest absolute correlation fell between 0.35 and 0.85 as per (Cohen, 1988), that imagines that two variables or items are said to be associated if their correlation coefficient value is at least 0.35. Therefore, it can surely be said that every item in the respective constructs correlated effectively with at least one other item within their own constructs.

The results of the factor analysis and Cronbach's alpha delivered in tables of all variables clearly demonstrate the feasibility of the study importance in the pilot result of the current study. The results of the exploratory factor analysis carried out on the pilot study data showed the forcefulness of the questionnaire used in the current study. The items used for all constructs in this study remained to further improve the questionnaire/research instrument. The current pilot study was able to detect mistakes in the questionnaire. Once the recommended modifications are made to the questionnaire, it can then be utilized in a full study.

4.14 Summary of the Chapter

The purpose of the present research is to find the impact of individual (trust, motivation), organizational (training & development, supervisor support), technological (ICT use) and industry cluster resources on knowledge sharing and innovation capability of the dairy farms in Pakistan. The target population of this study consists of dairy farms in Pakistan. Data was collected for the present study through the questionnaire and analysis was performed by using structural equation modeling technique on SMART-PLS 3.00 and SPSS 20. The validity and reliability of the items was also calculated as pilot study before going for the data collection for the current research.

CHAPTER FIVE

ANALYSIS AND FINDINGS

5.1 Introduction

This chapter is to provide research results which are about demographic, descriptive and inferential statistics for tested the hypotheses of the present research. The Partial Least Squares Structural Equation Modeling (PLS-SEM) and Statistical Package for the Social Sciences (SPSS-20) software were used to compile the collected data. The results of this research will be epitomized using data screening and descriptive statistics. The PLS technique was further used to calculate the reliability and validity of the measurement model, after which the structural model was operated to calculate the developed hypothesis of the current research.

The main objective of this study is to investigate the effect of individual (trust, motivation), organizational (training & development, supervisor support), technological (ICT use), industry factors (industry cluster resources), knowledge sharing in developing the innovation capability. This research is most important as most of the prior literature on individual (trust, motivation), organizational (training & development, supervisor support), technological (ICT use), industry factors (industry cluster resources), its practices and concepts originates from the different countries and different sectors and is most wanting and lacking in Pakistan. As such, it is great hope that the findings of the current research may provide the much-wanted insights into the conceptual development of individual, organizational, technological and industry factors in Pakistan.

The current chapter has centered on the statistical analysis swamped in answering the four research questions of this research. The major aim of this research is to establish a more rigorous understanding of the effect of individual, organizational, technological and industry factors in increasing the innovation capability and knowledge sharing effect on the dairy farms. The four major objectives of the current research are presented as follows:

1. To examine the influence of individual (trust, motivation), organizational (supervisory support, training & development), technological (ICT used) and industry factors (industry cluster resources) on innovation capability.
2. To examine the influence of individual (trust, motivation), organizational (supervisory support, training & development), technological (ICT used) and industry factors (industry cluster resources) on knowledge sharing.
3. To examine the impact of knowledge sharing on innovation capability.
4. To investigate the mediating effect of knowledge sharing in the relationship between individual (trust, motivation), organizational (supervisory support, training & development), technological (ICT used) and industry factors (industry cluster resources) and innovation capability.

The current chapter is further concentration on the numerous statistical techniques of analysis used in finding the answer of three research questions which directed the research. This research pursues to develop an important contribution to the knowledge of individual, organizational, technological and industry factors models by examining the impact of individual, organizational, technological and industry factors on innovation capability and the knowledge sharing of individual, organizational, technological and industry factors.

5.2 Response Rate

The measurement of persons, firms and organizations who respond to any conducted survey (Asch, Jedrziewski, & Christakis, 1997; Kaplowitz, Hadlock, & Levine, 2004). It is called the response rate of the survey. The high response rates of survey support to confirm that survey results are describe of the studying population. A survey method must have a high response rate in order to yield the useful and accurate results. Survey research is the best technique to accomplish unbiased estimates is to attain a high response rate. For this purpose, the works on survey methods is prevalent with best observes and ideas to increase survey response rates (Heberlein & Baumgartner, 1978; Dillman, 2000).

The survey method can be costly, time taken and want the maximum efforts by the researchers and unfeasible due to the increasing pressures placed upon them. So, the many researchers have initiated to question the generally held assumption that small response rates give biased results (Curtin, Presser, & Singer, 2000; Keeter *et al.*, 2000; Groves, 2006; Massey & Tourangeau, 2013).

The primary data for the current research was collected from the manager of Dairy SMEs (Dairy Farms) in Pakistan. The self-administrative questionnaire was distributed among the manager of dairy farms with a chocolate and sweet as a gift for developing the interest in survey questionnaire and maximum response of the data. The researcher also arranged some special meetings with respondents to guide how to fill the given questionnaires. These all efforts are made in order to set the highest response rate for the current study. In addition, reminder letter and an extra copy of questionnaire were sent to the non-respondents after eight weeks of the first mailing.

After these all efforts, 290 questionnaires returned from the 410 that are self-administrated to the manager of Dairy Farms in Pakistan. Therefore, the response rate of the collected questionnaires is 70.73%. However, from 290 responses only taken 254 responses for the further analysis, 36 questionnaires were excluded due to the incomplete questionnaire. So, the response rate for usable and final questionnaires to the analysis is 61.95% which is fulfill the requirements of the analysis.

$$\text{Response Rate} = \frac{\text{No.of completed Surveys}}{\text{No.of People Contacted}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$$

Table 5.1
Response Rate of the Questionnaires

Response	
Number of distributed Questionnaires	410
Returned Questionnaires	290
Useable Questionnaires for Analysis	254
Incomplete Questionnaires	36
Questionnaires not Returned	120
Response Rate for total Returned Questionnaires	70.73%
Response Rate for Analysis	61.95%

5.3 Data Screening Methods

The screening, preparation and editing data is the most important step for the multivariate analysis. It is also an important step to data screening to find any violation of the elementary assumptions linked to the application of the multivariate tools (Hair, 2010). Moreover, primary data is investigation to support the researcher to gain a profound understanding of the collected data. Therefore, outlier, normality test and multi-collinearity are tested and preserved respectively.

5.3.1 Non-Response Bias Test

The issue of non-response bias exists due to the responses of questioner and information by the respondent being different from the non-response. The data was collected for the current study through the survey method; the non-response bias had to be tested. Respondents (Manager) give response after several reminder and personal visits for the highest response. Due to this, the sample was more than 50%, the non-response bias problem also tested in the current study Salkind and Salkind (1997). In addition, the contempt for maximum response in current study, the prospective difference between late (164) and early (90) response were compared by using the variables of this study. So, response bias test was performed by split the respondent into two parts *i.e* early and late response.

The t-test was used performed for all studying variables, including the dependent, mediating and independent variables to discover if there is any bias between the groups. For the equality of variance, the Levene's test was performed to know the difference between early and late respondents. In addition, using the t-test (two-tailed equality of means) to finding the exact p-value associated with hypothesis.

Table 5.2
Descriptive Statistics for the early and late response

Variables	Response	Sample Size	Mean	S.D	S.E
IC	Early	90	4.21	0.52	0.06
	Late	164	4.05	0.66	0.05
KS	Early	90	3.96	0.44	0.05
	Late	164	3.91	0.75	0.06
TR	Early	90	4.10	0.63	0.07
	Late	164	3.99	0.69	0.05

MO	Early	90	4.29	0.85	0.09
	Late	164	4.10	0.76	0.06
SS	Early	90	3.42	0.43	0.05
	Late	164	3.24	0.60	0.05
TD	Early	90	3.89	0.69	0.07
	Late	164	3.99	0.60	0.05
TE	Early	90	4.18	0.60	0.06
	Late	164	4.13	0.52	0.04
IN	Early	90	3.23	0.55	0.06
	Late	164	3.24	0.58	0.05

Note: IC= "Innovation Capability", KS="Knowledge Sharing", TR="Trust", MO="Motivation", SS="Supervisor Support", TD="Training and Development", TE="Technology", IN="Industry Cluster Resources"

Table 5.2 shows that the mean, standard deviation (S.D) and standard error (S.E) of the response (early and late) are very close to each other's.

Table 5. 3
Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the difference	
		F	Sig	T	df	sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
IC	Equal variances assumed	2.9	0.1	2.1	252.0	0.0	0.2	0.1	0.0	0.3
	Equal variances not assumed			2.2	220.4	0.0	0.2	0.1	0.0	0.3
KS	Equal variances assumed	20.8	0.0	0.6	252.0	0.6	0.0	0.1	-0.1	0.2
	Equal variances not assumed			0.7	250.3	0.5	0.0	0.1	-0.1	0.2
TR	Equal variances assumed	0.1	0.8	1.3	252.0	0.2	0.1	0.1	-0.1	0.3
	Equal variances not assumed			1.3	197.9	0.2	0.1	0.1	-0.1	0.3
MO	Equal variances assumed	3.0	0.1	1.8	252.0	0.1	0.2	0.1	0.0	0.4

	Equal variances not assumed			1.8	166.2	0.1	0.2	0.1	0.0	0.4
SS	Equal variances assumed	3.9	0.0	2.5	252.0	0.0	0.2	0.1	0.0	0.3
	Equal variances not assumed			2.7	233.0	0.0	0.2	0.1	0.0	0.3
TD	Equal variances assumed	1.3	0.3	-1.2	252.0	0.2	-0.1	0.1	-0.3	0.1
	Equal variances not assumed			-1.2	164.3	0.2	-0.1	0.1	-0.3	0.1
TE	Equal variances assumed	1.8	0.2	0.7	252.0	0.5	0.0	0.1	-0.1	0.2
	Equal variances not assumed			0.7	162.2	0.5	0.0	0.1	-0.1	0.2
IN	Equal variances assumed	2.2	0.1	-0.1	252.0	0.9	0.0	0.1	-0.2	0.1
	Equal variances not assumed			-0.1	193.5	0.9	0.0	0.1	-0.2	0.1

Note: IC= “Innovation Capability”, KS=”Knowledge Sharing”, TR=”Trust”, MO=”Motivation”, SS=”Supervisor Support”, TD=”Training and Development”, TE=”Technology”, IN=”Industry Cluster Resources”

With respect to Innovation Capability, Table 5.3 and Table 5.2 shows that the Mean and SD of Innovation Capability (IC) shows that there is no significant difference between early response $(Mean = 4.21, SD = 0.52)$ and late response$(Mean = 4.05, SD = 0.66)$. Additionally, the calculated result highlighted that there is no significant difference between early and late responses$(t = 2.1, p < 0.05)$. So, the null hypothesis of the current study is accepted in favor of alternative hypothesis. The result shows that the early response of knowledge sharing (KS) ($Mean = 3.96, SD = 0.44$) and late response of knowledge sharing (KS) $(Mean = 3.91, SD = 0.75)$ are very closely to each other. The 2-tailed t-test $(t = 0.6, p < 0.05)$ indicated that the no difference between early and late response of knowledge sharing.

Furthermore, the independent t-test of Individual factors (Trust (TR), Motivation (MO)) shows that there is no difference between early response of TR$(Mean = 4.10, SD = 0.63)$and early response of MO $(Mean = 4.29, SD = 0.85)$. The late response of MO is $(Mean = 4.10, SD = 0.76)$ and late response of TR$(Mean = 3.99, SD = 0.69)$. Additionally, the independent two-tailed t-test of MO $(t = 1.8, P > 0.05)$ and TR$(t = 1.3, P > 0.05)$ show that the variance of early and late response of MO and TR are very close. Thus, the null hypothesis of MO and TR are accepted. The result for the Supervisor support (SS) indicates that the early response $(Mean = 3.42, SD = 0.43)$ and late response $(Mean = 3.24, SD = 0.60)$ are nearly too similar. Further result of t-test show that there is significant difference between the early and late response of the means$(t = 2.5, p < 0.05)$. Furthermore, the result of training and development (TD) of the early response $(Mean = 3.89, SD = 0.69)$ and the late response $(Mean = 3.99, SD = 0.60)$ are almost equal. As per result of t-test is $(t = -1.2, p > 0.05)$ of TD show that there is no significant difference between early and late response of the current study.

Add more; based on technological factor (TE), the early response of TE $(Mean = 4.18, SD = 0.60)$ and the late response $(Mean = 4.13, SD = 0.52)$ are act like the similar. The 2-tailed t-test of TE is $(t = 0.7, p > 0.05)$ indicated that there is no mean difference between early and late response. At last, based on Industry factor (IN), the early response $(Mean = 3.23, SD = 0.55)$ and late response of IN$(Mean = 3.24, SD = 0.58)$ are near to be same. However, the 2-tailed t-test of IN is $(t = 0.1, p > 0.382)$ indicated that there is no significant difference between early and late response. The independent t-test discussed above, it can be founded that the there is no significant difference between early and late response. Thus, there is no matter of non-response bias.

5.3.2 Common Method Bias Test

Common method biases problem are the several effects on the research findings and many authors agree that common method bias (i.e., variance that is feature to measurement methods instead of builds the measures represent) is a problem in a social science research. Since the discussions on the common method biases are before 40 years Campbell and Fiske (1959), and attention in this problem looks to have continued unrelieved to the current days (Campbell & O'Connell, 1982; Bagozzi & Yi, 1990; Bagozzi, Yi, & Phillips, 1991; Williams & Anderson, 1994; Williams & Brown, 1994; Scullen, 1999; Kline, Sulsky, & Rever-Moriyama, 2000; Lindell & Whitney, 2001; Conway & Lance, 2010).

Common method biases are issue because they are Foundations of measurement error. Measurement error effects on the validity of the results about the associations between measures and it is generally predictable to have both systematic and random components (Nunnally, 1978; Spector, 1987; Bagozzi, Yi, & Phillips, 1991).

In addition, the data on the endogenous variable and exogenous variables have collected in a single time with the same tools and techniques, common method bias could change in the collected information. Several evidences were on the scope of gravity of common method bias on the data (Bagozzi, 2011). Therefore, researcher gives an important consideration in the current study. There are many statistical tools and ways to handle common method variance. So, the researcher embrace confidentially of the respondents, wording of the questions, clarity of the variables with their items and statistical Harmon's one factor test (Podsakoff *et al.*, 2013). In the current study, un-rooted factor analysis is performed with 37 items of the variables in the study revealed that no single factor found for above 50% of the variance. The result created 8 different factors and only 20.78% (results are attached in Appendix-2) of the total variance was noted as a single factor, it shows that issue of common method bias was not exist in this study (Horman & Kaminka, 2005). This is in line with (Podsakoff *et al.*, 2013; Lowry & Gaskin, 2014), who suggested that common method bias exist when a one factor have greater than 50% of the variance.

5.3.3 Outlier

Outlier is considered observations, which differ from rest of the observations significantly. Under circumstances that follow normal probability, we should expect five observations in every thousand observations to be more than three standard deviations far from its average. Outlier may be due to variation in the measurement and may be show an experimental error (Rousseeuw & Leroy, 2005).

Detection of outlier is an essential step because skipping very fast examination of outliers can correct statistical test if it happens to be a problematic outlier. According to the study of (Tabachnik & Fidell, 2013) that the Mahalanobis D^2 was used to identify the multivariate outlier in the current study. Mahalanobis distance is used to estimate each value's position in assessment with the center of all the values on set of variable and is assumed an effective technique for excluding outliers (Hair *et al.*, 2009). By using IBM SPSS v20, the Mahalanobis distance D^2 was calculated by using simple linear regression model. In this study, we used 37 items and by seeing at chi square table, the table value of the chi square for $(df = 36, p < 0.001)$ was 69.35. Hence, any case having Mahalanobis distance D^2value exceed than 69.35 is a multivariate outlier and should be excluded from the analysis. Thus, any cases with value 69.35 and more were excluded from further analysis. No value was found which more than 69.35 in the current study data (Appendix-3). So, the outlier issue not exists in the data of the present research.

5.3.4 Missing Data

Missing data may be problematic for researcher at the time of analyzing the collected data. This problem occurs due to lack of response, less interest and laziness of the respondents (Enders, 2010; Graham, 2012; Little & Rubin, 2014). In the present study, calculating the negative effects of missing data in the analysis, the researcher called for protective action at the collection point in an attempt to reduce their occurrence. Upon receipt of the completed questionnaires, the researcher quickly checked by ensuring that all questions were answered appropriately. Attention of the respondents was drawn if a question(s) was/were ignored and they were asked to kindly complete filling the questionnaire accurately. According to Henseler, Dijkstra et al. (2014), missing values should be swapped through mean when there is less than 5% missing values per item. In present research, missing value analysis indicated none of the indicators had 5% of missing values; it ranged from 0.2% to 1.5%. Hence, missing values were exchanged by using SPSS 20 through mean replacement.

5.3.5 Normality Test

The researchers always assumed that the variables are normally distributed because normal distribution is a most important assumption for statistical analysis and PLS SEM. If the variables are not normally distributed than researcher may face the problem of skewed (lack of symmetric) and can potentially change the affiliation between the variables of the interest and the significance of the test results (Hulland & Business, 1999). The PLS-SEM is compassionate model that consider no assumption of the normality because PLS-SEM is non-parametric statistical method (Henseler, Ringle, & Sinkovics, 2009; Temme, Kreis, & Hildebrandt, 2010).

Normality refers to the shape of the distribution of the data for single metric variable and its corresponding to the normal distribution of the standard for statistical method (Hair, 2010). To check the normality, i-e measuring possible deviation from normality and the shape of the distribution, this study applied statistical method of Skewness and Kurtosis (Curran, West, & Finch, 1996; Saville *et al.*, 2011; Tabachnik & Fidell, 2013). In addition, Tabachnik and Fidell (2013), says that the deviation from the normality of Skewness and Kurtosis often do not make essential difference in the analysis when the sample is greater than 200.

5.3.6 Multi-collinearity

It refers to the association between more than two exogenous variables, where the explanatory (Independent) variables indicates a little correlation with other explanatory variable (Hair, 2010). The problem of multi-collinearity occurs when the explanatory variables are correlated with each other (Pallant, 2007; Hair, 2010; Pallant, 2013; Tabachnik & Fidell, 2013).

Moreover, when multi-collinearity between explanatory variable is high, the Standard error (S.E) tend to increase. Therefore, the t-test and F-test are not a significant instead of significant. The most famous statistical test of multi collinearity are Tolerance and Variance Inflation factor (VIF), the high value of VIF show that the more multi (Collinear) between explanatory variables. The rule of thumb for VIF is that, if VIF is greater than 10, which will happen if R^2(Co-efficient of Determination) is greater than 0.90, the variable is said to be highly multi collinear. On the other hand, if Tolerance (TOL) is closed to Zero, it means the high degree of multi (Collinearity) between explanatory variables. If the TOL is closed to 1, it means the greater evidence that explanatory variable is not multi (Collinear) with other explanatory Variables (Gujarati, 2009).

The Correlation matrix of the explanatory variables was examined to find out if there is any indication of high correlation among the variables (Gujarati, 2009; Hair, 2010). Multicollinearity occurs when association between explanatory variables is 90% and larger. However, (Pallant, 2013) suggested that the correlation value is exceeds 70% as edge for multi collinearity among the explanatory variables. The results of correlation matrix indicate that no one of exogenous variables is highly correlated with any other exogenous variable. The correlation Table indicate that the correlation values of all exogenous variables are less than 70 %(0.70). So, we conclude that there is no problem of multi-collinearity between the exogenous variables of the current study.

Table 5.4
Correlation between exogenous variables

Variables	KS	TR	MO	TD	SS	TE	IN
KS	1						
TR	0.314**	1					
MO	0.281**	0.364**	1				
TD	0.202**	0.082	-0.104	1			
SS	0.423**	0.185**	0.109	0.240**	1		
TE	0.192**	0.225**	0.052	0.372**	0.265**	1	
IN	0.250**	0.226**	0.263**	0.138*	0.210**	0.148*	1

Note: ** 0.01 level (2 tailed), 0.05 level (2 tailed)

In Table 5.5, multi-collinearity was tested through observed of Tolerance and VIF using regression model provided by the IBM SPSS v20 collinearity diagnostic results. From the Table 5.5, it is cleared that Tolerance range between 0.64 and 0.83 substantially larger than 0.10 and VIF range from 1.20 and 1.56 substantially below than 10. In line with (Hair, 2010; Pallant, 2013) that the Tolerance values below 0.10

and VIF values greater 10, show that high multi-collinearity, this result indicate that multi-collinearity problem not exist in this data.

Table 5.4
Multi-collinearity based on Tolerance and VIF values

	Collinearity Statistics	
Variables	**Tolerance**	**VIF**
KS	0.64	1.5 6
TR	0.80	1.25
MO	0.72	1.40
SS	0.79	1.26
TD	0.71	1.41
TE	0.76	1.31
IN	0.83	1.20

Note: KS=" Knowledge Sharing", TR=" Trust", MO=" Motivation", SS=" Supervisor Support", TD=" Training and Development", TE=" Technology", IN=" Industry Cluster Resources"

5.4 Demographic Analysis

Respondents were asking to indicate the different aspects relevant to their Dairy farms business, *i.e* Dairy Farms type (Public, Private), Dairy Farms status (Growth, Declining), Size of dairy farms according to employee, age of the dairy farms in term of experience and the location of dairy farms. The below discussion is about the respondents with their characteristics.

In the beginning to insure whether the respondents are fulfilling the basic information regarding to the conducting survey. The descriptive statistics were performed to generate frequency, cumulative frequency and mean scores for the dairy sector of demographic variables. Total 254 dairy farms owner/managers of the dairy SMEs

Punjab are the participants as a respondent in the current survey. According to survey analysis the maximum (94.9%) dairy farms belong to private ownership, it means people in Pakistan like to do businesses private instead of with Government. Additionally, the other demographic variable dairy farms status which is about the declining and growth of the dairy farms. The results in Table5.6 indicated that the dairy farms in Pakistan are almost facing the issue of declining (53.7%). Furthermore, indicated that the dairy farms in Pakistan are not in good survival and almost 53.7 dairy farms face the declining issue, means that the dairy farms growth not according to dairy farm's owner expectation.

According to the data in this research, in the term of dairy farms size, this demographic analysis indicated that the majority of the respondents have employee from 16 to 26 in their dairy businesses. Considered by the age (experience in dairy business) of dairy farms which is directed that the more dairy farms have limited experience, according to analysis 52.9% dairy farms have less than 05 years' experience and 33.3% dairy farms have experience between 6 to 10 years old. The majority of the dairy farms have very less experiences. In the last, 254 dairy farms are belonging to the Punjab (Lahore, Multan, DG Khan and Faisl) of Pakistan. The analysis of the location revealed that the 55.9% dairy farms are belong to the city Lahore in the collected data, 20.1% farms are from the Multan, 12.2% dairy Farms are in the DG khan and 11.4% dairy farms from the Faisal Abad.

Table 5.5
Firm Profile

Variable Name		**Frequency**	**Percent**	**Cumulative Percent**
Dairy Farm Type	Public Dairy Farm	12	4.7	4.7
	Private Dairy Farm	242	94.9	100

Dairy Farms Status	Declining	137	53.7	53.7
	Growing	117	46.3	100
Size of Dairy Farm	Employee< =15	87	34.1	34.3
	Employee 16 to 25	131	51.5	85.8
	Employee>= 26	36	14.2	100
Age of Dairy Farms	Less Than 05	135	52.9	52.9
	6-10 Years	85	33.3	86.2
	11-14 Years	19	7.5	93.7
	More Than 15 Years	15	6.3	100
Location of Dairy Farms	Lahore	142	55.9	55.9
	Multan	52	20.1	76
	Dg Khan	31	13.2	88.6
	Faisal Abad	29	11.4	100

5.5 Descriptive Statistics of the Variables

The variables were exposed to descriptive statistics to detect their characteristics. Specially, maximum and minimum values as well as mean, standard deviation, were also computed in this study. The meaning of descriptive statistics is to measure central tendencies and dispersions of the data set by using the values obtained for the maximum, minimum, mean and standard deviation values (Kazmier, 1996; Meier & Brudney, 2002; Dielman, 2005; Sekaran, 2006). These statistical methods can be more suitable for interval-scale variables (Coakes *et al.*, 2003; Sekaran, 2006). The purpose of the mean value is to measure the central tendency location of the data set, which is commonly calculated as the average (Dixon & Massey Jr, 1957; Sekaran, 2006). The meaning of standard deviation is the dispersion of data that deviate around the mean (Dahlberg, 1940; Tukey, 1977; Fess, 1989; Webster *et al.*, 1998). The functions of minimum and maximum values are to check the errors in data entry (Nachmias & Nachmias, 1976; Doane & Seward, 2007).

The overall descriptive statistics of the variables are used in the current study was observed. Descriptive analysis was conducted for the dependent variable (innovation capability), independent variables (trust, motivation, training & development, supervisor support, ICT used, industry cluster resources), and mediator variable (knowledge sharing). The results in descriptive statistics Table 5.7 revealed that the dependent variable innovation capability with minimum (1.83) and maximum score (5.00) with the mean score (4.10543), which can be considered as high, with a standard deviation of 0.61968. The minimum score of knowledge sharing is (1.50) and maximum score (5.00) with the mean value (3.9291) and standard deviation (0.65436), considered as high respectively.

Table 5.7, validates the results of the descriptive statistics pertaining to independent variable trust. The mean score of trust was (4.0276) with standard deviation (0.66733) and the minimum and maximum score of trust were (1.67) and (5.00), respectively. The mean score of motivation was (4.1652), which can be considered rather high as well, with a standard deviation of (0.79620), and minimum and maximum scores of (2.00) and (5.00), respectively. The mean score of supervisor support was (3.3076) with standard deviation (0.55003) and the minimum score of supervisor support was (1.67) and maximum score was (4.17). The mean score of training & development was (3.9581), which can be considered as moderate with the standard deviation (0.63478), and minimum and maximum score of training & development were (1.67) and (5.00), respectively. The mean score of ICT used was (4.1457), which can be considered as high with the standard deviation (0.54938), and minimum and maximum score of ICT used were (2.00) and (5.00), respectively. The mean score of industry cluster resources was (3.2346), which can be considered as moderate with the standard deviation (0.56853), and minimum and maximum score of training & development were (1.60) and (4.00), respectively.

Table 5.6
Result of Descriptive Statistics of all variables

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Innovation Capability	254	1.83	5.00	4.1054	0.61968
Knowledge Sharing	254	1.50	5.00	3.9291	0.65436
Trust	254	1.67	5.00	4.0276	0.66733
Motivation	254	2.00	5.00	4.1652	0.79620
Supervisor Support	254	1.67	4.17	3.3076	0.55003
Training & Development	254	1.67	5.00	3.9581	0.63478
ICT used	254	2.00	5.00	4.1457	0.54938
Industry Cluster Resources	254	1.60	4.00	3.2346	0.56853

5.5.1 Evaluation of PLS-SEM calculation

PLS-SEM stands for Partial Least Square-Structural Equation Modeling. PLS-SEM is a statistical procedure for studying multivariate relationship between latent and observed variables. The most important benefit of PLS-SEM in term of analysis that it deals with multiple dependents as well as multiple independents, also it has capability to deal multi-collinearity between the explanatory variables, screening and missing data, making independent latent variables directly on the source of depended variable(s) and making for stronger predictions. In addition, the results of factor analysis are discussed. It is already mentioned in chapter three that the all items of the study were adapted from the previous research. The reliability and the validity of the construct were measured through the PLS-SEM. The outer model indicates the uni-dimensionality variables in this study, in terms of factor analysis. After that, verify the reliability and validity of the item measure, the structural models were measured and the association between the latent variables was observed. The next step was to measure the outer model and inner model for this purpose we used PLS-SEM (Esposito Vinzi, Trinchera, & Amato, 2010; Hair , Hopkins, & G. Kuppelwieser, 2014). Similarly, PLS-SEM used to analyze the direct and mediating results for this study.

The latest version of PLS-SEM by Sarstedt *et al.* (2014) used to define causal links between the items in these theoretical models. Before performing the PLS-SEM analysis, there is a need to design the model in a way that it will obviously understand. For this purpose, indicators of all construct must be explained to create which indicators are formative if any, and which are reflective. It is necessary to note that model configuration is vital because approach in testing reflective measurement model is different from approach used in testing formative measurement model (Hair , Hopkins, & G. Kuppelwieser, 2014; Lowry & Gaskin, 2014). In this study, all the indicators of latent variables are reflective. In details, the unobserved variables and the observed variables are reflective rather than formative variables. In addition, the analysis does not involve testing second-order structures that contain two layers of components. Furthermore, the construct of this study for the inner model were preserved as first order constructs. The designate of sequence and relationship between the items, the current study has seven exogenous latent variables which include six independent variables (TR, MO, SS, TD, TE and IN), and one mediating variable KS. The endogenous variable in this study are the mediating variable KS and the dependent variable IC.

5.5.2 Measurement Model (Outer Model)

In this section, researcher discussed about the measurement or outer model. Outer model is the part of a model that explains the relationships between a latent variable and their indicators. The outer model is further divided in to two parts *i-e* formative blocks and reflective blocks. The first approach in PLS-SEM analysis is the assessment of the outer model. The outer model deals with the measurement of the component or items of each variable, which determines how well the indicators (items) load theoretically and associate with respective constructs. In other words, analysis of the outer model confirms that the survey items measure the constructs they were designed to measure, thus ensuring that they are reliable and valid.

Reliability and validity are the two main measures in PLS-SEM analysis to evaluate the outer model (Ramayah, Lee, & In, 2011; Hair , Sarstedt, & Hopkins, 2014). The conclusion about the nature of the relationship among constructs (inner model) depends on the reliability and validity of the measures. The examination of reliability and validity is the essential part in the PLS-SEM. The table 5.8 indicates that the reliability and validity of the indicators that researcher calculated through PLS-SEM. The suitability of the outer model can be assessed by looking at: (1) individual item reliabilities, i.e., indicator reliability and internal consistency reliability using composite reliability (CR); (2) convergent validity of the measures associated with individual constructs using average variance extracted (AVE); and (3) discriminant validity using Fornell-Larcker criterion and the indicator's outer loadings. To begin with, internal consistency usually measures the consistency of result between items of the same test. It measures whether the proposed items measuring the construct are producing similar scores (Hair , Sarstedt, & Hopkins, 2014). Therefore, in this study, internal consistency reliability was assessed by examining CR.

According to Hair Jr. et al. (2014), unlike Cronbach's alpha, CR does not assume an equal indicator loading of construct. CR varies between 0 and 1; the standard value should not be lower than 0.60 (Henseler et al., 2009) but value from 0.70 and above is most desirable (Joseph F Hair *et al.*, 2012). Accordingly, CR value between 0.6 and 0.7 indicates average internal consistency, while value between 0.70 and 0.90 is regarded as more adequate (Nunnally & Bernstein, 1994).

Therefore, in current study, CR and Cronbach's alpha values for all the constructs were examined, and the results in Table 5.8 indicates that all CR and Cronbach's alpha values exceed the recommended standard value of 0.70 (Henseler, Ringle, & Sinkovics, 2009; Hair , Sarstedt, & Hopkins, 2014). The CR values in current study, range from 0.83 to 0.91 indicating the reliability of the measurement model. Next is convergent validity, refers to the point to which two measures of same constructs that theoretically related to each other, are in fact related (Henseler, Ringle, & Sinkovics, 2009). Hence, successful assessment of convergent validity indicates that it is highly correlated with other tests to measure similar construct (Hair , Sarstedt, & Hopkins, 2014). With regards to identifying an element of convergence in the measurements of the construct, AVE is used with a standard of 0.50 and above (Henseler, Ringle, & Sinkovics, 2009; Joseph F Hair *et al.*, 2012).

AVE value of 0.50 indicates adequate convergent validity. In other words, latent construct explains half of the variance of its indicators and indicates adequate convergent validity (Hair , Sarstedt, & Hopkins, 2014). In this study, convergent validity was assessed by examining AVE values. Results in Table 4.8 show that the AVE value of all the constructs exceed the standard value of 0.50 (Henseler, Ringle, & Sinkovics, 2009; Joseph F Hair *et al.*, 2012). The result affirms that the AVE values of all variables in this study are range from 0.53 to 0.83; so, it can be clinched that convergent validity is established.

Table 5.7
Loadings, Reliability and Convergent Validity Values

Construct	**Items**	**Loadings**	**CA**	**CR**	**AVE**
	IC1	0.70			
	IC2	0.82			
IC	IC3	0.70	0.83	0.87	0.54
	IC4	0.67			
	IC5	0.79			
	IC6	0.71			
	KS1	0.72			
	KS2	0.70			
KS	KS3	0.82	0.75	0.83	0.83
	KS4	0.58			
	KS5	0.69			
TR	TR1	0.80	0.75	0.85	0.66
	TR2	0.85			
	MO1	0.88			
MO	MO2	0.88	0.86	0.91	0.78
	MO3	0.89			
TD	TD1	0.61	0.78	0.85	0.53

	TD3	0.69			
	TD4	0.75			
	TD5	0.77			
	TD6	0.80			
	SS1	0.80			
	SS2	0.76			
SS	SS3	0.75	0.81	0.87	0.57
	SS4	0.75			
	SS5	0.70			
	TE1	0.70			
	TE2	0.76			
TE	TE3	0.76	0.75	0.84	0.57
	TE4	0.78			
	IN1	0.85			
IN	IN3	0.74	0.72	0.83	0.62
	IN4	0.78			

Note: IC= "Innovation Capability", KS=" Knowledge Sharing", TR=" Trust", MO=" Motivation", SS=" Supervisor Support", TD=" Training and Development", TE=" Technology", IN=" Industry Cluster Resources", CA= "Cronbach's Alpha" CR=" Composite Reliability", and AVE=" Average Variance Extracted"

Then, discriminant validity was also considered, which concerns with the extent to which one construct is actually different from another construct. In other word, the measures of constructs that are theoretically not related to each other (Churchill Jr, 1979; Hair , Sarstedt, & Hopkins, 2014). The most conventional approach in assessing discriminant validity is Fornell-Larcker criterion (Hair , Sarstedt, & Hopkins, 2014). In addition, cross-loading examination method, which is considered more liberal, since it is likely to have more, constructs exhibiting discriminant validity.

The table 5.9 is about the Discriminant validity is establish when the value of the square root of AVE of each construct is higher than the construct's highest correlation with any other latent construct (Henseler, Ringle, & Sinkovics, 2009; Hair , Sarstedt, & Hopkins, 2014). Therefore, in current study, discriminant validity was assessed by comparing the square root of the AVE for each construct with the correlations presented in the correlation matrix. Table 5.9 indicates the results of Fornell-Larcker Criterion assessment with the square root of the constructs. The square root of AVE in bold is greater than its highest construct's correlation with any other constructs. Thus, it is clinched that discriminant validity on the construct has been established (Henseler, Ringle, & Sinkovics, 2009; Hair , Sarstedt, & Hopkins, 2014).

Table 5.8
Discriminant Validity

Variables	IC	KS	TR	MO	TD	SS	TE	IN
IC	**0.73**							
KS	0.38	**0.71**						
TR	0.22	0.20	**0.81**					
MO	0.25	0.26	0.37	**0.88**				
TD	0.38	0.30	0.09	-0.03	**0.73**			
SS	0.32	0.56	0.19	0.20	0.30	**0.75**		
TE	0.36	0.29	0.23	0.04	0.39	0.31	**0.75**	
IN	0.28	0.32	0.26	0.32	0.18	0.25	0.19	**0.79**

Note: IC= "Innovation Capability", KS=" Knowledge Sharing", TR=" Trust", MO=" Motivation", SS=" Supervisor Support", TD=" Training and Development", TE=" Technology", IN=" Industry Cluster Resources"

Lastly, in this study outer factor loading as important criteria in assessing indicator's contribution to assigned construct was examined. Outer loadings were examined based on the value of 0.50 and above (Hair, 2010). However, Hair Jr. et al. (2014) stressed that outer loading greater than 0.40 but less than 0.70 should be carefully analyzed and should be deleted only if it increases the value of CR and AVE. Based on these recommendations regarding item deletion, only 03 items were deleted out of 37 items.

Table 5.10 indicates that all the bold values of the loading exceed the suggested threshold of 0.50 and above, showing satisfactory contribution of the indicators to assigned constructs. Additionally, as argued by Hair Jr. et al., (2014), discriminant validity can be assessed by examining the indictors' outer loadings. They debate that discriminant validity can be established when the indicator's outer loading on a construct is higher than all its cross-loading with other constructs. Hence, Table 5.9 indicates absence of discriminant validity problem since the loadings are greater than 0.5, and no any other indicator has loading more than the one it intends to measure.

Table 5.9
Factor Loading/Cross Loading

Variables	Items	IC	KS	TR	MO	TD	SS	TE	IN
Innovation Capability	IC1	**0.70**	0.35	0.05	0.23	0.24	0.12	0.22	0.09
	IC2	**0.82**	0.32	0.20	0.22	0.25	0.26	0.27	0.29
	IC3	**0.70**	0.16	0.14	0.15	0.21	0.23	0.24	0.28
	IC4	**0.67**	0.29	0.19	0.11	0.41	0.29	0.41	0.08
	IC5	**0.79**	0.36	0.16	0.18	0.28	0.29	0.23	0.24
	IC6	**0.71**	0.16	0.23	0.21	0.23	0.17	0.16	0.27
Knowledge Sharing	KS1	0.22	**0.72**	0.13	0.20	0.08	0.39	0.06	0.18
	KS2	0.32	**0.70**	0.06	0.25	0.28	0.42	0.18	0.31
	KS3	0.27	**0.82**	0.11	0.17	0.24	0.55	0.18	0.25
	KS4	0.34	**0.58**	0.29	0.15	0.27	0.20	0.31	0.27
	KS5	0.20	**0.69**	0.15	0.17	0.19	0.37	0.32	0.09
Trust	TR1	0.19	0.17	**0.80**	0.28	0.09	0.19	0.21	0.22
	TR2	0.19	0.19	**0.85**	0.37	0.05	0.13	0.16	0.22
	TR3	0.16	0.12	**0.79**	0.24	0.08	0.15	0.19	0.19
Motivation	MO1	0.22	0.19	0.35	**0.88**	0.02	0.16	0.04	0.29
	MO2	0.23	0.31	0.28	**0.88**	-0.02	0.22	0.07	0.24

	MO3	0.20	0.17	0.35	**0.89**	-0.07	0.12	-0.02	0.33
Training & Development	**TD1**	0.10	0.10	0.05	-0.10	**0.61**	-0.01	0.30	0.16
	TD3	0.23	0.20	0.08	-0.06	**0.69**	0.30	0.25	0.05
	TD4	0.28	0.12	0.04	-0.13	**0.75**	0.07	0.32	0.09
	TD5	0.27	0.33	0.10	0.08	**0.77**	0.29	0.19	0.15
	TD6	0.39	0.26	0.04	0.01	**0.80**	0.29	0.38	0.20
Supervisor Support	**SS1**	0.25	0.53	0.15	0.18	0.24	**0.80**	0.22	0.27
	SS2	0.16	0.34	0.12	0.16	0.17	**0.76**	0.13	0.28
	SS3	0.21	0.39	0.14	0.00	0.22	**0.75**	0.29	0.13
	SS4	0.24	0.42	0.17	0.06	0.27	**0.75**	0.35	0.07
	SS5	0.32	0.37	0.14	0.33	0.21	**0.70**	0.18	0.21
Information Communication Technology Use	**TE1**	0.25	0.12	0.12	-0.03	0.27	0.23	**0.70**	0.12
	TE2	0.24	0.17	0.13	0.00	0.31	0.18	**0.76**	0.18
	TE3	0.31	0.29	0.24	0.03	0.31	0.30	**0.76**	0.16
	TE4	0.27	0.25	0.17	0.10	0.27	0.21	**0.78**	0.12
Industry Cluster resources	**IN1**	0.31	0.30	0.19	0.34	0.08	0.20	0.17	**0.85**
	IN3	0.12	0.23	0.26	0.16	0.15	0.16	0.17	**0.74**
	IN4	0.16	0.19	0.19	0.19	0.25	0.25	0.12	**0.78**

Note: IC= “Innovation Capability”, KS=” Knowledge Sharing”, TR=” Trust”, MO=” Motivation”, SS=” Supervisor Support”, TD=” Training and Development”, TE=” Technology”, IN=” Industry Cluster Resources”

After obtaining a good result of the evaluation of the outer model (measurement model), precisely the latent variables indicate satisfactory evidence of reliability and validity, the next step was evaluation of inner model (structural model). However, because the original framework is based on what is obtained in the literature, there is a need to revise and amend it since the outer model assessment has been conducted. This is because the analysis of the outer model led to the deletion of only 03 indicators out of 37. However, none of the constructs was eliminated and have sufficient number of indicators per construct (Joseph F Hair *et al.*, 2012).

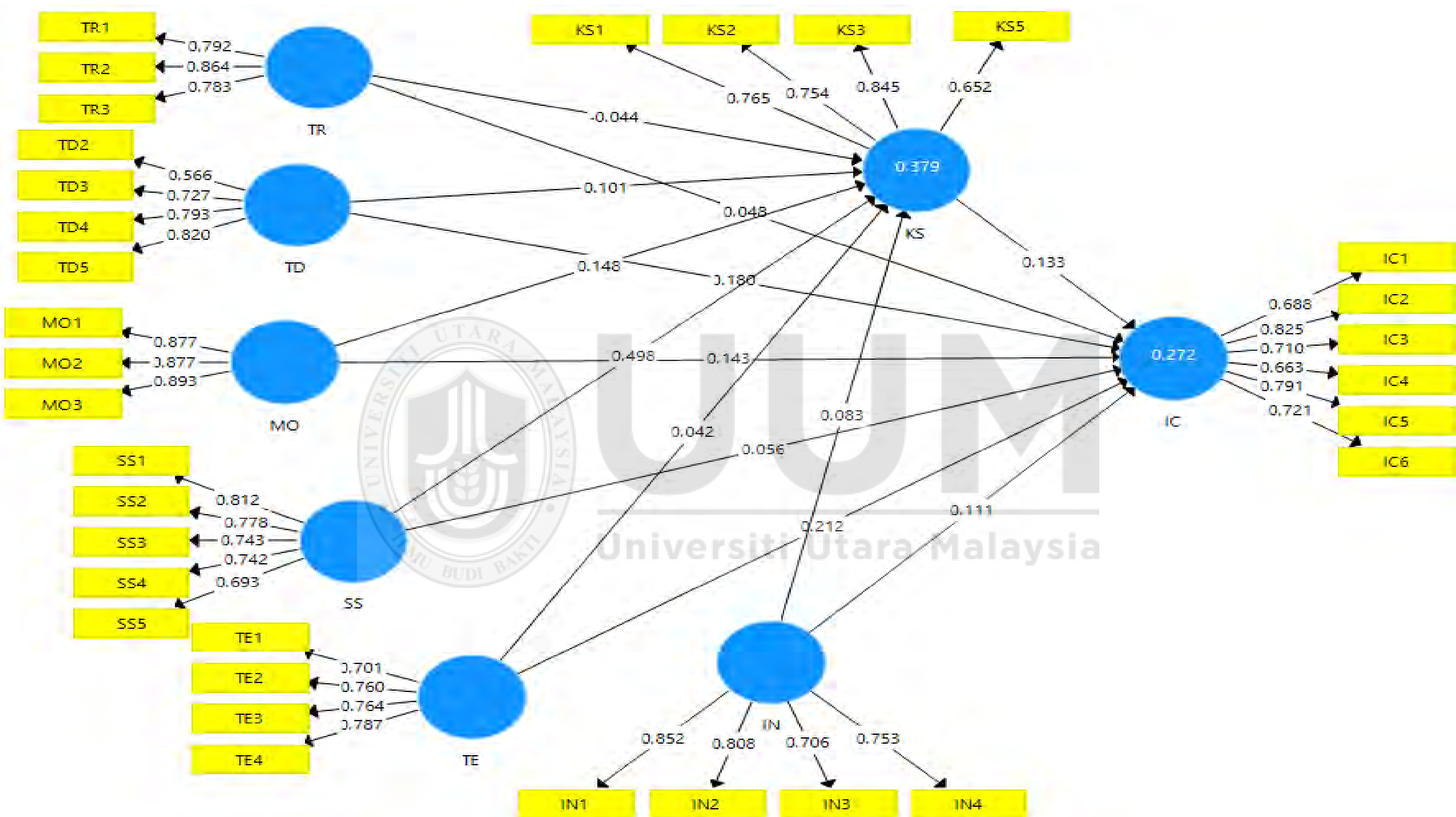

Figure 5.1
Measurement of Model

5.6 Inferential statistics

An Inferential Statistical defined whereby inference is made about the population of the research based analysis of a sample selected from studying population. The process of sampling from a population and making inference about a phenomenon in that population is at the heart of the scientific process Statistical tests are therefore needed to be able to understand the relationships or differences between variables when the variation is existing. Inferential statistics is the method and procedures to tested hypothesis. So, researcher draw inference about the population based upon the results in the sample.

5.6.1 The structural Model

In the previous, the reliability and the validity test was performed for testing the results of measurement model or outer model. The reliability and the validity test is assessing the ability of measurement model and their relationship between items of the current study. Multicollinearity should be examined between explanatory variables before run the structural model (Hair , Sarstedt, & Hopkins, 2014). After performing the VIF and TOL the researcher come to know there is no problem of multi-collinearity between the explanatory variables. The results of the table 5.11 show that the values of VIF are obviously less than the benchmark value (benchmark value 10). So, the results reveal that no multi-collinearity exist between explanatory variables in the structural model, and however, analysis for the current study should be carried out.

Table 5.10
Collinearity

First Set Constructs	VIF	Second Set Constructs	VIF
TR	1.247	TR	1.22
MO	1.396	MO	1.201
TD	1.261	TD	1.239
SS	1.407	SS	1.181
TE	1.313	TE	1.3
KS	1.559		
IN	1.201		

Note: KS=" Knowledge Sharing", TR=" Trust", MO=" Motivation", SS=" Supervisor Support", TD=" Training and Development", TE=" Technology", IN=" Industry Cluster Resources"

After testing and reconfirming nonexistence for collinearity problem, the next stage was to evaluate the structural model. In the study of (Hair , Sarstedt, & Hopkins, 2014; Gye-Soo, 2016), the major criteria for evaluating the structural model through the significance of the path coefficients, coefficient determination (R^2), effect size (f^2) and predictive relevance (Q^2) in PLS-SEM.

5.6.2 Direct Relationships

In this study, a systematic model analysis of the structural model was carried out to provide a detailed picture of the results and to test Hypotheses 1 to 19 comprehensibly. The evaluation of the inner model begins with an examination of the direct relationships between the independent variables and the dependent variable. The size of the path coefficients was examined through PLS-SEM Algorithm, and the significance of the relationship was examined through PLS-SEM bootstrapping procedure in the Smart-PLS 3.0. The original number of cases was used as the number of cases, and 500 was used as bootstrapping samples (Henseler, Ringle, & Sinkovics, 2009; Hair, Ringle, & Sarstedt, 2011; Joe F Hair *et al.*, 2012; Hair , Sarstedt, & Hopkins, 2014).

The first model focused on the analysis of the direct relationship between the independent variables and the dependent variable (trust, motivation, training & development, supervisor support, ICT used, industry cluster resources on innovation capability; $H_{2a}$to H_{2f}) and direct impact of independent variable on mediator variable as dependent variable ((trust, motivation, training & development, supervisor support, ICT used, industry cluster resources on knowledge sharing; $H_{1a}$to H_{1f}). In the second model, a mediator variable was introduced, and analysis of the relationship between the independent variables, the mediator and dependent variable (H_{4a}toH_{4f}) was carried out. Then, the relationship between mediator variable and dependent variable (Knowledge sharing to innovation capability;H_{3a}) was also examined.

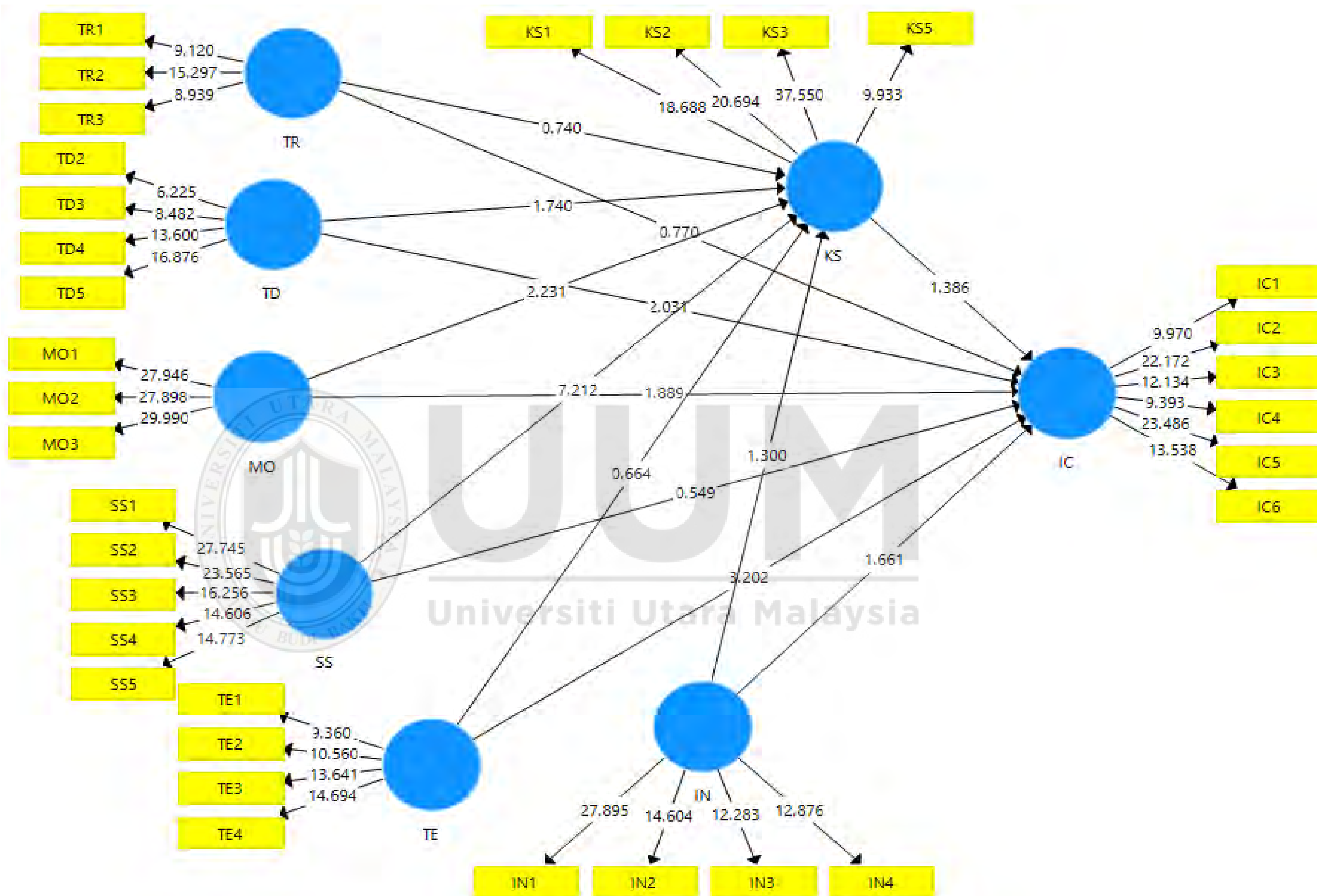

Figure 5. 2
PLS Algorithm Direct Relationship

According to PLS-SEM algorithm and bootstrapping method as mentioned above, Figure 5.2 shows the path coefficient of the independent variables and the dependent variable. The result discloses that all the exogenous variables have a significant and positive coefficient with the endogenous variable. The bootstrapping outcome in Figure 5.2 shows that the relationship between two of the independent variables and the dependent variable is significant at p<.01, similarly one of the of the independent variable and dependent variable is significant at p<.05 while three independent and dependent variables are not significant at 10% level of significance. Additionally, two of the independent variable and mediator variables are significant at p<0.01, similarly two of the independent variables and mediator variables are significant at p<0.05 and the remaining two variables of the independent and mediator variables are not significant at 10% level of significance. Furthermore, one mediator and dependent variable is significant at 5% level of significance. Table 5.12 indicates the path coefficients, standard deviation, t-statistics and p-values.

According toH_{2a}, the result suggests that there is a no significant impact of TR on IC($\gamma = 0.048$; $t = 0.77$; $p > 0.1$) hence, H_{2a} is not supported. However, H_{2b} is supported because the result indicates that significant impact of MO on IC ($\gamma = 0.143$; $t = 1.889$; $p < 0.05$). Likely H_{2b} ,H_{2c} is also significant impact of TD on IC ($\gamma = 0.180$; $t = 2.031$; $p < 0.05$), thusH_{2c} is supported. With respect to H_{2d}, the result provides that there is a no significant impact of SS on IC ($\gamma = 0.056$; $t = 0.549$; $p > 0.1$) hence, H_{2d} is not supported. With the statement of H_{2e}, the result provides the evidence there is a positive relationship of TE and IC ($\gamma = 0.212$; $t = 3.202$; $p < 0.01$)

hence, H_{2e} is supported. Similarly, H_{2f}, the result indicates that there is a positive association between IN and IC ($\gamma = 0.111$; $t = 1.661$; $p < 0.05$)therefore, H_{2f} is supported.

Table 5.11
Hypothesis Testing (Direct Relationships)

Hypothesized Path	**Path Coefficient**	**S.E**	**T**	**P-Value**	**Decision**
TR -> KS	-0.044	0.059	0.740	0.230	non-supported
MO -> KS	0.148	0.066	2.231	0.013**	**Supported**
TD -> KS	0.101	0.058	1.740	0.041**	**Supported**
SS -> KS	0.498	0.069	7.212	0.000***	**Supported**
TE -> KS	0.042	0.063	0.664	0.253	non-supported
IN -> KS	0.083	0.064	1.300	0.097*	**Supported**
KS -> IC	0.133	0.096	1.386	0.083*	**Supported**
TR -> IC	0.048	0.062	0.770	0.221	non-supported
MO -> IC	0.143	0.076	1.889	0.029**	**Supported**
TD -> IC	0.18	0.088	2.031	0.021**	**Supported**
SS -> IC	0.056	0.102	0.549	0.292	non-supported
TE -> IC	0.212	0.066	3.202	0.000***	**Supported**
IN -> IC	0.111	0.067	1.661	0.048**	**Supported**

***: p<0.01; **: p<0.05; *: p<0.10(t= 1.28 until 1.63),

Note: IC= "Innovation Capability", KS=" Knowledge Sharing", TR=" Trust", MO=" Motivation", SS=" Supervisor Support", TD=" Training and Development", TE=" Technology", IN=" Industry Cluster Resources" and S. E= "Standard Error"

The mediator variable was introduced in the second model and the relationship between the independent variables and the mediator variable were measured. In Figure 5.2, the path coefficients between the four independent variables and the mediator variable are positive relationship while two independent variables have negative relationship.

In addition, the path coefficient between the mediator and the dependent variable is also positive. The table 5.12 represents the path coefficients, standard error, t-statistics, p-values and the decision of the hypothesis. With respect to H_{1a}, the result suggests that there is a negative impact of TR on KS($\gamma = -0.044;\ t = 0.74;\ p > 0.1$) hence, H_{1a} is not supported. However, H_{1b} is supported because the result indicates that significant impact of MO on KS($\gamma = 0.148;\ t = 2.231;\ p < 0.05$). Likely H_{1b} ,H_{1c} is also significant impact of TD on KS($\gamma = 0.101;\ t = 1.74;\ p < 0.05$), thus H_{1c} is supported. With respect toH_{1d}, the result provides that there is a positive impact of SS on KS($\gamma = 0.498;\ t = 7.212;\ p < 0.01$) hence, H_{1d} is supported. With the statement of H_{1e}, the result provides the evidence there is no significant impact of TE on KS($\gamma = 0.042;\ t = 0.664;\ p > 0.10$) hence, H_{1e} is not supported. Similarly, H_{1f}, the result indicates that there is significant impact of IN on KS($\gamma = 0.083;\ t = 1.30;\ p < 0.10$) therefore, H_{1f} is supported. At the last with respect to H_{3a}, the result provides the evidence that, there is significant impact of KS on IC($\gamma = 0.133;\ t = 1.386;\ p < 0.10$) hence, H_{3a} is supported.

5.6.3 Mediation Test

In this study, the mediating variable knowledge sharing was introduced to check the impact of KS on the TR, MO, SS, TD, ICT used and IN resources relationship and KS to

IC relationship. The role of KS was examined as mediator with the help of Smart-PLS 3.0. The results of the mediation tests are displayed in Table 5.13, where it provides the evidence after applying the bootstrapping method, KS mediates MO, TD and SS have significant impact on IC. While KS to TR, TE and IN have not mediates impact on IC. The researcher tested indirect effect through generating the 95% bootstrap bias confidence interval on the basis of 5000 bootstrap samples. The results of this research show that the direct effect of TR-IC with mediation role of KS is insignificant (LL= -0.062, UL= 0.028) which is indicates that the lower limit and upper limit confidence interval of this mediation relationship exist zero. So, researcher conclude that knowledge sharing does not having mediation relationship with trust and innovation capability (H_{4a}). Additionally, H_{4b} was about the mediation relationship of knowledge sharing with motivation and innovation capability, the indirect effect of MO-IC with knowledge sharing is significant having value of confidence interval (LL= 0.006, UL= 0.106). Both upper and lower limits in this relation does not contains zero.

Thus, the mediation role of knowledge sharing between motivation and innovation capability is supported. H_{4c} was about the mediation relationship of knowledge sharing with training & development and innovation capability, the indirect effect of TD-IC with knowledge sharing was significant having value of confidence interval (LL= 0.0.004, UL= 0.085). Both upper and lower limits in this relation does not contains zero. Thus, the mediation role of knowledge sharing between training & development and innovation capability was supported. H_{4d} was about the mediation relationship of knowledge sharing with supervisor support and knowledge sharing, the indirect effect of SS-IC with knowledge sharing is significant having value of confidence interval (LL= 0.105, UL= 0.244).

Both upper and lower limits in this relation having in same direction means does not contains zero. Thus, the mediation role of knowledge sharing between supervisor support and innovation capability was supported. H_{4e} was about the mediation relationship of knowledge sharing with ICT used and innovation capability, the indirect effect of TE-IC with knowledge sharing was not significant having value of confidence interval (LL= -0.026, UL= 0.0.071). A both upper and lower limit in this relation having not contains zero means both upper and lower limits are having opposite direction in relationship. Thus, the mediation role of knowledge sharing between ICT used and innovation capability was not supported. Lastly, H_{4f} was about the mediation relationship of knowledge sharing with industry cluster resources and innovation capability, the indirect effect of IN-IC with knowledge sharing was not significant having value of confidence interval (LL= -0.014, UL= 0.071). Both upper and lower limits in this relation having zero means both upper and lower limits are having opposite direction in relationship. Thus, the mediation role of knowledge sharing between industry cluster resources and innovation capability was not supported.

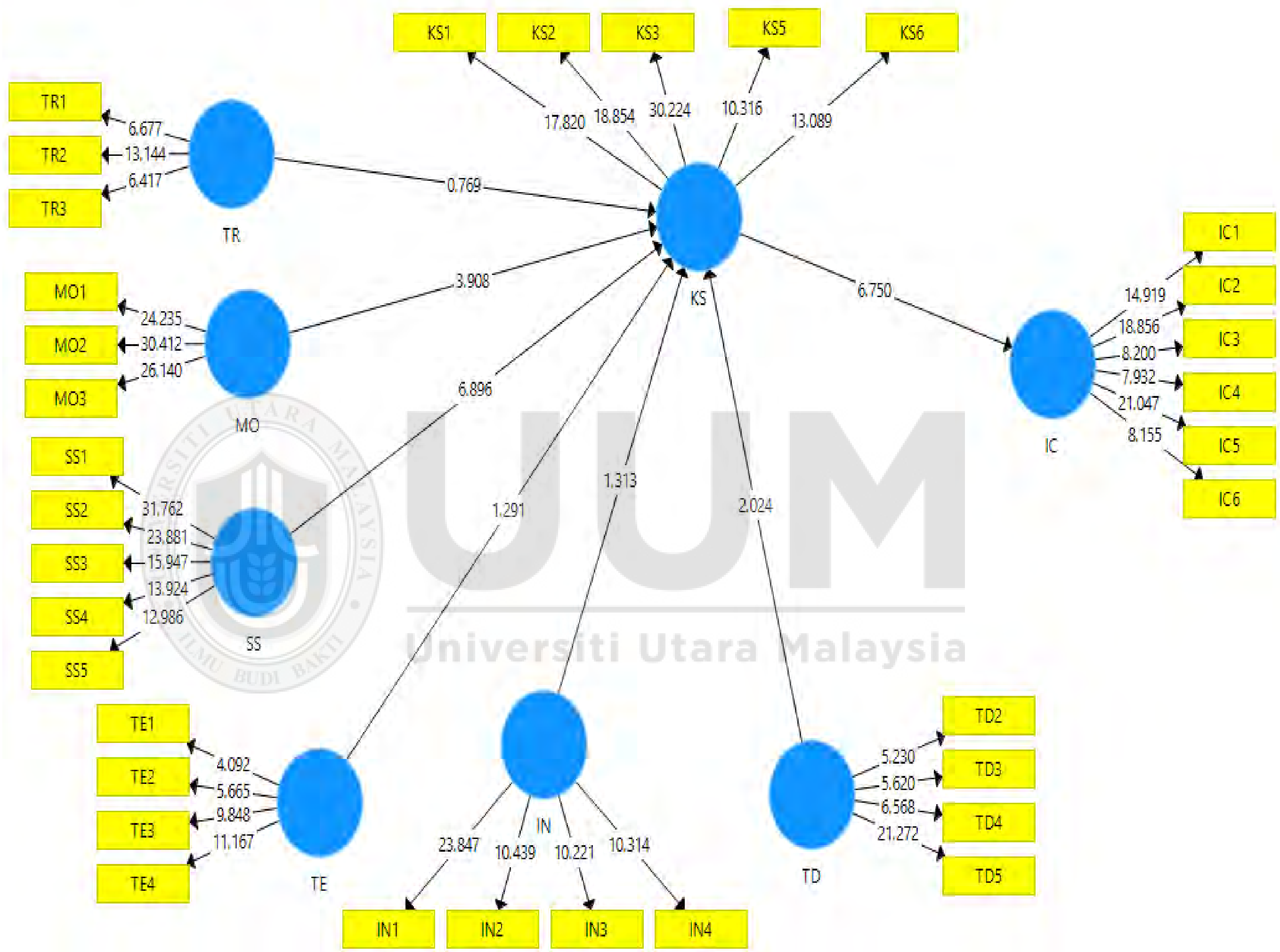

Figure 5. 3
Mediation Test

Indirect effect of the independent variable on the dependent has been evaluated by mediation analysis by the use of an intervening variable. However, Preacher and Hayes (2008) observed that there are several ways and techniques in order to assess mediation, including Causal steps strategy or serial approach (Hoyle & Robinson, 2004), also referring to the four conditions of Baron and Kenny (Baron & Kenny, 1986). There are some other methods in order to carry out mediation analysis which include product of coefficient method and Sobel test (Sobel, 1982); distribution of the product approach (MacKinnon, Lockwood, & Williams, 2004; MacKinnon, Fairchild, & Fritz, 2007; MacKinnon *et al.*, 2007); and bootstrapping approach (Preacher & Hayes, 2004; Hayes, 2009). Meanwhile, one of the latest approaches for the mediation analysis is the bootstrapping method, as there is generation of an empirical representation of the distribution of the sample of the indirect effect by the bootstrapping method (Hayes, 2009; Rucker *et al.*, 2011).

Commonly, few conditions should be pleased in order to keep the mediation in the four steps of (Baron & Kenny, 1986). However, it is not always essential that the relationship between variable has total effect as significant. Although, a significant indirect relationship may occur with mediation (MacKinnon *et al.*, 2002; Shrout & Bolger, 2002; Hayes, 2009; Zhao, Lynch, & Chen, 2010; Rucker *et al.*, 2011).

The relationship between independent and dependent variable may happen with the indirect effect of mediation; this is entitled the second condition for a significant relationship (Preacher & Hayes, 2008). This is in actual an effect of independent variable on meditator and effect of mediator of dependent variable (a and b). So therefore, if any effect on dependent variable by independent variable is not significant with the help of mediator, it reveals that the mediator variable has no mediation effect (Preacher and Hayes 2008). In the last the relationship between independent variable and dependent variable should be weak before inclusion of mediator variable. However, Rucker et al. (2011) question the effect of direct relationship before inclusion of a mediator variable and effect of full and partial mediation.

The bootstrapping method actually initiates with the model of direct and indirect relationship of dependent and independent variables without using the mediator term. These path models include the path coefficients and t-values using PLS-SEM algorithm and bootstrapping procedure, respectively (Hair , Sarstedt, & Hopkins, 2014; Henseler *et al.*, 2014). The second stage of PLS-SEM algorithm is to check the effect of independent variable on dependent variable with the relationship of mediator is significant. This is necessary but not sufficient to conclude mediation effect. The advantages and justification of bootstrapping algorithm to test the effect of mediation have been highlighted in many previous literature, such as (Preacher & Hayes, 2008; Hayes, 2009; Zhao, Lynch, & Chen, 2010; Henseler *et al.*, 2014). For instance, the four conditions of Baron and Kenny (1986) fail to involve the use of standard errors (Hayes & Preacher, 2010). The Sobel test requires the assumption of normal sample distribution of the indirect effect. However, according to Preacher & Hayes et al., (2007) the distribution of sampling of independent variables' effect on the mediator and the mediator effect on dependent variable is asymmetric. The distribution of the product strategy is a little difficult to use without the aid of tables and requires some assumptions of normal sampling distribution (Hayes, 2009). Shrout & Bolger (2002) argue that bootstrapping methods can be used to tackle the aforementioned errors as it allows testing the effect of indirect relationship to be tested empirically. Furthermore, Zhao et al. (2010) argue that bootstrapping approach solves these problems by generating an empirical sampling distribution ($a\ x\ b$).

In addition, Hayes and Preacher (2010) argued that the advantage of bootstrapping is that it does not require any presumption about the distribution of sampling, it product or its indirect effect. In other words, the confidence interval in bootstrapping method can be asymmetrical rather than at regular confidence intervals in other methods. This is a reason because it is based on the empirical analysis of the distribution of the sample, unlike the prior method which assumes normal distribution. So therefore, the method of bootstrapping results in interval estimation of a population, which were previously not possible using mediation tests (MacKinnon, Lockwood, & Hoffman, 1998).

Knowing the advantage of bootstrapping method over other methods, Hair Jr. et al., (2014) and Hayes & Preacher (2010) suggest testing the significance of the mediation using bootstrapping methods. Hence, the current study tested the mediation effect of knowledge sharing between trust, motivation, supervisory support, training & development, ICT used industry cluster resources and innovation capability through the SMART PLS-SEM 3.00 (Sarstedt *et al.*, 2014) using the bootstrapping method with 254 cases and 5,000 sub-samples. Figure 5.4 shows the PLS-SEM algorithm after including the knowledge sharing as mediator; and Figure 5.5 shows the PLS-SEM bootstrapping after knowledge sharing is included as mediator.

Table 5.12
Mediation Test

Variables	**Path a**	**Path b**	**Indirect Effect**	**SE**	**t-value**	**Bootstrapping Confidence Interval**		**Decision**
						05% LL	**95% UL**	
TR	-0.047	0.359	-0.017	0.023	-0.730	-0.062	0.028	No-Mediation
MO	0.156	0.359	0.056	0.025	2.212	**0.006**	**0.106**	**Mediation**
TD	0.113	0.359	0.041	0.023	1.803	**0.004**	**0.085**	**Mediation**
SS	0.485	0.359	0.174	0.036	4.904	**0.105**	**0.244**	**Mediation**
TE	0.063	0.359	0.023	0.025	0.908	-0.026	0.071	No-Mediation
IN	0.080	0.359	0.029	0.022	1.322	-0.014	0.071	No-Mediation

Note: UL= “Upper Limit”, LL=” Lower Limit”, TR=” Trust”, MO=” Motivation”, SS=” Supervisor Support”, TD=” Training and Development”, TE=” Technology”, IN=” Industry Cluster Resources” and S. E= “Standard Error”

5.6.4 Coefficient of Determination

The most common method for assessing any conceptual model the coefficient of determination (R^2) of endogenous latent variables (Henseler *et al.*, 2014). According to (Cohen, 1988), R^2values of .27, .13 and .02 indicate fair, moderate and weak R^2 values respectively. Results in Figure 5.1 indicate that the R^2value of KS (0.379) is fair and IC

(0.272) is slightly substantial. The reported R^2 value reported by current study is higher. It follows that the R^2 value indicates all the six exogenous variables (TR, MO, TD, SS, TE and IN) combined together in the model to explain 38% variance in the mediating variable KS and 62% of the variance explained by other factors. Similarly, the holistic R^2value indicates that all the seven exogenous variables (TR, MO, TD, SS, TE, IN and KS) combined together in the model explain 27% variance in the endogenous variable (IC) and 73% of the variance explained by other factors. Consequently, based on the assessment of the R^2 of the endogenous latent variables IC (0.272) and a standard KS (0.379), it is concluded that the model has substantial predictive validity.

5.6.4.1 Assessment of Effect Size

The second criteria for assessing any model is effect of size (f^2). The effect of size is mostly assessed after the coefficient of determination of endogenous constructs (mediator) (Henseler *et al.*, 2014). The effect of size is different from (R^2) as it is calculated by the difference of values when a particular exogenous variable is in the model and when the variable is not in the model. This is done purposely to evaluate whether the omitted exogenous construct has a substantial impact on the endogenous variables (Henseler *et al.*, 2014). The formula below is used to calculate the effect size for the exogenous construct, where 0.02, 0.15, and 0.35 have been proposed as small, moderate and large effects, respectively (Cohen, 1988). However, Chin, Marcolin, and Newsted (2003) stress that even the tiniest strength of f^2 should be considered as it can influence the endogenous variables.

$$f^2 = \frac{R^2 Included - R^2 Excluded}{1 - R^2 Included} \quad \text{..(5)}$$

In this study, the effect size for the exogenous construct found to be statistically significant to affect the endogenous variables are assessed and reported. The result in Table 5.14 shows the effect size of the particular exogenous construct on the respective endogenous construct. The result indicates that most of the exogenous constructs have small effect size on their respective endogenous construct.

Table 5.13
Effect size

Variables	**Effect Size**	
TR-IC	0.003	Small
MO-IC	0.021	Medium
TD-IC	0.037	Medium
SS-IC	0.003	Small
TE-IC	0.05	Small
IN-IC	0.014	Small
TR-KS	0.003	Small
MO-KS	0.027	Medium
TD-KS	0.014	Small
SS-KS	0.325	Large
TE-KS	0.002	Small
IN-KS	0.009	Small

5.6.4.2 Assessment of Predictive Relevance (Q^2)

Another assessment of the structural model is the model's predictive relevance ability. The predictive relevance can be assessed using Stone–Geisser criterion, which assumes that an inner model must be able to provide evidence of prediction of the endogenous latent construct's indicators (Henseler, Ringle, & Sinkovics, 2009). Hence, predictive relevance Q^2assessment can be carried out using Stone-Geisser's Q^2 test which can be measured using blindfolding procedures (Henseler, Ringle, & Sinkovics, 2009; Henseler *et al.*, 2014). Therefore, this study used Stone-Geisser test to assess theQ^2, through blindfolding procedure to obtain the cross-validated redundancy measure for endogenous latent construct (Henseler *et al.*, 2014). Table 5.15 presents the cross-validated redundancy for knowledge sharing and innovation capability.

Table 5.14
Predictive Relevance ($Q^{2)}$

Total	SSO	SSE	1-SSE/SSO
IC	1524	1329.21	0.128
KS	1016	811.34	0.201

Note: IC= "innovation capability"; KS= "knowledge sharing".

The results in Table 5.15 above show that all the Q^2 values are greater than zero knowledge sharing (0.201) and innovation capability (0.128); this suggests a substantial predictive relevance of the model. This is in line with the suggestion by (Henseler, Ringle, & Sinkovics, 2009; Henseler *et al.*, 2014) that Q^2 values greater than zero indicate the model has predictive relevance, while Q^2 values less than zero, indicate the model lacks predictive relevance.

5.6.4.3 Assessment of Goodness-of-Fit Index (GOF)

Another evaluation criterion is the global Goodness-Of-Fit (GOF) Index. However, there are many arguments on the usefulness of this criterion on the validating model (Hair , Sarstedt, & Hopkins, 2014; Henseler *et al.*, 2014). On one hand, Tenenhaus, Amato, and Esposito Vinzi (2004) propose that GOF can be applied to PLS-SEM3.0 to compare performances produced by models. As proposed by Tenenhaus et al. (2004), GOF is the geometric mean of the average communalities (outer measurement model) and the average R^2 of endogenous latent variables. However, others argue that no such global measure of GOF is available for PLS-SEM (Hair Jr et al., 2014; Hair Jr. et al., 2013; Henseler & Sarstedt, 2013; Sarstedt et al., 2014). Additionally, Henseler and Sarstedt (2013) challenged the applicability of GOF in PLS-SEM3.0 as their simulation result indicated that it is not useful for model validation, but can be useful to assess how well the model can explain different sets of data.

The table 5.16 indicates that the average value of the R^2 is 0.272 and 0.379 it means 27.2% and 37.9% explain the variation in IC and KS. The average AVE is 0.541 and 0.573. The comparison was developing on the basis of some criteria such as (GOF Small=0.10, GOF Medium=0.25 and GOF Large=0.36). The result of the GOF indicates that the model validity is adequate i.e (GOF=0.48).

Table 5.15
Assessment of Goodness-of-Fit Index (GOF)

Construct	**R^2**	**AVE**	**GOF**
IC	0.272	0.541	
IN		0.611	
KS	0.379	0.573	

MO		0.779	
SS		0.57	
TD		0.538	
TE		0.568	
TR		0.663	
Average	**0.325**	**0.615**	**48%**

Note: GOF Small=0.1, GOF Medium=0.25 and GOF Large=0.36 GOF=" Good ness of fit"

5.7 Summary of Chapter

This chapter signifies the statistical analysis of compiled data through questionnaire distributed in manager and owners of dairy farms in Pakistan. This chapter further characterized the results of the response rate calculation and non-response bias. Then, the initial data screening and examination were calculated, containing missing value analysis, assessment of outliers, tests of normality and multi-collinearity assessment. Next, sample characteristics are characterized, followed by the measurement model as well as the structural model which were measured with PLS-SEM using the SMART PLS-SEM 3.0 software package developed by Ringle et al. (2014). Subsequently, results from hypotheses testing based on the evaluation of the inner model are reported. Lastly, effects of control variables on the innovation capability are presented.

CHAPTER SIX

DISCUSSIONS, IMPLICATIONS AND RECOMMENDATIONS

6.1 Introduction

In the current chapter, the result of the current study has been presented. The results for this study are based on the research objectives and the interpretations of the results are also explained in the previous chapter. The contribution of the research on theory is that it gives the future recommendation that might help the researchers and policy makers of dairy development in Pakistan and also neighbor countries to set up a splendid environment for innovation capability, trust and motivation from owner and also provide a fruitful training to employee. At the end, the chapter is concluded with a summary highlighting key points presented in this chapter.

6.2 Overview of the Study

Innovation capability is major driver of the economy and continuous development in the growth of the industry and has competitive advantages. It is extensively acknowledged as the major source for the success of business at SMEs firms. As noted in the previous research, innovation capability may not only develop new ideas but also improve the ability of the firms to embrace and exploit existing system (Cohen & Levinthal, 1990; Wadhwa & Kotha, 2006; Wang & Kafouros, 2009). In more words, innovation capability is modifying the rule of game that enables an organization to enter into a new market (Edison, Bin Ali, & Torkar, 2013). The studies assured in literature, the influence of innovation capability in several contexts like higher education institutes, service, public sector, manufacturing, and even in SMEs (Lai *et al.*, 2014; Ren, Eisingerich, & Tsai, 2015).

Pakistan has the fourth largest milk producer country (FAO, 2011); but the people of Pakistan faces a problem of milking shortage and the milk production not fulfilling the demands and needs of the people. The major reason behind this problem is that the dairy farms owner do not brings an innovation. The major concern of the current study is to focus on the innovation capability at dairy farms. Because in developing countries like Pakistan. The majority of the people rely on the agriculture and dairy farms. But the dairy farms do not provide the enough output to the people because people do not focus on the innovation capability (Davidson, Ahmad, & Ali, 2001; Bilal, Suleman, & Raziq, 2006; Ahmad *et al.*, 2012; Mahar & Jamali, 2013; Rehman *et al.*, 2013).

The scope of the current study is limited to dairy farms in agriculture industry of Pakistan; Agriculture industry is the major player of the economy. But agriculture industry from last some years faces a lot of problems in which climate change, environmental effects, inflation and low productivity are very prominent. Major reason of these issues is that farms owner is not equipped with new technology and not come with innovative ideas (Cain, Anwar, & Rowlinson, 2007).

Pakistan agriculture sector is losing their contribution to GDP rapidly. Neighbor countries India, China and Bangladesh are applying a lot of innovative ideas in the Agriculture and its sub sector livestock (Dairy Farms) and take an advantage from the livestock to boost up the economy. Such steps are needed that the Pakistan dairy farms should come up with new technology and bring a lot of new innovative things for the dairy sector in Pakistan.

The basic purpose of the current study was to examine the mediating effect of KS on the relationships between TR, MO, TD, SS, TE, IN and innovation capability. Mainly, the current study is encouraged by the inadequate findings in the previous literature regarding the relationship between Trust, Motivation, Supervisor Support, Training and Development, ICT used, Industry Cluster Resources and Innovation Capability in Dairy Farms of Pakistan..

The findings of past studies focused on examining the relationship between TR, MO, SS, TD, TE, IN and innovation capability are however unpredictable. Several studies on the innovation capability have a significant and positive relationships (Lee, 2001; Svetlik, Stavrou-Costea, & Lin, 2007; Nawaz & Khatoon, 2015; Valdez-Juárez, de Lema, & Maldonado-Guzmán, 2016) but few studies have a contradicted result (Lawson & Samson, 2001; Calantone, Cavusgil, & Zhao, 2002; Tamer Cavusgil, Calantone, & Zhao, 2003; Chen & Huang, 2009). Furthermore, different researchers like (Svetlik, Stavrou-Costea, & Lin, 2007) discussed in the article that the theoretical models formulated in developed countries cannot be fully tested and imitated in under developed countries. He deeply felt that innovation capability relationship must be tested in the context of under developed countries. Edison, Bin Ali et al. (2013) mentioned that the innovation capability is considered as a key of success for enhancing the productivity and economic output. A number of studies carried out that KS is an essential for enhancing the role of innovation capability in the success and growth of the firms (Calantone, Cavusgil, & Zhao, 2002; Scarbrough, 2003; Svetlik, Stavrou-Costea, & Lin, 2007; Jyoti, Gupta, & Kotwal, 2011; Edison, Bin Ali, & Torkar, 2013).

Many researchers highlighted in their study (Turpin & Krishna, 2007; Sun, 2009; Awan & Akram, 2012; Khan, Sarwar, & Malik, 2014) that innovation capability need to be tested in the context of Pakistan. Nawaz and Khatoon (2015) emphasized on the implication of innovation capability in the context of SMEs in Pakistan. It is argued in the study of (Hult, Hurley, & Knight, 2004; Svetlik, Stavrou-Costea, & Lin, 2007) that innovation capability association need to be tested. They further directed that knowledge sharing, employee commitment and trust may be mediate with the innovation capability in the developing countries.

Therefore, the current study was conducted to fill this significant gap prevailing in the literature (as discussed in chapter. 1) and to integrate the suggestions recommended by previous studies. Hence, the mediating effect of knowledge sharing on linkage between trust, motivation, supervisor support, training and development, ICT used, industry cluster resources and innovation capability was studied.

Majority of the past researches overlooked the role of trust and motivation in the innovation capability (Zin *et al.*, 2012; Ullah, Kamal, & Arfan, 2016; Ullah, Kamal, & Shahzad, 2016). In case of Organizational factors, their also have two sub factors that are supervisor support and training and development discussed in the past literature. The previous research shows that the lack of support and unskilled employees are also a big reason behind the low innovation capability. In addition, technological factor has only one sub factor for the current study that is ICT used in conducted study. There is acute shortage of quantitative studies that have tried to explain the association between ICT used and Innovation capability. The relationship of industry cluster resources with innovation capability indicates that there has been inconsistent and inadequate study on it in the past.

To resolve the inadequate findings, the mediating role of Knowledge sharing was tested. This significant role of Knowledge sharing that can influence on individual, organizational, technological, industrial factors and innovation capability relationship has not been tested before. In context of under developed countries, there is a very limited study on innovation capability and especially on dairy sector.

6.3 Discussion on the findings of hypothesis test

The results testified in Chapter 5 will be further discussed in this chapter by relating them to theoretical requirements and empirical literature. The discussion will center around the impact of individual, organizational, technological, industry factors on both knowledge sharing and innovation capability, with the main focus being on the impact of the predictor constructs comprising of trust, motivation, supervisory support, ICT used and industry cluster resources on the predicted paradigms comprising of knowledge sharing and innovation capability. There is an enlarged interest in research seeking answers to the all-important question of how individual, organizational, technological and industry factors support in improving the innovation capability and knowledge sharing in the dairy farms. With the tremendous challenges faced by todays' managers and owners and the urgent need to equip themselves with the much needed life skills, this study hopes to contribute some solutions to this pertinent matter, by investigating the drivers of innovation capability and knowledge sharing, with special interest on the role played by individual, organizational, technological and industry factors. There is evidence to point that the chosen explanatory variables/constructs of individual, organizational, technological and industry factors are related to both innovation capability and knowledge sharing. A detailed summary of the results based on each regressor and its relationship with both innovation capability and knowledge sharing (the regressands) is explained further down.

6.3.1 Objective One

This section has discussion about the objective one of the current study. The objective one of this study is given below.

> "To examine the impact of individual (trust, motivation), organizational (supervisory support, training & development), technological (ICT used) and industrial factors (industry cluster resources) on knowledge sharing".

Table 6.1 is about the hypotheses from the above-mentioned objective. The hypotheses and their results with discussion about the findings are given as under.

Table 6.1
Hypotheses from Objective One

Hypotheses	Hypotheses from Objective One	T-Value	P-Value	Decision
H1a	There is a significant relationship between trust and knowledge sharing	0.74	0.230	Not Supported
H1b	There is a significant relationship between motivation and knowledge sharing	2.231	0.013	**Supported**
H1c	The relationship exist between training & development and knowledge sharing	1.74	0.041	**Supported**
H1d	The relationship exist between supervisor support and knowledge sharing	7.212	0.000	**Supported**
H1e	There is a significant relationship between ICT use and knowledge sharing	0.664	0.253	Not Supported
H1f	There is a significant relationship between industry cluster resources and knowledge sharing	1.3	0.097	Supported

In order to achieve the first objective of the present study regarding to examine the influence of individual factor of trust and motivation, organizational factors (SS, TD), Technological factor (TE), industry cluster resources (IN) on knowledge sharing, the regression paths between trust and knowledge sharing were examined. In Table 6.1, more specifically, while trust ($t = 0.74, p = 0.23$) has not significant influence on knowledge sharing. It is important to remember that trust is defined as the individual ability and willingness that centers on employee satisfaction by using the activities of knowledge sharing. The findings of this hypothesis in the current study was not supported and inconsistent with the prior studies (Morgan & Hunt, 1994; Davenport & Prusak, 1998; Dyer & Nobeoka, 2000; Soekijad & Andriessen, 2003; Möller & Svahn, 2004; Holste &

Fields, 2010; Ho, Kuo, & Lin, 2012). So, based on this finding it is revealed that trust does not effect on knowledge sharing.

Furthermore, the finding of this study is consistent with those studies who found no relationship between trust and knowledge sharing (Renzl, Matzler, & Mader, 2005; Renzl, 2008). However, few studies discussed some issues behind insignificant impact of trust on knowledge sharing. Hence, argued that trust is the individual ability and skill and the individual ability related to trust vary from person to person and it depend on the organizational environment and their culture (Levin *et al.*, 2002; Barachini, 2009; Casimir, Lee, & Loon, 2012). Some organizational culture not allowed to employee that encourages trust between coworkers to facilitate the knowledge sharing. The creation of a trust culture involves organizational managers and leaders to create a work environment that is encouraging to building trust between the colleagues to sharing their expertise.

The success of knowledge sharing depends to a great extent on how satisfied employees are on the job and the turnover rate in the workplace (Paliszkiewicz, 2011; Paliszkiwicz, 2011). The other reason is that trust building takes some time and experiences (Levin, Whitener, & Cross, 2006) but the employees from dairy farms in Pakistan have very less experiences and job switching time is also very high. So, this is the reasoned behind the insignificant result of trust with knowledge sharing.

In table 6.1, H1b which shows that motivation is positively influence on knowledge sharing. The present study found that the relationship between motivation and knowledge sharing ($t = 2.23, p = 0.013$) has positive significant. In line with the past study that motivation is viewed as the firm's tendency to build knowledge sharing in order to attain the goal of the firms. In the present study, motivation has positively effect on knowledge sharing: thus, H1b hypothesis was supported. However, individual motivation is the ability that has strong relation with knowledge sharing. The result of this study supports prior findings which suggested that motivation provide great help to enhance the confidence level of the employee to share their knowledge within the organization (Chang, Hsu, & Yen, 2012; Chen *et al.*, 2013; Hau *et al.*, 2013).

In addition, the result of the present study was supported and has the significant impact of individual motivation on knowledge sharing, which is consistent with the previous studies (Akhavan, Rahimi, & Mehralian, 2013; Chen *et al.*, 2013; Fadel & Durcikova, 2014; Chen *et al.*, 2015). So, motivation plays a very serious role in enhancing the knowledge sharing in dairy farms employee of Pakistan. Further, it is suggested that motivation is the individual factor that build a strong and significant relationship in enhancing the knowledge sharing activities.

Additionally, in table 6.1, hypothesis (H1c) which shows that training & development is positively influence on knowledge sharing. The present study was found that the relationship between training & development and knowledge sharing ($t = 1.74, p = 0.041$) has positive significant. It is well-meaning to communicate that training & development considered as firm's intangible resource which is most valuable and prominences for the firms to enhance the ability and skill of their employee and system and then allow firms to share their learning skill and expertise. Based on the result in the current study, indicates that the positive and significant relationship between training & development and knowledge sharing; so, the H1c was supported. Expressly, training & development which is practiced by firms to understand and updated their employee skill and ability to participate in knowledge sharing. Organization that gives proper training to their human resource will be a more successful in developing more capabilities that facilitate them to gain more knowledge for the repute of the firm. The findings of this study considered as the mirror of previous studies that have significant and positive effect training & development on knowledge sharing (Davenport & Völpel, 2001; Hall, 2001; Efimova & Swaak, 2002; Dowling, 2008; Williams, 2008; Noe, 2010; Stevens, Millage, & Clark, 2010; Jahanshahi *et al.*, 2011).

In table 6.1, hypothesis (H1d) shows that supervisor support is positively influence on knowledge sharing in the dairy farms of Pakistan. The present study found that the relationship between supervisor support and knowledge sharing ($t = 7.21, p = 0.00$) has positive significant. In the current study, supervisory support is referring to the intangible resources of the firms. In the current business era, many employees' faces turbulence environment and unstable economy at their job place which are the reason to increase the tensions between supervisors and subordinates.

To overcome this tension and confusion, the support of supervisor must with their subordinates to enhance commitment and efforts of the employee to share their knowledge and skills. Supervisor support is affected on subordinate who change the social environment of work. The most important and effected ingredients for dairy business is support of supervisors to share their knowledge in critical situation and for the betterment of the dairy sector. The result of the present study consistent with the prior studies which have demonstrated that supervisory support positively affected on knowledge sharing (Scully, Kirkpatrick, & Locke, 1995; Witt, Andrews, & Kacmar, 2000; Gentry *et al.*, 2007; Senge, 2014; Yadav, Rangnekar, & Bamel, 2016).

Thus, supervisory support is observed in this study as contributing towards employee attitude to share the knowledge at the dairy sector. Hence, this finding is important that supervisory support may have in the implementation of knowledge sharing systems. Supervisor support can send strong messages to the dairy farms as to how important knowledge sharing is. The outcome of this positive relationship of knowledge sharing and supervisory support can provide the performance enhancement of the employee as well as growth of dairy farms in Pakistan.

Moreover, in table 6.1, H1e is about the relationship of ICT used with knowledge sharing. The present study was found that the relationship between ICT used and knowledge sharing ($t = 0.664, p = 0.253$) was not significant. The findings of this hypothesis indicate that the relationship between ICT used and knowledge sharing is positively but not significant in dairy farms of Pakistan. The result of this hypothesis is strongly supported to previous findings in different studies and also consistent with the studies of (Iqbal, Toulson, & Tweed; Omar Sharifuddin Syed-Ikhsan & Rowland, 2004;

Bock *et al.*, 2005; Yeh, Lai, & Ho, 2006; Svetlik, Stavrou-Costea, & Lin, 2007; Kant & Singh, 2008; Lin, 2011).

This finding has the strong evidence that knowledge sharing not easy through ICT used because the employee may be not aware about the use of ICT and also reluctant from the technology. The other reasoned is that technology related to dairy is too much expensive and not in easy approach of the small dairy farms. Thus, the knowledge sharing not easy to involves human and social interaction as well as not easy of ICT usage. So, the dairy farms in Pakistan are avoided from the technology. They prefer doing job manually instead of electronically.

Lastly, the H1f hypothesis is about the relationship between industry cluster resources and knowledge sharing. Industry cluster is about advanced techniques and knowledge that are used to attract new firms because the new firms are reinforcing knowledge base and local industry capabilities. The relationship between industry cluster resources and knowledge sharing has significant($t = 1.3, p = 0..097$). The findings of this hypothesis show the positive and significant relationship between industry cluster resources and knowledge sharing, which is supported to hypothesis H1f. The result of this study consistent with the prior studies (Breschi & Malerba, 2001; Maskell, 2001a; Maskell & Lorenzen, 2004; Arikan, 2009; Casanueva, Castro, & Galán, 2013; Lai *et al.*, 2014). Thus, the industrial cluster resources are completely integrating at central position to share the knowledge and lower cost. This action increase knowledge sharing role in industrial cluster resources.

These all findings are suggested that the dairy farms are focused on motivation, training & development, supervisory support and industrial cluster resources and make these resources as main strategy in establishing a business has more reliable chances to success and grow in exiting business. Specifically, these all information is more valuable to dairy farms of Pakistan in adopting these all previous discussed findings as a response to take more benefits from the dairy business.

6.3.2 Objective Two

This section has discussion about the objective two of the current study. The objective two of this study is given below.

> "To analyze the impact of individual (trust, motivation), organizational (supervisory support, training & development), technological (ICT used) and industrial factors (industry cluster resources) on innovation capability".

In the Table 6.2 is about the hypotheses from the above-mentioned objective. The hypotheses and their results with discussion about the findings are given as under

Table 6.2
Hypotheses from objective two

Hypotheses	Hypotheses from Objective Two	T- value	P-value	Decision

H2a	The relationship exist between trust and innovation capability	0.77	0.221	Not Supported
H2b	The relationship exist between motivation and innovation capability	1.889	0.029	**Supported**
H2c	The relationship exist between training & development and innovation capability	2.031	0.021	**Supported**
H2d	The relationship exist between supervisor support and innovation capability	0.549	0.292	Not Supported
H2e	The relationship exist between ICT use and innovation capability	3.202	0.001	**Supported**
H2f	The relationship exist between industry cluster resources and innovation capability	1.661	0.048	**Supported**

The table 6.2 shows the result of hypothesis (H_{2a}) which is about trust and innovation capability $(t = 0.77, p = 0.221)$ indicates that there is no significant relationship between trust and innovation capability. Thus, hypothesis (H_{2a}) was not supported. Individual trust has no direct impact on innovation capability. It means that the increase of trust in employee will not enhance the innovation capability. This thoughtful relationship should be avoided as it may have an adverse effect to the future in the firms. The result of this relationship is against from the prior studies (Ellonen, Blomqvist, & Puumalainen, 2008; García, Sanzo, & Trespalacios, 2008; Dovey, 2009; Nielsen & Nielsen, 2009; Nielsen *et al.*, 2011; Skardon, 2011; Jack, Mary Rose, & Darabi, 2012; van der Valk *et al.*, 2016). Although, an empirical misperception still subsists in the relationship of trust and innovation capability. The researcher feels that the rich of literature on the trust with innovation capability but still the gap is existing between trust and innovation capability. The culture barrier and organizational structure also big snag behind this contradict result.

In addition, the result of hypothesis (H_{2b}) $(t = 1.889, p = 0.29)$ shows that motivation has a significant impact on the innovation capability. Motivation has a direct relationship with innovation capability and hypothesis (H_{2b}) was supported. It shows that the increase of motivation will enhance the innovation capability of the dairy farms. The current relationship between motivation and innovation capability should be considered for the survival and growth of business. Firms with the motivation are known as full involve in the matter of employee, an emphasis on empowerment of the employee. The findings of this hypothesis agreed with the previous studies (Stewart & Fenn, 2006; Chu & Chan, 2009; Kumar & Che Rose, 2012; Sivalogathasan & Wu, 2015; Dost *et al.*, 2016). This empirical evidence indicates that the dairy farms have benefited from the motivation in innovation capability. In other word, motivation seems indeed to be more important for the innovation capability in dairy farms.

The result of hypothesis (H_{2c}) $(t = 2.031, p = 0.021)$ of linear relationship between training & development was significant positive relationship. This indicates that the hypothesis (H_{2c}) that is developed in the favor of training & development and innovation capability is supported. This shows that training & development of the employee has helpful and impact on the innovation capability as individual and organization increased their abilities and skills to think about and bring some new ideas. This is in line with the past studies (Dermol & Cater, 2013; Sivalogathasan & Wu, 2015; Dost *et al.*, 2016). In the study of (Roffe, 1999), reveals that training & development as a pedagogy that links employee with a new idea that allows firm to strengthen and transform the idea. The training for development that employee gain through their abilities and the perceived effect their service had on the firm at large, will more strengthen their innovation capabilities.

This hypothesis (h_{2d}) is about the relationship between supervisor support and the innovation capability. The result of this hypothesis ($t = 0.549, p = 0.292$) was not supported. This result shows that the supervisor support has not any significant impact on innovation capability. Therefore, contrary to the stated hypothesis, this study does not find support for a positive and significant relationship between supervisor support and innovation capability. This finding advocates that the Dairy Farms managers not interested in new product and new system for the growth of the business especially in Pakistan. Because, the economy of Pakistan is not consistent with growth due to political unrest (PES, 2014). This political instability affected on the business and their owner's attitudes and behavior. So, they not provide any support in new ideas and not interested in new products. The other important things are that owners of dairy farms think that innovation is high risk. This risk builds fear for failure in the mind of owners. So, productiveness and innovation capability practices are hard to convert into action when the environment of the firms are risky and poses maximum challenges and problematic (Tang & Murphy, 2012; Tang, Chih-Hung, & Ya-Yun, 2015).

The other reason behind the insignificant relation between supervisor support and innovation capability is that where the turnover intention rate of employee is high, the support from supervisor is very low (Kalemci Tuzun & Arzu Kalemci, 2012). Additionally, the other reason behind this contrary result is that due to global economic crisis, many organization have accompanied re-engineering and downsizing for do more with less expenses (Lu, L. Cooper, & Yen Lin, 2013). Consequently, this result is not shocking because it is possible that this finding is payable due to the risk, turnover intention and opportunities. Hence, this finding suggested and in line with the report of BCIP (2015), the current research advises that dairy farms in Pakistan should concentrate on risk taking, employee satisfaction and facilitate employee to participate in innovation capability.

Further, this hypothesis (H_{2e}) is about the relationship between information communication technology (ICT used) and innovation capability. The result ($t =$ 3.202; 0.001) of this hypothesis indicates that the significant and positive relationship between ICT used and innovation capability. It is show that every enhance in technology advance will increase the innovation capability. The current type of relationship should be deliberated as it has a positive and strong effect on the firm in future. The result showed that the direct relationship between ICT used and innovation capability is existing. The result of this finding in line with the previous study (Ziman, 2003), that new technology has a vital role for the development of a firm's profitability and vitality.

In the study of Dundon (2002), mentioned that the expending world, customer demanding, competitive pressure and technology advances are the main factors that encourage innovation capability. It is mentioned in several studies that the technology advance is very necessary to innovation capability for the success of the business (Cooper, 2005; Svetlik, Stavrou-Costea, & Lin, 2007). Hence, these all facts indicated that the ICT is most valuable, important and key tool for the successful innovation capability in the small firms.

At the last, this hypothesis (H_{2f}) is about the industry cluster resources and innovation capability. The result ($t = 1.61$; $p = 0.048$) of this hypothesis shows that the positive and significant relationship between industry cluster resources and innovation capability and this hypothesis was supported. The result of this finding in line with the study of (Lai *et al.*, 2014) that industry cluster resources is necessary for the innovation capability. The industrial cluster resources are a new organizational system that ambitions to enhance development and innovation capability. By using the cluster resources, the firms can enhance the innovation capability for the new product and their cost, cultivate the professional labor and create some effective techniques that enhances the competitiveness of the firms (Gertler, 2003; Tallman *et al.*, 2004; Casanueva, Castro, & Galán, 2013; Connell & Voola, 2013). Therefore, industry cluster resource is positive impact on increase the innovation capability. It is evident that the improvement of business sustainable competitiveness and development should depend on industry cluster resources and associations to raise competitive advantage and innovation capability.

So, the dairy farms should be focused on individual motivation, training & development, information communication technology, and industry cluster resources in enhancing the innovation capability for effective role of dairy farms in country GDP and growth.

6.3.3 Objective Three

This section has discussion about the objective three of the current study. The objective three of this study is given below.

> "To analyze the impact of knowledge sharing on innovation capability".

In the Table 6.3 is about the hypotheses from the above-mentioned objective. The hypotheses and their results with discussion about the findings are given as under.

Table 6.3
Hypotheses from objective three

Hypotheses	Hypotheses from Objective Three	T- value	P-value	Decision
H3a	The relationship, exist between knowledge sharing and innovation capability	1.386	0.083	**Supported**

The hypothesis (H_{3a}) is formulated based on the above objective three which states that the relationship exists between knowledge sharing and innovation capability. The findings provide support for (H_{3a}) as the result $(t = 1.386, p = 0.083)$ suggested that there is a positive relationship between knowledge sharing and innovation capability and also was supported to hypothesis (H_{3a}). The finding of this hypothesis is consistent with prior studies (Jantunen, 2005; Svetlik, Stavrou-Costea, & Lin, 2007; Kumar & Che Rose, 2012; Yeşil & Dereli, 2013; Sulistiyani & Harwiki, 2016). The findings of the current study about knowledge sharing and innovation capability conducted in an emerging country economy support (Bell DeTienne & Jackson, 2001; Darroch & McNaughton, 2002; Jantunen, 2005; Song, Fan, & Chen, 2008; Wang & Noe, 2010).

The finding of this hypothesis proves that knowledge sharing is helpful source for innovation capability. Therefore, dairy companies and farms are looking for the ways to improve their innovation capability essential to pay consideration to knowledge sharing. Promoting knowledge-sharing culture in organizations and firms is same like to lead to innovation capability (Svetlik, Stavrou-Costea, & Lin, 2007). In addition, the firms should develop knowledge sharing mechanisms which is helpful for the innovation, such as enhance the budget for suitable training for knowledge sharing among the employee for the dairy farms and generation.

6.3.4 Objective Four

This section has discussion about the objective four of the current study. The objective four of this study is given below.

> "To investigate the mediating effect of knowledge sharing on the relationship between individual (trust, motivation), organizational (supervisory support, training & development), technological (ICT used) and industrial

factors (industry cluster resources) and innovation capability".

In the Table 6.4 is about the hypotheses from the above-mentioned objective. The hypotheses and their results with discussion about the findings are given as under

Table 6.4
Hypotheses from Objective four

Hypotheses	Hypotheses from Objective four	T value	P-value		Decision
			LL	UL	
H4a	Knowledge sharing mediates the relationships between trust and innovation capability	-0.73	-0.062	0.028	No Mediation
H4b	Knowledge sharing mediates the relationships between motivation and innovation capability	2.212	0.006	0.106	**Mediation**
H4c	Knowledge sharing mediates the relationships between training & development and innovation capability	1.803	0.004	0.085	**Mediation**
H4d	Knowledge sharing mediates the relationships between training & development and innovation capability	4.904	0.105	0.244	**Mediation**
H4e	Knowledge sharing mediates the relationships between information communication technology (ICT) and innovation capability.	0.908	-0.026	0.071	No Mediation

H4f	Knowledge sharing mediates the relationships between industry cluster resources and innovation capability	1.322	-0.014	0.071	No Mediation

To test the significance level of mediating effect, the bootstrapping method with 5000 bootstrap re-sampling and bias-corrected confidence intervals was applied (Preacher & Hayes, 2008). Based on the result of mediating relationship of knowledge sharing between trust and innovation capability. The researcher come to know that knowledge sharing does not have a significant mediating or indirect impact on the relationship between trust and innovation capability. The t-statistics for the mediation effect of knowledge sharing in the relationship between trust and innovation capability ($t = -0.73, p = (LL = -0.062, UL = 0.028)$) is lower than the 95% level of significance. It shows that knowledge sharing was not mediating the relationship between the trust and innovation capability. Hence, the researcher was bounded to reject the hypothesis (H4a).

There are some explanations that researcher considers could have resulted in knowledge sharing not being a significant mediator in the relationship between trust and innovation capability. Firstly, the current study only involved the managers and owners as a respondent, to build to the trust to enhance the innovation capability. The past literature show that the behavior of the managers and owners may vary country to country and organization to organization; the behavior of manager may be matter in building the trust of employee for increasing the innovation capability (Helfat & Peteraf, 2015).

The capacity for trust on someone also varies across individuals. As noted previously, researcher come to know that the trust on someone is the matter of individual ability and it may differ from person to person. In a study of (Kahan & Stanovich, 2016), individuals varied in their "response about trust" in reporting trust of an ambiguous signal. Likewise, trust depends on attention. This is the reason behind the insignificant result of the trust with knowledge sharing and innovation capability. We will need to re-look into this for our future result about trust and re-visit this mediating effect.

To tested the hypothesis (H4b) mediation, this hypothesis was also used the mediation procedure given by Preacher and Hayes, (2008) that is hold the relationship independent variable to mediator and mediator to dependent variable. Knowledge sharing is the ability of individual and organizational to share their expertise with other workers to participate in the innovation capability. So, the result H4b $(t = 2.212, p = (LL = 0.006, UL = 0.106))$ states that the knowledge sharing significantly mediate between motivation and innovation capability. Thus, based on this finding, H4b was approved and supported. The result of H4b further demonstrates that dairy farms manager and owners should use the motivation in the business for enhancing the innovation capability through knowledge sharing. This thing will provide better results to the dairy farms owner and play their role in dairy sector growth as well as country GDP growth. Furthermore, the current finding also in the favor of RBV that suggests firms are enhanced and participated in the innovation capability through the tangible and intangible resources. To this end, the findings give more support and facilitate to firms that knowledge sharing is most valuable intangible resources and ingredient for motivation of workers, which would allow firms to participate and practices innovation capability.

With regards to hypothesis (H4c), which was tested that knowledge sharing mediate the relationship between training & development and innovation capability. The result $\left(t = 1.803, p = \ (LL = 0.004, UL = 0.085)\right)$established that knowledge sharing mediate the relationship with training & development and innovation capability. Thus, H4c was supported. Additionally, training & development was found to effect on innovation capability positively through the mediating role of knowledge sharing. As per this finding, implementing training & development will give fruitful results to firms to increase their ability to innovate and in turn improve their valuable presence in the country GDP. This result further guide that no matter how much a firm is good in using their assets, but firms cannot enhance the innovation capability without knowledge sharing and training & development. As companion, this result identifies that while a several number of dairy farms are looking for batter ideas and system to build their role in GDP, some of them innovate sufficiently. This is due to that their strategies are necessary to use the knowledge sharing. Likewise, the current finding shows that dairy farms can use training & development to develop the new idea and trained more employee to share their expertise to enhance the innovation capability. The current finding is also supported by the RBV, which brief that innovation capability can increase via resources of the firms, like training & development and knowledge sharing.

In addition, the H4d hypothesis is about the mediate relationship of knowledge sharing between supervisor support and innovation capability. The result $(t = 4.904, p = \ (LL = 0.105, UL = 0.244))$ of the hypothesis is a significant mediates the relationship of knowledge sharing between supervisor support and innovation capability. Therefore, H4d was mediated and supported. Especially, supervisor support was found the affect innovation capability significantly positively through the mediating impact knowledge sharing.

Conforming to this finding, implementing supervisor support will help dairy farms to increase the knowledge sharing and for increase the innovation capability. This finding further told the reality to firms that supervisor support is affected knowledge sharing activities to improve the innovation capability. It means that support of the supervisor inspires the employee to participate in the knowledge sharing activities in participating the innovation capability. Especially, supervisor support has a significant role to build the knowledge sharing atmosphere for the innovation capability.so, the dairy farms should have established the environment in which supervisor support their co-workers to share their knowledge for the increase in innovation capability. Further, the current finding and results are also in favor of RBV, which speak that innovation capability is increased by using the intangible resources of the firms, like supervisor support and knowledge sharing.

The hypothesis H4e is about the mediate relationship of knowledge sharing between ICT used and innovation capability. The result $\big(t = 0.908, p = \ (LL = -0.026, UL =$

$0.071)\big)$of the test indicated that knowledge sharing has not mediate relationship between ICT used and innovation capability. So, the H4e was not supported and not mediated. This noteworthy finding has some obstacles behind the insignificant mediation relationship of knowledge sharing with ICT used and innovation capability. The ICT used has different sets in the mind of managers in different organizations. The lack of ICT used may not have created the knowledge sharing that was used for the increase of innovation capability. If the firms have any plan that the innovation capability activities to be carried out by the employee to serve in the role of economy, there is highly possibility that these employees would perceive the knowledge sharing impact on the firms and innovation capability; the firms should aware about the ICT used to profound the innovation capability and profound the enough to affect the way they thinking and reflected, hence enabling the mediating the mediating impact significant.

At the last, the hypothesis H4f is about the mediation relationship of knowledge sharing between industry cluster resources and innovation capability. The researcher comes to know after the result $(t = 1.322,\ p = (LL = -0.014, UL = 0.071))$that knowledge sharing has no mediation impact between industry cluster resources and innovation capability. Thus, the result of hypothesis H4f was not supported.

6.4. Contribution of the Current Study

The findings of this study reviewed here suggest several numbers of practical and theoretical implications to improving the innovation capability by using the individual, organizational, technological and industry factors. This study contributed new way and knowledge to existing body of research in the field of individual (trust, motivation), organizational (supervisory support, training & development), technological (ICT used), industry factor (industry cluster resources) and its effects on innovation capability and on knowledge sharing. In the below section discussed the theoretical and practical contributions of the present study. This study further focused on the components of individual, organizational, technological, industry factors that enhanced the firm's innovation capability and created the role of knowledge sharing on managers and owner of dairy farms. This study is also expected to contribute to Agriculture sector, with the great hope that individual, organizational, technological, industry factors becomes a major part of agriculture sector for every sub-sector. Aside from that, this study will also have a potential contribution concerning the manager and owner of the farms. This study will also provide various recommendations to practitioners and policy makers, with regards to policy making in the development of dairy and innovation capability practitioners. The following section of this study addresses the contribution to the literature and practical implications of the study.

6.4.1 Theoretical Implication

The current study like other studies offers some significant insights to scholars and academics. The current study empirically examined a framework to link trust, motivation, training & development, supervisor support, ICT used, industry cluster resources and knowledge sharing with innovation capability. The current study specifically also examined the mediating role of knowledge sharing between independent and dependent variables.

The first theoretical contribution, the present study combined the variables of trust, motivation, training & development, supervisor support, ICT used and industry cluster resources in a single model as independent variables influencing innovation capability has received slight consideration. Based on the structural relationships between trust, motivation, training & development, supervisor support, ICT used, industry cluster resources as independent variables affecting on innovation capability were summarized in a single model. The results in chapter five shows that motivation, training & development, ICT used and industry cluster resources have a positive impact on innovation capability but trust and supervisor support not have significant impact on innovation capability.

The second theoretical contribution of the present study is that trust, motivation, training & development, supervisor support, ICT use, industry cluster resources also tested their relationship with knowledge sharing. The current study adds more knowledge on the importance of knowledge sharing in predicting innovation capability. The results indicated that trust and ICT use have no significant impacts on the knowledge sharing in dairy SMEs of Pakistan.

Thirdly, the results of the current study deliver additional empirical support for the framework of this research. Therefore, the current study contributes to the RBV and diffusion of innovation through the empirical proof in favor of the declaration of these theories. The RBV and diffusion of innovation claims that innovation capability of the firm is improved through the intangible and tangible resources of the firms to reduces the uncertainty and risk.

The fourth and more importantly theoretical contribution of the present study is that it also contributed in literature through the empirically testing the mediation relationship of knowledge sharing with trust, motivation, training & development, supervisor support, ICT used, industry cluster resources and innovation capability. The results show that knowledge sharing mediates relationship between motivation, training & development, supervisor support and innovation capability. This means that innovation capability of dairy farms in Pakistan context improved through motivation, training & development, supervisor support, need to increase knowledge sharing. Therefore, the current research denotes that dairy farms may need to obtain more benefit from knowledge sharing to achieve better innovation capability for their growth of new business. Additionally, the findings of this study make more expected contribution to the RBV and diffusion of innovation, motivation, training & development, supervisor support literature by helpful the role that facilitate the knowledge sharing.

Last but not least, majority studies of the innovation capability and knowledge sharing have been directed in South-East Asian, Europe and Western countries. Noticeably, very limited studies have been conducted in Asian countries. Especially in Pakistan no study was found on innovation capability of Dairy SMEs. This study may be the first study within dairy farms to develop an integrative view of knowledge sharing and innovation capability, particularly in the Pakistani context and would be more helpful and supported to other Asian countries.

6.4.2 Practical Implications

Initially, dairy farms have been considered as one of the major players and contributors to the poverty alleviation, the economic growth and reduce the unemployment in Pakistan. Policy makers and government have to realize that their decisions regarding dairy farms have a direct impact on the dairy farms businesses. It is important to disclose that what government and policy makers may do it to enhance the innovation capability and business sustainability in Pakistan. From the literature review, the current study has acknowledged that dairy farms lack of social capital; less innovative things; a performing in unsupported environment is the basic reasoned behind the failure of the dairy farms (PES, 2014; SMEDAP, 2014).

From practical implication, the findings of the current study can increase the understanding and practice of dairy farms in terms of their knowledge sharing and innovation capability, the following suggestions are established to the help of dairy farms owners and managers increase the innovation capability through implementing a successful knowledge sharing.

The current study offers a comprehensive research framework for implementing knowledge sharing in enhancing the innovation capability. While several firms attempt to establish knowledge sharing, they are not aware of the values of knowledge sharing in establishing the innovation capability. The dairy farms managers and owners could have an idea of the big picture for implementing and developing effective knowledge sharing strategy to sustain competitive advantages through strengthening various factors and promoting farms member's willingness to share their knowledge.

Additionally, in order to simplify knowledge sharing in employee, managers and owners may allocate more resources to increase the relational and structural capital which adds to knowledge sharing behaviors for the innovation capability. As the results directed, managers and owners interested in sustaining and developing knowledge sharing in co-workers should develop motivation, training & development, supervisor support and industry cluster resources that develop and promote the interaction the relationships between employee of dairy SMEs in Pakistan. For instance, managers and owners can arrange seminars, face to face meetings with professional to share their experience and knowledge with employees as a way to enhance the interaction among the employees. Furthermore, managers can also help employee to establish formal and informal communication, arrange training programs and social events through which employees can have strong relationship for the knowledge sharing and innovation capability.

The findings of the current study also have a significant impact of motivation, training & development, supervisor support and industry cluster resources on knowledge sharing. Further, the present study also highlighted the role of motivation, training & development, ICT used and industry cluster resources on innovation capability. Therefore, the managers and owners of dairy farms need to acknowledge the more importance to motivation, training & development, supervisor support in enhancing the knowledge sharing for increasing the innovation capability.

Finally, the current study provides insights into where managers and owners of dairy farms should invest and emphasize more on knowledge sharing to increase the innovation capability for the growth in GDP.

In conclusion, the current study pinpoints that motivation, trust, training & development, supervisor support, ICT used and industry cluster resources are the important factors and resources that are breed of the innovation knowledge sharing and innovation capability in the dairy farms growth. Hence, managers and owners should be focused as matching resources, which directly increase the knowledge sharing activity and in turn impact on innovation capability. Therefore, a successful alignment of these resources is needed. For the dairy farms to be more innovative, the managers and owners should managers a right configuration of these resources. This will give dairy farms a greater economic outcome, which could in turn lead to an innovation capability. Thus, the current study highlighted the different factors that are big source to enhancing the innovation capability.

6.5 Limitation of the Current Study

The current study grants few limitations that should be give out with in future studies. First, because the analysis of the current study was carried out in the Pakistani context, it cannot give the root for the generalization of the findings. However, the researcher feels that having considered large companies in innovative industries, offers greater validity to the study on the topic of the generalization of the findings. Firms in innovative industries usually strive in international contexts. While, it is very true that the nationwide culture effects individual’s behavior and attitudes, internalization plays a significant role in the homogenization of behaviors and process in firms. Hence, the current limitation leads us to deliberate the need to use cross national samples in further researches.

Like other studies, the current study is also having limitation related to the sample size. The findings of this study should be reconfirming through the larger sample regarding to draw the conclusions that are more generalized. Additionally, this study used quantitative technique and depends on a single technique of data collection. In other words, questionnaire was the only tool used in collecting the data in the current study. The respondents may not always be ready to response correctly. Therefore, the responses may not accurately and consistently measure the study variables. It will be more fruitful if future research used the combine techniques (quantitaive and qualitative) to carry out in depth study on dairy farms’ innovation capability in Pakistan.

The other most important limitation of the current study is related to the measures of the construct used in this study. Generally, the variables used in this research were measured as a one-dimensional variable However, the variables such as trust, motivation, ICT used, industry cluster resources, knowledge sharing can give more facts if it is measured as multi-dimensional. Therefore, more examination on the relationship between these variables and innovation capability through the multi-dimensional scale is a sufficient for future research.

At the end, this study examined the mediating effect of knowledge sharing with the relationship of trust, motivation, training & development, supervisor support, ICT used, industry cluster resources and innovation capability in Pakistan. The independent variables tested in this study were restricted of dairy farms innovation capability. Other factors that belongs to firm's resources such organizational commitment, employee commitment, organizational culture, structure can be used to extend the research framework in this study. Future research could further broaden the scope of the current research by conducting a configurationally approach using knowledge sharing and trust as moderator to explain the variance in the innovation capability. Most important, Pakistan and China recently agreed to build an economic corridor to increase bilateral trade. So, this provides a new research area to examine. This new area research will provide the more strengthen to increase the role of dairy SMEs in this trade economic corridor.

Similarly, the results, contributions and conclusion of the current study are limited by the context of the research, but potentially helpful research could contain the replication of the current study in a number of different sectors.

6.6 Conclusion

The main purpose of the current research work is to examine the relationship between individual factors (trust, motivation), organizational factors (training & development, supervisor support), technological factor (ICT), industry factor (industry cluster resources) and innovation capability with mediating role of knowledge sharing of dairy SMEs in Pakistan. The present study has achieved all the objectives as discussed in chapter 1.

The Partial Least Squares Structural Equation Modeling 3.00 (PLS-SEM 3.00) technique was used in the present study. The researcher conducted several rigorous techniques to establish the validity and reliability of the outer model, prior to testing the overall model of present study, in line with the standard SEM data analysis reporting procedure. Upon ensuring that the measurement model was valid and reliable, researcher then proceeded to test the hypothesized relationships. Researcher also examined the predictive relevance of the model and also insured the goodness of the research model. Thereafter, researcher studied the structural model and reported the detailed results. As shown in Table 5.1, 5.2, 5.3 in Chapter 5, the hypotheses of H1 (b, c, d), H2 (b, c, e, f) and H3 (a), were statistically supported by the findings of the present study. However, the hypotheses on the mediation role of knowledge sharing between individual factors (trust, motivation), organizational factors (training & development, supervisor support), technological factor (ICT), industry factor (industry cluster resources) and innovation capability, that hypothesis H4 (b, c, d) were not mediated and supported, as shown in Table 5.4 in Chapter 5, knowledge sharing was found not to have a mediated with hypothesis H4 (a, e, f).

The findings of the present study show that the motivation, training & development and supervisor support has positive and significant impact knowledge sharing. However, the impact of trust, ICT use and industry cluster resources not supported with knowledge sharing. Further, the impact of motivation, training & development, ICT use and industry cluster resources on innovation capability was supported but not with trust and supervisor support. As for the impact of knowledge sharing on innovation capability was also supported. As for the analysis on the mediation role of knowledge sharing between motivation, training & development, supervisor support and innovation capability was significantly mediated and supported but not with trust, ICT use and industry cluster resources.

The present study contributes to theory, dairy development and also helpful for enhancing the role of dairy sector in GDP, dairy community, academic research and most importantly in the country development.

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Appendix I

QUESTIONNAIRES

Dear Sir/Madam,

I am inviting you to participate in my research project entitled "**Individual, organizational, technological and industry factors effects on innovation capability of Dairy SMEs in Pakistan: Knowledge Sharing as Mediated**". The present study will investigate the impact of Industry, Technological, organizational and individual factors which are shaped by the surrounding environment in the SMEs dairy sector of Pakistan. I hope you will be able to assist me by completing the enclosed questionnaires. All information provided will be treated as private and confidential. It will be used for academic purposes. As is normally in academic research, I shall not disclose the names of individuals who provided me with particular information. All data will be analyzed in a collective manner and will be not attributed to name individuals.

The survey should take approximately 15 minutes to answer. I shall be grateful if you could complete the enclosed questionnaires.

Thank you in advance for your time and cooperation.

Yours sincerely

Muhammad Imdad Ullah
P.hD Scholar (Management)
University of Utara,
Malaysia

Part I

1. **Demographic Profile of Dairy SMEs**

Please tick (√.) the appropriate box to answer the question.

1.1 Dairy Farm Type

Public	Private

1.2 Dairy Farm Status

Declining	Growing

1.3 Size of Dairy Farm

Employee<=15	Employee 16 to 25	Employee>=26

1.5 Age of dairy farm

Less Than and equal to 05 years	6-10 years	11-14 years	More than 15 years

1.6 Location of dairy Farms

Lahore Division	Multan Division	DG Khan Division	Faisal Abad Division

Part II

Strongly Disagreed	Dis-agreed	Neutral	Agreed	Strongly Agreed
SD (1)	**D (2)**	**N (3)**	**A (4)**	**SA (5)**

2. Innovation Capability

The following questions ask you about the extent of your judgment on the tool of acceptance, generation of new ideas, processes, products or services. Please indicate your agreement or disagreement on the following statements by indicating your appropriate response based on the following scale.

No.	Items	SD(1)	D(2)	N(3)	A(4)	SA(5)
2.1	Our company always tries for new ideas					
2.2	Our company try to find new ways of doing things					
2.3	Our company is creative in its operating methods					
2.4	Our company is commonly the first in the market to give new products and services					

2.5	Our firm always paid for creativity and take suggestions in the innovation domain					
2.6	Our new product introduction has increased during the last five years					

Strongly Disagreed	Dis-agreed	Neutral	Agreed	Strongly Agreed
SD (1)	**D (2)**	**N (3)**	**A (4)**	**SA (5)**

3. Knowledge Sharing

The following questions ask you about the extent of your judgment on Communicating to others what one's personal intellectual capital. Please indicate your agreement or disagreement on the following statements by indicating your appropriate response based on the following scale.

No.	**Items**	SD(1)	D(2)	N(3)	A(4)	SA(5)
3.1	In our firm employee shared their work reports and documents with other employees.					
3.2	In our firms employee shared their experience with other organization members.					
3.3	In our organization knowledge sharing with colleagues is an enjoyable experience.					
3.4	Our employee provides knowledge at the request of other colleagues.					
3.5	When our colleagues learned something new, they share with me and all of us.					
3.6	In our firm employee shared their work reports and documents with other employees.					

4. Individual Factors

The following questions ask you about the extent of your judgment on the degree to which an individual believes and loyalty another party to be trust worthy and about an individual or Unit's willingness to act.

Please indicate your agreement or disagreement on the following statements by indicating your appropriate response based on the following scale.

4.1 Trust

No.	Items	SD(1)	D(2)	N(3)	A(4)	SA(5)

4.1.1	Our firms have fully trust on the expertise of employee that they have.					
4.1.2	Our firms believe that our employee do not exploit for their own interest.					
4.1.3	Our firm trust on employee that would help us in innovation.					

Strongly Disagreed	Dis-agreed	Neutral	Agreed	Strongly Agreed
SD (1)	**D (2)**	**N (3)**	**A (4)**	**SA (5)**

4.2 Motivation

No.	Items	SD(1)	D(2)	N(3)	A(4)	SA(5)
4.2.1	Our firm would like more opportunities to share information					
4.2.2	Our firms motivated to share best practice knowledge					
4.2.3	In our firm exchanging information would be motivate and encourage					

5. Organizational Factors

The following questions ask you about the extent of your judgment on initiatives encourages employees to coherent their own concerns, ideas and initiations to investigate novel views and solutions to problems and promotes ideas further. Please indicate your agreement or disagreement on the following statements by indicating your appropriate response based on the following scale.

5.1Training & Development

No.	Items	SD(1)	D(2)	N(3)	A(4)	SA(5)
5.1.1	Our Company provides multiple career path opportunities for employees to move across multiple functional.					
5.1.2	Our company provides training for developing innovative ideas.					
5.1.3	Our company sponsor social events for employees to get new knowledge.					

5.1.4	Our company offers an orientation program that trains employees on the history and processes of the organization.					
5.1.5	Our company use job rotation techniques to develop new skills of employees.					
5.1.6	Our company use performance appraisals techniques for skill development and training for future advancement					

Strongly Disagreed	Dis-agreed	Neutral	Agreed	Strongly Agreed
SD (1)	**D (2)**	**N (3)**	**A (4)**	**SA (5)**

5.2 Supervisor Support

No.	Items	SD(1)	D(2)	N(3)	A(4)	SA(5)
5.2.1	Our supervisor encourages us to develop new ideas, new development and be creative					
5.2.2	Our supervisor provides equal opportunities at work place for new idea					
5.2.3	Our Supervisor actively supports our new development at work.					
5.2.4	Our firm always feel that supervisor give respects and makes use the expertise and knowledge for innovative ideas					
5.2.5	Our needs and goals are important for supervisor in firm					

6. Technological Factors

The following questions ask you about the extent of your judgment on degree to which knowledge management is supported by the use of its. Please indicate your agreement or disagreement on the following statements by indicating your appropriate response based on the following scale.

No.	Items	SD(1)	D(2)	N(3)	A(4)	SA(5)
6.1	Employees make extensive use of electronic storage (such as online databases and data warehousing) to access knowledge.					
6.2	Employees use knowledge networks (such as groupware, intranet, virtual communities, etc.) to communicate with colleagues.					

6.3	Our company use technology that allows employees to share knowledge with other persons inside the organization.					
6.4	Our company use technology that allows employees to share knowledge with other persons outside the organization.					

Strongly Disagreed	**Dis-agreed**	**Neutral**	**Agreed**	**Strongly Agreed**
SD (1)	**D (2)**	**N (3)**	**A (4)**	**SA (5)**

7. Industry Factors

The following questions ask you about the extent of your judgment about a new organization form that enhances the depth and breadth of cooperation and competition and brings together various industries to form a cluster relationship networks. Please indicate your agreement or disagreement on the following statements by indicating your appropriate response based on the following scale.

No.	Items	SD(1)	D(2)	N(3)	A(4)	SA(5)
7.1	Our Company use cluster to obtain individuals with talent and with high educational levels.					
7.2	Our company use to obtain experienced and required core technique talents.					
7.3	Our company can retain professional technical talents					
7.4	Our company use cluster to obtained technical interaction and innovation from the employees' flow.					

Appendix 2

Common Method Variance

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.688	20.778	20.778	7.688	20.778	20.778
2	3.690	9.972	30.750			
3	2.715	7.339	38.089			
4	2.193	5.927	44.016			
5	2.165	5.851	49.867			
6	1.730	4.677	54.544			
7	1.588	4.292	58.836			
8	1.334	3.605	62.441			
9	1.087	2.939	65.380			
10	1.029	2.782	68.163			
11	.966	2.611	70.774			
12	.864	2.336	73.110			
13	.779	2.106	75.216			
14	.753	2.035	77.251			
15	.657	1.775	79.025			
16	.630	1.703	80.728			
17	.604	1.633	82.361			
18	.524	1.416	83.777			
19	.507	1.369	85.146			
20	.492	1.330	86.476			
21	.462	1.249	87.726			
22	.443	1.196	88.922			
23	.438	1.184	90.106			
24	.399	1.077	91.183			
25	.382	1.032	92.215			
26	.346	.935	93.150			
27	.325	.878	94.028			
28	.304	.822	94.850			
29	.296	.799	95.648			
30	.264	.713	96.361			
31	.243	.656	97.017			

32	.237	.642	97.659			
33	.213	.575	98.234			
34	.190	.514	98.747			
35	.164	.444	99.192			
36	.158	.427	99.619			
37	.141	.381	100.000			

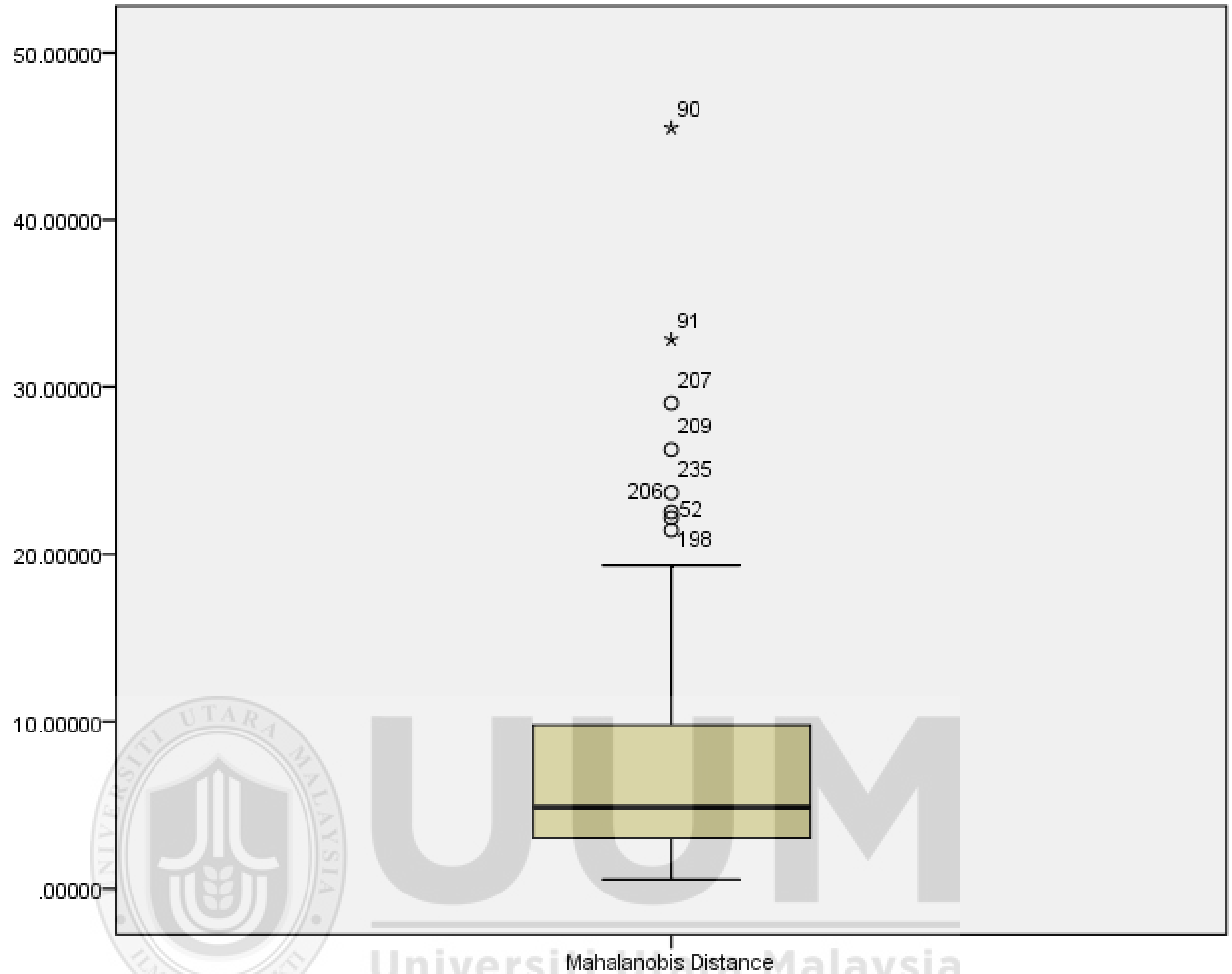
Extraction Method: Principal Component Analysis.

Appendix 3

Outlier Test:

Extreme Values

			Case Number	Value
Mahalanobis Distance	Highest	1	90	45.49483
		2	91	32.79602
		3	207	29.03180
		4	209	26.22347
		5	235	23.67131
	Lowest	1	94	.52210
		2	174	.59337
		3	78	.61265
		4	103	.63216
		5	64	.64750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40.00000
30.00000
20.00000
10.00000
.00000
90
91
207
209
235
206
52
198
Mahalanobis Distance