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To cite this article: Muhammad Khyzer Bin Dost, Ch. Abdual Rehman, Shahram Gilaninia, Kamariah Bte Ismail & Muhammad Wasim Akram (2018) The impact of knowledge management's practices on supply chain performance of the dairy sector in Central Punjab: a mediating role of decentralization, Economic Research-Ekonomika Istraživanja, 31:1, 290-312, DOI: [10.1080/1331677X.2018.1426478](https://doi.org/10.1080/1331677X.2018.1426478)

To link to this article: <https://doi.org/10.1080/1331677X.2018.1426478>



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Published online: 07 Feb 2018.



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The impact of knowledge management's practices on supply chain performance of the dairy sector in Central Punjab: a mediating role of decentralization

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ABSTRACT

In this study an attempt has been made to solve a problematic phenomenon regarding how a decentralised environment mediates the effect on supply chain performance (SCP) – by taking various dimensions of knowledge management (KM) – specifically in the dairy sector of Lahore, Pakistan. This study also explores the relationship between KM practices and SCP in the presence of a general system theory; the theory claims that every system is has sub-parts, and every sub-part is surrounded by other sub-parts. Decentralisation has a mediating role which influences the relationship between KM practices and SCP in the dairy sector of Pakistan. A self-administered questionnaire was developed, and data were collected through a random sampling of 355 supply chain members of different dairy organisations in central Punjab. The data was analysed by AMOS software and through structure equation modelling (SEM). The underlying study reveals that the hypothesis is accepted, that decentralisation mediates the relationship between KM practices and SCP at a 1% level of significance; it also reveals that KM practices (with the exceptions of knowledge creation and knowledge sharing) have a direct relationship with SCP. Meanwhile, statistical analysis also indicates that KM practices (with the exception of knowledge creation) have a significant positive relationship with decentralisation at the 1% significance level.

ARTICLE HISTORY

Received 20 January 2016
Accepted 27 March 2017

KEYWORDS

Knowledge creation;
knowledge sharing;
knowledge storage;
knowledge application;
decentralisation; supply
chain performance (SCP);
hypothesis; dairy sector;
Pakistan

JEL CLASSIFICATIONS

M11; M21; M31

1. Introduction

The emerging field of supply chain management (SCM) is forcing firms to cater to this phenomenon in order to thrive in the marketplace in terms of competition and long-term sustainability. As pointed out by various researchers, current rivalry is no longer between associations, it is now between supply chains. The purpose of this research is to explore

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the relationship of knowledge management (KM) practices and supply chain performance (SCP) through the lens of the general systems theory as illuminated by the literature. By accentuating KM and SCM, companies can enhance their potential for mounting competitive advantage. This study seeks empirically-based theoretical and practical insights into linking KM resources and SCP. Management choices in worldwide supply chains confront the difficulties of many-sided quality and vulnerability, these come about because of different internal and external elements, whether they are administrative, geo-economic or social. Practically speaking, the worldwide operation of numerous supply chains remains broken down, disengaged and constrained. It is fundamental to fathom the congruity of those variables and their effect on the operation of an overall supply chain. Despite the fact that boundless literature exists on KM for SCM, with everything consider, just a small amount of the literature has extended the examination of KM to the setting of general supply chains (Schubert & Legner, 2011). The literature has recognised the significance of knowledge sharing and exchange inside general supply chains, and at the same time acknowledging distinctive related difficulties. A general supply chain needs to concentrate on the crucial knowledge that it is discriminating and adequately solid enough to offer a conceivable, particular point of interest, as well as legitimise the costs of holding and exchanging that knowledge, and improving the KM exertion and philosophy, so that the knowledge overflowing the general supply chain members can be smooth and energetic enough to fabricate the supply chain's reaction time to general business portion.

Pakistan is the fourth largest milk-conveying country in the world, annually making 33 billion litres, of which 97% of aggregate creation is utilised as 'open milk' by casual courses in provincial and urban territories of Pakistan. Interestingly, just 3% of aggregate milk created is being packaged by the milk industry (Kamran & Rizvi, 2013) and during 2014–15 livestock contributing to the national GDP is 11.8% (Wasti, 2015). The milk business of Pakistan has possibilities to contribute to national GDP. With respect to the above exchange, just 3% of aggregate milk created is utilised as stuffed milk, the production network of the milk industry has hazy areas which should have been investigated. KM practices have an incredible effect on SCP. A quantitative and deductive approach is used to collect information from 500 respondents from the Pakistan Dairy Association's (PDA) listed companies in Lahore, Pakistan. Furthermore, SPSS and AMOS are used to apply statistics analysis, i.e., the KMO and Bartlett's test for reliability measures, structure equation modelling (SEM) for mediation analysis and for possible rejection or acceptance of the proposed hypothesis.

1.1. Rationale of the study

In the existing literature, the impacts of decentralisation and KM on SCP are treated as independent (Mahmood, Ilyas, & Rehman, 2014), supply chain external coordination is taken as a mediating variable which has a positive impact on mass customisation capabilities (Yinan, Qi, Tang, & Zhang, 2014). In the decentralised environment and the coordination of the fresh produce supply chain, every player wants quick decision-making authority because transportation time is short, the order quantity of fresh produce may be small and time factors and freshness of the product is very important, so the supply chain profits less (Su, Wu, & Liu, 2014). They also suggested that there is a vacuum which must be filled by a study of the supply chain coordination of fresh produce and information-sharing between supplier

and retailer. Work places have different measures for decentralised decision-making, which is totally dependent upon the organisational culture (Zoghi& Mohr, Zoghi & Mohr, 2011). Lee and Kumara (2007) proposed that supply chains can be performed in a better way if different organisations with distinctive attributes work together. It is inconceivable for a singular association to control a whole supply chain. Along these lines, decentralisation of choice-making power is an inevitable piece of cutting-edge supply chains. Nevertheless, controlling in a decentralised mode can fail without legitimate coordination segments. When the individuals from the chain are not prepared to work together with respect to data sharing, the whole supply chain can indicate indulgent inefficiencies, for instance, the bull-whip impact. Statistical tests have found that the decentralised system performs significantly worse than the integration of the supplier with the manufacturer (Mahdiraji, Govindan, Zavadskas, & Razavi Hajiagha, 2014). A decentralised mechanism allows every player in a supply chain to make decisions independently at the right time, which ultimately results in better SCP. KM and decentralisation have a positive impact on SCP (Mahmood et al., 2014), however It is suggested to study the effect of KM practices, supply chain coordination and decentralisation on performances of supply chain. This study will contribute to explaining the functional ramifications of supply chain and KM. Constrained studies are directed to focus on SCM as a KM approach. So, the phenomena of SCM from a decade ago can be investigated and the limited literature requires study, which we attempt here.

1.2. Aim/purpose

In today's period of change, it has turned out to be progressively complex for associations to accomplish abnormal state results. In this situation, workers are required who are ready to contribute successfully and effectively to accomplishing institutional performance, as well as being able to adapt to changing requirements and the steadily developing prospects of the milk industry. The aim of this study is to explore the relationship between KM practices and SCP with mediating role of decentralisation.

1.3. Objectives

- To explore the relationship between KM practices and SCP in the presence of a general system theory.
- Identify and review the factors of KM practices which influence SCP.
- Understand how a decentralised environment mediates the relationship between KM practices and SCP.

1.4. Significance of the study

- The study is conducted using general system theory as a theoretical lens. This has not been used in previous studies to explore the relationship between KM practices and SCP.

- This study expands upon a literature audit to define a reasonable examination structure, evaluating the KM literature as a potential wellspring of new pieces of knowledge, the management of knowledge in supply chains is also considered.
- Supply chain managers will get ideas to implement KM practices, and these will be helpful in achieving a comparative advantage in the global market.
- This study will enable practitioners to identify and implement those necessary administrative adjustments which are needed and are proposed by this study.
- The objectives of this study make strategy suggestions for managers, as well as policymakers and the rest of the dairy workforce.

1.5. Research questions

Main question:

Does decentralisation mediate the relationship between KM practices and SCP?

Sub-questions:

- Does knowledge creation affect SCP?
- Does knowledge sharing affect SCP?
- Does knowledge storage affect SCP?
- Does knowledge application affect SCP?
- Does decentralisation affect SCP?

1.6. Research hypothesis

H₁: There is a relationship between knowledge creation and SCP.

H₂: There is a relationship between knowledge sharing and SCP.

H₃: There is a relationship between knowledge storage and SCP.

H₄: There is a relationship between knowledge application and SCP.

H₅: Decentralisation mediates the relationship between KM practices and SCP

H₆: There is a relationship between knowledge creation and decentralisation.

H₇: There is a relationship between knowledge sharing and decentralisation.

H₈: There is a relationship between knowledge storage and decentralisation.

H₉: There is a relationship between knowledge application and decentralisation.

2. Literature review

2.1. Theoretical perspective

The study employs the general systems theory to examine the dynamics that have an effect on SCP as a whole system, with respect to the KM approach. In a holistic environment, SCM can be observed as a system by means of the 'general systems theory'. Von Bertalanffy

(1950) first identified the systems theory and subsequently it has been utilised in organisational settings by Kataz and Khan (1966). Systems theory is a way to deal with organisations which compares their endeavours to an organism with associated parts, each with its own particular capacity and interrelated obligations. A principal idea of general system theory is its emphasis on connections. The system may be the entire organisation, a division, office or group within the organisation; yet whether the entirety or a small section, it is critical to see how the system works, and the relationship between the various parts of the organisation. All parts or components produce particular occasions through their communications which are vital, with results that 'framework components are intelligently joined' (Luhmann, 1990) towards a common target (Golinelli, 2009). Katz and Kahn (1966) joined the thinking about the open system to the affiliations. The affiliation is seen as a system amassed by information yield, where the quality starting from the yield reactivates the structure. Social construct affiliations are open structures in light of their material trades with nature.

2.2. Knowledge management

Studies have similarly prescribed that KM instruments can be utilised by contemporary supply chains to redesign benefit and quality (Gunasekaran & Ngai, 2007). In significantly forceful organisations, firms need to concentrate on upgrading their KM capacity to ensure survival. These affiliations are more disposed to merge essential assets and accomplish pervasive performance (Hsu & Sabherwal, 2011). The target behind communitarian KM practices is fundamental to support intra- and cover progressive KM and to make impact knowledge resources and insightful assets synergistically (Cormican & O'Sullivan, 2003). As shown by Cormican and O'Sullivan (2003), community KM practices can be seen as supply chain-wide orderly attempts to make, store and use knowledge synergistically to enhance performance.

2.2.1. Knowledge creation

Some thought has focused on the conforming part of composed exertion along the supply chain and on the checks to knowledge creation (Samuel, Goury, Gunasekaran, & Spalanzani, 2011). For example, the impelled character of knowledge and how it influences the knowledge-sharing technique along the inventory network (Wagner & Buko, 2005). It has been demonstrated that one of the essentials for making new knowledge is an internal structure of knowledge trade. It relies on upon the knowledge centres and on the knowledge-based links (Marra, Ho, & Lee, 2014).

2.2.2. Knowledge sharing

Additionally, qualities of a trade channel influence knowledge sharing between supply chain accomplices (Tsai, 2002). Conversely, an absence of knowledge, absence of time and innovation were distinguished as the berries for sharing of knowledge. To do what is indicated, the association should develop correspondence modes, which may be relaxed, formal, individual, or detached (Alavi & Leidner, 2001).

2.2.3. Knowledge storage

An extreme focus of communitarian knowledge storage is to make up a database with a normal interface and to provide development, tying together and sorting access to diverse

knowledge-seekers in quantities of knowledge associations and Internet information assets for smooth knowledge coordinated effort over the supply chain (Li, 2007). Knowledge storage cements the affiliation, sorting and retaining authoritative knowledge, which allows the firm to keep up a various levels of memory, which joins knowledge that exists in distinctive structures; for instance, creating documentation, information filed in electronic databases, human knowledge kept in expert systems, filed hierarchical strategies, and frames or unspoken knowledge picked up by individuals and frameworks of individuals (Alavi & Tiwana, 2003). As knowledge storage practices reflect the truth by recording, arranging, or putting away information, their effect on performance is shown to be unmistakable when people in authority with a specific point trade or apply these exercises (Cummings & Teng, 2003).

2.2.4. Knowledge application

Hierarchical qualities cannot be created by knowledge itself, its application for getting important effects and activities in the support of association do make a difference. Knowledge execution bolsters and encourages knowledge exchanges in the general supply chain. KM application practices should focus on making the coordination and application of existing knowledge to authoritative exercises and discriminating deduction easier and all the more effective for the firm (Grant, 1996). The methods of knowledge creation, storage, and sharing do not provoke redesigned authoritative performance; practical knowledge application does (Alavi & Leidner 2001).

2.3. Decentralisation

It is a testing issue in decentralised supply chains to settle on appropriate choices to discover worldwide the most beneficial performance. McDaid and Font (2013) suggest that decentralisation could be one framework for coordinating bureaucratisation. Colombo, Delmastro, and Rabbiosi (2007) joined another measure of decentralisation with work practices and discovered a goliath influence on benefit of the firm. Docteur and Oxley (2003) proposed that the extended level of adaptability can be more complete within particular circumstances. Bresnahan, Brynjolfsson, and Hitt (2002) found that those workers who engage with their work produce significant productivity if the organisation allows them the decentralisation of decision-making and it is also positively related to information technology-demanding organisations. And it is also proved that a decentralised supply chain can perform better than a centralised supply chain (Su & Zhang, 2008). Institutional decentralisation enhances SCP and increases supply chain cooperation (Guo-bin, 2015). Further, Yu, Yan, and Edwin Cheng (2001) said that decentralised supply chain partnerships also enhance SCP. But according to Mahmood et al. (2014, p.131), decentralisation fails to show any impact on SCP. Maybe the organisational culture does not allow the members to make their own decisions because of the developed systematic environment in a specific industry. Unfortunately, the literature is blind to this prospect and does not show any study on the mediating role of decentralisation, but Schmitt, Sun, Snyder, and Shen (2015) gave direction in their study that researchers can take decentralisation as a mediating effect to check its effects on SCP. Decentralisation can be an institutional change with the desire of empowering strategy enhancements and to better serve the needs of the purchasers, especially in the grouping of open organisations, such as social protection (McDaid et al., 2013).

2.4. Supply chain performance

'A new unit of analysis has been identified for best business practices: the supply chain which is not an individual business sector and it has become a unit of competition in modern world' (Handfield, 2002).

As indicated by Hernández-Espallardo et al. (2010), organisations' pioneers are mindful of the fact that they can no more gainfully compete to the seclusion of their suppliers and different entities in the supply chain. Accordingly, they have moved their consideration from competition in the field of organisations to competition in the midst of their whole supply chains. Disappointment in the performance of a supply chain brings about focused misfortunes and can prompt breakdown (Ntayi & Eyaa, 2010). Different researchers have recommended assorted frameworks and various dimensions for SCP in order to provide efficiency and effectiveness (Lin & Li, 2010). Aramyan et al. (2007) displayed performance measures to survey the accomplishment of supply chains. The literature identified four main measures of performance including responsiveness, efficiency, flexibility, and quality (product quality or process quality) to evaluate SCP. According to Barney (2012), SCM has been critically recognised to gain competitive advantage for firms. SCP is a way of the viability and estimation of the chains. Effective SCP could mean getting the right thing to the right spot at the perfect time at the least cost. During the last two decades, interest in performance measurement has increased greatly (Taticchi, Tonelli, & Cagnazzo, 2010).

2.4.1. Efficiency

Porter (1996) discussed that supply chains which are cost savings and based on efficiency, can lead firms to short-term gains rather than long-term profitability, and these organisations may be unwilling to spend money on changing customer's needs, new product development and modern technical innovations, which are likely to be suited to customer needs and preferences. Beamon (1999) proposes three perspectives for measuring SCP; resources estimation (efficiency), output estimation (for the most part, consumer loyalty), and adaptability (how well the system responds to uncertainty).

2.4.2. Flexibility

It may similarly incorporate transport flexibility, buyer satisfaction, volume flexibility, lessen in the amount of postponement buys and loss arrangements. Flexibility is the competence to mould the accumulation of the things made, which draws in the firm to redesign customer trustworthiness by giving the sorts of thing that clients request, in a supportive way (Aramyan et al., 2007). Different experts have endeavoured to approach flexibility from a supply chain viewpoint, Vickery, Calantone, and Droge (1999) said that the quality, including the structure, must be considered and flexibility ought to be removed from an integrative, client masterminded perspective. Li (2007) depicts flexibility as a heap of adaptabilities that extend the estimation of affiliations and are transferred by two or more breaking points along the Supply Chain (SC).

2.4.3. Responsiveness

Responsiveness means furnishing the things asked for with a base lead-time (Persson & Olhager, 2002). It may mean lead-time; fill rate, client reaction time, item defer, conveyance oversights, and client difficulties or grievances. Gunasekaran, Lai, and Edwin Cheng (2008)

start portraying the responsive SC from the most punctual starting stage; recognising the five essential activities, which are: (1) operations; (2) inbound logistics; (3) acquirement; (4) advertising and deals; and (5) outbound logistics. They made a rundown of four legitimate coordinated efforts those need to exist in each swift/responsive association. They are: (1) make an interconnected data framework among suppliers; (2) little stock, dumbfounding thing; (3) sketching out creative things; (4) cost sharing very fitting conveyance.

2.4.4. Product quality

In view of the structure of product quality created by Luning, Marcelis, and Jongen (2002), it is separated into product and procedure quality.

Quality comprises:

- Product security and well-being;
- Tangible qualities and time span of usability; and
- Product unwavering quality and comfort

Inside of product security and well-being, well-being alludes to sustenance structure and eating regimen. Product security alludes to the necessity that products must be 'free' of perils with a satisfactory danger. A tactile view of sustenance is controlled by the general impression of taste, smell, shading, appearance and surface, which are dictated by physical elements and concoction synthesis. The timeframe of realistic use ability of a product is characterised as time between collecting or handling and bundling of the product, and the spot in time at which it gets to be inadmissible for utilisation. Product unwavering quality alludes to the consistency of genuine product synthesis with product portrayal, and comfort identifies with the usability or utilisation of the item for the buyer (Luning et al., 2002).

3. Methodology

3.1. Research approach

As indicated by Hussey and Hussey (1997) deductive research is 'a study in which a figured and hypothetical structure is created which is then attempted by trial discernment; thusly particular illustrations are deducted from general effects.' In this study, researchers hope to test a hypothesis by social event the new information from participants and watch the revelations by applying diverse quantifiable tests. This technique is suggested for definite studies in which examiners chip away at particular thought by making assumption, after checking those suppositions (Bryman & Bell, 2003). In this study, we expect that there is any mediating role of decentralisation between KM practices and SCP. So, the deductive approach is more suitable to be considered.

3.2. Research methods

The quantitative strategy is an experimental system and its basis can be found in positivism as this methodology is for the most part utilised by the Positivists (Grinnell & Unrau, 2010). This system concentrates on crisp information accumulation in understanding of the issues from huge populace and investigation of the information, however, it overlooks an individual's feelings and emotions or natural setting (Bryman & Bell, 2007). In this study,

the quantitative technique has been chosen as the researchers have selected positivism rationality and a deductive approach.

3.3. Research site

This study is about the milk industry in Pakistan. The milk sector supply chain is considered as a platform of noteworthy rank, where representatives confess to applying their concealed knowledge from the hearts and brains of the most experienced and adapted supply chain individuals. This investigation of knowledge is just conceivable when certain crucial variables are painstakingly included in the study, which is upheld by writing and demonstrated measurably. According to the PDA, there are 18 organisations which produce dairy items, particularly sanitised and Tetra-packed milk in Pakistan. The target population of this study is the milk producing companies of central Punjab. Pakistan is an agricultural country and Punjab province is the largest province of the country according to agricultural prospective. So, as per this view, most companies set their plants in centre of the Punjab. Data was collected from companies located in central Punjab. Recently, considerable growth in the milk industry has been seen locally, as well as internationally. This is a new advancement by academic and business, as this mix of multinational and national milk segments has provided chances to business people to join so that the population of Pakistan can get quality milk under the quality-controlled vision.

3.4. Population/sample

Stratified random sampling is used for data collection. In stratified sampling, respondents can be selected on common factors/attributes i.e. age, sex, education etc. In such settings, each respondent gets equal chance of being selected. Supply chain members who are engaged in SC process were being selected.

In Pakistan, following dairy products producing companies are working according to PDA:

- Gourmet Foods Ltd
- Haleeb Foods Ltd
- Jk Dairies (Pvt) Ltd (A&A Farm Fresh Milk & Products)
- Millac Foods (Pvt) Ltd
- Nestle Milkpak Ltd
- Noon Pakistan Ltd Dalda Foods Ltd
- Nestle Pakistan Ltd
- Solve Agri Pak
- Pakola Products Limited
- Premier Dairies Adam's Milk Foods (Pvt.) Ltd
- Americana Dairy
- At-Tahur (Pvt) Ltd
- Dairyland (Pvt) Ltd
- Engro Foods Limited
- Prime Dairies Ltd.
- Shakarganj Food Products Limited

- Sharif Dairies
- Yummy Milk Products (Pvt) Ltd

The selection of milk processing companies has been made on the basis of the following guidelines:

- Market share of the company
- Number of employees
- Quality controlled measures taken by company
- International standards adaptation
- Supply chain infrastructure of the company
- Net worth of the company

The authors made two strata for sampling, Stratum 2 is containing those companies who are fulfilling the above criteria and in top in list of criteria:

Stratum 1:

1. Adam's Milk Foods (Pvt.) Ltd
2. Americana Dairy
3. At-Tahur (Pvt) Ltd
4. Dairyland (Pvt) Ltd
5. Engro Foods Limited
6. Haleeb Foods Ltd
7. Millac Foods (Pvt) Ltd
8. Nestle Milkpak Ltd
9. Noon Pakistan Ltd

The companies of stratum 1 are those companies which are high in the list in criteria:

Stratum 2:

1. Jk Dairies (Pvt) Ltd (A&A Farm Fresh Milk & Products)
2. Gourmet Foods Ltd
3. Pakola Products Limited
4. Prime Dairies Ltd.
5. Shakargan Food Products Limited
6. Sharif Dairies
7. Yummy Milk Products (Pvt) Ltd
8. Dalda Foods Ltd
9. Solve Agri Pak
10. Premier Dairies

The following companies are being selected for strata 1 on random bases:

Stratum 1:

- Nestle Pakistan Ltd (Multinational)
- Engro Foods Ltd (Multinational)
- Haleeb Foods Ltd (National)

The following companies are being selected for strata 2 on random bases:

Stratum 2:

- Shakarganj Foods Ltd (National)
- Solve Agri Pak (National)
- Premier Dairy Ltd (National)
- Dalda Foods Ltd (National)

As the criteria is set out before selecting the sample, those companies whose market share, number of employees, SC infrastructure and international standards are high, were selected. Market share and net worth of each company is gathered from annual reports and other criteria such as number of employees, SC infrastructure, international standard, etc. is gathered by visiting the main head offices and plant sites of each company.

3.5. Strategy of inquiry

Close-ended inquiries were utilised so that respondents could answer the inquiries quickly, subsequent to analysing individual reactions with accessible decisions. To encourage this procedure a 5-point Likert scale was utilised. This procedure gave respondents a simple approach to answer the inquiry which consequently helped scientist to investigate the data.

3.6. Methods

The information was gathered with a considerable measure of exertion and diligent work. The researchers needed to visit five unique organisations. Further, an analyst drew nearer respondents working in distinctive branches of the organisation. It took about two and half months to gather the information. Five-hundred questionnaires were circulated specifically among 500 respondents and questionnaires were additionally sent by means of email. As a rule, questionnaires were conveyed to the members during the initial meeting and collected at the next meeting. Occasionally researchers needed to visit twice. An issue faced during the information gathering procedure was that numerous supply chain individuals did not demonstrate any enthusiasm for exploration. A few respondents were watched completing the questionnaire without giving careful consideration to the questions, or returning the questionnaire uncompleted. To get legitimate and solid results, this effort was required. For some respondents, KM in the supply chain was a new idea. Because of mindfulness about the significance of the examination these respondents turned into a decent wellspring of information gathering. The examination was finished by utilising essential assets to lead research.

This study used the Principal Component Analysis (PCA) on each variable. To assess the created authenticity (Convergent and discriminant authenticity), a component examination was used using PCA with varimax turn method. The explanation behind KMO and Barlett's test of sphericity is to examine whether the data is appropriate for component examination. The KMO measure of test adequacy chooses the nature of relationship, however Bartlett's Test of Sphericity Chi-square insinuates the orthogonality of portions of an assembly.

The initial phase in applying SEM is to build a link between chosen endogenous and exogenous variables by setting up the association with the assistance of single and twofold head bolts. The exogenous variables are indicated in circles and endogenous variables are demonstrated in squares according to the prerequisite of AMOS. The point of applying SEM is to give express gauge of slip difference parameters as other multivariate techniques, for

example, connection relapse and so on are not able to do either getting to or revising the estimation blunder, e.g., in the event of relapse, investigations into the positional lapse in every single free variable is disregarded, incorporated in the main model, and this makes a model deceptive while closing results from relapse gauges. SEM consolidates inert and measured variables which make it appropriate for demonstrating the multivariate relationship and assessing the immediate and backhanded effects of the variables.

4. Analysis and results

4.1. Descriptive statistics

4.1.1. Demographic profile of respondent

Table 1 shows that most respondents were male (277 out of 355) and only 78 were female. The demographic in Table 1 shows that majority of respondents are young, aged between 25 and 40. It is also shown in Table 1 that most of the respondents are well educated, having Master's (43%) and graduate (47%) degrees, which shows companies are employing well educated staff, and those staff are enjoying a good income level, as shown in Table 1, 60% of respondents have an income level between 51,000 and 70,000.

Table 2 shows the diversity of company size. Of 355 respondents, 220 are working in large companies (companies where there are more than 250 employees; 62%), 21% of respondents are from medium-sized companies (companies where there are less than 250 employees), Seventeen per cent of respondents work in small-sized companies (companies where there are 50 employees or less). When we talk about the type of company; multination, national, global or local, most respondents (44%) work for international companies. And these companies have 400 or more employees.

Table 2 also shows that most of the respondents (59%) are engaged with the sale and distribution department. Two-hundred and eleven of 355 respondents are engaged in the

Table 1. Demographic profile.

Respondent Demographics	Frequency	%
Gender (N = 355)		
Male	277	78
Female	78	22
Age (N = 355)		
25 – 30	80	23
31 – 35	94	27
36 – 40	85	24
41 – 45	70	19
46 – 50	21	6
51 years and above	5	1
Qualification (N = 355)		
Under Graduation	11	3
Graduation	165	47
Masters	154	43
M. Phil	25	7
PhD	0	0
Income in Rupees (N = 355)		
PKR. 20,000 – PKR. 50,000	70	20
PKR. 51,000 – PKR. 70,000	212	60
PKR. 71,000 – PKR. 100,000	40	11
PKR. 101,000 and above	33	9

Source: Calculation using SPSS Statistics 20.0.

Table 2. Demographic profile.

Respondent Demographics	Frequency	%
Size of the Company (N = 355)		
Small	60	17
Medium	75	21
Large	220	62
Type of the Company (N = 355)		
Local	110	31
International	155	44
Multinational	40	11
Global	50	14
Department (N = 355)		
Sales and distribution	211	59
Production	74	21
Procurement	70	20
Number of subordinates: (N = 355)		
Less than 5	327	92
5–10	20	6
10–20	8	2
Above than 20	0	0

Source: Calculation using SPSS Statistics 20.0.

sale department. In the sale and distribution department, 92% of respondents have less than five people reporting to them.

4.2. Reliability of measurement

‘Reliability is the overall consistency of a measure. A measure is said to have a high reliability if it produces similar results under consistent conditions.’ Cronbach’s alpha performs the function of reliability of measurement.

Table 3 represents the estimated values of Cronbach’s Coefficient alpha to examine the reliability and internal consistency of the measures. For the present sample, the values of Cronbach’s alpha vary from 0.72 to 0.96, which indicates that each multi-item construct possesses high reliability. Knowledge creation (alpha = 0.870), knowledge sharing (alpha = 0.810), knowledge storage (alpha = 0.777), knowledge application (alpha = 0.958), decentralisation (alpha = 0.930), flexibility (alpha = 0.920), efficiency (alpha = 0.958), product quality (alpha=0.830), and responsiveness (alpha = 0.724). The high Cronbach’s alpha value for each construct implies that they are internally consistent.

Table 3. Reliability of measurement.

Constructs	N	No. of Items	Cronbach's Alpha
Knowledge Creation	355	5	0.870
Knowledge Sharing	355	5	0.810
Knowledge Storage	355	5	0.777
Knowledge Application	355	5	0.958
Decentralisation	355	5	0.930
Flexibility	355	5	0.920
Efficiency	355	7	0.958
Product Quality	355	6	0.830
Responsiveness	355	8	0.724
Over all	355	70	0.882

Source: Calculation using IBM SPSS Statistics 20.0.

4.3. Factor analysis

By using the PCA for factor analysis to examine convergent and discriminant validity, a varimax rotation method is employed. Bartlett's test and KMO are used for getting the idea that factor analysis is suitable for data. Factor analysis converts large numbers of items into smaller numbers of uncorrelated factors. There is an assumption that there should be a correlation between constructs of dimensions. PCA is shown in Tables 4, 5 and 6. The KMO and Bartlett's test of sphericity are joined with the affirmative whether the data is adequate for component examination.

The value of KMO = 1 is best for factor analysis but KMO = 0.6 is acceptable by the researchers and KM = 0.5 is poor. In any case, Hutcheson and Sofroniou (1999) clarified that (KMO = 0.7, 0.8), (KMO = 0.8 and 0.9) considered as attractive (KMO = .5 and .7) considered as unsuitable, it is concluded from above Table 4 that value of KMO for each construct is acceptable at level of 0.6. KMO = .862 for KC, KMO = 0.658 for KS, KMO = 0.789 for KSH, KMO = .947 for KA, KMO = 0.892 for DC, KMO = 0.879 for FL, KMO = 0.852 for EF, KMO = 0.780 for PQ, and KMO = 0.812 for RES, which shows that driving segment examination is justified because of the present data. The strength of the relationship among constructs is indicated by Bartlett's test and the assumed null hypothesis, according to the rule of thumb if the p value is less than 0.05, that there is a relationship among constructs and their strength.

Table 4. KMO and Bartlett's test.

Constructs	No of items	KMO Measure of Sample adequacy	Bartlett's Test of Sphericity Chi-Square	Bartlett's Test of Sphericity Significance
Knowledge Creation	5	0.862	3351	0.000
Knowledge Sharing	5	0.789	1821	0.000
Knowledge Storage	5	0.658	1400	0.000
Knowledge Application	5	0.947	5384	0.000
Decentralisation	5	0.892	2458	0.000
Flexibility	5	0.879	5167	0.000
Efficiency	7	0.852	3151	0.000
Product Quality	6	0.780	1801	0.000
Responsiveness	8	0.812	1320	0.000

Source: Calculation using SPSS Statistics 20.0.

Table 5. Eigen values and total variance explained.

Constructs	Components	Total	Initial Eigen values	
			% of variance explained	Cumulative % of variance explained
Knowledge Creation	Comp 1	3.426	67.521	67.521
Knowledge Sharing	Comp 1	2.651	64.776	64.776
Knowledge Storage	Comp 1	3.610	71.324	71.324
Knowledge Application	Comp 1	8.321	72.631	72.631
Decentralisation	Comp 1	3.931	77.532	77.532
Flexibility	Comp 1	5.832	64.250	64.250
Efficiency	Comp 1	3.226	65.522	65.522
Product Quality	Comp 1	2.451	62.770	62.770
Responsiveness	Comp 1	3.110	80.325	80.325

Source: Calculation using SPSS Statistics 20.0.

4.4. Eigen values

All components (Table 5) are the primary segments in light of the fact that the Eigen values are more prominent than 1 and utilised for further examination and understanding. This shows the Eigen values are more prominent than 1 and aggregate fluctuation clarified utilising the PCA extraction technique.

It is a rule of thumb that loading that minimum value should be greater than 0.04 and it should not be greater than 0.04 for cross-loading. For all constructs (KC, KSH, KST, KA, DC, FL, EF, PQ and RES) they are loaded with only one component with different factor loadings. So, the component matrix is fulfilling validity criteria because all factor loading values are greater than 0.04 and Eigen values are greater than 1 for convergent validity.

4.5. Factor loadings

Table 6. Component matrix.

Items	Components
<i>Knowledge Creation</i>	
Problems, failures, and doubts are discussed openly in our institution.	.842
Members are assigned to new projects and programmes, depending on their know-how and availability.	.832
Members are assessed and rewarded for developing new knowledge and for testing new ideas.	.826
At our learning groups, members can discuss their work experiences and strategies.	.764
Important issues are explored, using scenarios or simulation techniques.	.812
<i>Knowledge Sharing</i>	
There are communities of practices or learning groups to share knowledge and experiences.	.832
Organisational culture helps to encourage information flows and improve employees' communication.	.737
There are frequent, well-distributed internal reports that inform employees about the firm's progress.	.828
There are formal mechanisms that guarantee best practices to be shared in the firm.	.791
There are projects with interdisciplinary teams to share knowledge.	.825
<i>Knowledge Storage</i>	
Organisational knowledge is codified and documented in manuals or other types of devices.	.802
There are databases that allow employees to use knowledge and experiences that have previously been loaded into the databases.	.727
It is possible to access knowledge databases and documents through some kind of internal computer network.	.828
There are databases with updated information about customers.	.891
Databases are frequently updated.	.895
<i>Knowledge Application</i>	
All the employees have access to relevant information and key knowledge within the firm.	.731
There are interdisciplinary teams with autonomy to apply and integrate knowledge.	.830
Suggestions from employees, customers or suppliers are frequently incorporated into products, processes or services.	.828
Knowledge that has been created is structured in independent modules, which allow for its integration or separation to create different applications and new usages.	.801
It is quite common to use external experts with experience on a specific subject in order to solve particular problems.	.805
<i>Efficiency</i>	
My company carries a higher level of inventory.	.732
Finished goods do not cover extra warehousing space.	.837
My company bears more expenses of inventory management.	.848

(Continued)

Table 6. (Continued.)

Items	Components
My company is enjoying greater profitability comparing with last year.	.891
Employees are offered bonuses and extra rewards because of company's good performance.	.815
My company's expenses do not increase to its profits.	.867
Stakeholders are satisfied with organisational overall performance.	.832
<i>Flexibility</i>	
My company has the ability to response demand variations.	.832
Sometimes my company fulfils orders after due date.	.737
My company has the ability to accommodate volume fluctuations from supplier, and customers.	.828
My organisation always welcomes to new product innovation.	.791
My company moves planned delivery schedule in order to accommodate special orders.	.825
<i>Responsiveness</i>	
My company has a system which helps to fulfill orders in time.	.732
Sometimes production unit takes much time to produce specific items.	.837
Customers give their feedback regarding delivery of products.	.728
We have a system which helps us to quick response to customers' complaints.	.891
Our supply chain responses toward changes in customers and suppliers more efficient and quickly.	.845
We review periodically to ensure the products align with the demands of customers.	.867
When we are informed of dissatisfaction of our consumers from our products, review it and perform corrective action.	.832
We continuously measure our customer satisfaction.	.837
<i>Product Quality</i>	
My company's product has attractive looks.	.832
My company's product colour scheme is better than others.	.837
The size of product is according to customer requirement.	.728
There are low chances of damaging while in transit.	.891
The product quality is according to international standards.	.805
We deliver nutritional values which we promise.	.867
<i>Decentralisation</i>	
My company has a decentralised decision-making system.	.832
Every departmental head has the authority to make the key decision of the department.	.837
My company empowers employees to improve performance.	.732
At my company, employees are allowed to take innovative initiatives.	.837
At my company, employees have freedom to raise their voice to improve the supply chain performance.	.808

Source: Calculation using SPSS Statistics 20.0.

4.6. SEM model

Computation of degrees of freedom (Default model)

Number of distinct sample moments:	45
Number of distinct parameters to be estimated:	18
Degrees of freedom (45 - 18):	27

The path diagram is the first step in order to apply SEM using AMOS software. Variables are in circles and squares are required by AMOS software. Figure 2 shows measured and latent variables for testing research model.

Applying SEM

The estimates (in Figure 3) demonstrate with arrows the change in SCP due to a unit change in decentralisation in the presence of KM practices.

Table 7 shows that changes in decentralisation in one unit in the presence of KM practices cause the unit change in SCP, and the p-value reveals whether to reject or accept the hypothesis. In Table 5, six hypotheses are accepted and three are rejected on the bases of

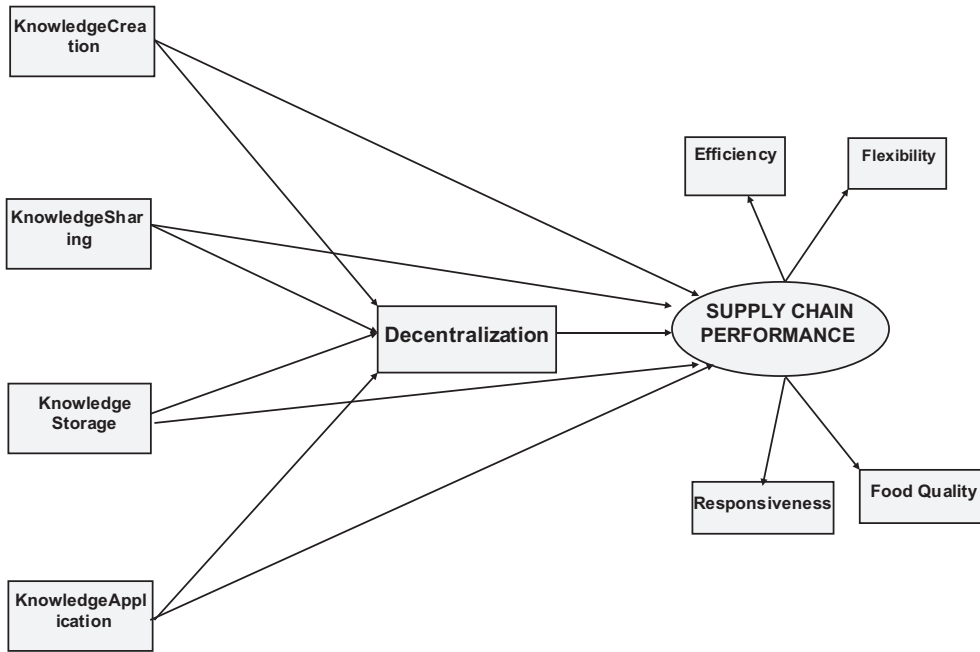


Figure 1. Proposed theoretical model. Source: Self-compiled from related literature.

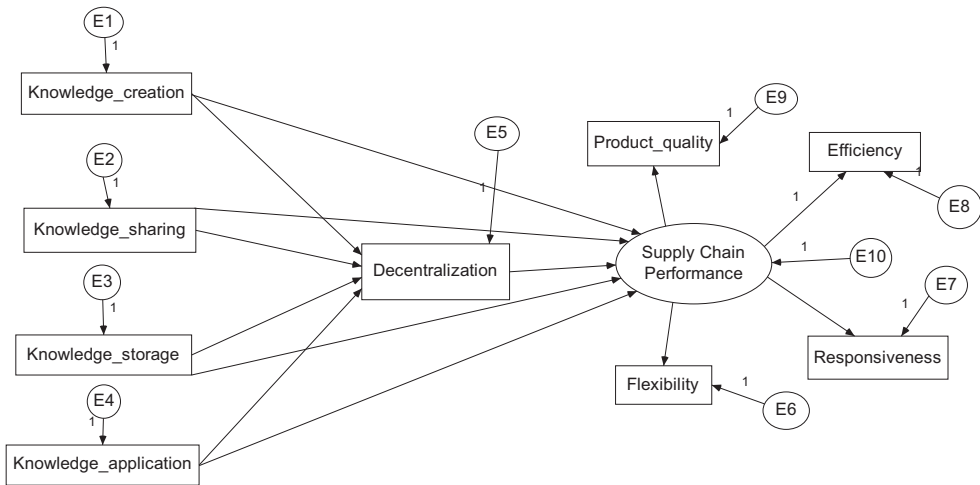


Figure 2. Path diagram. Source: An output using AMOS 16.0.

P-values at 1% significant level i.e., KM practices (knowledge application and knowledge storage) have a significant relationship with SCP and other KM practices (except knowledge creation) have a significant relationship with decentralisation. It is also analysed that decentralisation mediates the relationship between KM practices and SCP (Table 8).

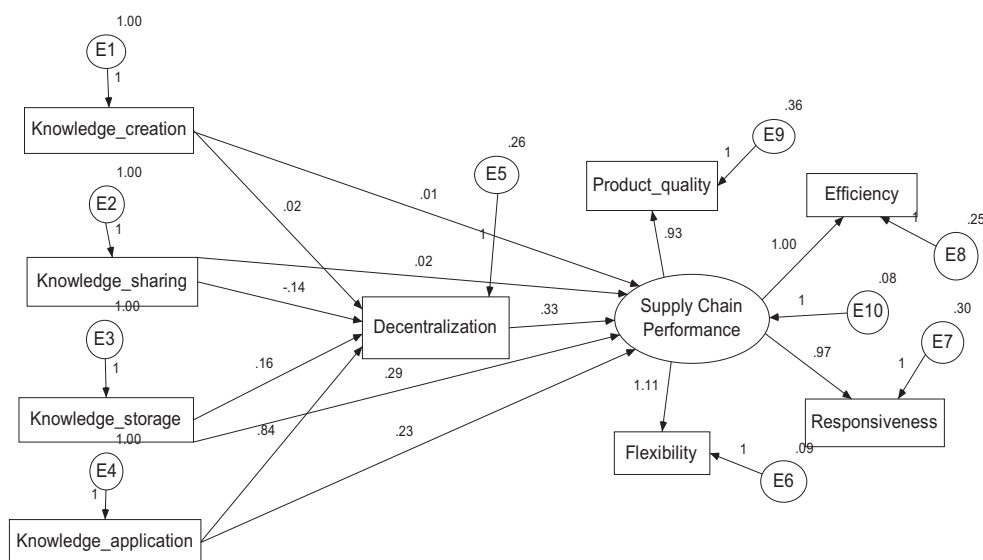


Figure 3. Recursive Simultaneous Model. Source: An output using AMOS 16.0.

Table 7. Regression weights.

		Estimate	S.E.	C.R.	P
Decentralisation	Knowledge application	.843	.027	31.143	***
Decentralisation	Knowledge storage	.162	.027	5.973	***
Decentralisation	Knowledge sharing	-.142	.027	-5.259	***
Decentralisation	Knowledge creation	.023	.027	.847	.397
Supply Chain Performance	Decentralisation	.335	.039	8.560	***
Supply Chain Performance	Knowledge creation	.012	.019	.642	.521
Supply Chain Performance	Knowledge application	.226	.038	6.017	***
Supply Chain Performance	Knowledge storage	.292	.023	12.945	***
Supply Chain Performance	Knowledge sharing	.021	.020	1.079	.281
Product quality	Supply Chain Performance	.928	.060	15.586	***
Efficiency	Supply Chain Performance	1.000	.031	8.094	***
Responsiveness	Supply Chain Performance	.966	.058	16.727	***
Flexibility	Supply Chain Performance	1.105	.050	21.937	***

Source: Calculation using SPSS Statistics 20.0.

4.7. Model fit summary

Twenty-two perimeters with 1263.410 discrepancies in Table 9 shows that the table is a good fit according to *P*-value 0.000.

5. Discussion

The findings increase researchers' understanding after analysis. The main model shows the results that decentralisation mediates the relationship between KM practices and SCP. Decentralisation mediates SCP in the presence of KM practices at $P < 1\%$, if decentralisation changes with one unit, SCP changes with 33.5%. It shows, in a fast working environment, that supply chain members prefer to make decisions on their own rather than ask their superiors, who can help them to make the right decision at right time. Ultimately the result

Table 8. Hypothesis results.

Hypothesis	Comments
There is relationship between knowledge creation and supply chain performance.	P-value (***)(0.012) Estimated value of Regression Hypothesis is rejected at 1% level of Significance See Table 7
There is relationship between knowledge sharing and supply chain performance.	P-value (***)(0.226) Estimated value of Regression Hypothesis is rejected at 1% level of Significance See Table 7
There is relationship between knowledge storage and supply chain performance.	P-value (***)(0.292) Estimated value of Regression Hypothesis is supported at 1% level of Significance See Table 7
There is relationship between knowledge application and supply chain performance.	P-value (.999)(0.021) Estimated value of Regression Hypothesis is rejected at 1% level of Significance See Table 7
Decentralisation mediates the relationship between KM practices and supply chain performance.	P-value (***)(0.335) Estimated value of Regression Hypothesis is supported at 1% level of Significance See Table 7
There is relationship between knowledge creation and decentralisation.	P-value (.035)(0.023) Estimated value of Regression Hypothesis is rejected at 1% level of Significance See Table 7
There is relationship between knowledge sharing and decentralisation.	P-value (***)(-0.142) Estimated value of Regression Hypothesis is supported at 1% level of Significance See Table 7
There is relationship between knowledge storage and decentralisation.	P-value (***)(0.162) Estimated value of Regression Hypothesis is supported at 1% level of Significance See Table 7
There is relationship between knowledge application and decentralisation.	P-value (***)(0.843) Estimated value of Regression Hypothesis is supported at 1% level of Significance See Table 7

Source: Calculation using SPSS Statistics 20.0.

Table 9. CMIN (chi-square Min).

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	22	1263.410	23	.000	54.931

Source: Calculation using AMOS 16.0.

will be better performance. But in other studies, decentralisation did not appear to be affect the SCP (Mahmood et al., 2014), however in this study, decentralisation plays an important part and positively affects SCP in the milk industry. Meanwhile knowledge creation and knowledge sharing have no relationship with SCP but knowledge storage (beta = 0.292) and knowledge application (beta = 0.021) have a relationship with SCP at 1% significance level. It demonstrated that supply chain members believe in applying stored knowledge. In a fast decision-making environment, supply chain members do not think to create new knowledge, or they do not go for new knowledge, because they think they considerable knowledge which is applicable in their field.

6. Conclusion and recommendations

The endeavor suggests that which are the factors and components of knowledge management practices have the ability to influence SCP in milk industry of Pakistan. Being a subjective exploration, it was hard to change the variables, i.e., KM practices, decentralisation, and SCP. With the assistance of a painstakingly outlined self-administrated survey, the analyst could get the obliged data and concentrate on the outcomes with the assistance of the most recent measurable devices and strategies. This examination improves commitment by giving bits of knowledge to KM practices, including knowledge creation, sharing, storage, and application, to enhance SCP. Further, by connecting these concerns to performance, this study shows the significance of KM for better performance. In addition, managers ought to see

the advantages of KM practices that can expand profitability, monetary performance, staff performance, development, work connections, and consumer loyalty. KM initiatives ought to put resources into internal and external assets utilising proper knowledge. Consequently, enhanced performance can be one of the long-term and vital advantages of satisfying KM best practices. Supply chain managers ought to appropriately change the work environment and ecological circumstances, so representatives receive, bolster, focus on and utilise KM practices in satisfying their exercises. The study by Mahmood et al. (2014) concluded that decentralisation significantly affects those who are reviewed in this study.

6.1. Suggestions and recommendations

The milk supply chain has a variable and muddled development. Supply chain individuals ought to be fast and adaptable so that the goals and desires of clients ought to be met satisfactorily. The greatest desire of a client is to get orders at the right time and of the best quality with the least cost. Thusly SCM comes into the acquirement of requests in the time needed, with the best quality and least cost. By and by, KM is required for an immaculate, or less defective, management of a variable and adaptable supply chain.

As indicated by the interested milk enterprises, the most essential component of KM is knowledge creation which has less significance in this study however, as indicated by Kanat and Atilgan (2014), knowledge creation has more noteworthy significance in clothing sector. The undertakings partaken are mindful of the circumstance that knowledge is the key to accomplishment. Aside from the creation of new knowledge, the data and encounters of qualified representatives (who are the most significant substances of the ventures) ought to be cleared up, composed and kept. At the end of the day, it is imperative to elucidate and discharge worker encounters, verbal tenets and business systems for the ventures. In this manner, worker encounters, verbal standards and business routines for the endeavours ought to be recorded and kept in touch with making these issues available and usable. The discoveries of the present study demonstrate that they offer significance to this component and utilise it effectively, yet in the milk business, knowledge creation could not show sway in SCP. Since it is difficult to shroud non-existing knowledge, the creation of it is substantially more critical than its storage and exchange.

6.2. Limitations and further research directions

The examination is just directed on departmental perspectives like deals and appropriation, generation and obtainment. The questionnaire can be created for supply chain accomplices like suppliers and other organisations' management and to investigate how SCP can be enhanced with the commitment of these variables.

Further studies can likewise incorporate the further build of knowledge sharing, i.e., trust, eagerness to share, ingestion limit as taken by (Khan, Rehman, & Dost, 2012) in their study. Though procured attributes may incorporate the builds of instructive history, abilities, and conjugal status. These measurements can be concentrated on to beg the SCP.

The study has been centred around one measurement of knowledge sharing. Yet there are numerous other builds, i.e., transferring open knowledge, sharing backhanded knowledge, utilising open knowledge.

Keeping in view the measure of the populace, the specimen size can be of inquiry for any examination. The study is lead in the centre point of the provinces of Punjab, i.e., Lahore, Faisalabad, Gujranwala, Sialkot. While different urban areas, particularly remote ranges, are excluded in the examination. Further specialists can incorporate the members of fluctuated urban areas to make more exact discoveries and suggestions.

The study is directed in a set up with no impedance with the respondent for a close-ended questionnaire. Meeting systems can likewise use this to further improve the legitimacy and unwavering quality of the exploration. The same number of concealed conclusions and remarks can just be extricated by testing the issue through immediate and roundabout inquiries of meetings.

Disclosure statement

No potential conflict of interest was reported by the authors.

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