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Research Article

Influence of Soft Total Quality Management Practices and University Performance

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Abstract

This study aims to assess the influence of soft total quality management practices on university performance. In addition to that, it also assesses the mediating role of data analytics knowledge between soft quality management practices and university performance. The data was collected from the middle and lower middle management of the both public and private universities of Pakistan and 219 responses were found suitable for analysis. The data was analyze using partial least square-structural equation modeling (PLS-SEM). The results of the analysis showed that out of three dimensions of soft total quality management; human resource and customer focus found to be significant while top management appears as insignificant. Moreover, the data analytics knowledge has a significant influence on university performance. In the mediation analysis, data analytics knowledge significantly mediates the relationship between top management, human resource, customer focus and university performance. The results suggested that in order to enhance the university performance, management need to recognize the importance of soft total quality management practices through the lens of data analytics knowledge. It is worth to allocate resources to develop strong soft quality management practices to achieve overall quality management system and superior performance.

Keywords

Soft total quality management, Data analytics knowledge, Organizational performance, Higher education institutions

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Introduction

Higher education institutions (HEIs) face various challenges and barriers approaching from technological advancements, lack of capable human resource, rankings, accreditations, intense competition and performance pressure (Jermsittiparsert & Sommanawat, 2019; Mahmood et al., 2020) along with spread of noble coronavirus (COVID-19) that creates severe problems for higher education institutions by switching the entire learning process from on campus to online campus that generates questions for quality of learning and adequate infrastructure to cope the requirements of online learning (Alotaibi & Kumar, 2019; Kandri, 2020; Shehzadi, Nisar et al., 2020). Seeing these fluctuating settings of world, it is imperative to maintain quality of learning in higher education institutions for a country like Pakistan, who is already lack behind the world in rankings and recently times higher education ranking has shown that only one Pakistani university is among the top five hundred universities of the world (THE, 2020; Mehmood, Chong et al., 2018). Importance of higher education cannot be denied as it is considered the most important aspect not only in the building of nation but also for the economy of any country as it produces the most skilled and trained people in any country. In Pakistan, the importance of higher education is also a vital but still there are deficiencies in forming and upholding the international standard of higher education due to non-implementation of quality, which results in lower performance of universities. In addition, financial perspectives are very essential and important factor in university performance as it is vital for the contribution in the university performance and HEC is now facing budget cuts that will affect the overall operational activity of the universities. HEC is now trying to cope up all the possible constraints from the budget received in the fiscal year (FY) 2019-2020. In fiscal year (FY) 2018-2019, higher education commission of Pakistan is allocated Rs. 82.504 billion but only Rs. 65 billion is received and remaining Rs. 17.504 billion (21.22%) is still pending (Haq, 2019). Despite all the situation, it is necessary that higher education institutions need to meet the expectation of the stakeholders while producing skillful people that contribute in the national economy (Yaakub & Samsudin, 2019; Ajmal & Kumar, 2020; Kumar, 2020), and enhancement in performance has forced them to adopt various plans and policies such as implementation of TQM practices that are already successfully used in other service sectors (Sciarelli, Gheith et al., 2020). Data analytics knowledge is indispensable to higher education institutions to enhance the capabilities in problem solving, help researchers, learning platform to students and enrichment of learning environment (Chaurasia & Rosin, 2017; Aguilar, 2018; Huda, Maseleno et al., 2018; Benyo & Kumar, 2020). The relationship between total quality management practices, data analytics knowledge and performance have been studied (Zu, 2009; Ghasemaghaei, Ebrahimi et al. 2018; Ghasemaghaei 2018), however, fewer studies are addressing the higher education, especially in Pakistan. Previously, it has been found that TQM studied as single aspect (Sadikoglu & Zehir, 2010) and some researchers have concluded the need to use TQM as multidimensional i.e., soft TQM practices (Zeng et al., 2017; Ershadi et al., 2019). Moreover, Gadenne and Sharma, (2009) have found that the TQM studied as soft TQM practices are more suitable for the successful implementation and enhanced performance. Keeping the above discussion, this study also used soft TQM practices to understand the relationship between TQM practices, data analytics knowledge and universities performance in the higher education sector of Pakistan. Moreover, the study contributes in creating new set of TQM practices and its impact on the data analytics knowledge and university performance. In addition, the framework for TQM, data analytics knowledge and university performance has been integrated. Lastly, the study will help higher education commission of Pakistan (HEC), quality department of the universities and policy makers of the sector for the improvement in the quality of learning and performance of the higher education sector of Pakistan.

Theoretical Background

Various scholars have identified soft or infrastructure TQM practices (Lewis, Pun et. al, 2006; Zu, 2009). Soft total quality management practices are behavioral (Zeng, Phan et al., 2015; Rahman & Bullock 2005; Flynn, Schroeder et al., 1995; Vouzas & Psychogios, 2007; Youssef & Zairi, 1995; Pike & Barnes, 1996; Dale, 1999; Yang, 2005; Dow, Samson et al., 1999). The classification is supported by resource-based view (RBV) theory by (Penrose, 1959; Barnery, 1991) and socio-technical systems (STS) theory by Manz and Stewart (1997) that explained the human aspect in an

organization. Based on the previous literature that identifies the soft quality management practices, detailed is shown in Table 1.

Table 1

Variable	Supporting References in HE field
Soft QM practices	
Top Management	Pearson, McCahon et al. (1995), Owlia and Aspinwall (1997), Kanji and Tambi (1999), Sila and Ebrahimpour (2002), Aziz, Mullins et al. (2005), Drew (2006), Spendlove (2007), McGoey (2007), (Venkartaman, 2007), Narne and Sreenivas (2017)
Human Resources	Quraishi, Hussain et al. (2010), Chao, Hsu et al. (2015), Allui and Sahni (2016), (Mallillin, 2017)
Customer Focus	Sirvanci (2004), Sakthivel, Rajendran et al. (2005), Eagle and Brennan (2007), Samad and Thiyagarajan (2015), Sahney (2016), Singal, Garg et al. (2016), Saha (2016), Ahmed and Ali (2016), Jager and Jan (2019), El Talla, Al Shobaki et al. (2019), Teeroovengadum, Nunkoo et al. (2019)

Soft Total Quality Management Practices

Top management is the most important aspect in management and in TQM; it is being identified as the vital construct for the implementation and organizational performance is attainable as top management support and intrusion is quite helpful in execution of the designs, concepts and ideas of TQM in organization (Zubair, 2013; Dale, 1994; Berry;1991). Kanji and Tambi (1999) has explained that in order to get maximum results and excellence from higher education institutions, top management guidance is vital and ignorance can cause delay in directions and decisions (Narne & Sreenivas, 2017) and McGoey (2007) also found that it is only top management, that guides about the vision and process for higher education institutes. Though, Pearson, McCahon et al. (1995) have pointed the role of top management from autorotative to facilitators as increase the morale of the staff can produce the maxim performance (Spendlove, 2007; Aziz, Mullins et al., 2005). Yasin, Batool and Ajmal (2020) have found that top management is a big crisis in Pakistan, as top management is responsible for providing the quality of education and performance in a university. Since 2014, HEC is not publishing report on the top management crisis and vice chancellor is now just a subordinate to HEC or to the chief minister of the province. These set ups are really hurting the quality of education and university performance (Chaudhry, 2018). Thus, it shows the importance of top management in the attainment of university performance. Allui and Sahni (2016) elaborated that the need of well managed human resource in higher education institutes to boost up the performance and Mallillin (2017) have elaborated the need to solve the problems of human resource in higher education institutes to enhance performance. In addition, Chao, Hsu et al. (2015); Quraishi, Hussain et al. (2010) faculty satisfaction is also vital to achieve quality and performance from the higher education institutes. Khan and Jabeen (2019) have found that human resource as competent staff is a problem in Pakistani universities. In addition, due to non-implementation of merit, mostly staff is not ready to not ready to stay, they move on, it creates faculty issues in university (Khosa, 2018). Moreover, Ahmad and Ghani (2018) found that human resource office on any university must provide solution to the staff, as it is seen, human resource office is creating more problems rather than facilitating. Therefore, the existence of competent faculty and role of human resource office is vital for the university performance. Importance of customer focus cannot be neglected in the higher education institutes as their customers both internal and external has an importance on the overall quality and performance and Teeroovengadum, Nunkoo et al. (2019) have found that student satisfaction is vital for quality and performance. Awais, Rehman, Ishfaq and Naseem (2019) have found some opinions of dissatisfaction of students and explained that these opinions are both useful for private and public sector universities. They have found that no doubt quality of teaching and learning is the basis of student's satisfaction and university performance but now days some other factors are also involved in satisfaction of students such as social life of students. Therefore, it is important for the universities to provide quality education so that the performance of the universities is increased as

well as the improvement in the performance of students as well.

Data Analytics Knowledge

As world is becoming global community in this era of digitization, different problems and needs arises. Although, various techniques and efforts are consumed but effective use of data helped in changing the overall process for the accomplishment of performance. In addition, this huge amount of data terms as big data has created different issues and hurdlers due to its complex and unstructured nature (Akter, Wamba, Gunasekaran, Dubey, & Childe, 2016; Richards & Chong, 2017; Strang & Sun, 2017). Big data termed as "high-volume, high-velocity and high variety information assets that demand cost effective, innovation forms of information processing for enhanced insights, decision making and process automation" (Gartner IT Glossary, 2019). However, organizations much worried about the large collection of data along with the complexity and unstructured nature of data (Zhao, Fan, & Hu, 2014; Kaisler, Armour, Espinosa, & Money, 2013; Micthell, 2014; McAfee & Brynjolfsson, 2012). Therefore, to cater these above issues faced by the organizations, data analytics knowledge technique introduced for effective use of big data in a more reliable and suitable mode to help the management for making efficient decision for the more productive performance. Data analytics knowledge is a revolution rather than evolution that help the organizations to increase the performance (Sathi, 2014). In addition, data analytics knowledge assists in retrieving the needs of customers and to measure the satisfaction of customers to improve the performance of organizations (Zhao, Xu et al., 2019; Xu, Frankwick et al., 2016). Data analytics knowledge not only providing different solutions to the organizations in general but also help the higher education institutions by giving adequate and exact information that create opportunities for all the stakeholders along with increasement in the performance of higher education institutes (Daniel, 2019) and students also get benefits by e-learning platforms that improve the learning ability and capability with enhancement seen in the productivity of students (Cantabella, Martínez-España et al., 2019). In the crunch times of pandemic, it is earlier explained by Aguilar (2018) that big data analytics provided adequate techniques for both students and teachers to continue uninterrupted work for the improvement of productivity and performance and further explained by Huda, Maseleno et al. (2018) that data analytics knowledge helped in digging the new techniques, methods to enhance the performance of the higher education institutes. Though, Chaurasia and Rosin (2017) have found that data analytics knowledge gaining importance for the enhancement of performance by capturing different opportunities and proved inevitable in the time of COVID-19 pandemic to cope the complex and unstructured data to get maxim benefit from it (Ting, Carin et al. 2020) and it is found by Adnan and Anwar (2020) that current era required an online learning platform for the students and data analytics knowledge help in fetching the exact data that benefits for the students to improve their productivity and performance.

University Performance

Effective implementation of TQM practices can help any organization in achieving the performance. As explained by Jermsittiparsert and Sommanawat (2019) that higher education sector performance depends upon the TQM practices adoption by the universities. Antunes, Mucharreira et al. (2018) have found that implementation of TQM practices results in performance of the universities. TQM practices also found helpful in satisfaction of both internal and external stakeholders (Psoman & Antony, 2017). Performance is measured by different aspects and in higher education sector, it is measured by balance scorecard approach i.e. financial and non-financial aspects (Mohammed, Taib et al., 2016), the student aspect (Bedggood & Donovan, 2012), quality culture and staff (Alnaji, Ridha et al., 2014), faculty and administration development (Mashagba, 2014), employers and employee motivation (Ilies, Osoian et al.,2010), effective leadership (Dobija, Górska et al., 2019), faculty development (Amin, Aldakhil et al., 2017). Moreover, Shahzadi and Ahmad (2011) have also measured the performance by environment and less tension, financial, services and research (Asif &Searcy, 2014), satisfaction of all stakeholders and financial aspects (Agarwal et al., 2003), teaching capacity, research culture, graduate employability (Algarni & Talib, 2014), efficient process and improvements (Crioclshank,2003), student satisfaction (Abdullah 2005, 2006), operations capacity (Ball & Wilkinson, 1994), knowledge creation, satisfaction of all stakeholders, efficient operations (Asif,

2015), faculty satisfaction (Ma & Todorovic, 2011). According to the above explanations, the current study adapted and modified the university performance measurement scale by asking the respondents about the views on overall performance, retention, funding, community services, research grants and faculty / student ratio. Scholars have discussed the different university performance indicators various studies and Table 2 presents the summary of various studies.

Table 2
Review of Performance Indicators in Higher education

Author(s)	Performance Indicators
Asif and Searcy (2014)	Financial, services and research
Agarwal et al. (2003)	Satisfaction of all stakeholders and financial aspects
Algarni and Talib (2014)	Teaching capacity, research culture, graduate employability
Cruickshank (2003)	Efficient process and improvements for employee of higher education through TQM
Abdullah (2005, 2006)	Service quality related to student satisfaction
Ball and Wilkinson (1994)	Operations capacity and classifications of both internal and external
Asif (2015)	Knowledge creation, satisfaction of all stakeholders, efficient operations.
Bratti, McKnight, Naylor and Smith (2004)	Retention, participation and research
Kuster and Aviles-Valenzuela (2010)	Research and employability of students
Bedggood and Donovan (2012)	Student satisfaction
Ma and Todorovic (2011)	Faculty satisfaction at workplace

Research Hypotheses and Theoretical Framework

It has found that there is relationship between soft total quality management practices and performance (Flynn et al., 1995; Kaynak, 2003; Rahman & Bullock, 2005). In addition, it is also found that soft total quality management practices facilitate in attaining performance (Zu, 2009). Sciarelli, Gheith et al. (2020) have studied the relationship between soft total quality management practices and university performance of higher education context but there is no other study found in the higher education of Pakistan. Following hypothesis are established for the study.

Soft Total Quality Management Practices (STQM) and University Performance (UP)

Soft total quality management aspects are behavioral aspects such as top management, human resource, customer focus, teamwork, loyalty, and contact with suppliers and professional associations (Wikinson, 1992; Rahman, 2001, 2004). If the soft total quality management aspects used in effective manner, it will increase the quality in universities and help in the enhancement of performance (Samson & Terziovski, 1999). Moreover, researchers have identified the soft total quality management aspects, which have a positive and significant impact on university performance (Rahman &Bullock 2005; Yusof & Aspinwall 1999; Abdullah, Uli et al., 2009). Flynn, Schroeder et al. (1995) have examined the relationship of dimensions of total quality management and performance and found that human resource is related to performance. Powell (1995) has also found that employee's relations are critical to soft total quality management practices and plays an important role in the performance of a university. Adam, Corbett et al. (1997) examined the relationship between various quality management aspects and found that employee satisfaction has significant forecast for the performance. Terziovski, Power et al. (2003) found that people management has a significant and positive relationship with the universities performance. Powell (1995) have examined the different quality management aspects and performance. He has also found that leadership is critical to soft total quality management practices and plays an important role in the performance of a university. Adam, Corbett et al. (1997) examined the relationship between various quality management aspects and performance and found that management involvement has significant forecast for the

performance. It is found that top management has positively and significant effect on the university performance (Ahire & O'shaughnessy 1998; Dow, Samson et al., 1999; Phan, Abdallah et al., 2011). Flynn, Schroeder et al. (1995) have found that customer focus is related to performance. Flynn, Schroeder et al. (1995) also found that customer focus has significant forecast for the performance. Terziovski, Power et al. (2003) have found that customer focus has a significant and positive relationship with the university performance. Dow, Elmslie et al. (1999) have found that workforce commitment has a significant and positive relationship with university performance. The above arguments led to following hypothesis to be proposed. Hypothesis 1 (H1): Soft Total Quality Management practices (STQM) have significant relationship with university performance (UP). H1 could be further broken down into the following hypothesis to understand the relative importance of each soft total quality management practices in relation with universities performance.

(H_{1a}): Top management has significant relationship with the university performance.
(H_{1b}): Human resource has significant relationship with the university performance.
(H_{1c}): Customer focus has significant relationship with the university performance.

This era is called the data era and organizations need to invest more heavily in data analytics knowledge to make substantial improvement and advancement. The reason is more unstructured data that need to be analyzed for the use of the organizations (Mikalef, Boura et al., 2019). Data analytics knowledge is now considered both important in academia and in industry as both are concerned for the better performance and researchers are using it for getting greater help in performance. Moreover, practitioners have also associated for the innovation, flexibility and productivity that enhance the performance of any organization (Mikalef, Krogstie et al., 2020). In addition, Yasmin, Tatoglu et al. (2020); Sena, Bhaumik et al. (2019) have explained that data analytics knowledge is now considered as next revolution in the management as it helped in decision making process that enhanced the performance (Kim, Dibrell et al., 2021). According to Ghasemaghaei, Ebrahimi et al. (2018), data analytics knowledge helps the organizations to improve the performance by help of different tools, techniques, predictive analysis and different processes and Lavelle et al. (2013) have also explained highest performing organization get help from data analytics knowledge to enhance and achieve the performance. Data analytics knowledge has gained importance not only in other organizations but also in the universities for the improved and better performance (Dubey et al.,2019) and universities are getting help from data analytics knowledge to improve operations and decisions for better performance (Strausser,2015). According to Kibe, Kwanya et al. (2020) data analytics knowledge has created more ways to improve the internal operations from student satisfaction to employee empowerment and to increase the capabilities of the universities to enhance performance. The above discussion and review of literature identified data analytics knowledge as an important factor that enhances university performance. The following hypothesis has been developed:

H2: Data analytics knowledge (DAK) significantly influence university performance.

It is due to adoption of data analytics knowledge, universities are able to compete themselves with each other by having adequate information and exact data that helped in attainment of performance of the universities. It is elaborated by Marín-Marín et al., (2019) that universities data in shape of both structured and instructed data of all relevant stakeholders and with data analytics knowledge, the management of the universities can extract the relevant information needed for the improvement in the process and performance. Moreover, Kibe, Kwanya et al. (2020) emphasized that it is now imperative for the universities to engage in data analytics knowledge to cater the needs of the future and to make decisions that based on the relevant facts and figures that aid in the increased in the performance of the universities. In the presence of the data analytics knowledge, universities tend to improve their processes through data drive decision. These data driven decisions are more powerful and concrete as they are not the biased opinion of someone but a result of sophisticated analytics techniques. Mangla et al. (2020) big data analytics as a mediator and found that adoption of big data analytics has a positive influence on project performance. In addition, it has been documented that big data analytics supports the decisions and help companies to achieve higher level of performance. In context of the current research, data analytics knowledge has been proposed to have a significant mediating influence between top management, human resources, customer focus and university

performance. The ability of big data analytics in supporting decisions based on data is a source for universities to focus on their incompetencies and always go for informed decisions. On the basis of above discussion and reviewed literature, the following hypothesis has been proposed.

H_{3a}: Data analytics knowledge mediates the relationship between top management and university performance.
H_{3b}: Data analytics knowledge also mediates between human resources and university performance.
H_{3c}: Data analytics knowledge appears to be significant mediating between customer focus and university performance

Soft total quality management practices are behavioral aspects of an organization. These are also known as social systems of an organization (Zu, 2009). Soft total quality management practices are related to social, behavioral aspects of quality management practices. It is found that soft total quality management practices were not significantly related to university performance (Motwani, Mahmoud, & Rice, 1994; Adam, Corbett, Flores, Harrison, Lee, Rho, & Westbrook, 1997). Therefore, for clarity in ambiguous relationship between soft quality management practices and universities performance, data analytics knowledge will mediate the relationship as shown in Figure 1.

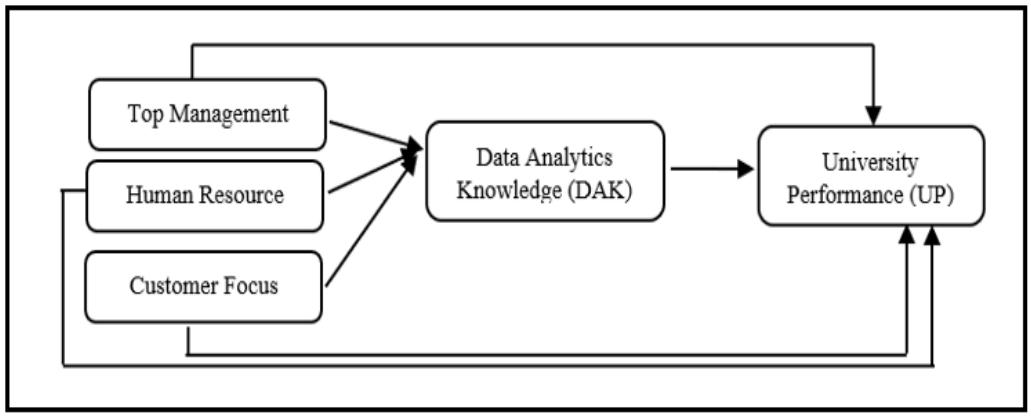


Figure1 Research Framework

Data and Methodology

Data and Measures

The data was collected using questionnaire using seven-point Likert scale from relevant literature (Saunders et al., 2009).

Table 3
Response Rate

Response	Frequency/Rate
No. of distributed questionnaires	329
Returned questionnaires	240
Returned and usable questionnaires	219
Returned and excluded questionnaires	21
Questionnaires not returned	89
Response Rate	73%
Valid Response Rate	67%

Soft total quality management practices i.e. top management was measured using 05 items, human resource was measured using 05 items and customer focus was measured using 04 items

adapted from (Mohammed, Taib et al., 2016). Moreover, data analytics knowledge was measured using 10 items adapted from (Ghasemaghaei, Ebrahimi, et al., 2018) and university performance was measured using 12 items adapted from (Caruana et al., 1998 & 1999; Abubakar, Hilman et al. 2018). According to Sekaran (2005), face validity is use to know that whether the contents is measuring the construct or not able to help in measurement of construct and the for the current study, five expert of research methods to access the fit of all the items. Three are from Malaysia and two are from Pakistan. The items of the questionnaire reported in Appendix. The questionnaire was sent through email to all the top, middle and lower middle management of the universities. The result of the questionnaire sent and received are shown in the Table 3.

Data Analysis

Descriptive analysis was conducted to see the profile of the respondents. It has been found that 67.58% respondents belong to public sector institutes and 32.42% belong to private sector institute. There were 84.47% male and 15.53% female respondents. Moreover, among the respondents 10.05% were Registrar, 22.83% were Deputy Registrar, 39.73% were Director QEC, 22.37% were Deputy Director QEC and 5.02% were Director ORIC. Majority of the respondents (86.76%) have a PhD degree as highest qualification while 13.24% were M.Phil./MS degree holders. This shows a well-diversified and representative sample. The collected data was also assessed for normality and multicollinearity, the data meets the standards of normality and there is not issue of multicollinearity. After ensuring the data meets the basic preliminary assumptions. The data analysis was conducted by following a two-step approach (measurement model and structural model) method as proposed by Henseler, Ringle and Sinkovics (2009) as adopted in Arshad and Ibrahim (2019). In first step, the reliability and validity of the focal constructs were assessed using measurement model and in second step, hypotheses were tested using structural model. Structural equation modelling (SEM) technique was used with the help of partial least squares (PLS) with Smart PLS 3.0. The following section presents measurement model and structural model.

Measurement Model

In measurement model the reliability and validity of the focal constructs was assessed.

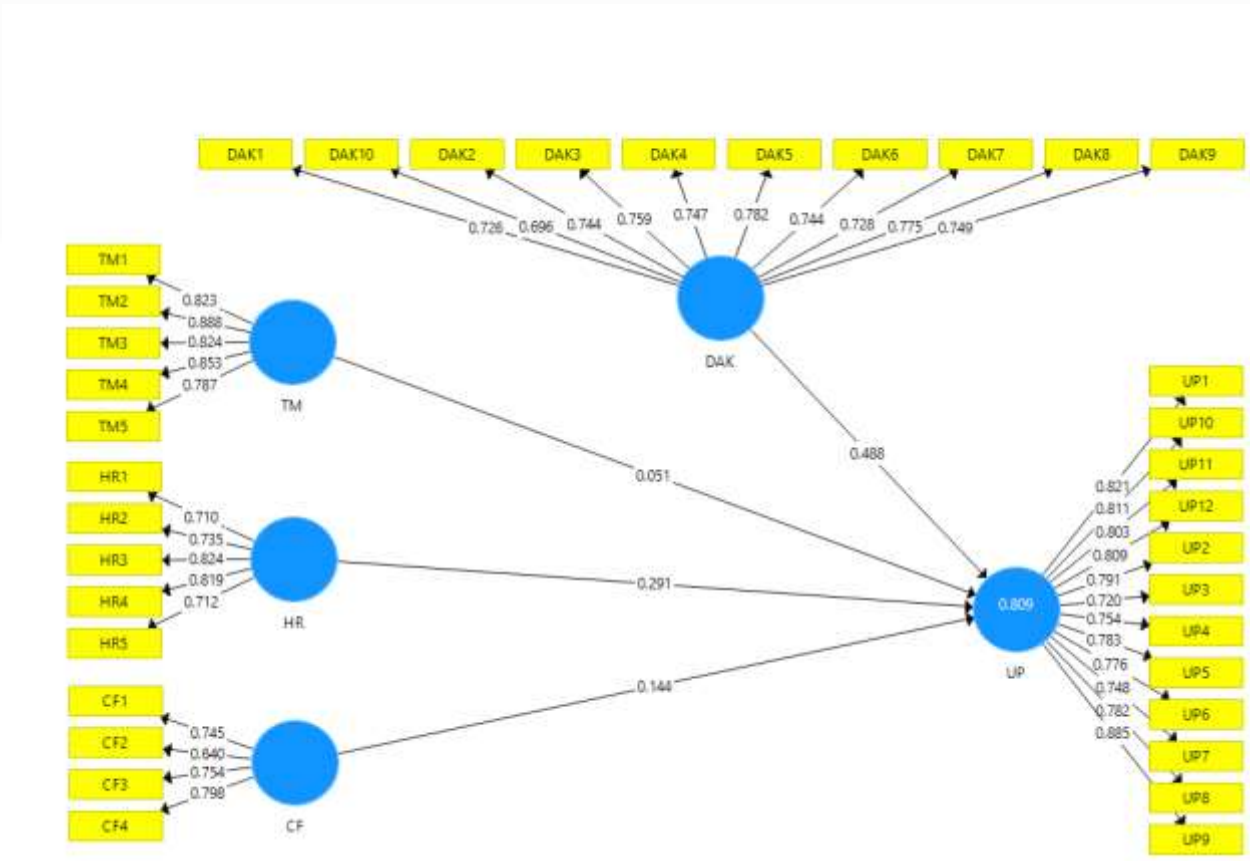


Figure 2 Measurement Model

Confirmatory factor analysis is used to assess the items of the constructs and items with lower factor loadings were removed to achieve the acceptable threshold of average variance extracted (AVE). Construct validity is assumed when the value of composite reliability is 0.70 or above. In addition, constructs will be assumed valid when the value of AVE is 0.50 or above as per suggestions of Fornell and Larcker (1981). In this study, both construct and composite reliabilities were established based on Fornell and Larcker (1981) criterion. In order to assess the measurement model, the literature suggests considering loading on three indicators, namely average variance extracted (AVE), composite reliability (CR) and convergent validity (CV). CV ensures whether the items of measurement represent the one and same underlying construct. As per criterion suggested by Chin, Gopal and Salisbury (1997) and Gholami, Sulaiman, Ramayah and Molla (2013), the loadings of the indicators should be above 0.6. The value of AVE should be above 0.5 and CR should be above 0.7. The fulfilment of these criteria assures the fitness of the measurement model. As indicated in Table 4 and Figure 2 all the values were above the recommended values and ensured the value of CV is acceptable.

Table 4
Measurement Model

Constructs	Items	Loadings	AVE	CR
Top Management	TM1	0.823		
TM2	0.888			
TM3	0.824	0.699	0.892	
TM4	0.853			
TM5	0.787			
Customer Focus	CF1	0.745		
CF2	0.640			
CF3	0.754	0.543	0.717	
CF4	0.798			
Human Resource	HR1	0.710		
HR2	0.735			
HR3	0.824	0.580	0.817	
HR4	0.819			
HR5	0.712			
Data Analytics	DAK1	0.726		
Knowledge	DAK2	0.744		
DAK3	0.759			
DAK4	0.747			
DAK5	0.782	0.556	0.911	
DAK6	0.744			
DAK7	0.728			
DAK8	0.775			
DAK9	0.749			
DAK10	0.696			
University	UP1	0.821		
Performance	UP2	0.791		
UP3	0.720			
UP4	0.754			
UP5	0.783	0.626	0.945	
UP6	0.776			
UP7	0.748			
UP8	0.782			
UP9	0.885			
UP10	0.811			
UP11	0.803			
	UP12	0.809		

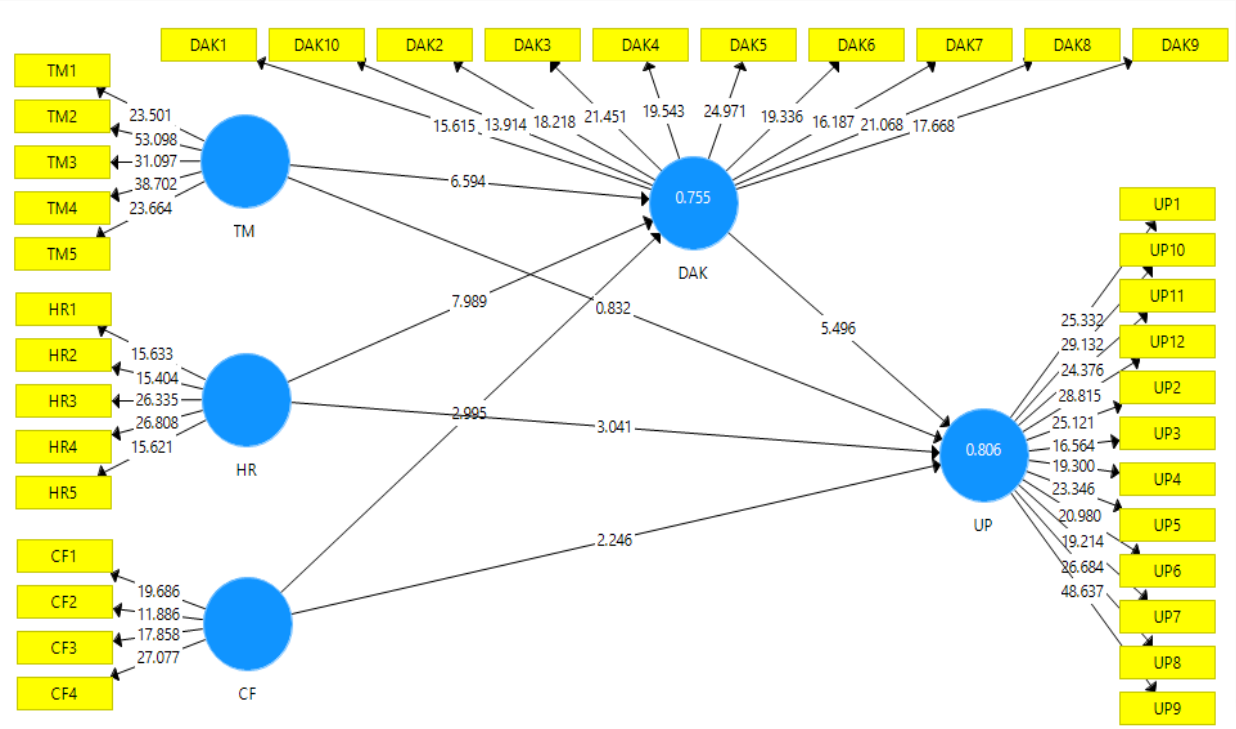
In the next step of the analysis, the analysis for the discriminant validity (DV) was done to ensure that the construct in the models differs from each other. The value of square root of AVE was

compared with correlation among the constructs. The cases where the value of square root of AVE is greater than correlation value in row and column confirmed that the measures are discriminant. In Table 5, the values of square roots of AVE in the rows and columns were higher than the correlations, showing that constructs are discriminant.

Table 5
Discriminant Validity

	CF	DAK	HR	TM	UP
CF	0.737				
DAK	0.697	0.745			
HR	0.695	0.824	0.762		
TM	0.679	0.785	0.750	0.836	
UP	0.722	0.869	0.832	0.751	0.791

TM= Top Management, HR= Human Resource, CF= Customer Focus, DAK= Data Analytics Knowledge and UP= University Performance



The results of measurement model ensure that data holds sufficient level of reliability and validity and can be further used for hypothesis testing.

Figure 3 Structural Model

Structural Model

After ensuring the reliability and validity of the collected data. The structural model was run to generate findings on the proposed hypothesized relationships using bootstrapping of 5000. The results of the analysis reflect that top management does not have any significant relationship with university performance (H_{1a}: β=0.051, p > 0.05) and failed to support H_{1a}. On the other hand, human resource has a significant relationship with university performance (H_{1b}: β=0.290, p<0.05). Similarly, data provide support for H_{1c}, where customer focus has a significant relationship with university performance (H_{1c}: β=0.142, p<0.05). In hypothesis 2, it has been proposed that data analytics knowledge has a significant relationship with university performance (H_2: β =0.489, p< 0.05) as presented in Table 6.

Table 6
Hypothesis Testing

Hypotheses	Relationship	β	t-value	p	Decision
H_{1a}	TM → UP	0.051	0.832	0.406	Not Supported
H_{1b}	HR → UP	0.290	3.041	0.002	Supported
H_{1c}	CF UP	0.142	2.246	0.025	Supported
H_2	DAK → UP	0.489	5.496	0.000	Supported
H_{3a}	TM → DAK → UP	0.163	4.228	0.000	Supported
H_{3b}	HR → DAK → UP	0.234	4.522	0.000	Supported
H_{3c}	CF → DAK → UP	0.067	2.678	0.007	Supported

TM= Top Management, HR= Human Resource, CF= Customer Focus, DAK= Data Analytics Knowledge and UP= University Performance

In addition, this research proposed that data analytics knowledge mediates the relationship between soft total quality management (top management, human resource & customer focus) and university performance. The results of the analysis showed that data analytics knowledge mediates the relationship between top management and university performance (H_{3a}: β=0.163, p<0.01) and supported H_{3a}. Data analytics knowledge also mediates between human resources and university performance (H_{3b}: β=0.234, p<0.01) and provide support for the proposed hypothesis 2a. Moreover, data analytics knowledge appears to be significant mediating between customer focus and university performance (H_{3c}: β=0.067, p<0.01). The results of the mediation analysis overall show that data analytics knowledge is a significant mediator between soft quality management and university performance as shown in Table 5 and Figure 3. Hair, Ringle, and Sarstedt (2013) recommended that Q^2 should be calculated. Q^2 can effectively be used as a criterion for predictive relevance (Stone, 1974; Geisser, 1975; Fornell & Cha 1994; Chin 2010). Based on blindfolding procedure, Q^2 evaluates the predictive validity of a large complex model using PLS. While estimating parameters for a model under blindfolding procedure, this technique omits data for a given block of indicators and then predicts the omitted part based on the calculated parameters (Hair et al., 2013). As the Q^2 value of 0.497 for university performance is larger than 0 as per criterion given by Fornell and Larcker (1981), the model can be considered to have sufficient predictive power. In PLS the most frequently used model's fitness criteria given are Standardized Root Mean Square Residual (SRMR) and Normed Fit Index (NFI). The value of SRMR for the current model is 0.062 and it is within acceptable range as suggested by Hu and Bentler (1999). According to Hu and Bentler (1999), a value less than 0.08 is generally considered as a good fit. Moreover, the value of NFI is 0.736 which is also within acceptable range and indicates the model achieved a good fit.

Discussion and Conclusion

In studies related to university performance a lot of emphasize has been given to the total quality management practices. In particular, soft total quality management practices are highlighted by Yasin, Batool and Ajmal (2020), Chaudhry (2018), Mallillin (2017) and Khan and Jabeen (2019). The current research also proposed significant relationship between soft total quality management practices and university performance. In addition, current research proposed that data analytics knowledge as a significant factor that mediates the relationship between soft total quality management practices and university performance. Because data driven decisions tend to have significant influence on the performance and improve efficiency. In the first hypothesis, among the dimensions of soft total quality management; top management does not have significant influence on university performance while human resource and customer focus tend to have significant relationship with university performance. In previous studies top management is considered as most important factor that derive higher performance (Narne & Sreenivas, 2017; McGoey (2007). Moreover, Al-Subari, Ruslan and Zabri (2020) highlighted that top management support is an important factor in determining university performance. While the results of current research contradict with previous studies in the context where top management appears as significant factor while in context of current research top management appears as an insignificant factor in university performance. In context of Pakistan, there is some crises which are not reported by HEC Pakistan, where vice chancellor who is the top hierarchy of university seems as subordinate to chief minister of the province. This problem appears as barrier on authority of vice chancellors

to make independent decision for the betterment of the university. As a consequence, quality of education and university performance suffers a lot as highlighted by Chaudhry (2018). In addition, it was proposed that human resource has a significant relationship with university performance. The results are aligned with previous research where Kumar (2021), Mallillin (2017), Khan and Jabeen (2019), (Khosa, 2018) and Ahmad and Ghani (2018), Izvercian, Radu, Ivascu and Ardelean (2014); Doleh (2012); Shahraki, Paghaleh and Zarei (2011) also found a positive and significant relationship with university performance. Human resource is contributing heavily in the performance of the university and competent and skillful human resource can create wonder not only in the betterment of students but also in the performance. Moreover, it is also stated that human resource is helpful in maintaining quality research and teaching in universities. In context of Pakistan and especially university setting human resource are the main source that derive performance of the university. Their research and teaching capabilities as important in determining university ranking in national and international context and also attract students. The hypothesis proposed that customer focus has a significant relationship with university performance. The results are in line with previous studies of Yala (2018), Chiguvi (2016), Jager and Jan (2019) and Nunkoo et. al (2019). Customer focus should be important component for the university performance and in Pakistan, it has been seen that university customers i.e., students are not the priority of the university. There has been a neglected part and university management is not focusing on the student's prosperity. Moreover, customer focus is never the main focus of the university and it ultimately did not any relation with the performance. Thus, the above discussion clearly shows that there is insignificant relationship between customer focus and university performance. Moreover, in this research data analytics knowledge has significant influence on university performance. These results are in line with earlier research where data analytics knowledge is act as significant factor to transform talent more effectively and assist in decision making process of leaders in various organizational settings (Agarwal & Dhar, 2014; Schuler & Jackson, 2014). This research also proposed that data analytics knowledge mediates the relationship dimensions of soft total quality management (top management, human resource & customer focus) and university performance. The results show that data analytics knowledge significantly mediates the relationship between top management, human resource, customer focus and university performance. As per Sathi (2014) data analytics is a revolution that increases the performance of the organizational performance. In universities context data analytics knowledge is helpful in retrieving useful information to improve performance (Zhao, Xu et al., 2019; Xu, Frankwick et al., 2016). Data analytics knowledge not only providing different solutions to the organizations in general but also help the higher education institutions by giving adequate and exact information that create opportunities for all the stakeholders along with increment in the performance of higher education institutes (Daniel, 2019) and students also get benefits by e-learning platforms that improve the learning ability and capability with enhancement seen in the productivity of students (Cantabella, Martínez-España et al., 2019). In the crunch times of pandemic, it is earlier explained by Aguilar (2018) that big data analytics provided adequate techniques for both students and teachers to continue uninterrupted work for the improvement of productivity and performance and further explained by Huda et al. (2018) that data analytics knowledge helped in digging the new techniques, methods to enhance the performance of the higher education institutes. Though, Chaurasia and Rosin (2017) have found that data analytics knowledge gaining importance for the enhancement of performance by capturing different opportunities and proved inevitable in the time of COVID-19 pandemic to cope the complex and unstructured data to get maxim benefit from it (Ting et al. 2020) and it is found by Adnan and Anwar (2020) that current era required an online learning platform for the students and data analytics knowledge help in fetching the exact data that benefits for the students to improve their productivity and performance. In Pakistani universities context, top management can take support from data analytics knowledge to make informed decision that will not only make their corrective action more rigorous but increase the university performance. In addition, human resource which is integral part of successful organization can use data analytics knowledge to improve the work management and efficiency. Moreover, by the virtue of data analytics knowledge, universities can be more focus on individual students. As all the data about students, their performance in academia is readily available in a sophisticated way and teachers and management can use these data to provide more student centric counselling. The information available on each and every student help university faculty to focus on weaker areas of students and help them to improve more efficiently. In other words, data analytics helps faculty and management to satisfy students in more effective way that in turn reflect high university

performance.

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