Association of Big Data with Sustainable Competitive Advantage in Online Retail Segment: A Serial Mediation Model for Relating Big Data with Strategic Management Tools

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ABSTRACT

Purpose:
Big-Data is one of the most studied and researched topics of recent times. The tool has been studied vastly in the western world. However, the domains were either related to science and technology, although there is a need to relate Big Data to strategic management and competitive advantage to remove the lack of research in that vein.

Methodology:
This study is systematically conducted to explore the effect of big data on the attainment of business improvement in the online retail segment. The model has been developed through an in-depth literature review to relate the resource-based view with the attainment of sustainable competitive advantage through serial mediation of big-data analytics knowledge and innovative capabilities. Data was collected through non-probability sampling from IT managers and specialists associated with the online retail segment and analysis was conducted through SMART-PLS.

Findings:
Results indicated that big data is for the improvement of business for the online retail segment. However, data availability is a must for applying big-data analytics toward sustainable competitive advantage.

Conclusion:
This study concludes that all the relations and indicates that Bug-Data is fruitful for booting advanced knowledge and innovative capabilities. However, the onlin IT sector needs to have some other elements like advanced IT skills to legitimize the relationship.

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1. Introduction

In recent times organizations are thrilled to use digital platforms for enhancement in business and sales. These optimizations in these business activities and operations might become more effective with the incorporation of Big-Data analytics. The use of Big-Data might also result in business intelligence innovation which can provide an edge to the company through strategic innovativeness of decision-making (Jayakrishnan et al., 2018). Businesses are used to extract required information and knowledge from larger data sets. Similar is the purpose of Big-Data analytics i.e., to process larger data sets through enhanced analytical techniques for extracting useful knowledge. Hence it is treated as a potential source to achieve a competitive edge (Dahiya et al., 2021).

Although some of the studies argued that the benefits of applying Big Data analytics are conditional and there is some evidence that firms have failed to attain a competitive advantage through the use of Big Data. The failure might happen due to technical issues rather than strategic roles and requirements associated with the implementation of Big-Data technology. Hence, it is optimal to reflect that managerial and organizational competency must support practitioners to attain the desired level of competitive edge (Ramadan et al., 2020). A study by Dahiya et al (2021) indicated that the Resource-Based (RB) Theory is the base by which it is legitimate to believe that firm's specific knowledge might result in the attainment of competitive advantage.

Therefore, in the light of RB Theory, it is optimal to reflect Big-Data models in association with advanced level firm's knowledge are essential to attain a sustainable competitive edge. Hence research must consider elements used by Ramadan et al (2020), to reflect the flow required for knowledge creation specifically for different types of firms. Inclusions of these elements are also aligned with the Knowledge-Based View (KBV) which is the extension of RB-Theory and is reflected by Dahiya et al. (2021).

2. Literature Review

There is a severe lack of research work that is associated with the research work in the area of Big-Data Analytics and its association with business value (Mikalef et al., 2017). Dahiya et al (2021) posited that several firms tried to opt for Big-Data analytics to have a competitive edge. However, there is still a requirement for further research work to explore the relationship between knowledge attained through Big-Data Analytics & competitive advantage. The major reason behind these sorts of requirements is the success ratio i.e., there is no guarantee of success even after using Big-Data analytics. These conditions are surrounded by a severe level of ambiguity due to dealing with enormous amounts of data (Jayakrishnan et al., 2018). The complexity enhances significantly when most of the research on big data is not associated with the capacity of the building of a firm. Hence, it is optimal to quote Dahiya et al (2021) and Ramadan et al (2020) to relate the use of Big-Data analytics with the increase of a firm's specific and differentiated knowledge. Therefore, this study will be focusing significantly on the relationship of Big-Data with the Big-Data knowledge that may affect the innovative capabilities of the firm and business improvement.

Sivarajah et al. (2017) indicated that Big-Data and Big-Data analytics are still in their infancy for research. Therefore, there is no unified & fully established definition and classification associated with these terminologies. On the other hand, most of the studies related to Big-Data are related to technical aspects rather than implications of Big-Data in strategic management. Therefore, studies based on the relationship between Big-Data and strategic management must be conducted in a multi-disciplinary context to overcome the lack of association between Big-Data and firm performance. Therefore, this study uses

the framework of Dahiya et al (2021) and Ramadan et al (2020) to formulate a unique research model based on serial mediation. The model is especially significant in relating Big-Data with sustainable innovation and a firm's performance through the serial mediation model to generate sustainable competitive advantage (SCA).

Decisions that are based on data are termed data-driven decisions, to make these decisions there is also a need for data analysis. These decisions are found to play a positive role for the company through optimizing measures e.g., returns on assets, returns on equity, market value & asset utilization, etc. (Jelonek, Stępniak & Ziora, 2018). Although, different forms of business collect information from different forms of sources to create consumer perfect e-picture through accessing browsing and purchasing information (Lambrecht & Tucker, 2015 & Lambrecht & Tucker, 2016).

Thus, data is termed as one of the most effective tools for marching progressively towards better decisions, especially in the field of e-commerce (Seetharaman et al., 2016). Although research in this vein is still at the initial stage (Yang et al., 2019) and companies are also not required to focus on big data until and unless they are required to understand proactively their customers, markets, and results of products (Charles & Gherman, 2013). Similar was indicated by McAfee and Brynjolfsson (2012) that companies that are in the list of top three are more inclined towards a data-driven approach and will attain more productivity, sales, and profit as compared to the rest. In recent times there is no company that is striving for the achievement of relevant data to gain a competitive advantage. However, a competitive advantage cannot be achieved without the extraction of value out of raw data (Charles & Gherman, 2013).

On the other hand, competitive advantage is the outcome of resources that are unique and inimitable and this is also the major assumption behind the IT capabilities. Thus, the IT department is required to apply full of their capabilities to induce and reshape organizational strategies for taking competitive advantage. That may lead to an increase in organizational performance (Wamba et al., 2017). Similar research has also been supported by Resource-Based Theory as firms are required to generate more economic benefits as compared to the competing firms through the effective definition of internal and external resources to use them strategically (Gupta et al., 2018).

There are three major types of IT capabilities i.e., value capability, competitive capability & dynamic capability. These three forms of capabilities are based upon the quality of infrastructure, quality of IT business expertise & intensity of organizational learning. Therefore, by combining all three forms of IT capabilities firms are trying to gain an advantage through (BDAC) Big Data Analytic Capabilities (Wamba et al., 2017). This may include reduction in cost, improvement in the firm's offerings, and optimization of decision making. Although there is a severe lack of studies that may explore the benefits of big-data implementation (Huang, Wang & Huang, 2020).

Therefore, the availability of data & data analytics is ranked among the most critical issues, and hence there is also a need to connect all the devices e.g., systems, devices, and sensors, etc., with the internet of things (IoT), to generate data adequately and to assist Big-Data analytics (Ramadan et al., 2020). These practices are effective in producing Big-Data that is enormously large as compared to the other forms of data (Kumar, Kamesh & Syed, 2014). On the other side, businesses are also required to focus on issues related to the environment and sustainability while carrying out operations and practices (Ramadan et al., 2020). In fact, studies indicated the major benefit of Big-Data is to extract knowledge from conglomerate data sets to establish actionable results that may

aid in attaining competitive advantage (Ferraris et al., 2018). Though some firms still remain unable to achieve the desired edge through Big-Data (Dahiya et al., 2021).

Therefore, in addition to the data availability and link between Big-Data analytics and sustainability must also be treated as an emerging issue. A sustainable competitive advantage might be defined as the blend of a firm's assets, capabilities, and features that is not easy to copy and replicate by competitors. However, to achieve that, the company has to use its capacity in a fully efficient manner in order to gain valuable insights through Big-Data analytics capabilities. (Ramadan et al., 2020). BDAC also has the capacity to create sustainable value to assist the progress of business but this also needs proper alignment of strategy and technology (Akter et al., 2016) In fact, Big Data Predictive Analysis is perceived as the next big frontier to gauge firm's level of innovation, competitiveness, and productivity (Gupta et al., 2018).

Consumer footprints are the most useful source for the tracing of individual-level data and these external sources like opinions and interests etc. are significantly important for gaining useful insights regarding individual consumers (Lambrecht & Tucker, 2015 & Lambrecht & Tucker,2016). These useful insights might be beneficial for managerial decision-making at every level of management and can also aid management at different stages of decision making like identification of the problem, determining the purpose, evaluation of options, forecasting of consequences, selecting the best stage, and improving the sensitivity analysis (Jelonek et al., 2018). Although the increase in volume and velocity of data will also foster the need to develop proper means for gathering, analyzing, and interpreting the data (Davenport et al., 2012). In addition, volume and other characteristics of Big Data are also found to be beneficial in creating new algorithms and also enable IT practitioners, to use databases in a way that was not possible previously. However, there is also a need for a sufficient amount of reliable data and reasonable precision to make stories that are valid and describe consumer decision processes so as to take effective decisions on the bases of data (Charles & Gherman, 2013). Therefore, the use of Big-Data with massive volume, velocity, variety, and Veracity was found to be a much more effective tool for achieving competitive advantage (Charles & Gherman, 2013).

Consistent with the study by Columbus (2014), 85% of the firms believe that within three years, BDA will reshare the competitive landscape of all the operating industries. Not only this but around 90% of firms believe that the adoption of Big-Data is a must and firms that fail to adopt Big-Data till the next year will surely the momentum and market worth (Akter et al., 2016).

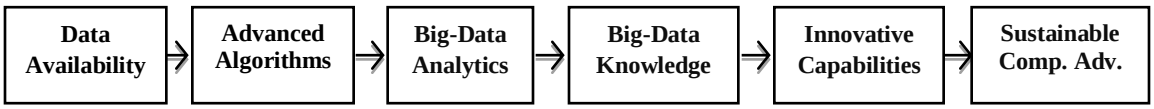

Figure.1. Theoretical Framework
Source: Author's own elaboration

H_{1a}: There is a relationship between data availability and advanced algorithms

H_{2a}: There is a relationship between advanced algorithms and Big-Data Analytic

H_{3a}: There is a relationship between Big-Data Analytic and Big-Data Knowledge

H_{4a}: There is a relationship between Big-Data Knowledge and Innovative Capabilities

H_{5a}: There is a relationship between Innovative Capabilities and Sustainable Competitive Advantage.

H_{6a}: There is a serial mediation of advanced algorithms, Big-Data Analytics, Big-Data Knowledge, Innovative Capabilities between Data Availability & Sustainable Competitive Advantage

3. Research Methodology

The study is based upon the theory i.e., Resource-Based (RB) Theory which has also been used by Dahiya et al. (2021), therefore the research is based on a deductive approach (Saunders, Lewis & Thornhill, 2009 & Sekaran & Bougie, 2016). Similarly, a study has been done on the indication by Dahiya et al (2021); Ramadan et al (2020), and Yang et al. (2019) to boost knowledge related to the relationship of Big-Data with the sustainable innovation and a firm's performance. Therefore, in accordance with Saunders et al. (2009), the research philosophy to this study is epistemology, as it is the philosophy of knowledge.

Thus, there is a definite need to relate epistemology with this study as there is a lack of studies related to the Big-Data, especially with respect to strategic management etc. As highlighted by Mikalef et al. (2017) and Sivarajah et al. (2017). Hence considering all these points, issues, and problems, especially the lack of quantitative studies, this study is related to post-positivism as the philosophical stance as it is effective for both qualitative and quantitative studies (Saunders et al., 2009 & Žukauskas et al., 2018). The study is based on primary data as Ramadan et al. (2020) and a questionnaire was used to collect data which is a hybrid of Ramadan et al. (2020); Le and Liaw (2017), through non-contrived settings with individuals as the unit of analysis (Sekaran & Bougie, 2016).

The study follows the sampling type incorporated by Ramadan et al (2020) and Jabeen et al (2021) to incorporate non-probability sampling through quota sampling. The data has been collected from IT experts associated with online businesses in Pakistan therefore the sample size is relatively low as it has been used in quantitative research. However, Ramadan et al (2020) use Power software to calculate sample size in order to assure adequacy and applicability and similar incorporations indicated minimum sample size for the study must be around 135.

4. Data Analysis

Most of the time research work in the field of marketing is found to be using Structural Equation Modeling (SEM), which is the second-generation multivariate data analysis model. The model is found to be a better choice for analyzing theoretically supportive additive and causal models. In fact, business research becomes much simpler with the ability of the technique to measure unobservable and latent variables.

The technique is based upon exogenous and endogenous variables with the latter being the one that is under the effect of the other. Although there are various methods to use SEM like AMOS, M-PLUS, LISREL, etc., for smaller sample sizes researchers have little knowledge regarding the parameters related to research PLS-SEM (Wong, 2013). Therefore, this study is lured by the use of SEM through SMART-PLS not only because of its association with strategic management. The study also has a relatively small sample size as compared to the other forms of studies and the model of the study is also much more complex about which there is a lack of conclusive studies, especially in the context of strategic management (Sivarajah et al., 2017).

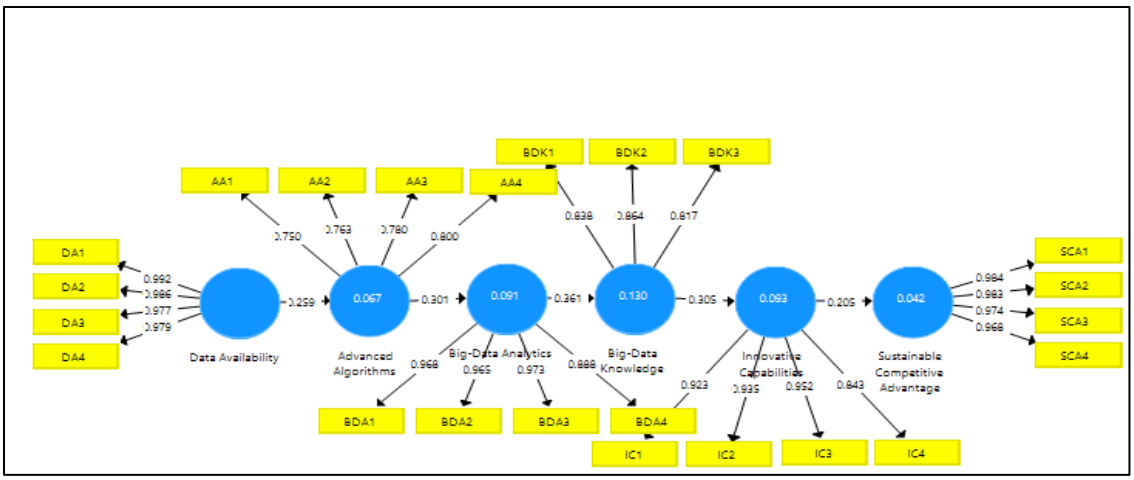

Figure.1. Conceptual Framework
Source: Author's own elaboration

Table 1 is indicating that the outer loading for all the elements (indicators) is higher than 0.708 which is the minimal requirement for including any of the elements in the research model (Hair, Sarstedt, Ringle& Mena, 2012). Similar has been posited by Wong (2016), though values higher than the threshold value are deemed more satisfactory and desirable for the purpose of analysis (Khan, Sarstedt, Shiau, Hair, Ringle & Fritze, 2019).

Table1.Outer Loadings

	Advanced Algorithms	Big-Data Analytics	Big-Data Knowledge	Data Availability	Innovative Capabilities	Sustainable Competitive Advantage
AA1	0.750					
AA2	0.763					
AA3	0.780					
AA4	0.800					
BDA1		0.968				
BDA2		0.965				
BDA3		0.973				
BDA4		0.888				
BDK1			0.838			
BDK2			0.864			
BDK3			0.817			
DA1				0.992		
DA2				0.986		
DA3				0.977		
DA4				0.979		
IC1					0.923	
IC2					0.935	
IC3					0.952	
IC4					0.843	
SCA1						0.984
SCA2						0.983
SCA3						0.974
SCA4						0.968

Source: Author's own elaboration

Table 2 is indicating that the value of R^2 is more than 0.50 for all of the cases and these values are equivalent or higher than the moderate level criteria of predictive accuracy (Cheah, Memon, Chuah, Ting & Ramayah, 2018). Therefore, in the light of these

parameters, the variance caused by IV in subsequent DVs is effective (Benitez, Henseler, Castillo & Schuberth, 2020).

Table.2. Predictive Accuracy (Quality Criteria)

	R Square	R Square Adjusted
Advanced Algorithms	0.667	0.665
Big-Data Analytics	0.591	0.589
Big-Data Knowledge	0.530	0.528
Innovative Capabilities	0.523	0.521
Sustainable Competitive Advantage	0.512	0.504

Source: Author's own elaboration

Table.3 is used to reflect construct reliability and convergent validity. The reliability has been reflected through three measures i.e., Cronbach Alpha, Goldstein rho, and composite reliability (Wong, 2013). Convergent validity requires three criteria composite reliability, (Average Variance Extracted) AVE and outer loading (Afthanorhan, 2013). The outer loadings are available in the table.1, however, Ab Hamid, Sami and Sidek, (2017) reflected that AVE can be the legitimate indicator of convergent validity when it is square of outer loading and must be equal to or greater than 0.5 (MohdDzin & Lay, 2021). Therefore, in the light of these criteria is it realistic to declare a table is fulfilling the criteria of construct reliability and convergent validity.

Table.3. Construct Reliability and Convergent Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Advanced Algorithms	0.779	0.787	0.856	0.598
Big-Data Analytics	0.963	0.969	0.973	0.901
Big-Data Knowledge	0.793	0.801	0.878	0.706
Data Availability	0.989	0.989	0.992	0.967
Innovative Capabilities	0.934	0.946	0.953	0.836
Sustainable Competitive Advantage	0.984	0.991	0.988	0.955

Source: Author's own elaboration

Table 4 is indicating discriminant validity through HTMT, i.e., the most preferred tool to reflect the discriminant validity (Ab Hamid et al., 2017). Although there is a requirement of values of 0.85 or less in order to assure the criterion (Hair Jr. *et al.*, 2017). Hence the discriminant validity has also been assured for the analysis and the model is legitimate to proceed for inferential statistics.

Table.4. Heterotrait-Monotrait Ratio (HTMT) & Discriminant Validity (HTMT)

	Advanced Algorithms	Big-Data Analytics	Big-Data Knowledge	Data Availability	Innovative Capabilities	Sustainable Competitive Advantage
Advanced Algorithms						
Big-Data Analytics	0.337					
Big-Data Knowledge	0.449	0.410				
Data Availability	0.294	0.186	0.262			

Innovative Capabilities	0.309	0.723	0.349	0.215	
Sustainable Competitive Advantage	0.300	0.181	0.260	0.804	0.211

Source: Author's own elaboration

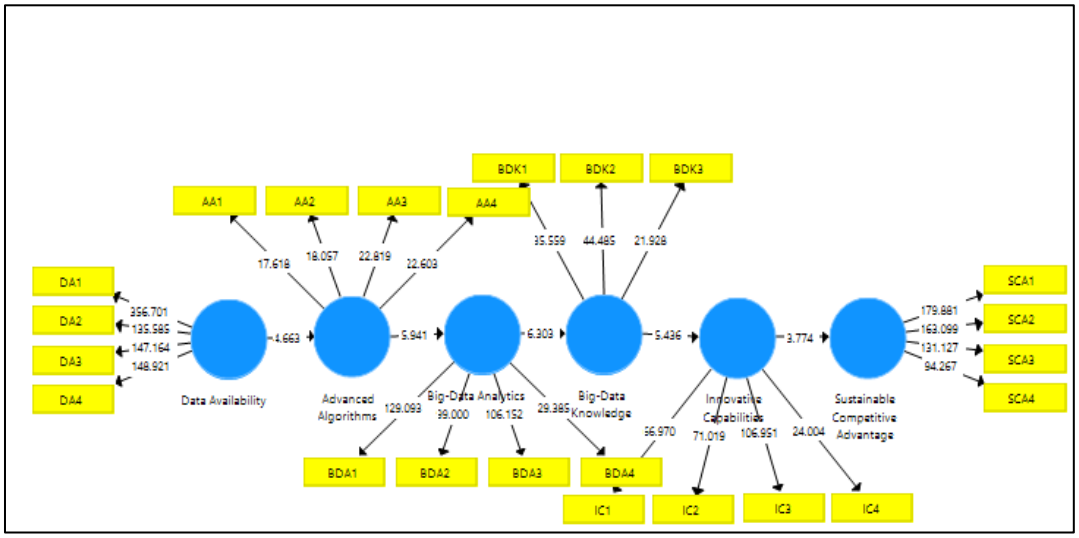

Figure.2. Path Coefficient
Source: Author's own elaboration

Table 5 indicated the path coefficient and this has been reflected through two parameters i.e., t-values and p-values. In order to have an impact, there is a need for a t-value of more than 1.97 and a p-value that is less than or equal to 0.05 (Hair Jr. et al., 2021 & Wong, 2013). Therefore, according to these parameters, all the relationships are effective i.e., exogenous created an impact over endogenous.

Table.5. Path Analysis

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Advanced Algorithms -> Big-Data Analytics	0.301	0.302	0.051	5.941	0.000
Big-Data Analytics -> Big-Data Knowledge	0.361	0.360	0.057	6.303	0.000
Big-Data Knowledge -> Innovative Capabilities	0.305	0.305	0.056	5.436	0.000
Data Availability -> Advanced Algorithms	0.259	0.260	0.056	4.663	0.000
Innovative Capabilities -> Sustainable Competitive Advantage	0.205	0.206	0.054	3.774	0.000

Source: Author's own elaboration

Table 6 is also showing Path-Analysis and for this, the criteria of p-values and t-values are the same as indicated in table 5. However, when researchers analyze serial mediation then it has been noticed that two of the relationships at the bottom of the table are insignificant. The analysis has been consistent with the criterion given by Hair Jr. et al. (2021) as the t-values are lesser than 1.97 in both the cases and the p-values are also greater than 0.05 Analysis of data through descriptive and inferential means indicated

that the data is reliable and effective to use for the analysis of impact created by the big-data on online retail segment and willingness to take sustainable competitive advantage.

Table.6. Specific Indirect Effects

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Data Availability -> Advanced Algorithms -> Big-Data Analytics	0.078	0.078	0.021	3.773	0.000
Advanced Algorithms -> Big-Data Analytics -> Big-Data Knowledge	0.109	0.110	0.031	3.499	0.001
Data Availability -> Advanced Algorithms -> Big-Data Analytics -> Big-Data Knowledge	0.028	0.029	0.010	2.760	0.006
Big-Data Analytics -> Big-Data Knowledge -> Innovative Capabilities	0.110	0.112	0.033	3.294	0.001
Advanced Algorithms -> Big-Data Analytics -> Big-Data Knowledge -> Innovative Capabilities	0.033	0.035	0.014	2.331	0.020
Data Availability -> Advanced Algorithms -> Big-Data Analytics -> Big-Data Knowledge -> Innovative Capabilities	0.009	0.009	0.004	1.972	0.049
Big-Data Knowledge -> Innovative Capabilities -> Sustainable Competitive Advantage	0.062	0.063	0.022	2.845	0.005
Big-Data Analytics -> Big-Data Knowledge -> Innovative Capabilities -> Sustainable Competitive Advantage	0.023	0.023	0.010	2.192	0.029
Advanced Algorithms -> Big-Data Analytics -> Big-Data Knowledge -> Innovative Capabilities -> Sustainable Competitive Advantage	0.007	0.007	0.004	1.712	0.088
Data Availability -> Advanced Algorithms -> Big-Data Analytics -> Big-Data Knowledge -> Innovative Capabilities -> Sustainable Competitive Advantage	0.002	0.002	0.001	1.389	0.165

Source: Author's own elaboration

Table 1, Table 2, Table 3, and Table 4 are used to reflect the appropriateness, reliability, and validity of the data. However, the purpose of Table 5 and Table 6 is to reflect the impact of variables through inferential statistics. Analysis indicated that only two relationships in the category of serial mediation i.e., Advanced Algorithms -> Big-Data Analytics -> Big-Data Knowledge -> Innovative Capabilities -> Sustainable Competitive Advantage and Data Availability -> Advanced Algorithms -> Big-Data Analytics -> Big-Data Knowledge -> Innovative Capabilities -> Sustainable Competitive Advantage are insignificant.

4.1. Discussion and Managerial Implications

The findings of the study are fruitful as the findings are effective to reflect the linkage of Big-Data with strategic management as well as with sustainable competitive advantage. That is required by Sivarajah et al. (2017) and Dahiya et al (2021) and Ramadan et al (2020) respectively. Moreover, the study will also be helpful in making studies of Big-Data active that were found to be in the infancy stage (Sivarajah et al., 2017), also for the relationship between data and data analytics in the field of e-commerce (Yang et al., 2019). The findings of the study are also relevant to Lambrecht and Tucker (2015) and

Lambrecht and Tucker (2016), as the data available are effectively related to advanced algorithms that create Big-Data analytics. That means an e-picture of consumer footprints is effectively created through browsing and purchasing information. Moreover, linkage of Big-Data knowledge is required for making innovative moves and therefore the findings are consistent with Davenport et al. (2012). Therefore, the linkage between all the devices must be developed with (IoT), to assist Big-Data analytics effectively, as indicated by Ramadan et al. (2020).

Last but not least the findings are also effective to legitimize the required relation i.e., Big-data knowledge with the attainment of sustainable competitive advantage (SCA). Although this requires effective use of firm capabilities and resources as indicated by Ramadan et al. (2020) and verified through the variable of innovative capabilities between Big-Data analytics and SCA. However, the insignificant relationship i.e. Data Availability -> Advanced Algorithms -> Big-Data Analytics -> Big-Data Knowledge -> Innovative Capabilities -> Sustainable Competitive Advantage, is there which still assures the indications of Dahiya et al. (2021). That means the indication made by Sultan et al (2021), that there is also a need for skilled data scientists for making Big-data work in an effective way. Although lacking Big-Data skills in the scientists working in the retail industry of Pakistan are disturbing the firm performance. Similar research has been reflected by Jabeen et al. (2021).

5. Conclusion

This study is fruitful to indicate that Big-Data is effective for boosting innovative capabilities, especially for online retail. However, the relationship of Big-Data through serial mediation is not clear in the attainment of sustainable competitive advantage. Therefore, the role of technical (IT), skills is significant as previously indicated by research work from Pakistan. Hence, legitimate to quote that relationship (serial mediation), would become more vibrant when supplemented with the moderation of skills from IT personnel.

5.1. Need for Future Research

The study is one of the initial ones to explore the effect of Big-Data on the attainment of sustainable competitive advantage, especially with respect to eastern and lower-income sides of the world. The other specialty of the study is a quantitative analysis which is a rare element in the studies of Big-Data which became further enlightened through the use of SEM, and SMART-PLS in the field of the online retail segment. The segment is really special not because only of its infancy stage (IBM, 2018) but also due to the continuous increase in the level of preference for online purchases (Mehmood and Najmi, 2017 & Rehman et al., 2019).

Therefore, the study will be fruitful for academicians as well as managers related especially to online retail segments to realize the importance of Big-Data Analytics and Big-Data knowledge along with the skill set of data scientists. Further studies might be conducted by applying moderation of skilled data scientists between data availability & Big-Data algorithms as the skill set of data scientists is not found to be effective in countries like Pakistan. Therefore, checking these forms of complex models might become more realistic and significant with the inclusion of moderation roles of skilled data scientists.

References

Ab Hamid, M. R., Sami, W., & Sidek, M. M. (2017, September). Discriminant validity assessment: Use of Fornell & Larcker criterion versus HTMT criterion. In *Journal of Physics: Conference Series* (Vol. 890, No. 1, p. 012163). IOP Publishing

Afthanorhan, W. M. A. B. W. (2013). A comparison of partial least square structural equation modeling (PLS-SEM) and covariance based structural equation modeling (CB-SEM) for confirmatory factor analysis. *International Journal of Engineering Science and Innovative Technology*, *2*(5), 198-205

Akter, S., Wamba, S. F., Gunasekaran, A., Dubey, R., & Childe, S. J. (2016). How to improve firm performance using big data analytics capability and business strategy alignment?. *International Journal of Production Economics*, *182*, 113-131

Benitez, J., Henseler, J., Castillo, A., & Schuberth, F. (2020). How to perform and report an impactful analysis using partial least squares: Guidelines for confirmatory and explanatory IS research. *Information & Management*, *57*(2), 103168

Charles, V., & Gherman, T. (2013). Achieving competitive advantage through big data. Strategic implications. *Middle-East Journal of Scientific Research*, *16*(8), 1069-1074

Cheah, J. H., Memon, M. A., Chuah, F., Ting, H., & Ramayah, T. (2018). Assessing reflective models in marketing research: A comparison between PLS and PLSC estimates. International Journal of Business and Society, 19(1), 139-163

Dahiya, R., Le, S., Ring, J. K., & Watson, K. (2021). Big data analytics and competitive advantage: the strategic role of firm-specific knowledge. *Journal of Strategy and Management*, https://doi.org/10.1108/JSMA-08-2020-0203

Davenport, T. H., Barth, P., & Bean, R. (2012). How'big data'is different, MIT Solan Management Review, (https://sloanreview.mit.edu/article/how-big-data-is-different/)

Ferraris, A., Mazzoleni, A., Devalle, A., & Couturier, J. (2018). Big data analytics capabilities and knowledge management: impact on firm performance. *Management Decision*

Grover, V., Chiang, R. H., Liang, T. P., & Zhang, D. (2018). Creating strategic business value from big data analytics: A research framework. *Journal of Management Information Systems*, *35*(2), 388-423

Gupta, S., Qian, X., Bhushan, B., & Luo, Z. (2018). Role of cloud ERP and big data on firm performance: a dynamic capability view theory perspective. *Management Decision, doi:* 10.1108/MD-06-2018-0633

Hair Jr, J. F., Sarstedt, M., Ringle, C. M., & Gudergan, S. P. (2017). *Advanced issues in partial least squares structural equation modeling*. Sage publications

Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the academy of marketing science*, *40*(3), 414-433

IBM Institute of Business Value IBM, (2018), "Analytics: The real-world use of big data in retail", How innovative retailers extract value from uncertain data, https://www935.ibm.com/services/us/gbs/thoughtleadership/big-data-retail/

Jabeen, M., Sultan, M. F., & Mannan, M. A. (2021). Perceived usefulness of big-data for store layout: Evidence for organized retailers of Karachi. *KIET Journal of Computing and Information Sciences*, *4*(2), 18-18

Jabeen, M., Sultan, M. F., & Mannan, M. A. (2021). Perceived usefulness of big-data for store layout: Evidence for organized retailers of Karachi. *KIET Journal of Computing and Information Sciences*, *4*(2), 18-18

Jayakrishnan, M. A., Mohamad, A. K. B., & Yusof, M. B. M. (2018). The Holistic View of Business Intelligence (BI) and Big Data Analytics (BDA) Towards Designing Strategic Performance Management Framework: A Case Study. *Journal of Theoretical & Applied Information Technology*, *96*(7), 2025-2045

Jelonek, D., Stępniak, C., &Ziora, L. (2018, April). The meaning of big data in the support of managerial decisions in contemporary organizations: review of selected research. In *Future of Information and Communication Conference* (pp. 361-368). Springer, Cham

Khan, G. F., Sarstedt, M., Shiau, W. L., Hair, J. F., Ringle, C. M., &Fritze, M. P. (2019). Methodological research on partial least squares structural equation modeling (PLS-SEM). *Internet Research*, 29(3), 407-429

Kumar, D., Kamesh, D. B. K., & Syed, U. (2014). A study on Big Data and its importance. *International Journal of Applied Engineering Research*, *9*(20), 7469-7479

Lambrecht, A., & Tucker, C. E. (2015). Can big data protect a firm from competition?. *Available at SSRN 2705530*

Lambrecht, A., & Tucker, C. E. (2016). The Limits of Big Data's Competitive Edge. *MIT IDE Research Brief*

Le, T. M., &Liaw, S. Y. (2017). Effects of pros and cons of applying big data analytics to consumers' responses in an e-commerce context. Sustainability,9(5), 798

McAfee, A. and Brynjolfsson, E. (2012), Big data: the management revolution, Harvard Business Review. 90(10), 60-68

Mehmood, S. M., &Najmi, A. (2017). Understanding the impact of service convenience on customer satisfaction in home delivery: Evidence from Pakistan. *International Journal of Electronic Customer Relationship Management*, *11*(1), 23-43

Mikalef, P., Framnes, V. A., Danielsen, F., Krogstie, J., & Olsen, D. (2017). Big data analytics capability: antecedents and business value, In Twenty First Pacific Asia Conference on Information Systems (PACIS 2017 Proceedings), 136.

MohdDzin, N. H., & Lay, Y. F. (2021). Validity and reliability of adapted self-efficacy scales in Malaysian context using PLS-SEM approach. *Education Sciences*, *11*(11), 676

Nag, R., &Gioia, D. A. (2012). From common to uncommon knowledge: Foundations of firm-specific use of knowledge as a resource. *Academy of Management Journal*, *55*(2), 421-457

Pauleen, D. J., & Wang, W. Y. (2017). Does big data mean big knowledge? KM perspectives on big data and analytics. *Journal of Knowledge Management*, 2(1), 1-6

Ramadan, M., Shuqqo, H., Qtaishat, L., Asmar, H., & Salah, B. (2020). Sustainable competitive advantage driven by big data analytics and innovation. *Applied Sciences*, *10*(19), 678

Rehman, S. U., Bhatti, A., Mohamed, R., &Ayoup, H. (2019). The moderating role of trust and commitment between consumer purchase intention and online shopping behavior in the context of Pakistan. *Journal of Global Entrepreneurship Research*, *9*(1), 1-25

Saunders, M. N., Lewis, P., Thornhill, A., & Bristow, A. (2015). Understanding research philosophy and approaches to theory development

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students*. Pearson education

Seetharaman, A., Niranjan, I., Tandon, V., & Saravanan, A. S. (2016). Impact of big data on the retail industry.Journal of Corporate Ownership & Control,14(1), 506-518

Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons

Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons

Sivarajah, U., Kamal, M. M., Irani, Z., &Weerakkody, V. (2017). Critical analysis of Big Data challenges and analytical methods. *Journal of business research*, *70*, 263-286

Sultan, M. F., Shaikh, S., Asim, M. & Imtiaz, R. (2021). Linking Big-Data Analytics with the Pricing Strategies of E-Retailers: A Quantitative Approach. *GMJACS*, *11*(2), 113-123

Wong, K. K. K. (2016). Mediation analysis, categorical moderation analysis, and higher-order constructs modeling in Partial Least Squares Structural Equation Modeling (PLS-SEM): A B2B Example using SmartPLS. *Marketing Bulletin*, *26*(1), 1-22

Yang, K., & Banamah, A. (2014). Quota sampling as an alternative to probability sampling? An experimental study. Sociological Research Online,19(1), 56-66

Žukauskas, P., veinhardt, J., & Andriukaitienė, R. (2018). Philosophy and paradigm of scientific research.Management Culture and Corporate Social Responsibility,121