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Evaluating the Influence of Big Data Analytics and Blockchain Technology on the Performance of Humanitarian Supply Chain Management

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ABSTRACT

The purpose of this study was to examine that how efficiency can be attain in Humanitarian Supply Chains Management (HSCM) through Enterprise Resource Planning (ERP), Block Chain Technology (BCT) and Big Data Analytics (BDA). A conceptual model is developed based on resource-based viewpoint and transactional cost theory that demonstrates the effects of BDA, Block Chain, and ERP on the performance of HSCM. The analysis shows that block chain connects people, groups, or nations to establish a network and plays a critical role in crisis management through monetary or non-monetary aid, whereas, BDA boosts the capacity of humanitarian operations to achieve their goals. Furthermore, it is also concluded that combining block chain with BDA capabilities can enhance HSCM performance. The study employed a quantitative approach, and responses from a 200-person sample size were gathered via survey questionnaires. Because Smart PLS, SEM enables broader dissemination in a variety of industries where non-normal data, small sample sizes, and formative indicators are being increased to support more complex model structures or solve data shortcomings like heterogeneity, the data was analyzed using this method. The PLS algorithm was used to analyze the study's data and content. The concept validity is tested using the Bootstrapping test, and the hypothesis outcomes are tested using binding folding. The findings (P-value P>0.05 and T-value 1.96 or higher) demonstrated that the study's premise had been amply confirmed by the current investigation. Due to its ability to narrow a performance gap between block chain and BDA in the current HSC literature and so improve the performance of the HSCM, this work is unique and valuable.

Keywords: Performance, measurement, Disaster, management, Humanitarian supply chain, block chain, Humanitarian operations, big data analytics.

INTRODUCTION

A supply chain is made up of suppliers, manufacturers, clients, and service providers, such those that handle logistics and provide IT services (Mageto, 2021). The four fundamental components of the supply chain are integration, operations, purchasing, and distribution work together to create a method of competing that is both cost-effective and competitive in nature (Fosso Wamba, 2020). In order to achieve the objectives of a humanitarian organization which are saving lives at maximum, reducing suffering, and securing donor money (accountability) for the sustainability of the economy the humanitarian operations' performance has grown complicated (Jusoh et al., 2022). Regardless of the nature of crisis natural or manmade (sudden or protracted emergencies, natural disasters, public health emergencies, and manmade complicated emergencies such as international or domestic armed conflict, etc.), conducting operations effectively is a difficult procedure. No matter the country's gross national income (GNI) level (poor, medium, or high), the affected population's legal status, or the location, duties are solely placed on the most vulnerable children and their families. The procedures of planning, implementing, and managing the cost-effective flow of commodities, services, and information, as well as the storage of goods, materials, and equipment from originating point to end consumer, play a significant part in the operations of humanitarian organizations is called humanitarian logistics and supply chain management (Shafiq & Soratana, 2019). Clarifies that the term "Humanitarian Supply Chain Management" (HSCM) encompasses all tasks involved in gathering and managing materials for use in relief efforts for natural or man-made disasters. One of the most difficult aspects of managing the humanitarian supply chain is the coordination between the many groups such as the military, government agencies, civilians, non-governmental organizations, and other commercial enterprises (rameshwar dubey, Angappa gunasekaran, 2022). Humanitarian groups put in a lot of effort to provide the needs of a disaster-affected area or population with aid. Usually during the first 24 hours of a crisis, an assessment team, donors, NGOs, and individuals with specialties in water/sanitation, health care, and medication are sent to the affected region. Depending on where they originate, disasters can be classified as either natural or man-made. Natural disasters include those brought on by geophysical and hydrological processes, such as earthquakes, floods, wildfires, landslides, volcanic eruptions, liquefactions, hurricanes, cyclones, tsunamis, tornadoes, pandemics, and blizzards (Abbaszadeh Shahri & Maghsoudi Moud, 2020). While complicated situations or wars, starvation, displaced people, industrial mishaps, and transportation catastrophes are all man-made disasters (Ministry of National Health Services Regulation and Coordination, 2019). Following the occurrence of any disaster, disaster management must deal with five key problems, including: restricted experts and reduced power requirements, company coordination, a lack of labor, resources for collaboration, inadequate funding, and language barriers (Muzamil et al., 2022). Therefore, the effectiveness of any humanitarian organization depends on how seriously they take disaster relief and how well they serve a large number of people. The use of big data and block chain technology, among other technical advancements, can help to accomplish this efficacy. Big data gives inventory managers' guidelines for how much to forecast by fusing historical sales trends with predictive technologies. Numerous company areas, including finance, advertising, supply chain, and operations, have effectively employed big data analytics (Lee & Mangalaraj, 2022). Businesses have faced several obstacles in recent years when attempting to use big data analytics and block chain technologies. Technically, the term "block chain" refers to either a distributed data infrastructure or a method of encrypting data before it is recorded (Y. Wang et al., 2019). According to prior research (Al-Alwan et al. 2022), ERP, an independent variable, has a considerable impact on SCM, whereas BDA has a big role in the efficiency of the humanitarian supply chain management. The goal of this study is to investigate the effects of BDA and

BCT on HSCMP using ERP as a mediator. We were unable to find any prior studies that used ERP as a mediator in humanitarian context but ERP used in corporate context (shafie sidek, samrat ray 2022), (Arfa Tayyab 2023),(Derri Muhammad Ramdani 2020). This study's goal is to empirically investigate the role of ERP as a mediator between the effects of BDA and BCT on HSCMP. While the world is presently focusing on successful, sustainable, and stable infrastructure, many initiatives in Pakistan are facing delays and cost overruns because of Pakistan's poor infrastructure. As a result, we are interested in learning more about how ERP mediates the humanitarian SCMP as well as how BCT and BDA impact it.Goal of this research is to contribute in the enhancement of humanitarian SCM performance and bring the social and economic sustainability in humanitarian organizations through use of big data and Block chain technology with the participation of Enterprise resource planning.Research objects include determination of the impact of big data towards humanitarian SCM performance. To analyze the role of block chain technology on humanitarian SCM performance. To explore the mediating role of enterprise resource planning between block chain Technology and humanitarian SCM performance and to investigate the role of enterprise resource planning as mediating between the relationship of big data analytics and humanitarian SCM performance.

METHODOLOGY

A quantitative questionnaire (Yi Sun, Shiqing Jiang, Wanjiao Jia 2022) was used as the primary data gathering tool for this investigation. Four academicians and three HSCM industry professionals (Xu et al. 2021) will review the original questionnaire, and based on their comments, the items will be changed. This research aims to ascertain the current development in the field and acknowledge that there is sufficient scope for a comprehensive study to explore new possibilities and directions for research in the future.

Questionnaire Structure

In this study investigator adapt questions and then put references of those articles which investigator used in their questionnaire. The construction of the questionnaire served as the study's primary research tool. There are a number of questions in it that are intended to elicit responses' knowledge of and expertise in the study's environment. There will be three sections to the questionnaire. The respondent's demographic data, including credentials, position, experience, and organization type, are gathered in the first section. To ensure that each participant in the study has the necessary background knowledge and work experience in the study's sector, demographic data is gathered. The following section of the questionnaire was used to gather data about the subject. The performance of the humanitarian supply chain management is the dependent variable that is measured in the third part. To guarantee the validity and reliability of the questionnaire, ten respondents will be chosen at random from the public. It will conduct online.

Data collection

The empirical setting of our study is National organizations involved in disaster relief operation. The questionnaire will design for HSCM professionals (Fosso Wamba 2020). The items will be evaluated on a five-point Likert scale (Lutfi et al. 2023), where 1 equals strongly disagree and 5 equals strongly agree. For the purpose of gathering data, surveys are sent by email, Google Sheets, and in-person using paper forms (Xiongyong Zhou a, Qinghua Zhu a 2022).

Research design

According to (Paś, Rosiński, Wiśnios, and Stawowy 2022), research design is a master plan that outlines the elements of study as well as the processes and methods for gathering and interpreting pertinent data. Since the current study is descriptive in nature and examines the relationship between the independent and dependent variables, a quantitative research design is used (Remmen & Iversen, 2022). In this study, we will investigate the interactions between dependent, independent, and mediating factors by hypothesis testing (Kunisky, Wein, & Bandeira, 2022). Independent Variable of studies BDA, BCT in this study. The humanitarian supply chain management is a dependent variable. The mediating rule for examining the link between independent and dependent variables is enterprise resource planning.

Sample size

Although researchers cannot agree on the optimal sample size, they generally agree that a large sample size is preferable to a small sample size (Bernheim & Sorek, 2023). According to Sekaran and Bougie, a sample size of 30 to 500 people is considered appropriate for research initiatives. The target demographic for this study received 200 questionnaires via hand delivery, Google Survey, and email. Out of those, 151 questionnaires with completed responses were returned, accounting for 75.5% of the sample size. 200 people make up our sample (Alam 2022).

Target population

The target population is the entire group, or set, that will be considered qualified for data analysis. This group needs to be clearly defined before selecting the sampling frame or design, as it will greatly affect the sample size, feasibility, and sampling method.(Mohammad Asghari a, Abbas Mardani b, Vladimir Simic c, Saeid Jafarzadeh-Ghoushchi a 2023) The main objectives of the study are to analyze how BDA, BCT, and HSCMP affect ERP; identify the strategies that will lead to an HSCM's success; and look into how infrastructure sustainability affects ERP as a mediating factor. The participants for this research study are drawn from many humanitarian organizations and NGOs, donors, government agencies (rameshwar dubey, Angappa gunasekaran 2022), as well as those workers who are a part of any humanitarian organizations, etc., because we also want to explore the effects of BDA and BCT on ERP as a direct connection.

Sampling techniques

In this study investigator adopt convenient sampling (Bag, Gupta, and Wood 2020), snowball sampling and simple random sampling technique (Yoon, Moon, and Lee 2022). While doing convenient sampling, the investigator chooses the variables for the study sample based on their accessibility (Bag et al. 2020). With the recruiting method known as "snowball sampling," volunteers are urged to help find other potential study subjects (Yoon et al. 2022). And the fundamental sampling method involves choosing a sample of people (subjects) from a larger group at random (a population).

Data analytic tools

Smart PLS (Samiaji sarosa 2022) is utilized for data analysis because it’s easy to use. A widely used reliability test for determining the internal consistency of a questionnaire or survey is Cronbach's alpha.

Instrument

In this study, we adapted questions from different research papers (Akter and Wamba 2019) (Mageto 2021) (Arfa Tayyab 2023). The study's questionnaires were modified from earlier versions. (BDA, BCT)

Separate Variable: Study independent variable Block chain technology and big data analytics are coded from BCT1 to BCT5 and from BDA1 to BDA5. Humanitarian supply chain management code from HSCM 1 to HSCM 5 is the dependent variable of the study (HSCM). Enterprise resource planning (ERP) mediator: ERP 1 through ERP 5. Five questions are asked for each variable.

Validity of Face and Content

For the research questionnaire, face validity and content validity are the two types of validity. If survey participants measure the things the survey is intended to measure, then the survey or questionnaire has face validity. If experts believe that a survey's questions cover every facet of the concept being measured, then the survey has content validity (Bolarinwa, 2023). Dr. Shafiq, an assistant professor at IBM&AS, has evaluated the survey's face validity and content validity as a research specialist.

RESULTS

Three main tests make up the data analysis in this study: the blindfold test, bootstrapping, and PLS algorithms. Convergent validity testing is done by PLS Algorithms to determine how well the underlying construct is represented. Cronbach's Alpha () is used to measure internal consistency; values of > 0.9 are regarded as outstanding, > 0.8 as good, and > 0.7 as acceptable. The mean squared load indicator connected to the structure is used to compute the AVE. The path coefficient test gauges how one variable affects another. Moreover, it evaluates the direct influence via a mediator as well as the overall effect on the dependent variable. The beta coefficient is calculated by bootstrapping using the T-value and P-value. The last test, which involves blindfolding, uses sample reuse to quantify the Q2 value in order to assess the study's hypotheses.

Descriptive Analysis

Smart PLS as evaluation tool of variable in descriptive analysis of research model to see the impact of independent variable on dependent variable and also see the impact of mediating variable. Studies used survey method and survey was built on five point “LIKERT SCALE” which has value from one to five (Strongly Disagree 1 to Strongly Agreed 5).

Assessment of the Measurement Model

Smart PLS-SEM is used for theory confirmation and hypothesis rejection, with the "Measuring Model" evaluated for validity and dependability. Convergent and discriminant validity are established to evaluate construct validity, with convergent validity indicating items converge to a measure representing the underlying construct. The average variance extracted (AVE) value must be greater than 0.50 in statistics. Discriminant validity determines the uniqueness of constructs used in the investigation. Reliability, convergent validity, and discriminant validity tests were performed for measuring construct and evaluation. Convergent validity is obtained when all factor loadings of the understudied item are >0.5 and no single loading from those components will high-load to evaluate. Composite reliability level must be at least 0.70 or higher. Cronbach’s Alpha values over 0.8 indicate high level of consistency in all variables under investigation.

Construct Reliability and Validity

The outer loading is a crucial parameter in Partial Least Squares Structural Equation Modeling (PLS-SEM), determining the strength and direction of the relationship between latent constructs and observed variables. It is essential for model assessment in Smart PLS software, which presents outer loading information in tables or visualizations. Cronbach's Alpha is a reliability coefficient used to evaluate the

reliability of latent constructs represented by multiple indicators. A Cronbach's Alpha value above 0.7 is considered satisfactory reliability. Common reliability metrics include Cronbach's Alpha, Composite Reliability (CR), and Dillon-Goldstein's Rho (ρ). Composite Reliability (CR) is preferred over Cronbach's Alpha due to its robustness with reflective latent variables. The Average Variance Extracted (AVE) assesses the convergent validity of latent constructs, with a common threshold of 0.5, implying that at least 50% of the variance in the indicators is explained by the latent construct.

Result of Table show outer loading value are greater than 0.7, Cronbach's Alpha is greater than 0.8, Rho A value is greater than 0.8 Composite Reliability value is greater than 0.8 and Composite Reliability value is greater than 0.5.

Table 1 Construct Reliability and Validity

Variables	Code	Outer loading	Cronbach's Alpha	Rho A	Composite Reliability	Average Variance Extracted (AVE)
Big Data Analytics	BDA 1	0.806	0.859	0.860	0.898	0.639
	BDA 2	0.777				
	BDA 3	0.835				
	BDA 4	0.810				
	BDA 5	0.767				
Block Chain Technology	BCT1	0.739	0.833	0.840	0.882	0.601
	BCT 2	0.811				
	BCT 3	0.706				
	BCT 4	0.848				
	BCT 5	0.764				
Enterprise Resource Planning	**ERP 1**	0.784	0.859	0.860	0.899	0.640
	ERP 2	0.821				
	ERP 3	0.782				
	ERP 4	0.782				
	ERP 5	0.832				
Humanitarian supply chain management	**HSCM 1**	0.817	0.832	0.837	0.881	0.598
	HSCM 2	0.743				
	HSCM 3	0.742				
	HSCM 4	0.812				
	HSCM 5	0.749				

Path Coefficients

The path coefficient represents the link between variables that are thought to impact and be influenced by one another. The route coefficients are calculated using correlations and are constant. The path coefficient must have a minimum value of 0.100 in order to be significant at a level of 0.05. **(**2018) Mohammed et al.

Table 2: Path Coefficient

	BDA	BCT	ERP	HSCM
BDA			0.466	0.602
BCT			0.334	0.017
ERP				0.326
HSCM				

According to results, our three variables BDA, BCT and ERP have path coefficients on HSCM such as 0.602, 0.017 and 0.326 respectively. But the variable BCT have less value that wouldn't be useful or acceptable. All variables haven't values on BDA and BCT while ERP have two values of BDA and BCT ranging such as 0.466 and 0.334 respectively.

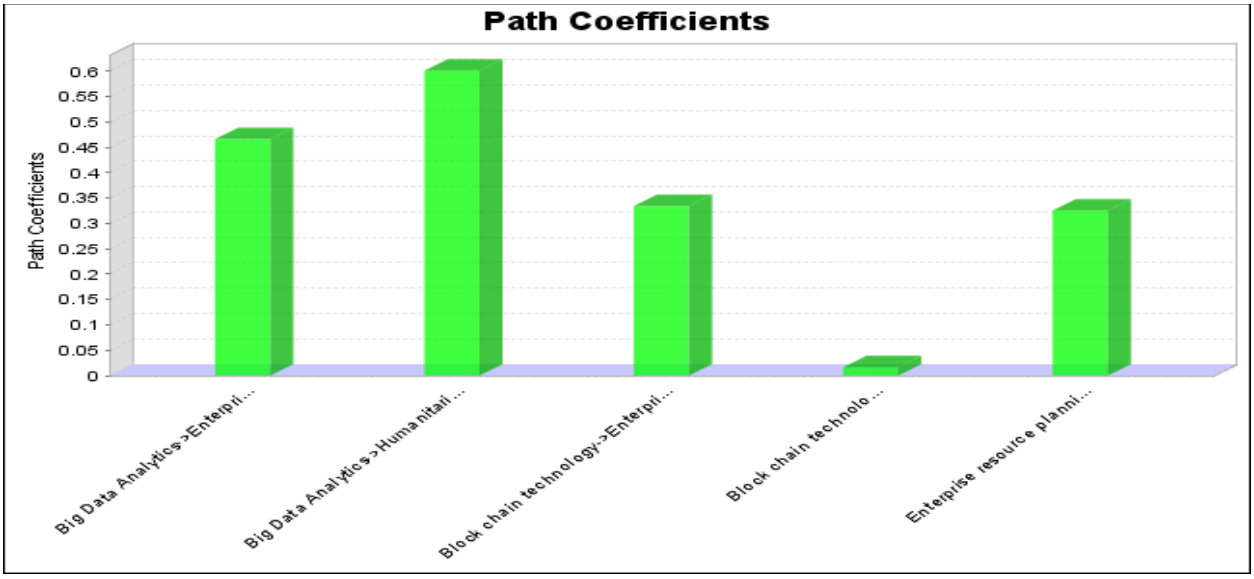

Figure 1: Path Coefficient

This graphical representation of the route coefficients displays the values. The route coefficients provide a measure of the magnitude and slant of the correlations between the model's variables. A positive connection exists when the path coefficient between two variables is positive, while a negative association exists when the path coefficient is negative.

Indirect Effect

PLS-SEM examines indirect effects, which involve the influence of one latent construct on another through intermediary constructs. Researchers define the structural model, validate the measurement model, assess direct effects using path coefficients, and assess total effects using bootstrap resampling for significance testing. Path coefficients should be significantly different from zero, and visual aids like path diagrams or charts aid interpretation.

Table 3: Indirect Effect

	BDA	BCT	ERP	Humanitarian

	SCM
BDA	0.152
BCT	0.109
ERP	
HSCM	

The amount of the link between BDA and BCT on humanitarian supply chain management that is represented by the indirect impact is significant when regression analyses are done and the coefficient values for HSCM are 0.152 & 0.109, respectively.

Specific indirect effect

Specific indirect pathway, performing bootstrap resampling, and calculating the indirect effect. Statistical testing is also necessary to determine the significance of these indirect effects. Smart PLS can provide valuable insights into these relationships, but careful review is necessary to understand their effects.

Table 4: Specific indirect effect

	Specific Indirect Effects
Big Data Analytics -> Enterprise resource planning -> Humanitarian supply chain management	0.152
Block chain technology -> Enterprise resource planning -> Humanitarian supply chain management	0.109

The table above shows particular indirect effects in further detail. All of the variables that are connected to the hypothesis' overall effect in the model are illustrated in the diagram above, and they all have a positive impact.

Discriminant Validity

The Fornell-Larcker Criterion is a method used to evaluate discriminant validity in Partial Least Squares Structural Equation Modeling (PLS-SEM), particularly in SmartPLS. It ensures that different constructs measure distinct underlying concepts, rather than overlapping or being redundant. The criterion is based on comparing the square root of the Average Variance Extracted (AVE) for each construct with the correlations between that construct and all other constructs in the model. This ensures that the construct measures a distinct underlying concept. The criterion is crucial for the credibility of a PLS-SEM model, as it helps draw meaningful conclusions about relationships between constructs. Result is accepted in PLS Smart.

Table 5 Fornell-Larcker Criterion

	Big Data Analytics	Block chain technology	Enterprise resource planning	Humanitarian supply chain management

Big Data Analytics	0.799			
Block chain technology	0.785	0.775		
Enterprise resource planning	0.729	0.700	0.800	
Humanitarian supply chain management	0.852	0.717	0.776	0.773

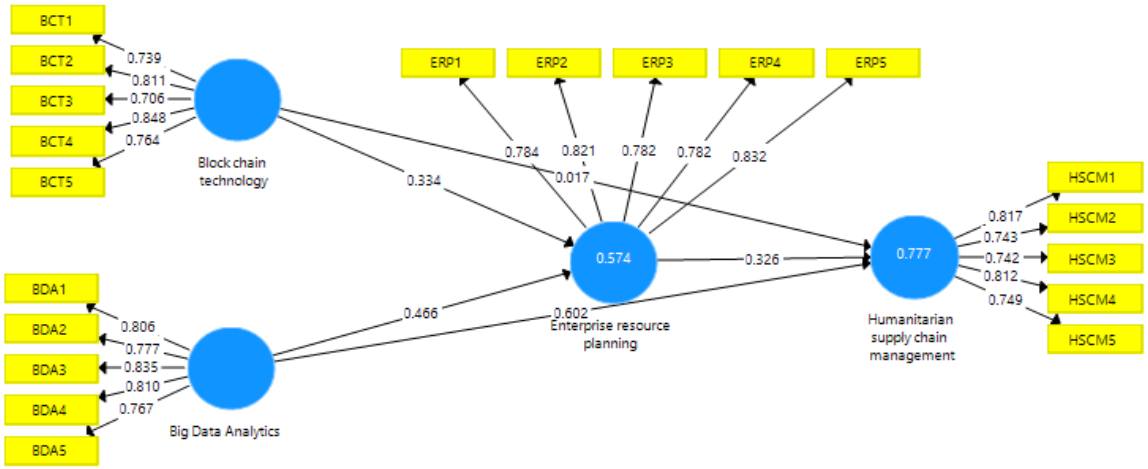

Figure 2: Measurement Model

Structural Model Assessment

Reviewing the measurement model precedes a Smart PLS 3.0 evaluation of the structural model. The structural model must be used to build tests for this, and hypothesis testing must employ values for the path coefficients (T-values), the effect sizes of the variables, and the predictive accuracy of the model under test.

Path Coefficients

By looking at the route coefficients in structural equation modeling, relationships between variables may be examined. These coefficients, which represent the causal link between variables, are standardized versions of the linear regression weights. The relevant explanatory variable's standard deviation is divided by the regression coefficients to normalize. This makes it possible to compare the relative weights of the model's included variables. Strong evidence of a link is defined as a path coefficient of 0.90 or above. T-statistics analysis is used to further assess the model; the t-values used should be more than 1.64. The bootstrapping method may then be used to compute the beta coefficient. Strong evidence to support the links in the model is indicated by a low p-value of 0.

The path coefficient represents the strength and direct relationships between constructs in the model. In this research, we used four constructs: block chain technology (IV), big data analytics (IV), humanitarian supply chain management (DV), and enterprise resource planning (mediator). The PLS modeling process is used to describe how changes in latent variables affect changes in observed variables. To determine whether hypotheses are accepted or rejected, we need to assess the statistical significance of the path

coefficient by examining the P-value. A higher P-value >0.05 shows there is no significance level observed in the results, which rejects the hypothesis. A P-value of 0.05 suggests the hypothesis is accepted. According to the rule of thumb for the significance of these relationships, a T statistic value of 1.96 or greater is accepted. (Joseph F., Hair., & William C, 2019). Interpretation of the above table shows H1: Big data analytics capability have a significant impact at enterprise resource planning a T-statistical value of 4.600 and a P-value of zero show a positive relationship. H2: Big data analytics capabilities have a significant impact at humanitarian supply chain management a T-Statistics value of 8.119 and a P-Value of zero show a positive relationship, and a P-Value of zero is accepted. H3: Block chain technology capability have a significant impact at enterprise resource planning T-Statistics is 3.628, and P-Value is zero. H5: Enterprise resource planning has a significant mediating effect on the path joining HSCM performance The T-statistic is 5.839, and the P-value is 0. H4: Block chain technology capabilities have a significant impact at humanitarian supply chain management T-statistics are 0.215 and P-value is 0.830 according to statistical testing P-Values > 0.05 and T-Values 1.96 are rejected.

Total Effect

Direct, total indirect, particular indirect and total effects are among the results of the PLS-SEM algorithm and the Smart PLS bootstrap technique. These results, which can be found in the Smart PLS results reports, allow the mediator analysis to be performed. Analysis of both simple and multiple mediation models is possible using Smart PLS data.

Table 6: Total Effects

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Big Data Analytics -> Enterprise resource planning	0.466	0.456	0.101	4.600	**0.000**
Big Data Analytics -> Humanitarian supply chain management	0.753	0.742	0.071	10.598	**0.000**
Block chain technology -> Enterprise resource planning	0.334	0.334	0.092	3.628	**0.000**
Block chain technology -> Humanitarian supply chain management	0.125	0.129	0.080	1.567	**0.117**
Enterprise resource planning -> Humanitarian supply chain management	0.326	0.328	0.056	5.839	**0.000**

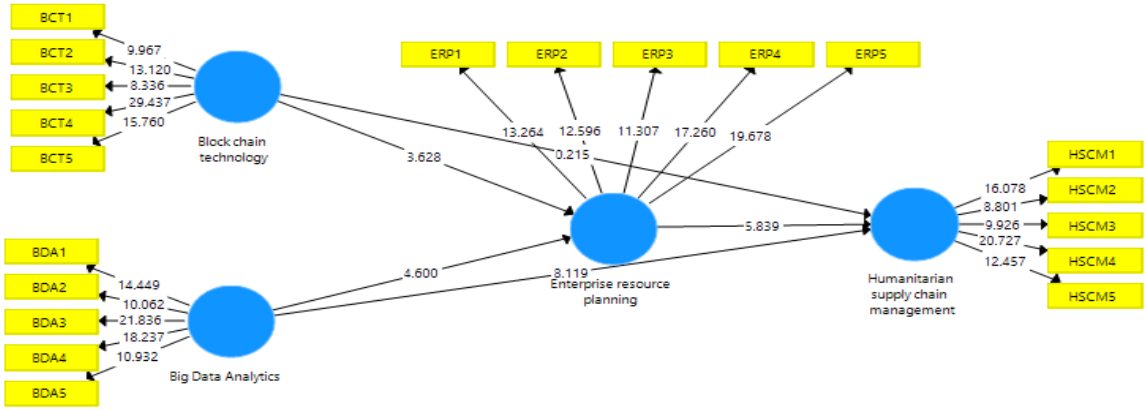

Figure 3: Structural Model

Direct Effect and Hypothesis Testing

Blindfolding is a statistical technique used in Partial Least Squares Structural Equation Modeling (PLS-SEM) to evaluate the predictive relevance of a model. In Smart PLS, blindfolding is an iterative process where a portion of the data is temporarily "blinded" or left out, and the model is re-estimated based on the remaining data. The model is then used to predict the blinded data points, and the difference between predicted and actual values is calculated. The Q2 statistic, which measures the predictive relevance of the model, is often used to summarize blindfolding results. A high Q2 indicates robustness and accurate predictions for new observations. Blindfolding in Smart PLS is a valuable tool for model validation, especially when assessing the model's reliability beyond the dataset used for model development.

Construct Cross validated Redundancy

Cross-validated redundancy (Q^2) is a crucial metric in Partial Least Squares Structural Equation Modeling (PLS-SEM) within Smart PLS. It evaluates a model's predictive relevance by assessing its ability to generalize and make accurate predictions beyond the original dataset. A positive Q^2 value indicates the model's predictive relevance beyond the original dataset, while a high Q^2 value indicates its ability to generalize well to new data.

Table 7: Construct Cross validated Redundancy

	SSO	SSE	Q^2 (=1-SSE/SSO)
Big Data Analytics	705.000	705.000	
Block chain technology	705.000	705.000	
Enterprise resource planning	705.000	460.753	0.346
Humanitarian supply chain management	705.000	393.707	0.442

The table displays the findings of a Construct Cross Validated Redundancy (CVR) study, which evaluates the validity and reliability of a certain measurement model construct. The following variables are represented by the table's columns:

SSO: the original sample's sum of squares

SSE: The sum of squares of the cross-validated residuals, which measures the sample's residual variability after taking the measurement model into consideration.
Q2: The CVR value, which is determined by subtracting 1 from the SSE/SSO ratio. A higher Q2 value signifies that the measurement model and the sample are more closely matched.
The constructions (ERP, HSCMP) had lower Q2 values, ranging between 0.346 and 0.442, demonstrating a less satisfactory fit of the measurement model for these constructs

Construct Cross validated Communality

Cross-validated communality is a statistical technique used to assess the performance and generalization capability of a model in Partial Least Squares Structural Equation Modeling (PLS-SEM) and Smart PLS. It refers to the proportion of variance in an observed variable accounted for by the underlying latent construct.

Table 8: Construct Cross validated Communality

	SSO	SSE	Q^2 (=1-SSE/SSO)
Big Data Analytics	705.000	390.393	0.446
Block chain technology	705.000	426.627	0.395
Enterprise resource planning	705.000	388.581	0.449
Humanitarian supply chain management	705.000	430.552	0.389

The percentage of variation explained by the independent variables in the relevant regression models is shown in this table by the Q2 value. A regression model that fits the data more closely has a higher Q2 value, which means that the independent variables account for more of the variance in the dependent variable.
We can see from the table that several factors have high Q2 values, such as BDA and ERP, indicating that they account for a substantial percentage of the variance in the dependent variable. Certain factors, like BCT and HSCMP, have low Q2 values, suggesting that they do not significantly contribute to the variation in the dependent variable**.**

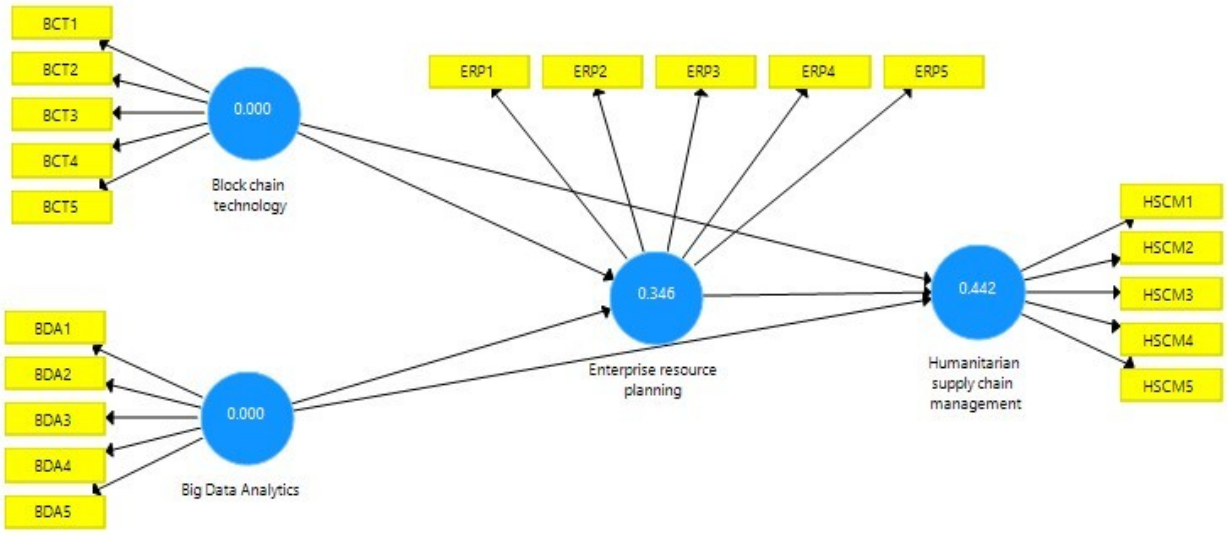

Figure 4: Direct Effect and Hypothesis Testing

CONCLUSION AND DISCUSSION

For the data analysis used Smart PLS for analysis this technique for taken sample size analysis is widely used in Social Science Studies. This chapter discussed the result of studies. Empirical data was used to conduct this investigation about how our variables connect with each other. In past investigations, researchers found that the HSCM performance will guarantee the success of humanitarian missions if BDA and BCT are applied. According to research, if our SCMP is effective, it will be a success. The researcher conducted an empirical study for this thesis to ascertain whether we found ERP to be a significant mediating effect when examining the impact of BDA and BCT at humanitarian SCM performance. She found that there were notable and beneficial effects on HSCM in addition to their reflective relationships with dimensions. ERP has acted as a good mediator for SCM. Both BDA and BCT may improve humanitarian SCM performance, according to the proposed model and empirical findings, supporting the applicability of BDA and BCT for SC and HSCM. The findings demonstrate that BDA has positive effects on HSCM. The mediator function of ERP is significant. In this study, the investigators sought to determine if ERP would have a mediating impact between IVs and DVs, since it had previously been examined as an independent variable in other studies. For the first time, an investigator used ERP as a mediator to examine the outcomes. However, given its importance, we have discovered that the ERP impact's role as a mediator is justified. In this study, we sought to determine whether or not there would be a substantial mediating impact. Therefore, Enterprise Resource Planning is significant with a P-value of 0.05 as a mediating relationship between BDA, BCT, and HSCM. When we obtained our t-values for the mediating effect using bootstrapping, we discovered the value is significant and that the mediating hypothesis is supported because our measurement model loading came out positive with a value of 0.00. The results of the current study confirm our hypothesized model, showing that BDA and BCT have significant impacts on HSCM through influencing HSCM and acting as a mediator for ERP. The current study adds to the body of knowledge in a number of areas regarding big data analytics,

block chain technology, and humanitarian supply chain management. It examines the direct relationships and significant effects between the mediating variable and the dependent variable. Which we have important and beneficial relationships, affects, and linkages, as well as mediating effects. BDA in business enterprises looks to be the secret to productivity and competitiveness for value generation and performance development, according to prior study. According to recent research, businesses intending to benefit from the use of BCT investments may face problems and difficulties instead of seeing any improvement in their performance. To the best of the authors' knowledge, however, not a single empirical study has looked at the influence of each BD characteristic (data variety, data volume, and data velocity) along with TOE factors on the adoption of BDA. Rather, previous studies have largely concentrated on anecdotal evidence suggesting that BDA can increase firm values. The results of this study show how effective humanitarian supply chain management using big data analytics, block chain technology and ERP may improve the efficacy of humanitarian operations in Pakistani humanitarian organizations. The identity and reputation of humanitarian groups may be impacted by these. Workers are more motivated to perform better for their company because they have more faith in the management team. Researchers may find this study useful for extending the body of knowledge and exploring the unexplored element of Enterprise Resource Planning as a mediator. The study's conclusions have a wide range of consequences for academics and decision-makers in humanitarian organizations. Applying BDA, BCT, and sustaining ERP in humanitarian organizations can provide considerable advantages. In order to reap the rewards of HSCM, organizations should maintain their infrastructure sustainability and develop practices that will improve their performance and make it sustainable. Organizations ought to support a culture that promotes sustainable development and the adoption of effective practices.

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