

Big Data Computational Analysis for the Competence of Trade Process among Native Firms

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Abstract – This paper goals at examining the have an impact on of the large information technology and its impact on the efficiency of commercial enterprise operations amongst indigenous firms. The research established the grasp of most commercial enterprise entrepreneurs and IT experts who are trying to find to join the shifting style of the huge information revolution for competitive advantage. It identified the fundamental driving elements at the back of the large facts market in different to consider their collective effect on business competency inside the international market. The learn about grew to be necessary due to the rising need to higher inform our authorities and corporate managers to take their rightful region in the past-paced global economy. The researchers adopted an analytical field survey and two quantitative evaluation approaches: Factor Analysis and the Multiple Regression aimed at examining the elements of big facts computing and their perceived outcomes on business competency. Both principal and secondary records were used in reaching our lookup objective, which gave enough insights into the contributing factors of huge information success and commercial enterprise competency. Based on the findings in this paper, we endorse that company managers ought to be motivated to take benefit of large statistics computing which provides new, affordable, open source, and disbursed structures (such as the Apache Hadoop), and surprisingly effortless to installation with the aid of all business corporations. Big records has been proved to have the capacity to supply phenomenal computing power, and its adoption is certain to bring about extended commercial enterprise competency and introduced aggressive advantage.

Keywords – Big Data, Business Competency, Open Source, Unstructured Data, Real-Time.

I. INTRODUCTION

1.1. The Big Data Technology

Big data is information units that are so voluminous and complex that traditional records processing software applications are inadequate to deal with them [20]. It is a term that describes the giant collections of information – both structured and unstructured – that floods our corporations on a each day basis. According to [5], huge facts is defined as the large and ever-growing and disparate volumes of records which are being created by people, equipment and machines. These dealers generate each structured and unstructured data on a daily foundation from a giant variety of sources inclusive of social media, statistics from internet-enabled gadgets (such as smart telephones and tablets), desktop data, video and voice recordings, and so on. According to [5] also, our society these days generates extra records in 10 minutes than all that humanity has ever created via to the 12 months 2003; and as [7] places it, “... 90% of the facts in the world these days was created in the remaining two years”.

A key success factor for both small and medium scale businesses is the availability of relevant records at the right time. Businesses need to be aware of what choices to make and when to make them, based on the reachable information. They need to understand when to take action and how these selections will have an effect on financial results and operational performance of their each day activities. There is an inherent and power demand for this type of insight by way of enterprise operatives and this demand has brought on the growth of Big information computing globally to enable managers make better, and data-driven selections that will trade the way they manage enterprise operations and compete in the market place.

The Big information revolution is on and it can grant enterprise entrepreneurs and managers with progressive applied sciences to acquire and analytically manner the large statistics elements to derive real-time commercial enterprise insights that relate to such market forces as consumers, risk, profit, performance, productivity administration and superior shareholder value. If excellent harnessed, huge facts computing will create great advantages to commercial enterprise businesses and supply them a competitive gain inside the world market. Effective and efficient commercial enterprise choices are also affected by using the ubiquitous nature of statistics that materials the each day need of corporate organizations. Companies that count totally on their inner historical information, which in most cases is incomplete and inaccurate, will now not stay afloat in today's fast-paced and fairly aggressive market [8]. For corporations to survive in today's international economy, they have to equip themselves with external data and imbibe a forward-looking ideology via predictive modeling approach. Organizations will need to encompass huge information from sources each within and outdoor the enterprise which include structured and unstructured data, computer data, on line and cellular records alongside the organization's person and inside data for the provision of extra predictive views for business decisions.

In order to end up greater competitive and greater efficient in their business operations, corporations will want to include more statistics sources, and make use of better analytical tools so as to go to real-time or near-real-time analysis and make more proactive decision [15]. The purpose for this is not far-fetched: regular structures are gradual and rigid and may additionally no longer effectively manage the measurement and complexity of big data. For example, most enterprise corporations operate with their inner data which is generally structured, historic and most times, incomplete. They make use of such software equipment as relational database management systems for statistics analysis and reporting. This is however insufficient in the face of large volumes of unstructured but relevant facts from various exterior sources that if efficiently harnessed using the right equipment can improve business selections for extended commercial enterprise competency. Big records overcomes most usual restraints in a economical manner and opens opportunities to keep and technique statistics from diverse sources like social media data, market data, communications, and interaction with customers by means of digital channels. According to [5], greater than 80% of the statistics inside organizations is unstructured and therefore unfit for standard processing. Using huge records will enable the processing of unstructured data and an improved business intelligence which can enhance performance in sales, customer pride and desires assessment, aid of advertising initiatives and enhanced fraud monitoring.

Big data capability allows groups to combine a couple of records sources with distinctly low effort in a brief timeframe. Combined with the lower cost of storage per gigabyte, groups can be enabled to build, for example, a federated view of clients via transferring patron information from quite a number separate enterprise departments into a single infrastructure, and run consolidated analytics and reporting on it. It is equally very tough to combine and pass data throughout an enterprise which is traditionally restricted through facts storage structures such as relational databases or batch files with restrained capability to procedure very giant volumes of data, statistics with complicated structure or without structure at all, or facts generated at very high speeds. Organizations want to start managing data via special sources, and integrating their values the use of a vary of technologies accessible in today's market [8]. With the perceived growth in technological capability to harness and analyze disparate volumes of data, and the increased statistical and predictive modeling tools on hand for today's business, big information will no doubt deliver about high-quality adjustments in the way groups compete and operate. Companies that invest in statistics administration and use the large facts technology to successfully derive price from their data will have a clear benefit over their competitors.

In today's enterprise world, it is frequent for commercial enterprise owners to desire new approaches of making use of available records to improve efficiency in strategic decision making. According to [7], there is a professional business want for agencies to obtain aggressive gain over others. Based on that, we see business organizations all over the world taking benefit of the opportunities provided by way of the huge data revolution, but in most cases they have failed to understand that the benefits of huge facts is no longer in the dimension of the handy statistics but the capacity to analyze them to bring out their real enterprise fee for proper selection making. There is need to discover certain hidden drivers of the huge records technology to better inform our governments and company businesses in taking their rightful vicinity in the past-paced world economy. There is equally a want to confirm the level of have an impact on of the huge statistics technology in enhancing commercial enterprise operations amongst indigenous firms.

1.2. Aim and Objectives of Study

The purpose of this research paper is to have a look at the affect of the large statistics technological know-how and its impact on business competency of indigenous corporations within the world market. The find out about will searching for to obtain the following particular objectives:

- i. Identify the riding elements in the back of the massive facts market.
- ii. Evaluate the impact of huge records science on enterprise competency, and
- iii. Ascertain whether or not huge facts computing has increased effectivity of enterprise operations amongst indigenous firms within the global market.

II. THEORETICAL FRAMEWORK

2.1. Foundation for Big Data Initiative

The idea of large records as it is acknowledged these days is extraordinarily new. However the operations worried in statistics gathering, storage, and analysis for value-added commercial enterprise decisions are not new. In truth statistics gathering and evaluation has been there from

the time human beings commenced to live together and interact in business activities. Nevertheless, the huge data thinking started out to acquire momentum from 2003 when Vs of huge records used to be articulated to provide the phenomenon the shape and the current definition it now has. According to the foundational definition in [5], large facts thought has the following 5 mainstreams: volume, velocity, value, variety, and veracity.

Volume:

Organizations accumulate their data from exceptional sources along with social media, mobile phones, machine-to-machine (M2M) sensors, deposit cards, enterprise transactions, photographs, videos recordings, and so on. A vast amount of information is generated every second from these channels, which have end up so massive that storing and examining them would genuinely represent a problem, in particular using our regular database technology. According to [5], fb alone generates about 12 billion messages a day, and over 400 million new snap shots are uploaded every 12 hours. Customers' daily remarks on merchandise and services for instance, are in millions. Collection and analysis of these giant pieces of statistics will truly represent an engineering challenge. Big information then again gives new technologies (such as the APACHE Hadoop) to ease the burden. Business corporations now make use of allotted systems, where components of the records are stored and analyzed in extraordinary areas and then brought collectively by using software software [5].

Velocity:

By velocity, we refer to the speed at which new records is being generated from the a number sources. Example, Emails, twitter messages, video clips, social media updates, and so forth come in torrents from round the world on a daily basis. The streaming data need to be processed and analyzed at the equal velocity and in a timely manner for it to be of fee to the organizations. Results of the analysis must also be transmitted without delay and given access to websites, deposit card verification, and so on. Credit card transactions, for instance, want to be checked in seconds for fraudulent activities. Certain structures like some buying and selling systems additionally need to analyze social media networks in seconds to achieve statistics for acceptable choices to purchase or sell shares. Big information science gives the potential to analyze data whilst it is being generated, and moves statistics round in real-time.

Variety:

Variety refers to exclusive kinds of data; the varied formats in which data is presented. We acquire statistics as structured and numeric data in typical databases. In today's society, we additionally get hold of data as unstructured textual content documents, email, video, audio, monetary transactions, and so on. It is clear that we no longer make use of solely structured facts these days (name, telephone number, and address) that suits well into relational database tables. According to [7], more than 80% of today's data is unstructured. Big data technological know-how now offers new and progressive approaches that approves simultaneous gathering and storage of each structured and unstructured facts [5].

Value:

Data is solely beneficial if it is turned into value. It is correct to have get entry to to a massive amount of data, but valueless records are useless. By value, we refer to the worth of the information being extracted. Business proprietors ought to now not solely embark on information gathering and analysis, but understand the costs and advantages of collecting and analyzing such data. The advantages to be derived from such information ought to exceed the fee of facts gathering and evaluation for it to be taken as valuable. Big information initiative creates a clear understanding of fees and benefits.

Veracity:

Veracity refers to the trustworthiness of the data. That is, how accurate is the data that have been gathered from the a number sources? Big records initiative tries to verify the reliability and authenticity of information such as abbreviations and typos from twitter posts and some net contents. In working with good sized data, massive data technology now allows us to make comparisons that carry out the right and qualitative facts sets, and develops new methods that link, match, cleanse and seriously change facts throughout systems. Sources of Big Data Sources for big records generally fall into three wide categories: Streaming Data: Streaming records is the class of facts which consists of information that receives to your IT systems from agencies of linked devices. Such streams of information can be analyzed as they arrive and selections can be taken as to what information will be kept, what facts will be achieved away with, and what information will require further analysis [8]. Social Media Data: Data emanating from social interactions has currently grow to be an increasingly fascinating set of information, particularly for marketing, sales and help services, although such data sets mainly come in unstructured or semi-structured varieties that pose a unique project when it comes to data extraction, analysis, and consumption. Publicly Available Sources: According to [8], Business records is additionally made reachable via public and open facts sources like the US government's data.gov, the CIA World Factbook or the European Union Open Data Portal.

Importance of Big Data to Corporate Organizations

Big data is very essential if corporate agencies will recognize what to do with it. Data from unique sources can be stored and analyzed to find solutions to a range of commercial enterprise problems. According to [15], huge statistics can assist corporate businesses in the following precise ways:

- a. Cost reductions,
- b. Time reductions,
- c. New product development and optimization,
- d. Accurate and smart decision making.

According to [15], a mixture of big information and other high-powered analytic systems will enable managers accomplish the following business-related tasks:

- Determine root motives of failures, troubles and defects in near-real time.
- Detect fraudulent behavior earlier than it affects the organization.
- Check credit card transactions in seconds to discover fraudulent activities.

- Trading systems can make appropriate selections to purchase or promote shares by way of making use of records from social media networks.
- Generate coupons at the factor of sale based totally on the customer's shopping for habits, and
- Recalculate whole risk portfolios in minutes.

Drivers of the Big Data Technology

The following drivers of huge records science have been identified:

- Ability of administration to undertake new and modern enterprise models,
- Openness to new insights that force aggressive advantage,
- Availability and persisted growth of commercial enterprise data,
- Ubiquitous nature of massive data,
- Failing of typical solutions beneath new requirements,
- High value of statistics systems, as a share of IT spending, and
- Cost blessings of commodity hardware
- Open supply software.

The above drivers are keys to the deployment and diffusion of the huge information initiative. For instance, [8] suggests that the exponential and continued boom of company facts and the inability to make use of facts correctly has given huge statistics a essential technological push. Again, facts is everywhere and in many formats. Besides being in a position to sieve via large volumes of data, having a move of disparate data also poses its very own threats [17]. Text, voice, video, logs and different formats of big facts make it tougher to reap insights the usage of normal tools. Therefore, organizations ought to take benefit of the massive facts revolution to prepare for this exploding statistics kind that is sweeping throughout our entire enterprise world. Any ideology that cuts price will in reality seize the attention of corporate managers [9]. The fee advantages of commodity hardware and open source software program will in reality drive the huge records technology. Our IT departments will experience an awful lot savings from shifting things to commodity hardware and leverage more on open supply platforms. This will provide fee fantastic approaches of accomplishing agency or company objectives. There will be reduction in the incidences of overpayment for top rate hardware when similar or better analytical processing may want to be finished the usage of commodity and open supply systems. Furthermore, it has been correctly argued that typical options are failing to trap up with the new facts demands and new market conditions. Big statistics has given rise to exploding volume, velocity and range of records which are now challenging to manage and demand reducing side technologies [7]. New necessities have emerged from altering market dynamics that could now not be addressed via ancient tools, but demands new massive data equipment [8].

Finally, there is equally a "low barrier to entry" in the massive records revolution. As with any business, low entry barriers should encourage groups to strive special applied sciences and come up with the satisfactory strategy. Easy-to-deploy frameworks and revolutionary enterprise paradigms have made on hand loads of tools, which are pretty effortless to use with the aid of all business corporations. These tools have been confirmed to have the capability to deliver out of the ordinary computing electricity for commercial enterprise breakthroughs.

III. RESEARCH METHODOLOGY AND DATA ANALYSIS

3.1. Research Design

Research diagram is a blueprint for conducting a study with most manage over all elements that may additionally intrude with the validity of the findings [3]. It is a diagram that describes how, when, and the place statistics will be gathered and analyzed, and represents the researchers' usual information for answering the lookup questions or testing the lookup speculation [12]. In this study, the researcher adopted an analytical discipline survey approach and a quantitative strategy aimed at inspecting the elements of large information computing and their outcomes on commercial enterprise competency within the international market economy. Two primary quantitative evaluation methods were adopted which consist of Factor Analysis approach, and the Multiple Regression. Both important and secondary facts have been used in reaching our research objective, which gave ample insights into massive records technologies and printed the using factors for its adoption by way of indigenous company organizations.

3.1.1. Data Collection

Primary data was gathered from administration of structured questionnaire to a chosen team of enterprise owners, company managers, and IT experts inside the goal population. Data used to be further subjected to issue evaluation the use of the IBM Statistical bundle for Social Sciences (SPSS) version 17. Hypothesis checking out was carried out using two statistical tools namely: The Analysis of variance (ANOVA) and the R-square test of association. Interpretation was given based on the lookup questions and the hypothesis testing.

3.1.2. Model Specification

To investigate and analyze the massive data computing and its consequences on business competency, we rent the more than one regression model.

The regression analysis carried out confirmed a relationship between the impartial variables (X_i) and the based variable (Y) as follows:

$$Y = a_0 + a_1x_1 + a_2x_2 + a_3x_3 + a_4x_4 + a_5x_5 \dots + a_nx_n + \epsilon_1 \quad (1)$$

Where

Y = Dependent variable.

x_1, x_2, \dots, x_n are the independent variables,

a_0 = Constant cost of Y when all x values are 0,

a_1, a_2, \dots, a_n are internet regression coefficients.

For instance, a_0 measures the exchange in x_1 while keeping the different variables constant, and ϵ_1 is the independent and normally dispensed random error time period with imply as zero.

In this study, 5 (5) primary riding elements had been recognized as affecting huge data computing for increased commercial enterprise competency. They include: Availability and increase of business data, ubiquitous nature of big data, capability to undertake new commercial enterprise models, failure of normal solutions, and fee advantage of open supply software.

Using the above regression mannequin therefore, we assign the following variables:

Y = Big information success / business competency

X_1 = Data availability

X_2 = Data ubiquity

- X3 = Openness to new commercial enterprise procedures
- X4 = Inadequacy of regular solutions
- X5 = Cost discount

3.2. Hypothesis Testing

The following speculation was formulated and examined at 0.05 self assurance level:
 H01: The collective drivers of huge facts computing have no considerable impact on commercial enterprise competency amongst our indigenous companies inside the world market economy.
 HA1: The collective drivers of huge statistics computing have big impact on business competency among our indigenous companies inside the world market economy.
 In order to check the null speculation H01 noted above, the Analysis of Variance (ANOVA) used to be used. Also the F-test was once used to test the magnitude degree of each recognized driver of large records technology on commercial enterprise competency.

IV. EMPIRICAL FINDINGS AND DISCUSSIONS

4.1. Descriptive Statistics

Table 4.1 suggests the descriptive statistics of the large statistics success / commercial enterprise competency with recognize to the five (5) drivers of big statistics identified, which are: Data availability, Data ubiquity, Openness to new business approaches, Inadequacy of usual solutions, and Cost reduction. From the desk 4.1 we word that large facts success / enterprise competency (Y) has a imply cost of 29.83. This implies that the diffusion of big statistics science has sizeable high-quality effect on improved commercial enterprise competency and offers aggressive gain inside the global market economy. This impact alternatively is not very excessive as considered from the table. Notice additionally that the value of big records success / commercial enterprise competency is quite excessive for widespread deviation. The table also shows the suggest cost and fashionable deviation of all the elements affecting massive information success / business competency. We equally note from the desk 4.1 that value reduction has the best possible suggest fee of 16.46. This capacity that of all the identified drivers of the large facts technology, most of our respondents aid the reality that price reduction has a splendid impact on the successful adoption of the massive statistics technology. We also be aware from table 4.1 that the value of large information success / commercial enterprise competency is negatively skewed, while most of the elements affecting large statistics science are seen to be typically distributed.

Table 4.1. Descriptive Statistics

	Mean	Standard Deviation	Skewness	N
Big data success / Business competency	29.8300	4.27618	-4.2541(0.000)	100
Data availability	14.5100	3.99864	0.0508(0.876)	100
Data ubiquity	14.3200	3.01940	-0.5753(0.146)	100
Openness to new business approaches	13.5400	2.63858	0.2324(0.685)	100
Inadequacy of traditional solutions	14.3200	2.62805	0.1675(0.235)	100
Cost reduction	16.4600	2.86505	0.0628(0.345)	100

Source: Researchers' Computation via SPSS version 17.0

4.2. Determining the Relationship between the Independent Variables and the Dependent Variable the use of Pearson’s Coefficient.

Pearson correlation coefficient (r) is adopted to test for strength of the relationship between variables. Table 4.2 gives the end result of the take a look at for relationship between the based variable (Y) and the impartial variables (Xi). From the result, it can be hooked up that there are fine relationships current between huge data success / business competency and the quite a number elements considered in this study. For example, the relationship between price discount and huge information success is proven with $R = 0.393$. The relationship between different unbiased variables with massive records success / commercial enterprise competency is also shown. From the table, it can be discovered that the relationship between Inadequacy of traditional options (X4) and Data ubiquity (X2) has the highest hyperlink with $R = 0.486$.

Table 4.2. Link between the Independent Variables and the Dependent Variable using Pearson’s Coefficient

		Big data success/ Business Competency	Data availability	Data ubiquity	Openness to new business approaches	Inadequacy of traditional solutions	Cost reduction
Pearson Correlation	Big data success / Business Competency	1.000	.034	.308	.339	.378	.393
	Data availability	.034	1.000	.001	-.103	.133	-.015
	Data ubiquity	.308	.001	1.000	.139	.486	.455
	Openness to new business approaches	.339	-.103	.139	1.000	.268	.310
	Inadequacy of traditional solutions	.378	.133	.486	.268	1.000	.428
	Cost reduction	.393	-.015	.255	.310	.428	1.000
	Sig.(1-tailed)	Big data success / Business Competency	.	.376	.001	.000	.000
Data availability		.367	.	.495	.154	.094	.443
Data ubiquity		.001	.495	.	.084	.000	.000
Openness to new business approaches		.000	.154	.084	.	.003	.001
Inadequacy of traditional solutions		.000	.094	.000	.003	.	.000
Cost reduction		.000	.443	.000	.001	.000	.
N		Big data success / Business Competency	100	100	100	100	100
	Data availability	100	100	100	100	100	100
	Data ubiquity	100	100	100	100	100	100
	Openness to new business approaches	100	100	100	100	100	100
	Inadequacy of traditional solutions	100	100	100	100	100	100
	Cost reduction	100	100	100	100	100	100

Source: Researchers’ Computation via SPSS version 17.0

4.3. Relationship Model Estimation and Interpretation

The regression result from desk 4.3 shows that $R = 0.504$, and $R^2 = 0.254$. The mannequin precis additionally revealed the dependent variable 1(Y), and predictor variables 5(X1, X2, X3, X4, and X5). The normal predictability of the mannequin is equally shown in table 4.3. It can be found that R-square fee for the model is 25.4% (with $R^2 = 0.254$). This result indicates that the

influence level of the large data technology on enterprise competency can be estimated from the unbiased variables (Data availability, Data ubiquity, Openness to new enterprise approaches, Inadequacy of normal solutions, and Cost reduction). Thus, massive facts computing has been proved to have 25.4% effect on enterprise competency of indigenous companies inside the global market economy.

Table 4.3. Model Summary

Table 4.3. Model Summary Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	.504(a)	.254	.214		3.77376

Source: Researchers' Computation via SPSS version 17.0

V. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

In this research we have examined the impact of the big data technology to discover its effect on business competency for improved business competency of our indigenous firms within the global market economy. The research has further established the perception of various business entrepreneurs and IT experts on the need to join the moving trend of the big data revolution for a competitive advantage. Results obtained showed that all the driving factors considered in this study (Data availability, Data ubiquity, Openness to new business approaches, Inadequacy of traditional solutions, and Cost reduction) contribute to big data success and business competency of indigenous firms. From the study also, we conclude that "Cost advantages of commodity hardware and open source software" is the most critical factor of the big data technology.

5.2. Recommendations

Based on the findings in this research paper, we recommend that government agencies and corporate managers should be encouraged to take advantage of the big data revolution which opens new offers for businesses to try new technologies. Big data technology has made available lots of affordable, open source, and distributed platforms (such as the Apache's Hadoop), that are relatively easy to deploy by all business corporations. Since big data has been proved to have the capacity to deliver phenomenal computing power, its adoption by indigenous firms is bound to bring about improved business competency and added competitive advantage.

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