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Data Democratization in Business Intelligence and its Role in Increasing Efficiency within Multi-National Organizations

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ABSTRACT

Study's main aim was to shed the light on data dem ocratization as one of business intelligence practices and examine its influence in increasing efficiency within multi-national organizations in terms of (accessibility, interpretability, collaboration, governance, empowerment, scalability and feedback loop). Reaching that aim was done depending on quantitative approach in which we employed a questionnaire self-administered by (261) individuals. Through SPSS dealing with primary data; results of analysis indicated that data democratization in business intelligence statistically influence efficiency within multi-national organizations. Among the chosen sub-variables of study, it was found that scalability in business intelligence statistically influence efficiency within multi-national organizations.

Keywords: Business Intelligence, Data Democratization, Efficiency, Empowerment, Scalability and Feedback Loop
JEL Classifications: M15, D83, D24, M16

1. INTRODUCTION

The evolution to business intelligence (BI) represents a major turning point in the ability of organizations to use data to support their goals and strategies. Niu et al. (2021) argued that BI emerged from business data analysis used in analysis and management information systems and has become a phenomenon that is ubiquitous in modern business process. With the constantly growing amounts of data and the needs for timely analysis, BI tools and practices are as important as air within today's business environments.

According to Sjarif et al. (2021), the emergence of BI in business world is based on the ever-increasing realization that data is actually an important organizational asset that, if well harnessed, can spur innovation and efficiency as well as unlock strategic opportunities for competitive edge. Large corporations have now woken up to the reality that the digital age and big data mean that decision makers need insights in the form of structured information from the huge volumes of data available. Business Intelligence tools and platforms have now evolved into critical means for compiling and visualizing data that helps stakeholders of an organization make informed decisions (Bharadiya, 2023).

From perspective of Gottfried et al. (2021), in an ever evolving business environment whereby change happens at the blink of an eye, business intelligence has invaded every modern business. When organizations use BI solutions they are able to gather rich insight into customer behaviors, markets, operations, and financials in order to swiftly respond to dynamic environments and capitalize on them. The expanded inclusion of BI in organizations' programs has not only served to optimize their functions and reduce costs but also molded organizational concern towards effective decision-making that forms the backbone of development and creativity in the contemporary business world (Phillips-Wren et al., 2021).

1.1. Business Intelligence (BI)

Doshi et al. (2023) came defining BI as technologies, tools, applications, processes and associated best practices that organizations use to gather, analyze, process, report and distribute

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business information. Kilani (2022) argued that BI involves turning the collected data into information with a view to assist in decision-making. Business intelligence solutions assist an organization in the collection, warehousing, analyzing and visualization of data from disparate sources to identify patterns, trends and indicators for efficiency in the formulation of the business strategy (Freihat et al., 2023; Nimer et al., 2022).

Bharadiya (2023) added that BI is the appliance of a set of specialized software tools for turning raw data into an informative content handy for reaching business decisions for executives, managers, and other employees of a company. According to Niu et al. (2021) BI is a systematic approach to the integration of methods, tools, structures and technologies for the management of corporate data for the purposes of producing business-relevant information. Such definitions - as according to Kilani (2022) - put into focus that business intelligence is providing comprehensive and optical picture of business, its customers, market environment and internal business processes to the organizations in support of their decision making and strategic management.

Al-Okaily et al. (2023) noted that BI components may comprise functionality such as data visualization, data dashboards, reporting, ad hoc query, and even predictive analytics that will assist users to enhance operational effectiveness, uncover marketing opportunities, as well as manage risks. According to Qafesha et al. (2024), business intelligence solutions help organizations become more effective in the context of a modern data environment by using its potential to enhance various processes and make necessary changes quickly.

1.2. Data Democratization in BI

Lefebvre et al. (2021) stated that data democratization is a concept, which belongs to data analysis and business intelligence and promotes free access, usage, and enfranchisement of people in an organization. This idea is based on repudiation of the idea of compartmentalizing and segregating data where it becomes the preserve of a few elites in organizations or specific departments of an organization. Data democratization is seen as purposes to enable all business workers who are not experienced in data analysis to use these data in decision-making (Harland et al., 2022).

Burtenshaw (2022) noted that from a business perspective data democratization is viewed as a carefully planned business approach to drive value and create and effective data culture throughout the organization. It therefore means that organizations can increase data accessibility that in turn can increase transparency, productivity and avenues for creating value from information sets. This approach as according to Olaoye and Potter (2024), on top of improving operation functionality and flexibility, improves decision-making decision inclusiveness and accuracy as a result of minimizing the negative effects of decisions espoused by the modern data-driven business environment.

1.3. Data Democratization in Multi-National Organizations (MNOs)

Data democratization has risen as a competitive necessity in MNOs to support employee engagement in data decision-making processes by providing them with suitable technology tools to analyze large volumes of data. Marinakis et al. (2021) argued that through reducing data isolation and sharing information to varying teams in different locations, MNOs are able to accelerate a culture of analytic superiority across the organization irrespective of geographical location. With self-service BI tools, MNOs allow its employees to analyze data on their own and discover trends, patterns and usage of BI dashboards and data visualization tools enhance decision-making and thereby improve operational flexibility of business (Samarasinghe and Lokuge, 2022).

Eichler et al. (2022) stated that when it comes to MNOs, data democratization serves as a crucial approach to synchronizing the consolidated dataset and avoiding assorted perceptions of business outcomes and market trends worldwide. Due to enhanced accessibility of numerous databases, MNOs can contribute towards enhancement of knowledge flow besides propelling a synchrony of objectives between numerous departments on worldwide basis. The practice of data democratization also helps MNOs manage the threats in data fragmentation and data inconsistency, create the general standard for further reporting and benchmarking, and constant monitoring of the performance at the subsidiaries and business units level (Eboigbe et al., 2023).

Omol et al. (2024) added that by providing access to data for employees of the MNOs, it is possible to foster a culture of data usage and promote learning based on that data. By offering training programme, seminars and information exchange, MNOs can equip employees to be able to understand data, form the right questions to ask and come up with relevant questions to receive the right insights that will enhance operational effectiveness and innovation. Gad-Elrab (2021) also confirmed that data democratization does more than increase workforce participation and response or make employees more responsible for the use and maintenance of business data; it also makes the MNOs more proactive and responsive to the dynamic market forces and increased competition.

1.4. Dimensions of Data Democratization

Several dimensions of data democratization include the process by which data is made available, interpretable and usable by diverse employees in the firm. It was noted by Samarasinghe and Lokuge (2022) and Samarasinghe et al. (2022) that there are seven key dimensions of "big data" analytics, namely accessibility, interpretability, collaboration, governance, empowerment, scalability, and feedback loop are critically important in creating the cultural context for "big data" analytics and innovation. Focusing efforts on improving data availability, shared use of data, effective governance structures, and ongoing end user feedback ensure that organizations achieve the maximum value from their data, as well as ensure that end-users across the organization are equipped to utilize data strategically (Harland et al., 2022; Kapadia, 2023; Wang et al., 2022; Flaherty et al., 2022; Hertzano and Mahurkar, 2022).

1.4.1. Accessibility

Availability of data is a critical component of data democratization that seeks to make the right data accessible to users in the

organization. This has to do with the ability to adopt tools and processes that help to eliminate barriers to data owners and analysts, and to provide easy access to data repositories, reports, and analytical applications. Through the provided easy access to information, organizations enable skills development of their employees, research on information on their own, decision making, and increase organizational effectiveness.

1.4.2. Interpretability

Another important possibility is that interpretability is the capability of generating meaning from data efficiently. This dimension is underlined by the need to transform data into a set of packages that may be understood and used by different stakeholders. Organizations make data understandable, clear, and give training on how to read and analyze that data to make good decisions and plans in an organization.

1.4.3. Collaboration

Coordinated data democratization stresses the working on culture insights and benchmarking of the practices within the organization. This dimension fosters cross-business unit cooperation, learning, and problem solving with respect to the data management agenda. Due to increased cooperation between people and departments in business, organizations can tap into the resources within different teams and come up with stable solutions, make wiser decisions, and gain a broader perspective on organizational issues and potential benefits.

1.4.4. Governance

The fact that governance of data democratization is an important element raises questions concerning policy, procedure, and control aimed at maintaining the quality, integrity, and compliance of the data in an organization. Governance frameworks specify who does what, which data belongs to whom, who can access and in what manner, and how to protect data and ensure that consumers have confidence in the worth of the data. In this case, organizations can minimize risks attributed to misuse of data, legal compliance as well as instill corporate responsibility on data management and use.

1.4.5. Empowerment

In the context of data democratization, the meaning of the term empowerment refers to preparation of individuals to make optimal use of data in their decision making processes. This particular dimension entails the culture of developing capacity, training and supporting employees on data and using data. By empowering users, organizations allow people to search the data, provide the correct questions, and find meaningful answers that help to shape organizational development and innovation. Engaging employees also means that they shall take full responsibility of data related tasks and this shall help to foster concretization of data enhancement tasks and enhance continuous improvement within the organization.

1.4.6. Scalability

Another facet of data democratization is scalability that is the pragmatic capability of data processes, systems, and infrastructure to handle more volumes of data and additional users. Scalability is the ability to create data architectures, and solutions to grow or shrink based on the changing business needs without affecting either performance or data quality. When organizations thus achieve scalability of the data democratization effort, they can meet the future needs for data, incorporate more users, and handle big data analytics tasks swiftly. Self-servicing of data requires an infrastructure that can support it to help organizations achieve their data led transformation.

1.4.7. Feedback loop

The emphasis in this dimension of data democratization is to set up a feedback system to capture directions from users and stakeholders concerning data processes, tools and insights being used. This dimension fosters culture change in learning and continuous improvement through helping organizations gather feedback on data content and values for decision-making purposes. Including feedback cycles in data democratization processes enables organizations to recognize areas that require improvement, understand the requirements of the consumers, and continuously make improvement to data management procedures for maximum productivity. The feedback loop builds teamwork, participation and quick problem-solving measurability in decision-making leading to better results.

1.5. Data Democratization from Around the World

Mcdonald (2024) stated that there are many MNOs that managed to include data democratization practices in their strategies for improving organizational functions and effectiveness in their global networks. Among these organizations:

1.5.1. Microsoft

Microsoft has led the way in the process of data democratization inside its corporate entity. Microsoft uses solutions such as Power BI and Azure Data Services to allow organizational workers at any tier obtain, analyze data, design dashboards, and generate derived insights when making decisions. Due to the availability of data, teams have increased organizational effectiveness and operational efficiency making collaboration easier across regions.

1.5.2. Procter and gamble (P&G)

P&G, a global consumer goods company, has benefited from its process of data democratization. By introducing the concept of self-service analytics and business intelligence tools like Tableau into P&G by providing the data, employees have been able to query the data, collect insights about the consumers in the market place and generally create solutions to new ideas in product development and marketing strategies. This paper shows that data democratization at P&G has supported cross-interaction between teams and functions, improved decision-making processes, and increased operational efficiency.

1.5.3. Unilever

Unilever is a multinational company, which belongs to the consumer goods sector; therefore, in its processes, the company applies the concept of data democratization. Unilever has been empowering employees through engaging data analytics techniques and the cloud data environment to enable real-time data analytics for supply chain and marketing effectiveness as well

as new product development. Data democratization has helped Unilever to create the sharing of valuable information, increase organizational transparency and enhance rapid decision-making across its global nature.

2. PROBLEM STATEMENT, MODEL AND HYPOTHESES

Takang and Amaechi (2023) argued that in the modern trend of changing the business environment and the need to use data for business improvement, data democratization in business intelligence has gained a lot of attention from organizations. Thus, this research seeks to fill the gap that has been realized based on how data democratization influences efficiency of MNOs. Wishing to contribute to the investigation of the factors related to data democratization concept, this study seeks to focus on seven dimensions of data democratization, namely, Accessibility, Interpretability, Collaboration, Governance, Empowerment, Scalability, and Feedback Loop to clarify the impact of such practice on increasing effectiveness of various kinds of works in different geographic contexts. Durango et al. (2024) stated that while there is increasing pressure to open up data and make it available to more people, still there are few scholarly studies that examine the interrelationships of these factors and their cumulative effect on operational performance in MNOs.

As for Vemulapalli (2023), it was noted that by realizing that business intelligence comes with many layers in terms of Accessibility and Interpretability, Collaboration and Governance, Empowerment, Scalability and the Feedback Loop is where MNOs face a multifaceted challenge to obtain the best business intelligence functioning. A literature review reveals that prior works analyzed each type of factor independently although no research synthesizes them to understand how they collectively promote efficiency within the framework of data democratization. Tan (2021) supported the same idea adding that it is with this rationale that this study shall attempt to fill this identified gap through an assessment of these dimensions uniquely in the context of multi-national organizations. To grasp how these pieces of data democratization contribute to operational effectiveness is critical for MNOs which try to get the maximum value of their data and remain relevant in a data-centric world economy.

Going through the previous literature and related studies, we have aimed in this study to shed the light on business intelligence "data democratization" and how it managed to increase efficiency within multi-national organizations including (Accessibility, Interpretability, Collaboration, Governance, Empowerment, Scalability and Feedback Loop). In other words, our study seeks to answer the following question:

> How can data democratization in business intelligence have a statistical influence efficiency within multi-national organizations?

Answering the study question was done through achieving the following objectives:

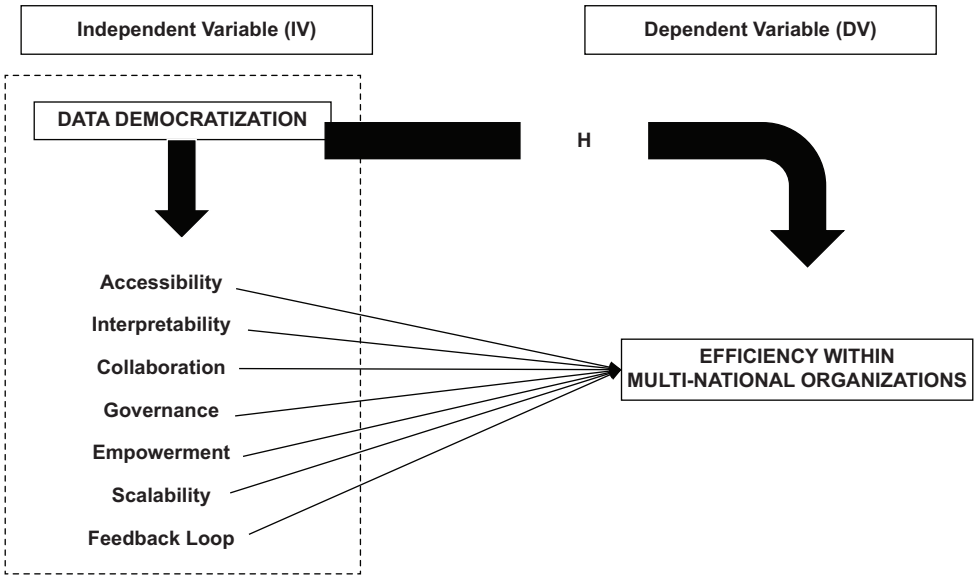
- Identify the concept of data democratization as one of BI services
- Explore data democratization in terms of (accessibility, interpretability, collaboration, governance, empowerment, scalability and feedback loop) in relation to business efficiency
- Shed the light on multi-national organizations" degree of awareness regarding data democratization

In order to make our argument clearer and more vivid, we have built a model from which study hypotheses was derived.

Based on Figure 1, study hypotheses were:

- Main hypothesis
  H: Data democratization in business intelligence statistically influence efficiency within multi-national organizations
- Sub-hypotheses
  H_1: Accessibility in business intelligence statistically influence efficiency within multi-national organizations

Figure 1: Study model Takang and Amaechi (2023); Durango et al. (2024); Vemulapalli (2023); Tan (2021)



H_2: Interpretability in business intelligence statistically influence efficiency within multi-national organizations
H_3: Collaboration in business intelligence statistically influence efficiency within multi-national organizations
H_4: Governance in business intelligence statistically influence efficiency within multi-national organizations
H_5: Empowerment in business intelligence statistically influence efficiency within multi-national organizations
H_6: Scalability in business intelligence statistically influence efficiency within multi-national organizations
H_7: Feedback Loop in business intelligence statistically influence efficiency within multi-national organizations.

3. MATERIALS AND METHODS

The current study followed the quantitative methodology in order to answer its question and realize its presented hypotheses. Among quantitative methodology tools, a questionnaire was chosen to be the main tool in current study for primary data collecting. The questionnaire was built on Likert 5-point scale and consisted of two main sections; the first took into perspective demographics of study sample. While the other presented statements related to study's sub-variables including (Accessibility, Interpretability, Collaboration, Governance, Empowerment, Scalability and Feedback Loop).

For validity sake, the questionnaire was arbitrated by a group of academics in the field; in its final version, the questionnaire consisted of (41) statements. Testing reliability and consistency of questionnaire was done depending on Cronbach's alpha test (α). It appeared that the questionnaire was reliable and consistent as alpha values scored higher than 0.70 as according to Table 1.

Table 1: Alpha value

Variable	Alpha value
Accessibility	0.702
Interpretability	0.855
Collaboration	0.721
Governance	0.756
Empowerment	0.707
Scalability	0.712
Feedback loop	0.746
Efficiency	0.776

Table 2: Demographics

Variable	f	Percentage
Gender		
Male	211	80.8
Female	50	19.2
Education		
Diploma or below	47	18.0
BA	138	52.9
High studies	76	29.1
Experience		
2-6	46	17.6
7-11	83	31.8
+12 years	132	50.6
Total	261	100.0

Population of study was managers and administrative officers within multi-national organizations operating in Jordan. We have chosen (300) individuals to respond to a self-administered questionnaire as a convenient sample. After distributing the questionnaire, we were able to retrieve (261) properly filled questionnaires. This managed to refer to response rate of 87% as statistically accepted.

Dealing with primary data was done through statistical package for social sciences (SPSS). We have run mean and percentage tests on demographics data, in addition to multiple and regression tests on study hypotheses.

It is worth mentioning here that current study was launched under the premises of "Information Processing Theory." This theory takes a view on how data is gathered from and within organizations and how this data is used to make decisions. Information availability is also in line with some postulates of the information processing theory because accessibility, interpretability and collaboration characterize data democratization approach in many organizations today. Making the data easily accessible, usable, and disseminating it throughout the organization, can help MNOs enhance the quality of decisions made as well as their organizational performance.

4. RESULTS AND DISCUSSION

4.1. Demographic Results

Table 2 presented results of demographic analysis. As it was seen, 80.8% of individuals were males who held BA degree forming 52.9% with an experience in the field that was more than 12 years forming 50.6%.

4.2. Questionnaire Analysis

Looking at Table 3 below, it can be seen that the questionnaire was well-received by individuals as they managed to respond to it with a mean that was higher than mean of scale 3.00. Collaboration scored the highest mean of 4.306 compared to the lowest that was accessibility scoring a mean of 3.927, however, it is still considered positive, as it was higher than mean of scale.

4.3. Multicolleniarity Test

The variance inflation factor (VIF) and Tolerance were computed for each independent variable to assess multicollinearity. Table 4 below indicated that the variance inflation factor (VIF) scores fall below 10, while the Tolerance figures exceed 0.10.

4.4. Hypotheses Testing

The main hypothesis was tested depending on multiple regression. r = 0.908, shows a strong correlation between the variables we're looking at (Table 5). What's more, the variables we are studying explain 82.4% of the changes we see in what we're measuring. Also, the analysis found that the F value is important at a 0.05 level. This means that Data democratization in business intelligence statistical influence efficiency within multi-national organizations.

Table 3: Questionnaire analysis

Statement	μ	σ
Needed data are accessible all the time for employees and users	3.716	1.036
There is no need for technical expertise to access the needed data	3.812	1.212
Tools are user friendly and smooth	4.011	0.926
The interface of data in AI is easy and accessible	3.885	1.005
Easiness of data generators does not require specialized training	4.211	0.906
Accessibility	3.927	0.691
Democratized data enjoy a high level of understandability	3.770	1.053
It helps individuals understand it through the source and place	3.989	0.879
Democratized data can appear visually, which help individuals dealing with it	4.050	0.925
Usually democratized data can appear intuitively	4.172	0.875
Insights are easily interpreted due to democratization of data	4.050	0.925
Interpretability	4.006	0.743
The fact that users are allowed to share and collaborate makes data more facilitating	4.372	0.909
Analysis take place easily through collaboration of democratized data	4.510	0.871
It helps reaching a collective decision-making based on current data	4.107	1.211
Democratized data are usually based on feedback mechanism	4.299	1.028
Data that are democratized are known to be of quality	4.241	0.980
Collaboration	4.306	0.692
Democratized data are accurate and secure	3.655	0.982
When data are democratized, they are usually regulated with governance	3.916	0.920
Democratization makes sure that data are trustful and enjoys integrity	3.900	0.876
The access control in democratized data establishes who can view them	4.146	0.756
Democratization with governance protect sensitive data and maintain its security	4.172	0.812
Governance	3.958	0.621
Democratized data give empowerment to users to explore more insights	4.061	0.930
It can give users their own visualization in preparing independent reporting	4.257	0.799
It provides the resources and support that an organization need for more insights	4.268	0.787
Users who depend on democratized data are usually with better skills and confidence	3.977	1.067
Democratized data are effective data	4.107	0.825
Empowerment	4.134	0.602
Democratized data are usually able to accommodate its growth	3.778	1.010
Data democratization efforts ensure a good level of scalability	4.027	0.942
It optimizes performance through well-processed data	4.207	0.806
Effective data can be accessed effectively according to their scalability	4.123	0.837
The scalability of data gives more insights and information for users	3.927	0.999
Scalability	4.012	0.629
Democratization presents feedback from users regarding data quality and availability	4.226	0.999
Feedback can help in always improving data quality	4.226	0.999
Data democratization efforts enhances overall accessibility to the needed data	4.077	1.082
Individuals can find solutions for the data through feedback	4.142	0.928
Usability of data are more apparent due to democratization	3.885	1.134
Feedback loop	4.111	0.726
Organization now have better decision-making tools due to democratization	3.969	1.030
There would be a noticeable collaboration level due to availability to needed data	4.130	0.911
Availability to needed data positively influence efficiency of performance	4.065	0.940
There is a consistent access to better insights which helps better performance	3.985	0.911
Accessibility to quality data enhances business units	4.184	0.773
Democratized data gives more agility to multi-national organizations	4.211	0.778
Efficiency	4.091	0.615

Table 4: VIF

Variable	Tolerance	VIF
Accessibility	0.358	2.792
Interpretability	0.314	3.188
Collaboration	0.676	1.479
Governance	0.388	2.575
Empowerment	0.403	2.480
Scalability	0.307	3.259
Feedback loop	0.643	1.555

As for sub-hypotheses presented earlier, we have utilized linear regression to test them and find their correlation in reference to the dependent variable. Results of analysis as Table 6 indicated that following:

H_1: r = 0.53 showed a medium correlation between the variables we're looking at. What's more, the variables we're studying explain 28.1% of the changes we see in what we're measuring. F value was important at a 0.05 level. This means that Accessibility in business intelligence statistical influence efficiency within multi-national organizations

H_2: r = 0.561 showed a medium correlation between the variables we're looking at. What's more, the variables we're studying explain 31.4% of the changes we see in what we're measuring. F value was important at a 0.05 level. This means that Interpretability in business intelligence statistical influence efficiency within multi-national organizations.

Table 5: Testing main hypothesis

H: Data democratization in business intelligence statistical influence efficiency within multi-national organizations							
Coefficients							
Model	**Unstandardized coefficients**		**Standardized coefficients**	**t**	**Significance**	**R**	**R square**
	B	**Standard error**	**Beta**				
1							
Ç(Constant)	0.105	0.140		0.751	0.453	0.908[a]	0.824
Accessibility	−0.028	0.039	−0.031	−0.701	0.484		
Interpretability	0.043	0.039	0.052	1.094	0.275		
Collaboration	0.037	0.029	0.041	1.289	0.199		
Governance	−0.136	0.042	−0.137	−3.235	0.001		
Empowerment	0.227	0.042	0.222	5.344	0.000		
Scalability	0.657	0.047	0.672	14.095	0.000		
Feedback loop	0.178	0.028	0.210	6.372	0.000		

Table 6: Sub-hypotheses testing

Model	**Unstandardized coefficients**		**Standardized coefficients**	**t**	**Significance**	**R**	**R square**
	B	**Standard error**	**Beta**				
H_1: Accessibility in business intelligence statistical influence efficiency within multi-national organizations							
1							
(Constant)	2.239	0.187		11.977	0.000	0.530a	0.281
Accessibility	0.472	0.047	0.530	10.059	0.000		
H_2: Interpretability in business intelligence statistical influence efficiency within multi-national organizations							
1							
(Constant)	2.231	0.174		12.851	0.000	0.561a	0.314
Interpretability	0.464	0.043	0.561	10.897	0.000		
H_3: Collaboration in business intelligence statistical influence efficiency within multi-national organizations							
1							
(Constant)	2.548	0.220		11.560	0.000	0.403a	0.163
Collaboration	0.358	0.051	0.403	7.091	0.000		
H_4: Governance in business intelligence statistical influence efficiency within multi-national organizations.							
1							
(Constant)	1.784	0.199		8.944	0.000	0.588a	0.346
Governance	0.583	0.050	0.588	11.707	0.000		
H_5: Empowerment in business intelligence statistical influence efficiency within multi-national organizations							
1							
(Constant)	0.941	0.176		5.333	0.000	0.746a	0.557
Empowerment	0.762	0.042	0.746	18.047	0.000		
H_6: Scalability in business intelligence statistical influence efficiency within multi-national organizations.							
1							
(Constant)	0.739	0.128		5.765	0.000	0.854a	0.730
Scalability	0.835	0.032	0.854	26.468	0.000		
H_7: Feedback Loop in business intelligence statistical influence efficiency within multi-national organizations							
1							
(Constant)	1.840	0.168		10.984	0.000	0.647a	0.418
Feedback loop	0.547	0.040	0.647	13.640	0.000		

H_3: r = 0.403 showed a medium correlation between the variables we're looking at. What's more, the variables we're studying explain 16.3% of the changes we see in what we're measuring. F value was important at a 0.05 level. This means that Collaboration in business intelligence statistical influence efficiency within multi-national organizations.

H_4: r = 0.588 showed a medium correlation between the variables we're looking at. What's more, the variables we're studying explain 34.6% of the changes we see in what we're measuring. F value was important at a 0.05 level. This means that Governance in business intelligence statistical influence efficiency within multi-national organizations.

H_5: r = 0.746 showed a strong correlation between the variables we're looking at. What's more, the variables we're studying explain 55.7% of the changes we see in what we're measuring. F value was important at a 0.05 level. This means that Empowerment in business intelligence statistical influence efficiency within multi-national organizations.

H_6: r = 0.854 showed a strong correlation between the variables we're looking at. What's more, the variables we're studying explain 73% of the changes we see in what we're measuring. F value was important at a 0.05 level. This means that Scalability in business intelligence statistical influence efficiency within multi-national organizations.

H_7: r = 0.647 showed a strong correlation between the variables we're looking at. What's more, the variables we're studying explain 41.8% of the changes we see in what we're measuring. F value was important at a 0.05 level. This means that Feedback

Loop in business intelligence statistical influence efficiency within multi-national organizations.

4.5. Discussion

We aimed in this study to shed the light on data democratization as one of business intelligence practices and examine its influence in increasing efficiency within multi-national organizations in terms of (accessibility, interpretability, collaboration, governance, empowerment, scalability and feedback loop). Depending on quantitative approach using a questionnaire. We have gathered primary data from (261) managers working within MNOs. Through SPSS, results we reached indicated that main hypothesis r = 0.908, this showed a strong correlation between the variables and explain 82.4%. Among the chosen sub-variables, it was revealed that empowerment, scalability and feedback loop scored a strong correlation, while accessibility, interpretability, collaboration and governance scored a medium correlation.

The highest in influence was scalability scoring a variance of 73%, this meant that scalability in business intelligence has the highest statistical influence on efficiency within multi-national organizations.This has been revealed in the study as a factor that shows the growth rate of the business intelligence system has an effect on the flow of the multi-national business organization. Here, the percentage of variance of the most importance factor, scalability was recorded to be 73%. This implies that the capacity of a business intelligence system to grow dynamically to accommodate increasing calls and explosion in data volume is the key factor in improving performance of business across large organization operating across geographical diversity. This attribute has a very high statistical impact, which implies its criticality for assessing this kind of organizations' data's decision-making and strategic planning potential.

Taking the highest variance score in influence at 73%, scalability in the business intelligence systems is established as a critical consideration for efficiency within multi-national firms. Thus, this research strengthens the understanding of the premium importance of these organizations to focus on and invest in appropriate and sustainable BI solutions for growth to support operational needs. The high level of correlation between scalability and efficiency proves it as a key factor in terms of which organizations can successfully manage and process big amounts of data in various places, departments, and markets. Tackling scalability issues in BI systems can therefore result in increased functionality, efficiency and effectiveness of decision making in large, diverse organization such as multi-nationals.

In the second rank, there appeared that empowerment scored a variance of 55.7% in influence on efficiency. This accepted the 5th sub-hypothesis arguing that empowerment in business intelligence statistically influence efficiency within multi-national organizations. The result identifying empowering employees as the second highest ranking factor giving a variance of 55.7% for efficiency in multi-national organizations underlines the importance of adopting this factor within the Business Intelligence context. This result supports the 5th sub-hypothesis as the study expected that empowerment in BI systems have significant relationship with global efficiency in big firms with their operations spread across the world. The high influence of the empowerment is illustrated as one of the events that gave the employees the authority and the means to make fast working decisions based on data, thus enriching organizational performance. Effective business intelligence tools enable individuals at all levels to utilize the right BI tools at workplace, organizations can embed data-driven culture that is capable of improving efficiency at the workplace.

The acknowledgement of empowerment as a major efficiency driver of MNOs offers insights into the need to invest in advanced BI technologies but also in the crucial cultural enabler that empowers data literacy. The results demonstrate how to make use of business intelligence tools more effectively in order to improve decision-making processes and performance while achieving greater corporate alignment at the local level. This result points to the fact that organizations can pay a lot of attention to creating a BI technical environment of an organization but should take much attention in creating a culture of BI end user involvement to support Business Intelligence as a concept to support efficiency and effectiveness in today's competitive world Business environment.

In the 3rd rank of the most influential variables of data democratization on efficiency of MNOs, it appeared that feedback loop scored a variance of 41.8%. This accepted the hypothesis feedback loop in business intelligence statistically influence efficiency within multi-national organizations. This is based on the observation made earlier that feedback loop has been found to be the third most influential variable in the defined context of data democratization in relation to MNOs efficiency with a variance of 41.8%. The outcome of this research lends support to the hypothesis to the effect that feedback loop within business intelligence system consequence efficiency within multi-national organization has a' statistically significant effect. Such means of feedback as summaries provide an organization with the ability to learn from the feedback and work towards enhancing BI effectiveness in the organization leading to more informed organization decision-making. This goes a long way in depicting the need of developing a culture of systems improvement and learning on the part of MNOs, in order to fully optimize the use of big data for efficiency gains.

It worthy to note that feedback loops has now been accredited as an influencing factor to efficiency within multi-national organization as this highlights the need to close the loop between the data collected, analyzed and the decision taken thereon. Through the inclusion of feedback mechanisms within a company's business intelligence frameworks, MNO can develop a system that actively evolves to meet new challenges and requirements of the market. This result underscores the need to draw on feedback loops not only to refine best practices that are already in use and provide insights to enhance continuous improvement but also to identify novel solutions and approaches to solving strategic business problems based on up-to-date data feedback. Thus, the introduction of effective feedback loops within the BI systems may help MNOs develop the culture of strategic responsiveness that would raise their effectiveness and adaptability to the new contemporary challenging business environment.

The least and weakest sub-variable in influencing efficiency in MNOs was collaboration as it scored a variance of 16.3% compared to the highest of 73% scored by scalability. This weakly accepted the hypothesis collaboration in business intelligence statistically influence efficiency within multi-national organizations. The outcome of the study showing that collaboration was ranked the least and the weakest sub-variable in relation to efficiency in Multi-National Organizations (MNOs), with a variance of 16.3%, while scalability had the highest variance of 73%, makes the paper argue that within BI systems collaboration may not be the key variable that enhances efficiency in this particular regard. This weak acceptance of the hypothesis that collaboration in BI statistically affects efficiency in MNOs means then that although collaboration is key in pursuing efficiency, it may not carry as much statistical relevance compared to other important factors such as scalability. This reduced variance score for collaboration underlines the possibility for organizations to reconsider the level of focus they apply to collaborative activities within the framework of their BI plans in order to maximize potential efficiency improvements in a multi-national environment.

The difference in variance scores of efficiency due to collaboration and other factors such as scalability affects efficiency in MNOs highlight other aspects of the issue. However, as the statistical results demonstrate a comparatively lower significance for collaboration, it seems that MNOs must reconsider how they address the issue and how collaboration fits into the BI framework. This result reaffirms the need for work on various aspects that define multi-faceted performance within multi-national organizations when improving several factors reinforcing efficiency, while maintaining a holistic approach of improving assembly factors fostering greater collaboration within organizations and integration with other key factors such as flexibility for improved operational efficiency and organizational performance.

5. CONCLUSION AND RECOMMENDATIONS

The paper on Data Democratization and Effects on efficiency in Multi-National Organizations (MNOs) introduces the distinguishing factors that affect efficiency in today's dynamic business environment. A quantitative method using a self-developed questionnaire and SPSS in the analysis identified social relationships as the cause of the conflict, while scalability appeared most impactful with 73% variance. This underscore the importance of scalability in business Intelligence systems for the improvement of MNOs efficiency, and underlines how it is the most critical factor that support data expansion and efficient MNOs functioning in different geographical environments. Consequently, the need for MNOs to depend on investments in BI that has been highlighted concerns the need for MNOs to find BI solutions that are scalable and efficient enough for general use and employee-based data analysis.

In addition, the study considered empowerment as the second most significant factor with variance of 55.7% in relation to empowering employees within the BI context as a central factor to enhancing organizational efficiency. The results point to the importance of supporting and empowering organization-wide culture that would ensure that no employee is left out from the opportunity to transform their practice using data. Despite this, when broken down into sub-variables, collaboration appeared as the weakest and had the lowest variance with 16.3% as opposed to scalability results indicate that MNOs should reconsider the importance of a collaboration within the BI strategy. In general, the research supports the need to conduct a continuum of the various factors that affect efficiency, including scalability of services through channels, empowering and creating synergy in the workforce, with the end goal of streamlining functional operations in today's complex and competitive environment for MNOs.

Launching fro results and conclusion, current study recommended:

- Due to similar reasons, cost per user and due to high relevance of the scalability factor in efficiency within the MNO business model, capacity-improving investments in business intelligence in an MNO framework must be oriented on scalability. To maintain BI solutions when the business environment changes this investment in scalable solutions will help MNOs to realize the definite value of these tools and be able to re-apply them properly.
- MNOs should work to both improve a commitment to data and invest in the right tools and training to empower employees at every level with access to and confidence in that data. The organization should therefore develop data literacy programs and training activities to enable the employees to utilize BI tools in a proper manner, hence make better decisions, and boost the performance of the organization's operations.
- Though collaboration seems to be the weakest factor compared with scalability and empower organizations should not discard collaboration as part of the BI strategies in MNOs. Experience shows that cross-departmental cooperation, sharing, and collaboration allow achieving beneficial synergies leading to increased process productivity and thinking in terms of creating innovations.

5.1. Theoretical and Practical Implications

A practical application of the research in data democratization in business intelligence in Multi-National Organizations (MNOs) is the enhancement of decision making in such organizations. This will create a culture whereby MNOs increase operational efficiency, improve resource management and utilization as well as discover potential opportunities. There could be standards associated with the use of Self-service BI, awareness programs that can help automate data literacy throughout the organization and an environment in which global teams can share their analysis.

At the theoretical level, the paper provides understanding of how data democratization contributes to organizational culture and increases efficiency of MNOs. This research expands the data democratization literature by analyzing its consequences on decision-making, cooperation and measures of organizational performance across multinational organizations. Theoretical contributions might relate to how access to information, methods of analyzing it and organizational performance interact as well as

how the structures of governance affect data democratization in large, multinational organizations.

5.2. Limitations of Study

Study was limited to the following:

- There is a limitation of generalizations where we focus the research on MNOs only. As for future research, it would be interesting to investigate the principles of data democratization in different organizations, in order to check the generalization of the results.
- Another weakness may be that it uses the information given by participants or quality of information used to do the study as a basis for arriving at conclusions. The nature of the identified data quality problems could help to improve the reliability of research results.
- Some limitations of the study can be identified from the design of the study and may include drawbacks in achieving causality in the relations between the data democratization practices and the operational efficiency of the MNOs. The present findings could be followed by more extensive investigations using cross-sectional data only or employing a longitudinal design or experimental study to increase the evidence of causal relationships.

5.3. Future Research

We suggest future research launching from results of current study that focuses on examining the impact of cultural differences into the effectiveness of the data democratization within the MNOs taking into consideration comprehensiveness of the communication processes, decision-making patterns, and overall attitudes towards data sharing. Future research can also be oriented towards examining the practical applications of the presented theories; future studies could focus on how emerging technologies like artificial intelligence and machine learning can support the MNOs' data democratization processes. It was thought that learning about how these technologies affects efficiency and the decision making process could help.

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