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Managing Supply Chains Using Business Intelligence

Mahmoud Mohammad Al-Ajlouni¹, Associate Professor, Department of Human Resource, Faculty of Business Administration, Northern Border University, Saudi Arabia, Arar, <u>mahmoud.alajlouni@nbu.edu.sa</u> Dirar Abdelaziz Al-maaitah², Assistant Professor, Business Administration and Accounting Department, Alburaimi University

College, Alburaimi - Oman. <u>Dirar.almaitah@buc.edu.om</u> **Tamara Adel Al-maaitah**³, Assistant Professor, Business Intelligence Department, Business School, Jadara University, Irbid – Jordan. T.maitah@jadara.edu.jo.

1.0 Abstract

Using information system sustenance and business process orientation as moderators, the study observes the connection among analytical services in the plan, source, make, and deliver area of the supply chain and its performance. A sample of 305 businesses from various companies in Jordan is used in structural equation modelling. The outcomes point to a statistically important correlation among performance and analytical prowess. Support for information systems has a farstronger moderating impact than business process orientation. The conclusions offer a clearer picture of the domains in which business analytics may have the most impact.

Keywords: Supply chain, Business Intelligence, Make.

1.1 Introduction

Over the last twenty years, there has been a noticeable increase in the significance of business intelligence (BI) and its associated discipline of data analytics in both academic research and managerial practice [1]. Many firms have adopted business intelligence (BI) systems to generate and handle information on their own, allowing for quick responses to problems encountered through analytical assessments [2]. BI systems, often known as "data-driven DSS," assist organizational business objectives [3]. In order to integrate and turn enterprise-wide data into knowledge that can be put to practice, the BI procedure contains extraction, transformation, and loading (ETL), which are crucial elements of data management. Drill-down and database queries are utilized to support the process, and online analytical processing (OLAP) features are employed for assessments. These procedures and technologies have been integrated by enterprise system (ES) providers like SAP, Oracle, and Microsoft into their BI platforms, which are offered as standalone add-ons or as part of their ES applications [4]. Scorecards and dashboards—built-in reporting tools for corporate performance help with the visual study of various indicators and quantifiable data. Furthermore, for numerous analytical requests, statistics warehousing and numerical tools are employed for data division, arrangement, and gathering in addition to regression analysis and predictive modeling.

Despite the acknowledged significance of business intelligence (BI) [5], there has been a limited amount of study undertaken to scrutinize these techniques and assess their commercial usefulness. Research in business intelligence suggests that BI projects rarely have a meaningful influence on business outcomes without a properly defined identification of business-driven demand [6]. The main objective of a manufacturing enterprise is to maintain a competitive edge by employing

efficient supply chain management (SCM) strategies. Moreover, a recent study indicates that assessing a company's capacity to make strategic choices in supply chain management can offer fresh perspectives on its likelihood of attaining successful competition [7].

The aim of this research is to regulate the essential approaches of business intelligence (BI) that are required to efficiently transform data into practical insights for supply chain operations. Its primary objective is to examine the deficiencies in business intelligence (BI) solutions within this specific framework. The study contains leading meetings with the administration supervise of a protruding electronics industrial company that has used Business Intelligence (BI) to gain insights into their data transformation procedures and the execution of critical supply chain decisions. Therefore, a significant contribution of this article is to assess the influence of Business Intelligence (BI) tools on the implementation of Supply Chain Management (SCM) policies. This research show visions from business operators who are dynamically involved in supervision supply chain processes and frequently use business intelligence (BI) statistics for decision-making.

1.2 Literature Review

With the proliferation of data made possible by technological advancements and the subsequent requirement to differentiate between "need to know" and "nice to know" information, the value of effective intelligence systems has grown in recent decades [8].

Every day, businesses gather vast quantities of data, including details about customers, orders, inventory, accounts payable, and POS transactions. Companies also get information like mailing lists and demographics from other places.

Regrettably, a recent assessment found that more than 93% of corporate data is currently useless for commercial decision-making [9]. Some organizations employ business intelligence to help make sense of all this data. With so many possible applications, it is challenging to provide a single, comprehensive definition of BI. According to [10], business intelligence is defined as the deliberate, systematic, ongoing, lawful, and legitimate process of collecting, analyzing, andutilizing data and information for the purpose of making strategic and tactical marketing decisions."Encompasses a broad range of analytical software and solutions for gathering, consolidating, analyzing and providing access to information in a way that is supposed to let an enterprise's usersmake better business decisions," says [11], summarizing business intelligence. The advantages of business intelligence (BI), as pointed out by [12], help to connect the dots in the new-form organization by storing data in real-time and providing analytics that can be used by all levels of the company and those outside of it. [13] states that business intelligence (BI) is the process of utilizing computer technology to uncover, identify, and analyze financial data, product sales, expenses, and income. On the other hand, business intelligence (BI) can be seen as more technicaland combine various ETL tools, including data warehouses (databases that collect, organize, and make data available for analysis), database queries, and reporting [14]. Data mining discoveries concealed shapes in data and acts at a comprehensive level in its place of a summary level, while multidimensional/online analytical processing (OLAP) summarizes data and merely provides forecasts. We also find multidimensional processing, which is used to handle different sorts of

analytical problems. Business intelligence (BI) is a system that gathers data from various sources to aid in decision making.

To further grasp the BI dimension, we have provided a quick explanation of a few of these terminologies. Business intelligence (BI) facilitates knowledge creation from data by identifying relevant data, unlocking its potential, and disseminating its benefits. By analyzing data, BI can draw conclusions.

1.3 Business Intelligence

Business intelligence (BI) systems have become essential tools in companies, offering valuable insights, aiding in decision-making, and enhancing overall organizational performance [15]. These systems facilitate the examination of crucial business data by utilizing extensive data infrastructure expenditures, such as enterprise systems implemented by enterprises. Business intelligence (BI) solutions have the capability to unlock the significant value that is present in an organization's data assets [16]. Having penetrated numerous industries such as manufacturing, telecommunications, finance and banking, assurance, and retail, the implementations have yielded a combination of outcomes - achievements (e.g., Mainland Airlines and First American Company, which improved customer faithfulness and increased return on investment) as well as failures in other companies that were unable to enhance performance or boost profit following their businessintelligence deployment [17]. An essential element in establishing achievement in a business intelligence (BI) execution is ensuring the provision of data that is fresh, reliable, of high excellence, and combined [18]. However, a successful implementation enables an organization to possess the capacity to understand, think in abstract terms, generate new ideas, resolve issues, anticipate outcomes, develop strategies, and engage in logical thinking. It can result in enhanced data consistency through data integration, more interaction, simplified asking and examination, and expedited admission to statistics. It lets a business to acquire knowledge that improves administrative understanding, effects decision-making, facilitates successful actions, and aids in the establishment and attainment of business objectives.

Business intelligence solutions enable the conversion of data according to specified requirementsinto meaningful and valuable information. Moreover, a systematic check of the physical leads tofollowing achievement and outcomes. Business Intelligence (BI) leverages the practical featuresof data granaries to enable the abstraction, examination, and reporting of corporate data across various business activities along the value chain [19] Large enterprise software (ES) providers, like Oracle and SAP, have integrated business intelligence (BI) solutions into their offerings. Specialized mid-size business intelligence (BI) firms, Traditionally, BI systems were primarily used to assist with strategic management decisions. However, organizations have now started to utilize these systems for a broader range of business activities, including tactical and operational process improvements, supply chain management, manufacture optimization, and client service.

1.3.1. Business Intelligence in Supply Chain Management

An essential element in a business's capacity to improvement a competitive advantage by using Business Intelligence (BI) approach that improves the effectiveness of analytics for Supply ChainManagement (SCM). The usage of business intelligence (BI) improves an executive's cognitive capacities when monitoring the outcomes of the supply chain process. Business intelligence (BI)solutions combine and centralize data to assist companies in achieving supply chain efficiency bypromoting vendor and customer loyalty and retention [20]. Various scholars have investigated theeconomic worth of business intelligence (BI) systems by utilizing analytics

in the supply chain domain [21]. According to [22], the creation of supply chain intelligence allows organizations toidentify chances for cost decrease and profits development. This enables them to examine the entire SC from the client's point of view. The primary analytics encompass the fundamental factors that drive supply chain procedures, such as planning, procurement, production, shipping, and revenues. These analytics aim to enhance the efficiency inside the supply chain management (SCM) system.

In order to accomplish this, it is crucial to create a comprehensive perspective of the supply chain via recording transactional data and ensuring efficient control and accessibility to information through end-user view representation. Measuring the effectiveness of the supply chain in relationto corporate goals helps identify ways to enhance production capabilities, enhance vendor management, lower expenses, and optimize delivery [23]. Supply chain analytics aim to deliver strategic insights to decision-makers in companies by utilizing business intelligence to analyze data from enterprise systems. Information arrangements encompass a wide range of activities, including assessing the efficiency of a supply chain in delivering cost-effective products and evaluating hypothetical scenarios for restructuring important supply chain management operations[24]. Achieving excellence in supply chain management (SCM) involves adopting request-drivenjust-in-time provisions, effectively managing warehousing and distribution facilities, establishingmethods for inventory planning and monitoring, and tracking instructions and distributions.

According to recent studies [25] business intelligence (BI) is crucial for the execution and evaluation of strategies like sustainable supply chain practices. Operational staff can receive timelyand relevant information using these tools, allowing them to make good decisions on their own. Current business intelligence (BI) solutions, according to some scholars [26], often respond to questions with data-oriented answers that don't always make sense in light of strategic objectives and company models. To meet these demands, ES vendors have begun to include business intelligence (BI) modules and their analytical capabilities into their offerings; for example, SAP has combined Strategic organization Management with Commercial Information Warehouse(SEM-BW), allowing for the provision of real-time data for decision-making in the present [27].

1.4 Methodology

This study has a dual purpose of being descriptive and exploratory. Its objective is to provide a detailed and organized analysis of the effect of analytics, business process outsourcing (BPO), and information systems (IS) provision on supply chain (SC) performance.

This study expands on preceding research that collected worldwide statistics on the adulthood of supply chain management [49]. The survey encompassed inquiries regarding the fundamental decision-making approaches of (SCM) and the degree to who they are employed. The original study project utilized a literature analysis, as well as discussions and meetings with supply chain specialists and consultants, to concept the review questions. The negotiations and meetings wereprepared rendering to the SCOR Model.

The individuals with expertise and experience who were involved in creating and confirming the accuracy of the initial measurements were chosen from the roster of members belonging to the Supply Chain Council. This list encompassed many sectors and included individuals employed in the supply chain area.

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In this study, we identified and confirmed specific measures that solely represent analytics practices within each SCOR decision area. To do this, we compiled a list of potential analytics practices and distributed it to supply chain management experts, who were asked to determine whether each measure accurately represented a business analytics practice or not.

The SC concept refers to a self-assessment of presentation in each of the SCOR decision parts. The concept is created on the assessment of presentation, as determined by the members of the investigation. Each choice area is represented as a singular item. The detailed element statementregarding the SC presentation for each of the SCOR conclusion parts is: "In general, this decisionprocedure area proves excellent presentation." The memberships were taught to show their levelof agreement or disagreement through the element statement via a five-point Likert scale (1=strongly disagree; 5=strongly agree).

We count the overall procedure direction of the company, as well as its level of description, values, and horizontal construction, via events derived from earlier revisions rather than any exact business process management (BPM) methodologies or actions. Moreover, BPM is a comprehensive concept that can be interpreted differently by several participants. Conversely, previous studies extensively examined BPO and its quantification.

The metrics assessed the degree of process meaning and guarantee, the practical or procedureoriented nature of the structural building, presentation pointers, and the roles and tasks within theSC firms. These systems of measurement were observed as determinative variables in order to found the concept of business procedure direction. The Information Systems Support concept was evaluated over direct investigations concerning the degree to which the information systems presently enable the general supply chain procedures, as well as the instruction assurance progression, supply administration, the Make process, the Foundation process, and the request management process. These indicators were regarded as formative variables in the construction ofInformation Systems Support. The definition and inquiries on Information Systems Provision were

deliberately broad to assess the perceived level of support for IS. This approach has demonstratedits ability to assess the viewpoint of the end user regarding information system assistance within aprocedure situation. The value of a technology is contingent upon the exact responsibilities performed by the user. Therefore, client assessments can properly reflect disparities in the fundamental structures and facilities offered to them. The overwhelming common of review defendants were commercial users of technology, and they tend to categorize all skills asinformation systems provision.

1.3.2. Data Gathering

The survey tool was shaped on a 5-point Likert scale to assess the regularity of performs. The scaleranges from 1 (never or non-existent) to 5 (always or definitely existing). The preliminary surveywas evaluated within a multiple supply chain expert.

After conducting these tests, the instrument underwent revisions in its wording and format, resulting in the elimination of several components.

The board of directors of the SC Assembly also evaluated the preliminary survey instrument. According to this evaluation, the survey was somewhat rearranged in order to align more closely with the SCOR model. The survey is depicted in Figure 1. Research model based on general principles and laws.



Figure (1): Research Model.

The last sample consisted of defendants whose parts are straight connected with supply chain management (SCM) operations from 305 distinct organizations headquartered in Jordan. Supply Chain Management Adulthood Model. The sample intentionally comprised organizations from numerous businesses in order to examine various industry settings within the framework of international supply chains.

The study participants were chosen from companies that have a formal affiliation is an esteemed logistics education and consultancy organization. Upon obtaining the email tilt of this organization, the sample composition has been refined to include industrial firms, building firms, trade enterprises, realistic industries, extractive businesses, communication and IT suppliers, as well asair, water, and power creative amenities and delivery services.

Figure 2 presents a multiple sample profile. The members were drawn from nine dissimilar parts, including auctions, IS (Information Systems), planning and preparation, advertising, creation, manufacturing, money, delivery, and buying. Around 20% of the participants are employed in alternative roles, primarily in emerging supply chain-focused positions like "Global Supply ChainManager" and "Supply Chain Team Member".

Figure 3 offerings a shape of the defendants categorized by their positions. The proportion of older influential/directors, bosses, and advisors/individual suppliers is roughly equal.



50% of the companies created from the industrial segment, while 19.9% were from logistics and communication services, and 7% were from the nutrition manufacturing.

Figer (2): Members Through Defendant Location.

5.5 % of the income comes from the auto manufacturing, while 20% comes from other businesses.

Kurdish Studies

Data Analysis

We put the hypothetical model to the test and looked at how the moderators affected the variablesusing structural equation modeling (PLS).

At first, the analytics capabilities outlined in SCOR's Strategy, Foundation, Make, and Distribution domains were supposed of as dormant variables in the determinative construct associated with performance. With an R2 value of 0.667, we can see that the analytical capability indicators explained 65.7% of the variation in the performance outcomes.

Subsequently, the original model was supplemented with the addition of "Information System Support" and "Business Process Orientation" as external variables. The correlation coefficient (R2) for the two new constructs and the analytical capacity indicators was 0.6925, meaning that they accounted for 69.25% of the variation in the sample's performance outcomes.

Finally, "Information System Support" and "Business Process Orientation" were thought of asmoderators.

Pointer	Presentation	Wounding standards
AVE	0.5560	N 0.5
Composed reliability	0.8535	N 0.8
R2	0.7325	N 0.67
Cronbach's alpha	0.755	N 0.6
Communality	0.5560	-
Redundancy	0.0555	-





Figure3: Participants by Industry.

Regarding the connections between individuals. The results demonstrated a significantly higher R2 value of (0.7325.) The results of the structural equation modeling, taking into account the moderators, are reported in Table 1. This table shows the specific threshold values utilized to evaluate the proposed model, as suggested by [28].

The gained outcomes designate that the scales applied for measuring the constructs should be regarded as satisfactory. In lieu of the Cronbach alpha, which may underestimate the consistency of a scale, the compound consistency was computed and demonstrated a high value that is valid for confirmatory purposes. The AVE, or average variance extracted, is the average

level of shared variance among the indicators of a formative latent component. The model union is considered valid if the value is greater than 0.5.

Communality is the total of the correlations between the reflective block and the formative latent variable. High markers of communality refer to variables that align well with the solution [75]. The measure quantifies the proportion of variability in one variable that can be accounted for by the collective influence of all other components. It is necessary to take into account the impact of the other elements. Even whereas a communality of 0.26 may seem low, it can still be significantif the item plays a crucial role in enhancing the definition of the model. Similarly, the joblessnessnotch estimates the efficiency of the structural model for each endogenic chunk, attractive into explanation the (measurement model). Redundancy measures the proportion of the factor's volatility that can be accounted for by the remaining indicators and exogenous elements of the model [28]. This specifies that the prototypical is ready to take into account 56% of the attainablefitness. A score exceeding the threshold of 0.5 specifies that the set of structural equations is clearly defined, provides a strong representation of the dataset, and is valid with a reasonable levelof fitness [66].

Furthermore, the application of structural equation modeling provided an estimation of the overall impact of the variables in the model on the performance outcomes. The results are visually displayed in Figure 4 below, pertaining to the nomothetical model produced in this research.

To assess the structural components of the model, the Bootstrapping method was employed to produce 305 new samples based on the proposed model. Each sample consisted of 305 instances. Additionally, the Jacknife method was utilized to examine each construct of the model. The results, as presented in Table 2, indicate the presence of a p-value for to each link.

The validation of all structural model linkages was conducted using a significance level (p/value) of 0.05. This determines that our model has exceptional adjustment scores, indicating compellingevidence that organizations striving to implement information systems to enhance their analytical capabilities are likely to achieve superior supply chain performance.

However, it is uncertain whether organizations that focus more on processes would be able to attain a higher level of supply chain performance. The research findings suggest that although a Business Process Outsourcing (BPO) has a statistically proven moderating impact, it is quite small. One could claim that the Business Process Outsourcing (BPO) can be advantageous in providing support to Business intelligence (BI) and enhancing performance. Nevertheless, firms with a

functional focus can equally benefit from Business intelligence when they have robust InformationSystems support.

Figure 1 demonstrates the analysis of Make have the greatest important influence on SC performance. This demonstrates that allocating resources to this specific domain, such as adoptingsales and operations planning strategies, integrating customer data into the inside manufacture plan, and providing detailed production plans for each item, can have a significant impact on the supply chain performance.

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