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## Article

# Structural equation modeling for impact of Data Fabric Framework on business decision-making and risk management

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## INFORMATION & TECHNOLOGY MANAGEMENT | RESEARCH ARTICLE

# Structural equation modeling for impact of Data Fabric Framework on business decision-making and risk management

Amani Abu Rumman<sup>1\*</sup> and Lina Al-Abbadi<sup>1</sup>

**Abstract:** As the concept of Big Data takes hold in the corporate world, modern businesses are making concerted efforts to manage data silos in advance of centralized data management. The multi-cloud structure of the data fabric provides a realistic approach to managing various forms of data. This study explores how data fabric, which is a useful way of organizing data, affects decision-making and risk assessment through Structural Equation Modeling (SEM) using IBM AMOS software. The study collected data from 200 respondents, representing a 67% response rate, out of 300 management experts in Amman-Jordan who conditionally agreed to participate in the research. The study finds a positive relationship between data



Amani Abu Rumman

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### PUBLIC INTEREST STATEMENT

In today's world, we rely heavily on using data to make important decisions. That's why it's really important to understand how new technology, like the Data Fabric Framework, affects businesses and how they manage risks. This research is really important because it helps us learn about the impact of this new technology on decision-making and risk management. Lots of people will be interested in the findings of this research, including business leaders, policy-makers, investors, and consumers. The results can help these groups make better decisions and create policies that promote the responsible use of data.

fabric and decision-making, data fabric, and risk management. The findings of this study suggest that strengthening the relationships between data fabric, decision-making, and risk management can play a critical role in fostering successful decision-making for crucial elements and risk management in crises, ultimately contributing to the overall success of the business.

**Subjects:** Databases; Business, Management and Accounting; Information Technology

**Keywords:** Data Fabric Framework; business decision-making; risk management; big data; structural equation modeling

## 1. Introduction

### 1.1. Background

With the advent of cloud computing and the exponential growth of data that is often difficult to make sense of, we have entered the era of big data, which is considered a cornerstone of the 4th industrial revolution (Skilton & Hovsepian, 2018). Unfortunately, the complexity of managing big data increases as its ease-of-use declines. In other words, as businesses grow, they tend to use more cutting-edge apps, while their storage systems continue to rely on outdated technology. When information is stored in isolated silos, it becomes obsolete and difficult to retrieve (Patel, 2019). This can lead to low productivity and efficiency, limited data accessibility, storage dependency, security concerns, and scalability issues, among others. However, big data centers and clouds are not a panacea for these issues because they tend to separate and categorize data, leading to inadequate visibility and accessibility. Data Fabric is the best term to use when discussing potential solutions to these issues (Smith & Johnson, 2022).

To streamline their operations, businesses have been looking for ways to centralize their data, and Data Fabric provides that single, scalable platform. When it comes to storage and data management, Data Fabric is at the forefront of modernization thanks to how it employs the hybrid cloud to provide a seamless multi-cloud experience. In other words, Data Fabric unifies all data stores into a single, scalable platform, allowing businesses to access and transfer data with confidence in its safety and control, independent of its location (Moon et al., 2021).

Using knowledge-based integration approaches (i.e., applying rules and data connecting facts) to bring together heterogeneous data that spans across several sources or formats operationally, the concept of “data fabric” is bridging the conventional gap between data and knowledge. Knowledge Management is a useful tool for overseeing the care of valuable assets like the knowledge embodied in a data fabric (Awan, 2019). The study authors argue that knowledge conversion steps should be included in the design of a data fabric (Moon et al., 2021).

Data fabric leverages both human and artificial skills to get access to preexisting data and to support its consolidation when appropriate. It is constantly recognizing and linking data from many applications to discover unique, economically meaningful linkages among the available data pieces. This new understanding, in comparison to traditional methods of data administration, facilitates reorganized decision-making and adds value by being easily accessible and easy to understand (Riahi & Riahi, 2018). The article (Theodorou et al., 2021) evaluates the potential benefits of adopting the new Data Fabric Architectural technology for a company. Hybrid, multi-cloud, and on-premises-cloud deployments, as well as data sources and users, are all within its purview of management. Using machine learning and improved automation, it provides features like data pre-processing and information governance to improve data quality (Awan et al., 2018; Liu et al., 2021). In addition, it facilitates data exchange with both internal and external stakeholders with the help of API support (Buchmann et al., 2018). The way the data fabric works is quite similar to the way the brain does. It eliminates the need to make duplicates of data by using

a connected, network-based architecture for management which enables more efficient use of storage resources, and lead to cost savings (Kobielus, 2021). Since the advent of digitalized data, this technique has the potential to be the first time that data fabric can replace point-to-point integration with universal access controls, eliminate data copying, promote collaborative intelligence, break down data silos, and establish reasonable data ownership (Zhao et al., 2017).

### 1.2. Research gap

While Data Fabric has gained attention as a promising solution for data management, there is a gap in the literature regarding its impact on decision-making and risk management. As organizations increasingly rely on data-driven decision-making processes, understanding the impact of Data Fabric on decision-making is crucial. Additionally, given the potential risks associated with managing and storing large volumes of data, it is important to investigate how Data Fabric can enhance risk management strategies.

Previous studies have explored the technical aspects of Data Fabric and its benefits in streamlining data management processes (Awan, 2019; Moon et al., 2021). However, there is a lack of research on the impact of Data Fabric on decision-making and risk management. While Chavan et al. (2021) discussed the security concerns associated with Data Fabric, they did not investigate its impact on risk management strategies.

Moreover, studies have shown the importance of data quality and accessibility for effective decision-making (Kim & Kim, 2021; Wu et al., 2020). However, it remains unclear how Data Fabric can impact the quality and accessibility of data and subsequently improve decision-making processes.

Overall, this research aims to contribute to the understanding of how Data Fabric can be leveraged to enhance decision-making and risk management strategies, providing valuable insights for organizations interested in implementing modern data management solutions.

### 1.3. Research questions

This study aims to solve the following research questions:

- How might a conceptual model for data fabric be constructed for achieving success in different business elements?
- How can the architecture of the data fabric be analyzed for business decision-making concerning various operations and customer management?
- How data fabric could assist in developing a comprehensive risk management framework to enhance the resilience of businesses against crisis and uncertain situations?

### 1.4. Aims and objectives

The study aims to analyze the influence of data fabric on decision-making and risk management for enterprises. The following objectives are associated with this aim:

- To develop a conceptual model for data fabric for achieving the desired level of business success through SEM.
- To analyze the data fabric architecture for business decision-making regarding different operations and customer management.
- To develop a comprehensive risk management framework through data fabric to enhance the resilience of businesses against crisis and uncertain situations.

## 2. Literature review

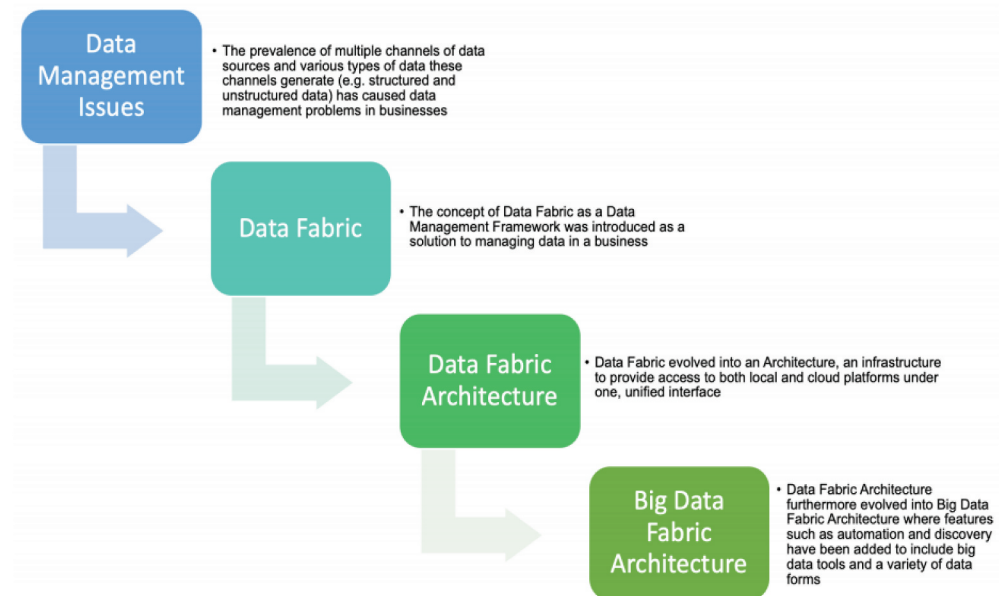
A research study by Alvord et al. (2022) is fundamental in discussing the architecture of data fabric as it grows from Big Data. Figure 1 illustrates the need for efficient management of large data in the corporate world, which served as the impetus for the development of the Big Data

Fabric Architecture. The architecture is specifically designed to meet the requirements of businesses, with the hope of enabling them to achieve a competitive edge. The Big Data Fabric Architecture addresses the challenges associated with managing large data in the corporate world, including the integration of different data sources, data processing, and data storage.

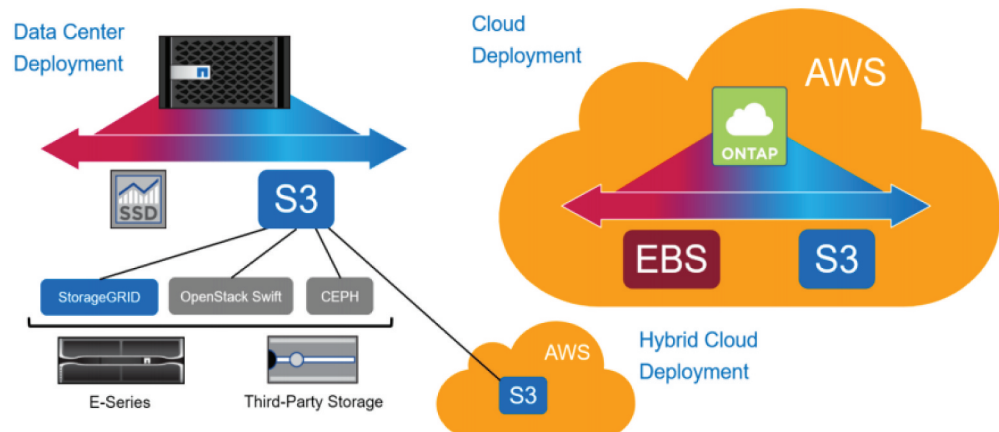
By eliminating the complexity of multi-platform sources and integration issues that are typical of modern enterprise architecture, the Big Data Fabric Architecture was proposed to do more than just manage data; it was intended to generate extractable, useful information from data and transform it into actionable business insights (Izzi et al., 2016). As can be seen in Figure 2, the pillars of the Big Data Fabric Architecture are the rising technologies of Big Data Analytics, Cloud Computing, and Data Fabric Architecture, each of which is recognized to produce its unique competitive advantage. The data fabric model could also be implemented through the multi-cloud platform as shown in the figure below:

The term “Big Data Fabric” was created by Izzi et al. (2016) to describe the intersection of two technical terms: “Big Data” and “Data Fabric.” The data management architecture of Data Fabric differs in that it does not promise large data. Big Data Fabric is founded on the combination of

**Figure 1. Infrastructure components for big data fabric (Alvord et al., 2022; Izzi et al., 2016).**



**Figure 2. Data fabric implementation through multi-cloud environment (CaraDonna & Lent, 2016).**





these two established technologies. A unified, trustworthy, and complete picture of consumer and business data by automatically, intelligently, and securely bringing together different big data sources and processing them in a big data platform technology, using data lakes, Hadoop®1, and Apache Spark™2 (Dooley, 2018).

### **2.1. Big data and organizational competitive advantage**

Big data differs technically from transactional data in many key respects. As a result, cutting-edge data management and analysis applications are essential. Companies like Google and Amazon are used as examples in a study by Ylijoki and Porras (2016) that argues data-driven businesses have a competitive edge over their less data-driven rivals. The key to gaining significant insights from big data is applying the right analytics tools to it, which may be difficult given the amount, diversity, and velocity of big data (Ylijoki & Porras, 2016).

Since 2006, Netflix has made use of big data analytics as a leading online streaming service provider. Through the use of big data analytics, Netflix hopes to improve its recommendation system and better serve its customer base (Maddodi & Maddodi, 2019). Two distinct data-collecting methods allow for a highly accurate recommendation system based on user preferences:

To begin with, content-based filtering uses a user's viewing habits to determine which shows to recommend to them, whereas collaborative filtering uses the viewing habits of other users to determine which shows to recommend to them. Netflix's recommendation algorithm is a unique blend of content-based filtering and collaborative filtering. It also uses the Amazon Web Services cloud computing platform to better understand its clientele and handle their information. Since cloud computing allows for infinite scalability and rapid response, Netflix can reliably meet the demands of its millions of subscribers throughout the world.

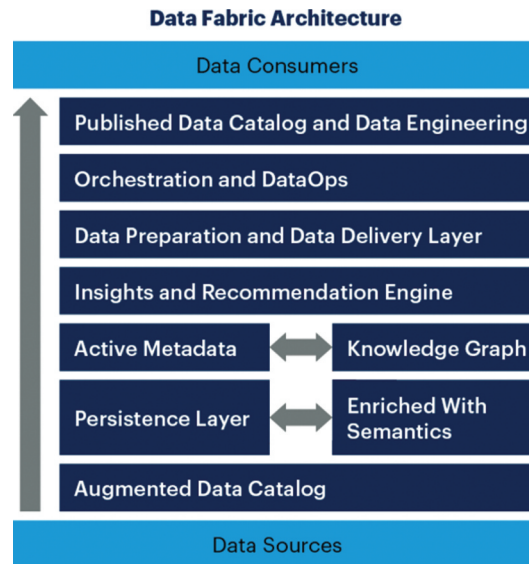
### **2.2. Data fabric and organizational competitive advantage**

Organizations may accelerate their digital transformation via the use of data fabric. Enterprise architecture that is state-of-the-art fuels creativity. When it comes to market sensing, customer service, cyber threat prediction, and process optimization, data-driven businesses have a distinct advantage. Data fabric designs are used by service providers like NetApp and Winshuttle to assist businesses to handle, manage, analyze, and store data from a wide variety of sources (Wang et al., 2020).

World-famous pizza delivery service Domino's has undergone digital transformation by using Data Fabric Architecture (Talend, 2020). Domino's plans to unify data from all sources into a unified picture of its business. Domino's may use data fabric to create a system that gathers information from all of its POS terminals, distribution hubs, and other advertising channels. Another major player in the motorcycle business that uses Data Fabric Architecture to gain an edge is Ducati. A total of 55,000 bikes were manufactured by Ducati in 2018. Ducati's original strategy was to gain an edge over its rivals by being able to provide new models and improvements quickly, rather than investing millions in manufacturing capacity. As a result, the corporation views data as an integral component in its pursuit of rapid growth. Data from more than 15,000 bikes throughout the globe is now easily accessible via a hybrid cloud platform, allowing Ducati to accelerate the rate at which it can go from the road to product innovation (Garg, 2020).

Alvord et al. (2022) present a proposed framework that integrates principles for efficient big data governance with those for maximizing the value of big data analysis, as outlined by Begoli and Horey (2012). The framework's components are interdependent, requiring a comprehensive approach to achieve an organization's key objectives. Big Data Fabric Architecture (BDFA) is an effective tool for gaining a competitive advantage, and the recommended architecture provides a path to achieving this objective. While BDFA's technical benefits are evident, its combination with non-technical factors such as robust data management and clearly defined data plans determines

**Figure 3. Data Fabric Architecture**



its ability to deliver a competitive advantage. Furthermore, leveraging the insights and observations obtained through data analysis to make strategic business decisions provides a competitive advantage to organizations. Anand (2022) has also proposed a data fabric model that considers various layers that combine to form the overall framework, as illustrated in Figure 3 below.

The intelligent Cloud-to-Edge Data Fabric MEDAL was developed by Theodorou et al. (2021) to automate management and orchestration activities across a unified view of data and resources. By using and federating IaaS/PaaS/SaaS resources located in various Cloud and Edge contexts, MEDAL makes it easy to construct and administer data workflows on top of existing, malleable data services as shown in Figure 4 below.

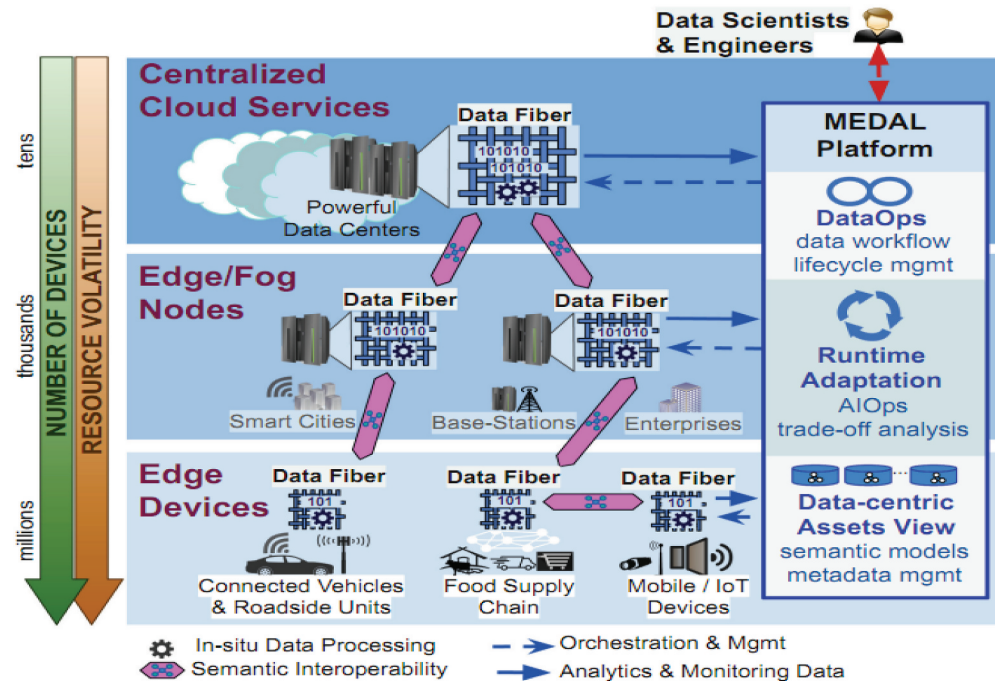
### 2.3. Digital change and innovation management by data fabric

Using a transport environment simulator, the Data Fabric technology might take the shape of a system for collecting data on transportation-related events. Information on traffic incidents, vehicle owners' reports, and roadside gadgets from intricate transportation and road networks are all part of the structures. To maximize the use of current Intelligent Transport System (ITS) resources and infrastructure, a blockchain-based autonomous ITS environment may be built. In the context of crowdsourcing, this is an invaluable tool (Kuftinova et al., 2022). With Virtual Information Fabric Infrastructure (VIFI), customers may easily do analytics-in-place without having to move the underlying datasets to a centralized location. By allowing automated analytics scripts to be sent to the data and managing distributed infrastructure, VIFI enables users to perform, execute, and coordinate advanced analytics operations in place with the data on disparate data repositories (A. A. Rumman, 2022a; Talukder et al., 2017).

The DRF market is based on an open foundation environment in which data and reason are freely shared throughout the numerous systems that must work together to manage the complex and congested airspace operations required to fulfill increased air mobility objectives. DRF initiatives will discover, test, and create important core technologies to offer architectures and development platforms that stimulate broad public and private sector procurement and self-sustaining DRF and associated standards. Together with end-users, we will beta-test these methods, design patterns based on open standards, and unified model (Van Dalsem et al., 2021).



**Figure 4. Machine Learning-based Data Fabric Platform**  
 (Theodorou et al., 2021).



Machine learning, AI, and cutting-edge approaches like experimental and network modeling and assessment, unsupervised training (including deep learning), and AI-related hardware projects allow for the integration and collecting of data (e.g., edge computing). Science Practice: The Department of Energy's Research and Development (R&D) uses and creates Earth system datasets via its Basic Energy Research (BER) Environmental Systems Science Division (EESD) program and its Applied Energy Research (AER) programs (EERE, FE, and NE) (Rose et al., 2021). A true data fabric may take the role of traditional applications, allowing users to enjoy experiences that are driven by the information alone. These experiences look and feel identical to those offered by an API or app to the end user, yet their development is as easy as updating a spreadsheet. To properly mature metadata-driven experiences and convert them into cutting-edge technology, a developed data fabric with a broad variety of linked data sources is necessary. However, the foundations for such experiences should be included in any contemporary technology that claims to be a data fabric. Its numerous advantages include shorter development periods and more leeway in solution customization.

The article (Kumar et al., 2016) aims to help readers better understand the impact of smart city efforts on supply chain design via the lens of distributed manufacturing, big data analytics, and the industrial internet of things. This method illustrated the potential integration of manufacturing and integrative technologies within the framework of smart city supply chain planning.

#### 2.4. Risk management

Risk management is an integral part of every successful company plan. As a result, there is a wide range of opinions on the best ways for businesses to build up their defensive mechanisms against the numerous supply chain risks they face (Zsidisin et al., 2016). Now more than ever, it is challenging for managers to design effective risk management strategies since firms are exposed to so many hazards (quality, safety, product, leadership, labor, and environmental) (A. A. Rumman et al., 2020). Thus, academics have worked to better understand the many forms of disruption risks that enterprises face, as well as how organizations have sought to respond to these risks (A. Rumman, 2022; Sawik, 2016; Shen & Li, 2017). There are many theories about how businesses may become more risk-tolerant, but one that has caught the

eye of both practitioners and academics is the potential of big data analytics (BDA) to help organizations better prepare for and recover from supply chain disruptions (Papadopoulos et al., 2017).

Companies may now readily gather data from a variety of sources in real-time and evaluate it with the help of modern technologies. However, companies' inability to generate useful business insight from collected data is a major weakness. How business analytics insight creation may be improved are increasingly the subject of study (El-Kassar & Singh, 2019). According to academics, companies must now devote time and energy to acquiring the "other resources which are required to establish firm-specific 'hard to mimic' BDA capabilities" rather than only focusing on technological advancements (Gupta & George, 2016). While some research has looked at how data fabric capabilities may aid in disaster mitigation and enhance recovery efforts (Redman, 2014), there hasn't been nearly as much written on how data fabric might increase business risk resilience (A. A. Rumman, 2022b; Altay et al., 2018).

In recent years, the data fabric has emerged as a key factor in helping businesses build the skills and resources necessary to succeed. One prominent topic of study in the literature on supply chains is the potential of data fabric to help businesses increase their competitive edge. According to Tan et al. (2015), companies should not only prioritize creating analytics methods to successfully interpret the information flowing through the company's supply chain, but they should also prioritize the availability of data analytics capabilities inside the supply chain.

The institutional memory of having dealt with similar disruption risks influences managerial decision-making under uncertainty. The cognitive behavior of decision-makers may be affected by the frames in which they make decisions, according to the research, and institutional norms may affect these frames. Therefore, managerial decision-making affects businesses in several ways, including improving operational efficiency, lessening risk, and bolstering resilience to business risks (Truong Quang & Hara, 2018). That's why, from a business standpoint, learning how to deal with the potential consequences of supply chain disruptions is a great area of opportunity (Gualandris & Kalchschmidt, 2015). Taking this line of thinking further, we propose that, as businesses mature and learn to cope with institutional risks, they will evolve distinctive responses to a fixed class of typical threats they will face. The company's answers to disruptions become embedded in its culture, giving it the wherewithal to deal with similar situations in the future. Therefore, external environmental forces and institutional memory built in reaction to past disruptive events impact managers' decision making under risk.

Data Fabric can support risk management by providing a real-time view of risk exposure across the organization (Pandey et al., 2021). This allows organizations to identify potential risks and take proactive measures to mitigate them.

According to two recent studies, using the Data Fabric Framework can enhance businesses' risk management capabilities (Deloitte, 2018; Informatica, 2021). Data Fabric Framework enables organizations to integrate data from various sources and gain a holistic perspective of their data, which aids in identifying potential risks and taking proactive measures to mitigate them. Furthermore, it enables companies to comply with regulatory requirements by offering a unified view of their data (Deloitte, 2018; Informatica, 2021).

## **2.5. Decision-making**

Businesses often spend a lot of money on information systems because of how much they can help in decision-making (Yalcin et al., 2022). Big data's benefits include helping businesses unearth previously unrevealed knowledge, bolstering decision-making, and facilitating strategic planning (Yalcin et al., 2022). However, multi-criteria decision-making (MCDM) procedures play a significant part in analytical processes due to the presence of numerous criteria and various choices in most decision-making scenarios. These two ideas are now inextricably linked because of the need of

using the appropriate MCDM approach when making decisions and the importance of using previously hidden information obtained via business analytics (Yalcin et al., 2022).

A company can efficiently gather, process, analyze, and display data thanks to its data fabric architecture, which in turn helps its decision-makers generate actionable insight (Sharma et al., 2014). Organizational capacity to conduct complicated computations and do pattern analysis is the key benefit that companies get from implementing data analytical skills (Acharya et al., 2018). Improved openness and accountability are other benefits. This allows businesses to provide products that are unique to their customers (Matthias et al., 2017). Scholars have also claimed that businesses' data fabric capabilities aid in their responsiveness to disruptive events and contribute significantly to decision-making under pressure (Redman, 2014). Therefore, a company's data fabric capabilities are a crucial resource for building an agile and responsive decision-making framework.

It allows decision-makers to identify patterns and insights from data, which can inform strategic decision-making and improve organizational performance (Maimon & Rokach, 2020).

The adoption of data fabric offers several benefits to organizations, including improved decision-making, enhanced customer experience, and increased agility. Data fabric enables organizations to make data-driven decisions by providing a holistic view of data that supports analytics and business intelligence. Data fabric also helps organizations to deliver a consistent and personalized customer experience by providing a single view of the customer across different channels and touchpoints (Lakshmanan et al., 2021).

Data Fabric Framework is a platform that helps businesses bring together data from various sources to provide a comprehensive view of their data for decision-making purposes. Studies have shown that implementing Data Fabric Framework can significantly improve a company's decision-making capabilities. For instance, a study by Forrester Research conducted in 2019 found that businesses that used Data Fabric Framework reported better access to real-time data from multiple sources and improved data analysis, leading to improved decision-making. The same study also revealed that Data Fabric Framework helped businesses identify areas where they could enhance their operations (Forrester Research, 2019).

Similarly, a study by Ma, Wu, and Chen conducted in 2020 examined the impact of Data Fabric Framework on business intelligence and decision-making. The results showed that Data Fabric Framework enabled companies to access more accurate and timely data, leading to improved decision-making. The study also found that Data Fabric Framework helped businesses enhance their data management and analytics capabilities, improving their overall business intelligence.

### **3. Research model**

#### **3.1. Conceptual model**

The theoretical contributions made by researchers in the field of data fabric and business resilience and decision-making shows that the impact of data analytics and heterogenous data interconnection is useful for assisting managers in decision-making and risk management. For establishing the relationship between these variables, this study proposes a conceptual model relating data fabric with business decision-making and risk management. This model will ensure success for business by establishing relationships between different elements related to decision-making and risk management.

#### **3.2. Identifiers**

The model contains qualitative variables that cannot be measured directly. Therefore, the researcher needs some quantitative variables, called identifiers. For example, data fabric could provide identifiers in its applications for modern enterprises like the extent of data analytics, utilization of tools for data management, and data fabric services' management. These identifiers

take the labels D1, D2, and D3 in the conceptual model along with the error of measurement associated with them. The measurement of these identifiers will be carried out on the standard Likert scale from 1 (Never/Strongly Disagree) to 5 (Always/Strongly Agree).

Similarly, for measurement of decision-making and risk management also requires suitable identifiers. This study will use M1 and M2 as identifiers measuring data fabric insight into business processes for decision-making, and trending of performances for risk management. The identifiers for Risk management and business resilience will be R1 (resources for risk mitigation), and R2 (data fabric utilization for business continuity in crisis). The model showing interconnections of qualitative and quantitative variables is shown in the conceptual model. Note that Risk management functions R1 and R2 involve only endogenous variables, whereas the business decision-making and data fabric itself involve exogenous variables. The arrows pointing from the source to the destination show the relationships that will be hypothesized in the next section.

#### **4. Research hypotheses**

The conceptual model shown below considers the following three hypotheses:

**H1:** Data fabric application positively influences business decision-making.

This hypothesis states the relationship between data fabric as an architecture that would have a positive influence on business decision-making. The related identifiers D1, D2, and D3 would have a strong association with those of decision-making M1 and M2.

**H2:** Data fabric application positively impacts risk management in an organization.

This hypothesis states the relationship between data fabric as an architecture that would have a positive influence on risk management practices. The related identifiers D1, D2, and D3 would have a strong association with those of decision-making R1 and R2.

**H3:** Healthy decision-making leads to a positive impact on risk management in an organization.

This hypothesis states the relationship between business decision-making as an architecture that would have a positive influence on risk resilience and management. The related identifiers M1 and M2 would have a strong association with those of risk management R1 and R2.

#### **5. Methods**

##### **5.1. Research design**

This research takes a quantitative approach to test the concept by creating a survey instrument and running SEM on the data to see whether the predicted associations hold up. We choose a questionnaire-based survey design because it allows researchers to collect and assess the correlations between several dimensions on large sample size, thereby boosting the generalizability of the results. To create the survey instrument, we first utilized the model as a starting point, developing the constructs and the model shown in Figure [Figure 5](#). The poll uses a Likert scale with five levels to record respondents' opinions on many factors.

##### **5.2. Data collection**

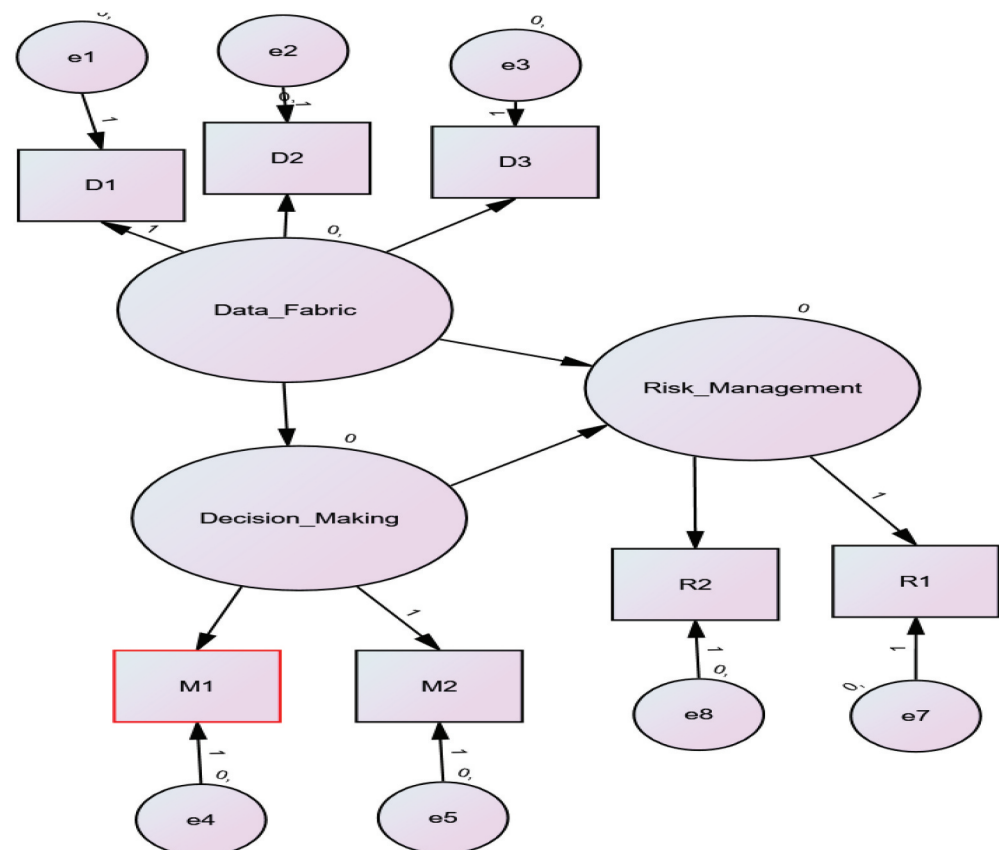
We conducted in-depth interviews with two academics and two practitioners who are experts in data fabric, risk management, and corporate decision-making to ensure content validity and then

iterated on the survey instrument based on their suggestions. When the survey was complete, we moved on to data collecting. The data-collecting procedure began with the use of online social networking sites like LinkedIn and Facebook. Our survey participants were selected at random from those who met the criteria we set forth. After reaching out to 500 management experts in Amman-Jordan, 300 conditionally consented to take part in the study. After uploading the survey to an online survey site, the link was sent to the previously contacted respondents. In all, 200 replies were submitted, for a 67% response rate. After compiling all of the survey answers, we looked for blanks and eliminated them. The demographic information of the survey respondents is clearly shown in Table 1.

### 5.3. Measurement model

Before developing a structural model, the authors ensured that their measurement model satisfied construct reliability, discriminant validity, convergent validity, and uni-dimensionality criteria (Hair et al., 2019). To assess the scale's stability, internal consistency was checked, and high Cronbach's alpha values were obtained for both the overall scale ( $\alpha = 0.934$ ) and individual constructs (Field, 2018). Exploratory factor analysis was then performed, and all items on the scale had factor loadings above 0.4, which allowed for confirmatory factor analysis to be conducted with all items included (Hair et al., 2019). High Cronbach's alpha values and composite reliability values greater than 0.7 were observed for all constructs, indicating uni-dimensionality (Fornell & Larcker, 1981). The authors also checked for response bias by comparing the responses of early and late respondents and non-respondents, and found no statistically significant difference in the t-test results (Dillman et al., 2014).

Figure 5. Success model for businesses through data fabric assisting in decision-making, and risk management.



**Table 1. The demographic information of the survey respondents**

Demographic Available		Frequency	Percent
Gender	Male	115	58%
	Female	85	42%
Experience	less than 6 yrs.	77	39%
	6 to 10 yrs.	51	26%
	11 to 15 yrs.	43	21%
	16 to 20 yrs.	22	11%
	more than 20 yrs.	7	3%

#### 5.4. Data analysis software

Data analysis is carried out in AMOS 26 as it provides robust features for conducting Structural Equation Modeling SEM for the given conceptual model. AMOS is a widely-used program that offers a one-of-a-kind GUI for addressing structural equation modeling issues. IBM and SPSS Inc. create the program. Researchers rely heavily on AMOS because of its ability to do multivariate analysis with a single program, combining the strengths of many multivariate analysis techniques including regression, factor analysis, correlation, and analysis of variance. AMOS's graphical or programmatic user interface makes it easy to assess the interdependencies between the various building blocks (Kline, 2016).

### 6. Findings

The results of the AMOS analysis for the given model are provided below in Table 2:

#### 6.1. Regression weights: (group number 1 - default model)

Regression coefficients are determined using the least-squares method with the correlation coefficient as the independent variable (Johnson & Wichern, 2007). Scores on dependent, observable variables may be predicted based on these regression coefficients.

When comparing direct effects on the same endogenous variable across groups in single-group research, standardized estimates are utilized (Kline, 2016). Generally speaking, the indicator variables have to have standardized regression weights of 0.7 or greater on the latent variable they stand for to be considered reliable indicators of the latent variable (Hair et al., 2019).

The result of the regression weights shows that Data fabric has a significant positive effect on the decision-making of enterprises, but has a weak positive relationship with risk management. The cutoff threshold for a significant relationship is usually 0.7, whereas it is 0.554 for Data fabric influence on risk management. Moreover, decision-making derived from data fabric has a significant positive association with risk management.

The quantitative assessment of the result is that when data fabric increases in weight by 1, the decision-making variables increase in weight by 1.704. When decision-making variables increase in weight by 1, the risk management weight increases by 0.746. When data fabric weight increases by 1, the risk management indicator variables increase by 0.554. The results also indicate that the prediction of decision-making from data fabric at the CR value of 5.234 is quite significant that produces a p-value less than 0.001. Therefore, the relationship between data fabric utilization and management support for decision-making is quite strong.

The total effects are as follows in Table 3:

The total effect (combined direct and indirect effect) of each column variable on each row variable. This table is displayed when you estimate indirect, direct, and total effects. The total effects show the



Table 2. Regression Weights for SEM							
			Estimate	S.E.	C.R.	P	Label
Decision making	<—	Data fabric	1.704	.326	5.234	<0.001	par_7
Risk management	<—	Decision making	.746				par_1
Risk management	<—	Data fabric	.554				par_2
D1	<—	Data fabric	1.000				
D2	<—	Data fabric	1.157	.283	4.092	<0.001	par_3
D3	<—	Data fabric	.978	.272	3.590	<0.001	par_4
M2	<—	Decision making	1.000				
M1	<—	Decision making	.989	.061	16.102	<0.001	par_5
R1	<—	Risk management	1.000				
R2	<—	Risk management	.890	.055	16.195	<0.001	par_6

**Table 3. Total effects for variables**

	<b>Data fabric</b>	<b>Decision making</b>	<b>Risk management</b>
Decision making	1.704	.000	.000
Risk management	1.826	.746	.000
R2	1.625	.664	.890
R1	1.826	.746	1.000
M1	1.685	.989	.000
M2	1.704	1.000	.000
D3	.978	.000	.000
D2	1.157	.000	.000
D1	1.000	.000	.000

influence of a latent variable on the endogenous and exogenous variables. This result is comparable with the regression output. Data fabric has a strong direct impact on the decision-making variable with a weight of 1.704 (when data fabric increases by 1, decision-making increases by 1.704). The total (direct and indirect) effect of Data fabric on Risk management is 1.826. That is, due to both direct (unmediated) and indirect (mediated) effects of Data fabric on Risk management, when Data fabric goes up by 1, Risk management goes up by 1.826. For regression, the increase in weight of risk management for data fabric was 0.554 which goes up by 1.826 due to the inclusion of indirect effects also. Thus, standardized total effects (direct and indirect) give a broader picture of the overall context. The total (direct and indirect) effect of Decision making on Risk management is .746. That is, due to both direct (unmediated) and indirect (mediated) effects of Decision making on Risk management, when Decision making goes up by 1, Risk management goes up by 0.746.

## 7. Discussion

Data fabric's potential as a resource for helping businesses improve their decision-making and risk-management capacities has been a hot topic of conversation among managers and academics (Fernandez & Fernandez-Mendez, 2020). Specifically, there is a rising interest in learning more about how data fabric might benefit organizational supply chains within the supply chain literature (Bullinger, 2019). The goal of this article was to assess the potential influence of data fabric on managerial decision-making and resilience in this setting. To this end, we looked at the value added by data fabric architecture to preexisting IT capabilities and preexisting institutional risk response to disruption events to try to have a better grasp on the role it plays in establishing risk resilience capabilities. The first working theory is about the impact of the data fabric on managerial judgment. Our findings reveal that H1 had a significant impact on our model's predictions and predictions. This finding runs opposed to common sense, yet it has significant ramifications for the use of trends and data analytics in management decision-making. To improve performance and achieve a competitive edge, businesses may use the data fabric model to develop evidence-based plans for using data analytics such as AI and deep learning.

The second hypothesis (H2) investigated the significance of an organization's data fabric and its role in helping businesses build resilience to supply chain risks. The results corroborated the supposition that enterprises may help their clients build supply chain risk resilience by creating a data fabric. The finding contributes to the expanding body of research on the use of information technology (IT) in supply chain management and its role in helping businesses achieve better performance. Defenses may be prepared for mounting threats and dangerous scenarios with the use of data fabric and analytical prowess. Big data stored in disparate locations might help with resource allocation and utilization for company continuity in times of crisis and the unexpected thanks to the data fabric.

Enterprise risk management and strategic planning for resilience were the subjects of the third hypothesis (H3). Decision-making in this capacity is vital for the management of the company as a whole, including the allocation of resources to deal with emergencies. The companies might

utilize data-driven decision-making to prioritize which of their supply chains to protect while compromising others to get through the crisis as smoothly as possible. Businesses might benefit from using risk management techniques developed with the help of business models operating on complex decision-making frameworks in times of uncertainty.

Effective risk management necessitates rules that demand superior decision-making, and if the status quo of risk is unacceptable, then the most cost-effective actions must be found and applied until it is. This is the crux of every reliable method for mitigating danger as demonstrated in the current study. If any of these procedures are skipped or executed without the necessary expertise, individuals who were harmed may be held financially responsible. The use of lawyers to improve safety by ensuring that those at fault pay damages is an example of corrective action; it is reactive since it is taken after the fact. But preventing accidents from happening in the first place is preferable to paying for those that do. Implementing a methodical framework for decision-making with tools like data fabric is a proactive strategy to increase security. For effective risk management, this policy should be kept separate from the parties involved. There is no logical reason why the worth of life should rely on what sort of job you perform; thus, a preferable approach would be to elevate the choice of the value of life above the many industrial divisions.

Thus, the overall success of the business depends on how well the managers can use data fabric for decision-making and risk management. With the help of different elements of the SEM of the data fabric, the managers could incorporate features to strengthen evidence-based decision-making and utilize resources in crises. The SEM analysis demonstrated that the decision-making itself ensures success by strengthening risk management practices (Chen, 2021).

## **8. Theoretical and practical implications**

### **8.1. Theoretical implications of research**

Businesses are increasingly relying on data fabric designs because of the comprehensive perspective they give. Although there are varying opinions on the best way to do this, all parties agree that it must be more comprehensive than data lakes, data catalogs, and data virtualization. To better use data stored in disparate locations, a data fabric architecture has been developed. It also gives the company something to strive for, simplifying and protecting data access across a dispersed network.

### **8.2. Practical implications**

Data fabric, in practice, provides self-service access to data and analytics that organizations need to experiment with and rapidly extract value from data. Since the fabric already provides such a high level of data management, governance, and security, demonstrating compliance (both industry and regulatory) is essentially a byproduct of its implementation. While this isn't a foolproof method, it does significantly lessen the burden of meeting regulatory standards. If businesses adopt a data fabric design, they may also facilitate a data marketplace where citizen developers can find and combine data from a variety of sources to create novel models. As an alternative to building new infrastructure for each use case, data marketplaces enable data engineers to build out a shared framework that can be used in a variety of contexts.

At present, there is no one-and-only-one platform or technology that can be used to set up a data fabric architecture. You'll likely need to use a combination of approaches, such as a powerful data management tool for most of your demands and supplementary tools and/or custom-coded extensions for the rest of your architecture. Having the standard components of a powerful data integration solution in place is essential, in addition to other aspects of data architecture. Everything from how your information is gathered and stored to how it is managed and accessed falls under this category. Furthermore, implementing best practices for metadata management, data lineage, and data quality as part of a comprehensive data governance framework.

## 9. Limitations and future directions

The following are some of the study's limitations. Managers from various parts of the globe, who may have vastly different perspectives on how data fabric affects an organization's capacity to build resilience to business risks and make decisions, were not surveyed for this research. Managers need to be hyperaware of prospective risk events and their influence on business disruption, and this may be particularly true for organizations operating in developing regions of the globe, where macro and micro-business risk events are widespread. In addition, to achieve the required level of performance and competitive advantage, company management may use a variety of decision-making tools and frameworks.

Secondly, the analysis covers a wide range of business types. While a more comprehensive study increases the generalizability of the results, it also reduces our capacity to provide insights that are relevant to particular industries on the use of data fabric to fortify resistance to risk. Third, from a methodological standpoint, the findings may not be representative since mistakes and bias were introduced into the regression analysis and total impact analysis. Fourth, the sample size of 200 is rather small and may introduce bias to the finding.

Future studies should involve managers from different parts of the world to research the impact of data fabric on different aspects of businesses, in addition to business decision-making and risk management. As the IT capabilities of modern enterprises are increasing, the applications of data analytics should improve to enhance performance in different niches. Future studies could use detailed parameters to indicate business performance by utilizing data fabric architecture through hybrid multi-cloud infrastructure. The researchers should explore how heterogeneous data could be managed effectively for the betterment of the companies.

## 10. Conclusion

In this study, we looked at how data fabric, as a powerful architecture, influences choice and risk management for achieving business success. Companies nowadays are working hard to manage data silos in preparation for centralized data management as the Big Data idea gains traction in the business world. Data fabric's multi-cloud design offers a practical means of handling diverse data types. This research examined how a solid data fabric may aid company managers in making critical choices that can impact performance and give them an edge in the market. In addition, the research shed light on how data fabric affects the resilience of businesses.

The present research examined the impact of data fabric design on decision-making and risk management procedures by using Structural Equation Modeling (SEM) inside the IBM AMOS program. This study suggested a conceptual model create the connection between data fabric, decision-making, and risk management by using identifiers to quantify various aspects. There is a positive correlation between the data fabric and decision making, the data fabric and risk management, and the decision making and risk management, according to the AMOS software quantitative study. The conceptual SEM analysis ensures business success by establishing the relationship between decision-making, risk management, and the data fabric itself.

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