

# Insights from Big Data Economy of Finnish Company Trust, Consumer Confidence and Data Exchange: An Empirical Evidence of Structural Equation Modelling

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**Keywords:** Big Data Economy, Company Trust, Consumer Confidence, Data Exchange, Structural Equation Modelling, Finland.


**Abstract:** In the emerging development of the big data economy, data exchange under management information systems is increasingly relevant in society and organizations. Recent studies have contributed to the literature on data exchange by investigating security, privacy, errors, and risk issues. However, there is less attention on the impact of company trust and consumer confidence on data exchange. Interoperability is a panacea to data exchange, and it refers to the capacity of information systems to share data and information, reducing the likelihood of information gaps and blind spots. This study fills the gaps in the literature on data exchange and the big data economy by giving a deeper understanding of data exchange through the influence of company trust and consumer confidence with the lens of structural equation modelling, thus, consolidating the big data economy and management information systems. The results from the model tested indicate the direct relationship between the path coefficient of company trust, consumer confidence and data exchange. The study emphasized the theoretical contribution and managerial implications and gave future research direction.

## 1 INTRODUCTION

The earlier research emphasised the importance of data across different business sectors and discovered a gap for further investigation of data exchanges (Elsaify & Hasan, 2021). *Data exchange* is a tool that facilitates the sharing of information between different stakeholders, and it is an offshoot of information management systems. A data exchange provides access to data points from all over the world, which is used to power data-driven marketing and advertising campaigns worldwide. By gaining access to a Data Management Platform (DMP), companies will harness previously outdated or inaccessible data to power their marketing campaigns. The utilization of a data exchange offers the companies and customers a limitless number of information points, which data stakeholders can use to close any gaps in their current audience's profile and learn about their interests even when they are not on their site. On the other hand, a considerable amount of data management might assist businesses and their clients

in increasing their target audience prospects. Despite the goodness of data exchange, security, privacy, and errors are some challenges that call for the data stakeholders' urgent attention. There is a need for a standardized, unified privacy computing framework (Jianpeng, Zheng, Du & Boran, 2022) to have the maximum benefits of safe data circulation in data trading marketing.

Interoperability is a panacea to data exchange, and it refers to the capacity of information systems to share data and information, reducing the likelihood of information gaps and blind spots. Interoperability refers to a method that is both focused and intelligent in its use of current data to achieve the best practices in information management while ensuring that all fundamental rights, those about data protection regulations, are fully respected. To better secure and strengthen the company's internal security, the management of data within companies needs to be made more effective and efficient while also taking into consideration fundamental rights.

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A recent study posits that data relay through mobile nodes is subject to security attacks due to openness in vehicular delay-tolerant networks (VDTNs). The study utilized the proximity-based  $k$ -nearest neighbour ( $k$ NN) classification model as a panacea for trust estimation to calculate the global trust values (Chourasia, Pandey & Kumar, 2022). Corroborating the challenges of data exchange (Ritter, et al. (2022) highlight the risk of silent errors in the reactor design while engaging with manual data exchange and proffers transforming the solution of the digital engineering ecosystem to the engineering teams. Further, Sukiasyan, Badikyan, Pedrosa & Leitao (Sukiasyan, Badikyan, Pedrosa & Leitao, 2022) examined the secured data exchange in the context of the Industrial Internet of Things and created a threat model as a panacea with spoofing identity, tampering with data, repudiation threats, information disclosure, denial of service and elevation of privileges (STRIDE) approach and likewise (Freeman & Garcia, 2022) in the context of Urban Air Mobility Environments.

Recent studies have contributed to the literature on data exchange by investigating security, privacy, errors, and risk issues. However, there is less attention on the impact of company trust and consumer confidence on data exchange. This study fills the gaps in the literature on data exchange and the economy by giving a deeper understanding of data exchange through the influence of company trust and consumer confidence in the Finnish environment. This study answers the following research question: what impact do company trust and consumer confidence have on Finnish data exchange? The second part of the study reviewed the literature on company trust and consumer confidence and formulated two hypotheses that connect data exchange. The third method discussed the methodology employed, the fourth part discussed the data analysis and results, and the fifth part concluded with the study implications, limitations, and future studies.

## 2 THEORETICAL MODEL AND CONSTRUCT DEFINITION

An understanding of the company's target audience and potential new segments is gained through this study, which benefits both the companies and the customers involved. Through meaningful data exchange, it is possible to identify and exploit behavioural patterns, demographic similarities, frequently used devices, and interests or affinity

groups among a company's customers. This pattern allows a company to understand its target customers better and extrapolate potential customers based on its data and exchanges with other companies or customers. It is advised that businesses use data exchanges to ensure that their data is reliable and of high quality to ascertain that their efforts yield tangible results and an outstanding return on investment.

Data exchange is a critical resource for publishers, advertisers, agencies, and others who either lack sufficient first-party data to make broad campaign decisions or seek additional information on their existing consumers. Rather than that, companies can rely on data exchange to provide them with the information necessary to optimize their strategy and go forward confidently. Here are a few ways agencies, marketers, publishers, and other data stakeholders can maximize their outcomes by utilizing a data exchange. A data exchange helps the stakeholders rise above the competition, target potential customers, find new customers, learn about the target audience, extend reach, and increase conversions. It also helps companies develop personalized product offers from their DMP with data exchange. Data Exchange enables the company to manage and restrict business data internally and externally with suppliers, partners, and customers. It is critical to grant and revoke access to data via standard and personalized listings.

This section focuses on the proposed theoretical model and the construct definition.

### 2.1 Company Trust

A company is like a leader with whom people wish to connect. Based on this analogy, a company expects to live an exemplary life for the customer and the consumer. For companies to act in a leader's capacity, it is essential to develop trust stores with the core three drivers of authenticity, logic, and empathy (Frei & Morriss, 2020). Company trust is multidimensional. Malkamäki, Hiltunen & Aromaa, (2021) examined trust as a strategic management process in the context of grocery trade business based on the dimensions of trust of ability and competence, benevolence, integrity, affective-based and cognitive-based trust. The authors indicate the prominence of trust at the top management level to pave the way for innovation, engagement, and efficiency in company strategic implementation.

## 2.2 Consumer Confidence

Consumer confidence is an essential indicator that explains the possible amount the consumer is willing to spend. Between 1995 and 2022, there is a history of declining consumer confidence in Finland, and there was negative consumer confidence of -10.5 in March 2022, according to Statistics Finland (2022). Consumer confidence measures either optimistic or pessimistic consumer financial expectations. Juhro & Lyke, (2020) investigated the consumption-confidence relationship of the Indonesians based on combined data on consumer and business confidence and found that sentiments contribute to the forecast accuracy of consumption between four and thirteen per cent. Similarly, Zorio-Grima & Merello, (2020) examined the causality relationship between consumer confidence and the economic information ecosystem in Spain and discovered a causality influence of consumer confidence and financial information on each other. Also, Vanlaer, Bielen & Marneffe, (2020) worked on the financial information of the global financial crisis for thirteen years and probed how the European financial crisis can defect consumer confidence. The duo results from the study show that confidence in the household financial situations had a more significant effect on household savings than confidence in the general economic situation.

## 3 METHODOLOGY

The term "*data economy*" refers to an economy in which several different operators work together in the same environment to ensure the accessibility and usability of data, as well as to make use of data and use it as a basis for the creation of new applications and services. This concept is widely accepted and growing steadily. The data of this study was collected as an online questionnaire. It was commissioned by Sitra through an international IHAN project and made available as open data. Innolink, an international data consultant, undertook the data collection as a business decision-maker panel between April and May 2019. Large enterprises and SMEs in Finland, France, Germany, and the Netherlands participated in the survey. The study sample size accounts for  $n=1667$  responses, and the questionnaire focuses on companies' awareness, attitudes, and commitment to business potential enabled by a fair data economy. The study focused on the Finnish data economy, one of the leading global data economy countries. Only Finnish data was extracted from the total responses,

and the sample size for Finnish data accounts for  $n=427$ . The questionnaire captured the company's descriptive information such as the accompanying attitudes towards data sharing, capabilities for using data economy, the margin between attitudes and commitment to fair data principles, data economy challenges and its potential. Through the data cleaning process of the data, six variables emerged as independent and dependent variables (variable pricing, customer experience, company trust, consumer confidence, privacy, and data exchange). Subject to more rigorous Structural Equation Modelling (SEM) assumptions such as common method bias, multivariate normality, multicollinearity, linear relationship between the observed variables and their constructs, and no missing data, only three variables met the criterion of SEM. This study used company trust and consumer confidence as independent variables to predict data exchange as a dependent variable. The study utilized Warp Version 7.0 to conduct SEM analysis.

### 3.1 Hypotheses Development

A belief in another person or entity's dependability, integrity, and honesty is referred to as trust. It is essential to social capital and promotes teamwork, collaboration, and cooperation between people and groups.

Trust is the cornerstone of intimacy and the secret to creating lasting bonds in interpersonal interactions. Trust is essential for partnerships and transactions to succeed in business since it establishes credibility and reduces uncertainty. In societal and institutional environments, trust is also crucial. People depend on institutions like governments, legal systems, and financial systems for stability and security. People are more likely to obey these institutions if they have their trust.

The study of Malkamäki, et al. (2021; Fregidou-Malama & Hyder, 2021), shed more light on multilevel trust as a means of strategic international marketing for healthcare services, and the study culminates multilevel trust as individuals, company performance, and context. This multilevel trust will help companies increase their business relationships and achieve consumer acceptance. Resolving consumer sentiments is one of the ways of building a company's trust. Istanbuloglu & Sakman, (2022) spotlights five dimensions of handling based on timeliness, redress, apology, credibility, and attentiveness with consumer's trust mediation. The authors conclude that the credible perception of consumers about the company will be high in

handling the complaint, and this situation determines the consumer's repurchase intention. Based on the literature reviewed, a company's trust is an antecedent of data exchange. This study hypothesized that ( $H_{0a}$ ): the lower the company's trust, the lower the intention for data exchange; ( $H_{1a}$ ): the higher the company's trust, the higher the intention for data exchange.

On the other hand, the construct of confidence refers to an individual's belief in their abilities, skills, and competencies to accomplish a particular task or achieve a specific goal. It is a psychological concept that reflects a person's self-assurance and conviction in their abilities. It can manifest in various domains of life, such as personal, social, academic, and professional contexts.

Confidence varies from situation to situation. For example, an individual may feel confident in their ability to give a presentation but need more confidence in their ability to perform well in a sports competition. Factors such as past experiences, feedback, social comparison, and personal beliefs can also influence confidence.

Confidence is often associated with positive outcomes such as high motivation, resilience, and effective performance. On the other hand, low confidence or self-doubt can have negative consequences such as anxiety, avoidance, and underperformance. Confidence is a complex and multidimensional concept that significantly shapes an individual's thoughts, feelings, and behaviours in various situations.

Macready, et al. (2020) combined consumer trust and consumer confidence to assess the food value chain in five countries across Europe and discovered that consumer trust beliefs predict confidence in food and technology integrity. Diffey, (2020) reflected on the possibility of sunscreen product development jeopardizing consumer confidence and concluded that retention of consumers' confidence in the veracity of products is paramount. The synthesized literature shows that consumer confidence could be optimistic or pessimistic, and this study hypothesized that ( $H_{0b}$ ): the lower the consumer confidence, the lower the intention for data exchange; ( $H_{1b}$ ) the higher the consumer confidence, the higher the intention for data exchange.

### 3.2 Data Analysis

This study tested the hypothesis showcased in the proposed conceptual framework in Figures 1 and 2 with WarpPLS 7.0 statistical software. WarpPLS is suitable software for Variance Structural Equation Modelling (VSEM). This software has been used in

earlier studies (Sanusi, Olaleye, Agbo & Jatileni (2021; Olaleye, Sanusi, Mark & Salo, 2020).

### 3.3 Measurement Model

This section ascertains the quality criterion of the tested model. The variables adopted reliability and validity were tested, and the model fit was evaluated, and the results are shown in Table 1. The results were satisfactory based on the algorithm of WarpPLS (Kock, 2020). Further, the Composite Reliability (CR), Cronbach Alpha (CA) and Average Variance Extracted (AVE) of all the variables were found satisfactory in comparison to the thresholds of 0.7 and 0.5. Similarly, the factor loading of all the items was more significant than 0.5 (See Table 2). Variance inflation factor (VIF) that measures the level of multicollinearity is below 3.5, which conforms to the acceptable thresholds and variance inflation factors (VIFs) that ascertain the extent of correlation between one predictor and the other predictors are less than 1.5, which certify the acceptable boundary. All these criteria certify the model's internal consistency, reliability, and proper loading of the variable's items.

This statistical model shows the relationship between trust and confidence as independent variables and data exchange as dependent variables. Further, the model provides valuable information for understanding the causal relationships between key data variables.

## 4 RESULTS

This study confirmed that the adopted variables and their items align with their thresholds as specified in the existing literature. The study formulated two hypotheses to understand the relationship between Company Trust, Consumer Confidence, and Data Exchange. The results from the model tested indicate the direct relationship between the path coefficient of company trust, consumer confidence and data exchange. Hypothesis ( $H_{1a}$ ) company trust  $\rightarrow$  data exchange ( $\beta = 0.48$ ,  $t = 10.62$ ,  $p < 0.001$ ).  $H_1$  consumer confidence  $\rightarrow$  data exchange ( $\beta = 0.17$ ,  $t = 3.58$ ,  $p < 0.001$ ). The null hypotheses ( $H_{0a,b}$ ) were rejected for trust, confidence, and data exchange against the alternative hypotheses ( $H_{1a,b}$ ). Company trust is the highest predictor of data exchange and has the largest effect size of 0.25. The entire model explained  $R^2 = 30\%$  variance, while 70% could not be explained. This  $R^2$  is higher than the weak threshold of 0.25.



Table 1: Data Quality Assessment.

Average path coefficient (APC)=0.326, P<0.001
Average R-squared (ARS)=0.298, P<0.001
Average adjusted R-squared (AARS)=0.295, P<0.001
Average block VIF (AVIF)=1.052, acceptable if <= 5, ideally <= 3.3
Average full collinearity VIF (AFVIF)=1.287, acceptable if <= 5, ideally <= 3.3
Tenenhaus GoF (GoF)=0.443, small >= 0.1, medium >= 0.25, large >= 0.36
Sympson's paradox ratio (SPR)=1.000, acceptable if >= 0.7, ideally = 1
R-squared contribution ratio (RSCR)=1.000, acceptable if >= 0.9, ideally = 1
Statistical suppression ratio (SSR)=1.000, acceptable if >= 0.7
Nonlinear bivariate causality direction ratio (NLBCDR)=1.000, acceptable if >= 0.7

Note: APC - Average path coefficient; ARS - Average R-squared; AARS - Average adjusted R-squared; AVIF - Average block VIF; AFVIF - Average full collinearity VIF; GoF - Tenenhaus GoF; SPR - Sympson's paradox ratio; RSCR - R-squared contribution ratio; SSR - Statistical suppression ratio; NLBCDR - Nonlinear bivariate causality direction ratio; A - Acceptable.

Table 2: Measurement Quality Assessment.

	DE	CT	CC	SE	VIF	VIFs	CA	CR	AVE	Effect Size
Data Exchange										
DE1	0.954			0.043	3.05	1.404	0.9	0.95	0.91	
DE2	0.954			0.043	3.05					
Company Trust										
CT2		0.822		0.043	1.94					
CT3		0.819		0.043	1.93					
CT4		0.652		0.044	1.4	1.372	0.81	0.87	0.569	0.25
CT5		0.639		0.044	1.36					
CT6		0.815		0.043	1.84					
Consumer Confidence										
CC1			0.599	0.045	1.23	1.084	0.74	0.83	0.5	0.05
CC2			0.8	0.044	2.12					
CC3			0.821	0.043	2.28					
CC4			0.674	0.044	1.51					
CC5			0.608	0.045	1.39					

Note: DE – Data Exchange; CT – Company Trust; CC – Consumer Confidence; ES – Effect Size

## 5 CONCLUSIONS

This study combined the theories of fragments of company trust and consumer confidence to examine the viability and the impact of data exchange in Finnish context. Finland is one of the countries in the world that is leading in data economy hence the study focusses on Finland as a case country. The study shows that company trust and consumer confidence have very strong impact in data exchange. To be more specific the higher the perception of the company

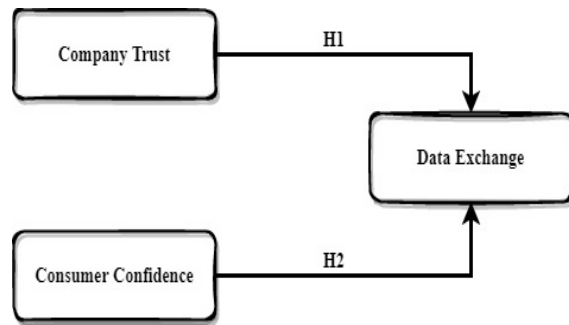


Figure 1: Proposed Model Hypotheses.

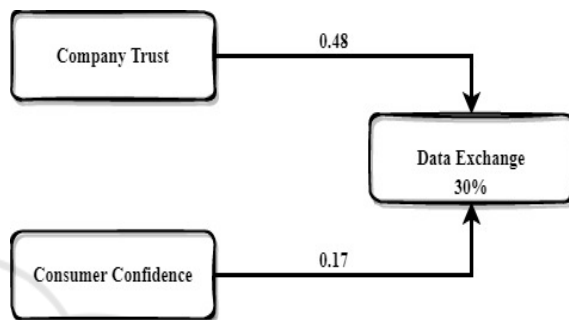


Figure 2: Data Exchange Model Path-Coefficient Results.

Table 3: Tested Hypotheses Results.

Path Connection	T Ratio	P Value	HYP Results	Remark
CT → DE	10.623	0.001	Significant	Accepted
CC → DE	3.579	0.001	Significant	Accepted

Note: DE – Data Exchange; CT – Company Trust; CC – Consumer Confidence

trust, the higher the data exchange and the perception of consumer confidence also increases the data exchange. Earlier researchers examined the data exchanges among firms and found that data exchanges took place between firms in similar industries with relevant data science capabilities (Elsaify & Hasan, 2021). This study only focused on bilateral data exchanges without considering company trust and the consumer confidence. Similarly, to this result, the study of Nicolaou & McKnight, (2006) confirmed the significant relationship of trust and the intention to use exchange data. This study theoretically contributes to the literature of data exchange and the emerging data economy literature by explaining how company trust and consumer confidence impact the data exchange. This result is consistent with the existing study that mentioned that trust is a key predictor for customer retention (Olaleye, et al. 2020).

The exchanging of data between different systems is what data exchange is all about. It establishes an instance of target data based on the data received after

it has been delivered from the source and obtained through a data link. The enormous amount of data produced due to the modern digital transformation is, for the most part, locked away in proprietary silos. Data exchange has become increasingly important as a means of accomplishing effective information sharing and fostering the efficient use of valuable data because of the tremendous improvements that have been made in information and computing technologies. Sharing information in a trusted, compliant, secure, auditable, and accessible way is necessary for a successful data exchange. Managerially, suggest that the data stakeholders should pay close attention to trust and confidence through security assurance, privacy concern data ethics.

This study is not without a limitation. The coefficient of determination of this study indicates 30% variance. The future research should extend this study by adding and tested more relevant variables hypothetically. Also, the future researchers combine the artificial intelligence and blockchain to examine trustworthiness of data exchange. Further, the future researcher should examine the blockchain-based data economy.

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