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Critical Factors of Supply Chain Based on Structural Equation Modelling for Industry 4.0

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ABSTRACT

Industrial Revolution 4.0 encourages the digitalization of manufacturing, especially in terms of improving the supply chain processes. Currently, the development of information technology follows the principles of Industrial Revolution 4.0 in the form of interconnections/connections to communicate with machines, transparency, and technical assistance. The presence of a decision support system, COBIT 5, and ISO 9126 are expected to maximize business processes and technology. Thus, relationship analysis needs to be carried out on decision support systems, COBIT 5, and ISO 9126, to determine the relationship of each variable with the supply chain process. Relationship testing can be performed using statistical tool such as Structural Equation Modelling (SEM). The study focuses in analyzing influence of DSS COBIT 5 variables, ISO 9126 functionality, ISO 9126 reliability, and decision support systems on supply chain management. The primary data are based on questionnaires to employees of the furniture manufacturing industry. The results of this study are DSS COBIT 5, functionality ISO 9126, reliability ISO 9126, and decision support systems significantly affecting the supply chain management process. Thus, the industry needs to focus on implementing these factors so that business processes comply with the standards and principles of the industrial revolution 4.0.

1. INTRODUCTION

Industrial Revolution 4.0 is a trend that has changed manual processes to become automated [1]. Economic growth has encouraged companies to develop and improve [2]. The industry is still working hard to digitize its business processes to compete with the ever-developing automation [3-6]. Andry et al. [7] stated the manufacturing industry, especially in the furniture sector, is a complex mainstay sector in handling supply chains. Supply chain management involves many activities to ensure that the distribution of goods is carried out in the correct quantity, quality and on time [2]. Support for the supply chain is proven by the application of technology in the form of decision-support systems [8]. A decision support system helps make ideal decisions following the first principles of Industrial Revolution 4.0, related to interconnections/connections to communicate with machines. In the industrial world, the use of interconnection/communication with machines is in the form of Supervisory Control and Data Acquisition (SCADA) technology. Rashad et al. [9] stated that SCADA technology is used as a remote application process monitoring tool to retrieve information from several industrial branches. In addition to focusing on interconnection/connection capabilities, the furniture manufacturing industry needs to increase information transparency in preparing qualified technological and operational standard.

Preparing technology operational standards needs to go through a planned and measurable transformation. Based on the second principle of Industrial Revolution 4.0, it is necessary to increase the operational transparency of the manufacturing industry [10]. The industry needs to apply the COBIT 5 framework to evaluate system transparency and supply chain business management. Rama et al. [11] stated that governance and technology management assessments can use COBIT 5 assistance in the DSS domain to manage controlled needs. Rizal et al. [12] stated that COBIT 5 provides educational value for the industry, namely helping top-level leaders make decisions and increasing competitive advantage in the production process. Furthermore, the third principle of the 4.0 industrial revolution also expects technology to be able to implement an evaluation of technical assistance using ISO 9126. Souza-Pereira et al. [13] stated that the functionality and reliability of technology can be assessed using ISO 9126 to evaluate the quality of technology and support processes that occur in the supply chain. Escultor and Moises [14] stated that ISO 9126 could be used as a system quality measurement tool to meet industry characteristics precisely and quickly. Thus, relationship analysis needs to be carried out on decision support systems, COBIT 5 and ISO 9126, to determine the relationship of each variable with the supply chain process.

To find out the interrelationships of factors in the supply chain process, examining the relationships between them is necessary. Testing the relationship between the decision support system, COBIT 5, and ISO 9126 in the supply chain can use the help of statistical tools Structural Equation

Modeling (SEM). Suhartanto et al. [15] stated that SEM could solve multilevel models simultaneously, which cannot be solved using ordinary linear regression equations. In this study, the structural model of the supply chain is complex (covers four variables) and includes many constructs, indicators or model relationships. SEM can help test more than one variable/level [16]. Haiyun et al. [17] stated that testing the relationship of variables in the supply chain aims to find the correlation that is formed. SEM testing aims to overcome various inconsistent supply chain business processes even though a decision support system has been implemented. Problems that arise when implementing the system include the absence of system procedures, incident handling, or identification of problems with supply chain operations. Therefore, analyzing the factors that influence the supply chain is necessary. To help process SEM data, LISREL tools can be used to analyse structural equation models. SEM can help determine the factors that affect the supply chain in the era of Industrial Revolution 4.0, namely the decision support system, COBIT 5, and ISO 9126. Based on this, it is necessary to analyse the factors that influence supply chain management using SEM.

This study aims to analyse the influence of DSS COBIT 5 variables, ISO 9126 functionality, ISO 9126 reliability, and decision support systems on supply chain management. The educational value created from this research is knowing the process of testing variables using SEM techniques so that the furniture manufacturing industry can use the results of influential variables as a reference for improving and prioritizing the supply chain process. The data used is primary data from collecting questionnaires from 300 furniture manufacturing industry employees. The innovation of this research is to calculate the value of the magnitude of the influence of each variable on the supply chain process so that users can find out whether the security systems and guidelines implemented are following the expectations of the industrial world. The stages of the research started with defining the factors, collecting data, testing reliability and validity, calculating the average and standard deviation, and forming a Confirmatory Factor Analysis (CFA) path model by testing the multivariate relationship model using SEM. Tests use LISREL tools to validate factor structures in addition to testing the fit between the model and data based on Goodness of Fit (GOF). The results of this study identify the factors that significantly affect the supply chain management process. The research implies the need for prioritization in system implementation, governance rules, and improving the quality of the supply chain process so that the process runs as it should. Thus, it is necessary to improve/implement these factors so that the furniture manufacturing industry can meet the challenges in the 4.0 industrial revolution era.

2. METHODOLOGY

2.1 Demographic data

The data used is primary data collected through questionnaires given to employees of the furniture manufacturing industry with a total of 300 respondents. Respondent identity was categorized by gender, age of the respondent, and working period. There were 175 male respondents (58.33%) and 125 female respondents (41.67%). The number of respondents <25 years was 37 (12.33%), between 25 and 35 years was 163 (54.33%), between 35 and 45 years was 56 (18.67%), and < 45 years was 44 (14.67%). The number of respondents with a working period of 1-2 years was 102 (34%), > 2-5 years was 48 (16%), 5-10 years was 93 (31%), and > 10 years was 57 (19%). After distributing the questionnaires, measurements were taken using a Likert scale. To test the relationship between factors, LISREL assistance was used.

2.2 Research variable

Table 1 describes the variables and indicators to be used. The classification of these variables is divided into exogenous variables, mediating variables, and endogenous variables [18].

Table 1. Variable and indicator

Characteristics	Variable Type	Indicator	Code
COBIT 5 Domain DSS (X1)	Exogenous	Manage Operation	D1
		Manage Services Requests and Incidents	D2
		Manage Problems	D3
		Manage Continuity	D4
		Manage Security Services	D5
		Manage Business Process Controls	D6
Functionality (X2)	Exogenous	Suitability	F1
		Accurateness	F2
		Interoperability	F3
		Security	F4
Reliability (X3)	Exogenous	Maturity	K1
		Fault tolerance	K2
		Recoverability	K3
		Reliability Compliance	K4
Decision Support System (Y1)	Mediation	Data Management	S1
		Model Management	S2
		User Interface	S3
		Knowledge Based Management	S4
Supply Chain Management (Y2)	Endogenous	Supply Chain Integration	SC1
		Supply Chain Performance	SC2
		Information Sharing	SC3

Table 1 shows the variables and indicators used in this study. Arizmendi et al. [19] stated that exogenous variables cause or affect the dependent variable. The exogenous variables in this study are DSS COBIT 5 (X1), functionality ISO 9126 (X2), and reliability ISO 9126 (X3). The mediating variable in this study is the decision support system (Y1). Jin et al. [20] stated that endogenous (dependent) variables were variables that were affected due to changes in exogenous variables. The endogenous variables in this study are supply chain management (Y2).

2.3 Hypothesis development

In aligning the direction of research, the development of research hypotheses in Figure 1.

Figure 1 shows the research model used. This research model includes a theoretical framework related to the description of the research hypothesis tested using SEM:

H1 : DSS COBIT 5 affects the decision support system.

H2 : ISO 9126 functionality affects the decision support system.

H3 : ISO 9126 reliability affects the decision support system.

H4 : DSS COBIT 5, Functionality ISO 9126, and Reliability ISO 9126 jointly affect the decision support system.

H5 : DSS COBIT 5 affects Supply Chain Management.

H6 : ISO 9126 Functionality affects Supply Chain Management.

H7 : Reliability ISO 9126 affects Supply Chain Management.

H8 : Decision Support System affects Supply Chain Management.

H9 : DSS COBIT 5, Functionality ISO 9126, Reliability ISO 9126, and Decision Support System together influence Supply Chain Management.

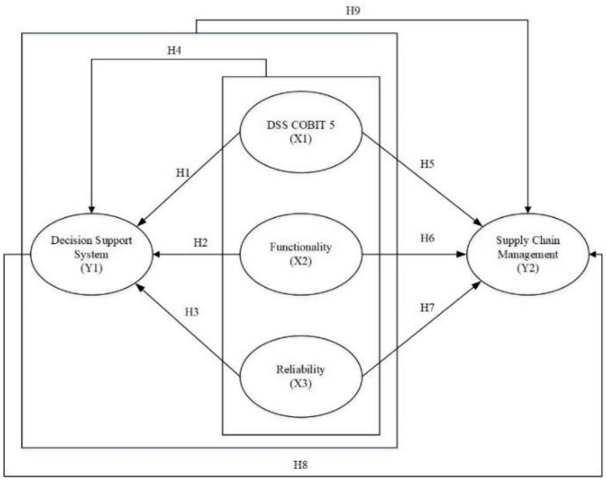

Figure 1. The research model [21, 22]

2.4 Research stages

The stages of the research to be carried out are in Figure 2. The first stage starts by defining a theoretical framework by analysing what factors influence supply chain management. This stage defines a path model for conducting CFA by describing endogenous, exogenous, and mediation constructs. The second stage is collecting data by conducting surveys and distributing questionnaires, and then testing is carried out according to the defined classification requirements. Measurement of the questionnaire for each respondent using the Likert scale. The third stage describes the use of exogenous, endogenous, and mediating variables. After that, verifies the validity of the data and tests the reliability. The fifth stage is descriptive analysis. This stage describes the calculation of each variable's average and standard deviation, which aims to describe the distribution of data, detect outliers, and identify relationships between variables. The sixth stage is confirmatory factor analysis using SEM. This stage tests the multivariate relationship model using SEM. Tests use LISREL tools to validate factor structures and examine relationships between latent variables. Testing the relationship between factors on variables using LISREL focuses on COBIT 5 Domain DSS (X1), Functionality ISO 9126 (X2), Reliability ISO 9126 (X3), Decision Support System (Y1), and Supply Chain Management (Y2). Testing the fit between the model and the data is based on GOF. The last stage is path analysis and hypothesis testing. This stage examines the relationship variables to determine the factors that significantly affect supply chain management [23].

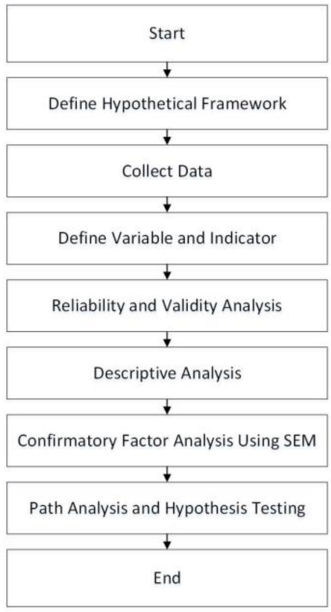

Figure 2. Research stage

3. RESULTS

Previous research on SEM generally used quantitative methods to help collect data through questionnaires [24]. Furthermore, reliability and validity testing are required to determine data consistency. The test was used to determine the compatibility of the factors involved in the CFA test on each factor.

3.1 Reliability of the questionnaire

The first step is to conduct a reliability test to answer questions related to the constructs. The question construct is a dimension of a variable and is arranged in a questionnaire form. Each measuring device should have the ability to provide consistent measurement results. The reliability test focuses on knowing the stability and consistency of the respondents with a Cronbach Alpha value > 0.6 [25]. Reliability test by distributing questionnaires to 300 respondents of manufacturing industry employees. COBIT variable 5 DSS domains get 0.607, functionality ISO 9126 obtains 0.669, ISO 9126 obtains 0.688, decision support system obtains 0.695, and supply chain management obtains 0.676. Based on the results, all variables have a value above 0.60 and have a good level of consistency. From the reliability test results, all indicators and variables are valid and reliable.

3.2 Validation of the constructs

Furthermore, validity testing is carried out on all factors. A validity test was carried out to obtain a valid instrument as a measuring tool [26]. The r product moment value for each question item is then correlated with the total score of each instrument item from all respondents' answers.

If the result value/validity score is high, it will have a small error variance, so the data collected is a reliable tool. The test tool that is commonly used is the product-moment correlation test with the Karl Pearson model. The r product moment value is compared with the critical r product moment value in the statistical table with n = 300 and α = 0.05 (obtained from the value of r table = 0.113). The following presents the results of the validity test of the questionnaire used in this study. The COBIT 5 deliver, service, and support variables consist of 6 statements, ISO 9126 functionality variables consist of 4 statements, ISO 9126 reliability variables consist of 4 statements, decision support system variables consist of 4 statements, and supply chain management variables consist of 4 statements. Table 2 shows that all variables are valid because they have value ≥ 0.113.

Table 2. Variable validity test (n=300)

Code	R value count (corrected item total correlation)	R value table	Decision
D1	0.560		
D2	0.562		
D3	0.663		
D4	0.643		
D5	0.557		
D6	0.500		
F1	0.697		
F2	0.738		
F3	0.633		
F4	0.767		
K1	0.687	0.113	Valid
K2	0.743		
K3	0.656		
K4	0.788		
S1	0.515		
S2	0.561		
S3	0.488		
S4	0.614		
SC1	0.600		
SC2	0.603		
SC3	0.587		

3.3 Descriptive statistics

The next step is to describe the research variables by calculating the mean and standard deviation. Descriptive analysis describes the object under study using sample data. The distribution of the average score for each indicator is divided into five levels: strongly disagree, disagree, disagree, agree, and strongly agree. Calculating the mean and standard deviation of each variable is based on the questionnaire results from each respondent. COBIT 5 DSS has a mean value of 3.874 and a standard deviation of 0.748. Functionality ISO 9126 has a mean value of 4.234 and a standard deviation of 0.611. ISO 9126 reliability has a mean value of 4.224 and a standard deviation of 0.627. The decision support system has a mean value of 3.552 and a standard deviation of 1.026. Finally, the supply chain management variable has a mean value of 3.552 and a standard deviation of 1.018. All variables get a high average score based on the calculation. The calculation results show that most respondents agree on the effect of using COBIT 5 DSS domains, functionality, reliability, decision support systems, and supply chain management.

Domain Deliver and Support (DSS) emphasizes the information technology service process, which includes operational management, service requests, security, and business processes. Functionality is used as a tool to evaluate the features and capabilities of the system as a whole. Reliability is used to assess the level of system service when used under certain conditions. A decision support system can detect anomalies from operational data in an easy-to-understand visualization display. Then, the supply chain management process succeeded in producing strategic collaboration with supply chain partners and made real-time, reliable, and value-creating information transfers to make better decisions about ordering, capacity allocation, production planning, and materials.

3.4 Confirmatory factor analysis using SEM

Use of SEM to test multivariate relationship model data [27]. SEM was chosen as a multivariate statistical technique because it can validate factor structures, adjust measurement errors, and examine the relationship between latent variables. This study used LISREL 8.80 with maximum likelihood estimation for all CFA tests. LISREL is an SEM program where users can write syntax in the LISREL programming language or define a model by drawing it using CFA. The CFA test determines whether the grouping of indicators based on a specific construct is consistent within that construct [28]. Next, the calculation of the overall fit test of the model is performed in Table 3.

Table 3. Whole model fit test

GOF	Acceptance Match Rate	Model Index	Notes
ChiSquare	The smaller the better (*p-value* ≥ 0,05)	7320.21 (p=1.00000)	Good
GFI	≥ 0,90 *good fit* 0,80 ≤ GFI ≤ 0,90 *marginal fit*	0.90	
RMSR	≤ 0,05 *good fit*	0.000	
RMSEA	≤ 0,05 *good fit*	0.00	
NNFI	≥ 0,90 *good fit* 0,80 ≤ NNFI ≤ 0,90 *marginal fit*	1.00	
NFI	≥ 0,90 *good fit* 0,80 ≤ NFI ≤ 0,90 *marginal fit*	1.00	Good Fit
AGFI	≥ 0,90 *good fit* 0,80 ≤ AGFI ≤ 0,90 *marginal fit*	1.00	
RFI	≥ 0,90 *good fit* 0,80 ≤ RFI ≤ 0,90 *marginal fit*	1.00	
IFI	≥ 0,90 *good fit* 0,80 ≤ IFI ≤ 0,90 *marginal fit*	1.00	
CFI	≥ 0,90 *good fit*	0.90	

Table 3 shows the results of the GOF analysis results based on the model fit criteria obtained by the chi-square statistic with a value of 7320.21 and a p-value of 1,000. Table 3 uses several statistical tests, such as [29, 30]:

- Goodness of Fit Index (GFI). Model fit index for model fit assessment reference.
- Root Mean Square Error of Approximation (RMSEA). Measure the residue contained in the model.
- Non-Normed Fit Index (NNFI). Calculation of data correlation and the number of parameters in

the model.

- Normal Fit Index (NFI). This index is also a measure of comparison between the proposed model and the null model.
- Adjusted Goodness of Fit Index (AGFI). The greater the AFGI value, the better the suitability of the model.
- Relative Fit Index (RFI). It is a derivative of NFI and CFI.
- Incremental Fit Index (IFI). Used to address parsimony and sample size problems related to NFI.
- Comparative Fit Index (CFI). Comparison value of the model compiled with the ideal model. The expected CFI value is above 0.90.

The next step is to analyze each variable's measurement model (full model) in Table 4. The Composite Reliability criteria or Construct Reliability measure (CR), often referred to as reliability, needs a CR value > 0.7. Variance Extract Measure (VE) needs a value of VE > 0.5.

Table 4 shows that all dimensions forming exogenous and endogenous latent variables. Likewise, both exogenous and endogenous latent variables have good reliability because it has a construct reliability value greater than 0.7 and a variance extract value greater than 0.05.

Table 4. Measurement of whole model per variable

Latent variable	Code	SLF (≥ 0.5)	STD Error (SE)	t-value (≥ 1.96)	CR (> 0.7)	VE (> 0.5)
COBIT 5 Domain DSS (X1)	D1	0.75	0.39	10.96	0.856	0.5
	D2	0.83	0.82	11.29		
	D3	0.85	0.82	11.21		
	D4	0.87	0.47	10.04		
	D5	0.98	0.92	11.82		
	D6	0.99	0.39	11.98		
Functionality ISO 9126 (X2)	F1	0.86	0.75	17.74	0.911	0.723
	F2	0.66	0.57	10.02		
	F3	0.87	0.83	16.34		
	F4	0.76	0.39	11.24		
Reliability ISO 9126 (X3)	K1	0.89	0.76	17.73	0.803	0.509
	K2	0.66	0.56	10.36		
	K3	0.87	0.79	17.21		
	K4	0.78	0.39	11.93		
Decision Support System (Y1)	S1	0.87	0.78	17.28	0.804	0.510
	S2	0.66	0.56	10.47		
	S3	0.88	0.73	18.20		
	S4	0.78	0.40	12.06		
Supply Chain Management (Y2)	SC1	0.77	0.41	10.28	0.775	0.536
	SC2	0.82	0.73	17.91		
	SC3	0.85	0.58	9.25		

Table 5. Relationship between variables

Hypothesis	Structural Track	SLF	t-value	Conclusion
H1	DSS COBIT 5 → *Decision Support System*	0.46	9.34	Significant
H2	*Functionality* ISO 9126 → *Decision Support System*	0.16	2.88	Significant
H3	*Reliability* ISO 9126 → *Decision Support System*	0.26	4.47	Significant
H4	DSS COBIT 5, *functionality* ISO 9126 and *reliability* ISO 9126 → *Decision Support System*	0.43	11.26	Significant
H5	DSS COBIT 5 → *Supply Chain Management*	0.25	5.37	Significant
H6	*Functionality* ISO 9126 → *Supply Chain Management*	0.20	4.04	Significant
H7	*Reliability* ISO 9126 → *Supply Chain Management*	0.50	8.97	Significant
H8	*Decision Support System* → *Supply Chain Management*	0.27	5.55	Significant
H9	DSS COBIT 5, *functionality* ISO 9126, *reliability* ISO 9126 and *decision support system* → *Supply Chain Management*	0.79	7.08	Significant

3.5 Path analysis and hypothesis testing

Structural measurement model analysis to examine the relationship between variables. To describe and test the model of the relationship between variables in the form of cause and effect, use path analysis to help. The path analysis method examines the variables' direct or indirect influence or impact. The results of testing in Table 5.

Table 5 shows the results of testing:

1. First Hypothesis Testing. The decision support system's COBIT 5 DSS regression coefficient value is 0.46. The t-count value of the effect of DSS COBIT 5 on the decision support system is 9.34, which is greater than 1.96 (t-count> 1.96). Partially, DSS COBIT 5 has a significant effect on the decision support system.
2. Second Hypothesis Testing. The ISO 9126 functionality regression coefficient for the decision support system is 0.16. The t-count value of the influence of ISO 9126 functionality on the decision support system is 2.88, which is greater than 1.96 (t-count > 1.96). Partially, the functionality of ISO 9126 has significant effect on the decision support system.
3. Testing the Third Hypothesis. The regression coefficient value of the reliability of ISO 9126 on the decision support system is 0.26. The t-count value of the influence of the reliability of ISO 9126 on the decision support

system is 4.46, which is greater than 1.96 (t-count> 1.96). Partially, the reliability of ISO 9126 has a significant effect on decision support systems.
4. Testing the Fourth Hypothesis. The calculated F-value of the influence of DSS COBIT 5, ISO 9126 functionality, and ISO 9126 reliability on the decision support system is 11.26, greater than 3.84. The coefficient of determination R^2 is 0.43 or 43%, and the error value is 0.57 or 57%. Together, DSS COBIT 5, functionality ISO 9126, and reliability ISO 9126 positively and significantly affect the decision support system. The DSS COBIT 5 variable is the most dominant variable influencing the decision support system (0.46), followed by ISO reliability (0.26) and ISO 9126 functionality (0.16).
5. Fifth Hypothesis Testing. The COBIT 5 DSS regression coefficient value for supply chain management is 0.25. The t-count value of the effect of DSS COBIT 5 on supply chain management is 5.37, which is greater than 1.96 (t-count> 1.96). Partially, DSS COBIT 5 has a significant effect on supply chain management.
6. Testing the Sixth Hypothesis. The ISO 9126 functionality regression coefficient on supply chain management is 0.20. The t-count value of the effect of ISO 9126 functionality on supply chain management is 4.04, which is greater than 1.96 (t-count > 1.96). Partially, ISO 9126 functionality positively and significantly affects supply chain management.
7. Testing the Seventh Hypothesis. The value of the ISO 9126 reliability regression coefficient on supply chain management is 0.50. The t-count value of the influence of the reliability of ISO 9126 on supply chain management is 8.97, which is greater than 1.96 (t-count> 1.96). Partially, the reliability of ISO 9126 has a significant effect on supply chain management.
8. Testing the Eighth Hypothesis. The regression coefficient value of the decision support system for supply chain management is 0.27. The t-count value of the influence of the decision support system on supply chain management is 5.55, greater than 1.96 (t-count> 1.96). Partially, the decision support system has a significant effect on supply chain management.
9. Testing the Ninth Hypothesis. The calculated F-value of the effect of DSS COBIT 5, functionality ISO 9126, reliability ISO 9126, and decision support systems on supply chain management is 7.08, greater than 3.84. The coefficient of determination R^2 is 0.79 or 79%, and the error value is 0.21 or 21%. Together, DSS COBIT 5, functionality ISO 9126, reliability ISO 9126, and decision support systems positively and significantly affect supply chain management. ISO 9126 reliability variable is the most dominant variable influencing supply chain management (0.50), followed by the decision support system variable (0.27), DSS COBIT 5 variable (0.25), and ISO 9126 functionality variable (0.20).

4. CONCLUSION

Industrial Revolution 4.0 was marked by an increase in manufacturing digitization, especially in the furniture sector. A decision support system helps make ideal decisions per the first principles of the revolution, which are related to interconnections/connections to communicate with machines. The second principle of the 4.0 industrial revolution is to increase the manufacturing industry's operational transparency. The industry needs to apply the COBIT 5 framework to evaluate system transparency and supply chain business management. The DSS domain has an evaluation focus on delivering data and services to the system by comparing it to the current supply chain process. Furthermore, the third principle of the 4.0 industrial revolution also expects technology to make the right decisions and solve urgent problems quickly. The furniture manufacturing industry has implemented a decision support system but needs to implement an evaluation of technical assistance using ISO 9126. ISO 9126 in Industrial Revolution 4.0 can support evaluating technology for current supply chain control capabilities. Thus, relationship analysis needs to be carried out on decision support systems, COBIT 5 and ISO 9126, to determine the relationship of each variable with the supply chain process. Testing the relationship between the decision support system, COBIT 5, and ISO 9126 in the supply chain can utilize statistical tools like SEM. SEM testing aims to overcome various inconsistent supply chain business processes even though a decision support system has been implemented. Problems that arise when implementing the system include the absence of system procedures, incident handling, or identification of problems with supply chain operations. The process of testing variables using the SEM technique makes the results of influential variables usable by the furniture manufacturing industry as a reference for improving and prioritizing the supply chain process. To help process SEM data, you can use LISREL tools to analyse structural equation models. This study aims to analyse the effect of DSS COBIT 5 variables, ISO 9126 functionality, ISO 9126 reliability, and decision support systems on supply chain management. Based on all the hypotheses and model testing that has been done, the whole hypothesis can be accepted. Thus, the factor that has the greatest influence is the reliability of ISO 9126, followed by the decision support system, DSS COBIT 5, and functionality of ISO 9126. SEM can help determine the factors that affect the supply chain in the era of Industrial Revolution 4.0, namely the decision support system factor, COBIT 5, and ISO 9126. The results of this study centre on all factors that significantly affect the supply chain management process. This research still has limitations, especially in determining the supply chain process statement for the questionnaire because the process coverage area in the furniture manufacturing industry is wide. Therefore, future research can determine the limitations of the supply chain process in one more specific area to facilitate the formulation of questionnaire statements. Thus, it is necessary to improve/implement these factors so that the furniture manufacturing industry can meet the challenges in the 4.0 industrial revolution era.

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