CoreID JOURNAL

Vol. 2 No. 1, March 2023 (11-19)
ISSN: 2987-6990
DOI: https://doi.org/10.60005/coreid.v2i1.27

The Effectiveness of Utilizing the Fabric Order Information System at PT. Ateja Tritunggal Using the PIECES Method

Kurniawan
[1]Information Systems Study Program, Sangga Buana University

Article Info

Article history:

Received December 20, 2023
Revised February 12, 2024
Accepted March 24, 2024

Keywords:

Textile Industry
PIECES Method
Effectiveness

ABSTRACT

The development of information technology has brought significant impacts to the business world, including the manufacturing industry. One important aspect in the textile industry is the production of fabric orders. PT Ateja Tritunggal also faces challenges in managing the fabric order information system. The PIECES (Performance, Information, Economy, Control, Efficiency, and Service) method framework is a framework used for classifying problems, opportunities, and directions within the scope of system analysis and design definitions. This study aims to analyze the effectiveness of fabric order production at PT Ateja Tritunggal using the PIECES method. This research uses quantitative methods and data collection techniques through a survey using questionnaires conducted using Google Forms media to all personnel in the PPIC (Planning Product Inventory Control) department at PT Ateja Tritunggal. The test results showed that the information system running at PT Ateja Tritunggal falls into the good category, but there is a need for improvement so that all business processes can run more effectively and properly.

Corresponding Author:

Kurniawan
Information Systems Study Program, Faculty of Engineering, Sangga Buana University,
Jl. PH.H. Mustofa No.68, Cikutra, Kec. Cibeunying Kidul, Kota Bandung, Jawa Barat 40124
Email: kurniawan2116207004@gmail.com

1. INTRODUCTION

The development of information technology has had significant impacts on the business world, including the manufacturing industry [1][2]. The advancement of information technology in companies within the manufacturing industry and the utilization of data mining technology as a critical technology to achieve systems can make decision-making in manufacturing companies more effective and scientific [3][4]. The era of globalization has demanded that all information be accessed quickly and conveniently [5][6]. Information systems are vital in supporting business processes efficiency and effectiveness. PT Ateja Tritunggal is a manufacturing company operating in the fabric production sector. The company has business processes involving various stages, including fabric order-making, requiring efficient and timely management. Human resources are vital components in any organization. The higher the human resources performance, the higher the organizational performance [7][8].

In the rapidly evolving era of digitalization, information systems play a crucial role in supporting the efficiency and effectiveness of business processes. The more advanced information technology becomes, the more its role is more noticeable [9]. Achieving good economic efficiency in the business world depends on having scientific leadership based on a good understanding of financial laws, operative and accurate knowledge of supply and demand in internal and external markets, commodity price dynamics, technology trends, and their ways [10][11]. A critical aspect in the textile industry is fabric order-making, which marks the beginning of the business process, involving receiving orders from customers that are then processed through production stages until the completion of the order and its delivery to the customer. Information systems must also be utilized effectively to support the efficient running of the production process. At PT Ateja Tritunggal, it is

necessary to examine how the fabric order-making process is carried out and whether the information system's success rate is satisfactory when tested using the PIECES method.

Business process efficiency refers to an organization's or company's ability to perform tasks, activities, or business operations by utilizing available resources optimally, thus achieving maximum results with minimal costs and time. Business process efficiency focuses on managing and improving efficiency in various operational aspects of the company, such as production, distribution, administration, and so on. A company's success or survival depends on its ability to effectively and efficiently respond to the complex dynamics in the global market [12].

The effectiveness of business processes in the manufacturing industry is the ability of manufacturing companies to operate and manage various production, logistics, and administrative processes most efficiently and effectively. This effectiveness is measured based on how far the company can achieve its business objectives, such as increasing productivity, reducing manufacturing costs, further developing product quality, and addressing client issues in an ideal manner. Management Information Systems process flows through computer data and integrates with other methods to provide information faster and more efficiently to support decision-making and other administrative tasks [13].

Increased Information and Communication Technology utilization within an organization aims to enhance competitiveness across various fields [14]. In efforts to strengthen the effectiveness of utilizing such information systems, comprehensive analysis is necessary. The PIECES method is a framework comprising six categories for classifying and solving problems, namely (Performance, Information, Economy, Control, Efficiency, and Service) [15]. Models can be developed to measure the success of an information system through adoption, adaptation, and combination [16]. The PIECES method is a framework for analyzing the effectiveness of information systems. Through applying the PIECES method, this research will measure the extent to which the current information system meets these criteria and identify the improvements or developments needed for the information system to perform better.

2. METHOD

PIECES is one of the methods that can be used to assess whether a system is already suitable for the purpose for which it was built [17]. In this study, the author will discuss the six factors in the PIECES method. This is aimed to focus the discussion on the issues present in the effectiveness of the fabric order production information system at PT Ateja Tritunggal. The research instrument uses a questionnaire containing questions based on the factors in the PIECES method (Performance, Information, Economy, Control, Efficiency, and Service) regarding the fabric order production information system currently in operation at PT Ateja Tritunggal. Each question item will be provided with answer alternatives using a Likert scale. The Likert scale is a scale used to measure the perceptions, attitudes, or evaluations of an individual or group regarding an event or social phenomenon.

Table 1. Scale Likert

Answer Format	Score Weight
Very satisfied (SP)	5
Satisfied (P)	4
Sufficien (N)	3
Dissatisfied (TP)	2
Very Dissatisfied (STP)	1

Table 2. Research Instrument

Dimension	Code	Indicator	SP	P	N	TP	STP
Performance	P1	Throughput, where the system is evaluated based on how much work (output) is completed over a certain period of time to address issues.					
	P2	Response time is the expected time for the information system to complete a work cycle.					
	P3	Audibility, for example, is the consistency where adjustments to principles can be examined.					
	P4	Correspondence congruence, especially concerning the UI used in the system, is evaluated in terms of its ease of understanding.					

Dimension	Code	Indicator	SP	P	N	TP	STP
Information	P5	Fulfillment, particularly how much the information system has the full capability to support work.					
	P6	Error tolerance, or damage caused by errors in the program.					
	I1	Accuracy, where the information from the evaluation results should have a high level of precision/accuracy.					
	I2	Relevance of information, where the generated information is in line with the requirements.					
	I3	Presentation of information, where information is presented in an appropriate form.					
	I4	Accessibility of information, where information is available at any time when needed.					
Economy	EC1	Reusability, which is the extent to which a program or part of the program can be reused in another application.					
	EC2	Resources, which refers to the amount of resources used in system development, including human resources and economic resources.					
Control	C1	Integrity, which is the level at which access to software or data by unauthorized individuals can be controlled.					
	C2	Security, which refers to mechanisms that control or protect programs and data within the information system.					
Efficiency	EF1	Usability, which refers to the effort required to learn, operate, prepare input, and interpret output of a program.					
	EF2	Maintainability, which is the effort required to find and correct errors in a program.					
Service	S1	Accuracy, which is the precision of computation and control.					
	S2	Reliability, the extent to which a program can be trusted and relied upon to perform the requested functions.					
	S3	Simplicity, the extent to which a program can be understood without difficulty.					

Validity and reliability tests are used to test the instrument to ensure that the questionnaire developed is truly good at measuring symptoms and producing valid data. Validity Test: If the calculated value (r-value) is greater than the table value (t-value), then the statement items within the questionnaire are said to correlate significantly with the overall scores obtained. This means that the items in a questionnaire can be considered valid. However, suppose the calculated value (r-value) is not greater than the table value (t-value). In that case, the statement items within a questionnaire do not significantly correlate with the overall scores obtained. In this case, the items in a questionnaire are considered invalid.

Additionally, the questionnaire is considered valid if the significance value (p-value) is less than 0.05 and positive [18]. Reliability Test: The basis for making decisions about reliability testing is if the value of Cronbach's Alpha is more significant than 0.70, then the questionnaire can be considered reliable. However, the questionnaire is considered unreliable if the value of Cronbach's Alpha is less than 0.70. Calculation of Average: The average calculation using the End User Computing Satisfaction model is done using Microsoft Excel. The average calculation is performed using the following formula:

$$\boldsymbol{TCR = \frac{average\ score\ *\ 100\%}{maximum\ score}}$$

Table 3. Classification of Respondents' Achievement Level

Achievement Percentage	Criteria
81% - 100%	Very Satisfied
61% - 80%	Satisfied
41% - 61%	Sufficien
21% - 40%	Dissatisfied
0% - 20%	Very Dissatisfied

3. RESULTS AND DISCUSSION

The PIECES method is a system analysis tool that allows a system to be examined in detail and comprehensively, enabling the identification of its strengths and weaknesses. This information can then be used as a reference for advancing the system in the future [19].

3.1. Current Order Booking Process

The fabric ordering process involves the sales marketing department issuing orders to PPIC (Planning Product Inventory Control) using Delivery Order Product (DOP) forms. Subsequently, PPIC calculates the raw and auxiliary material requirements to determine the production lead time for the orders received. Once the raw material and auxiliary material requirements, production schedule, and lead time are determined, PPIC will provide the delivery date to the sales marketing department and enter the order into the order summary data.

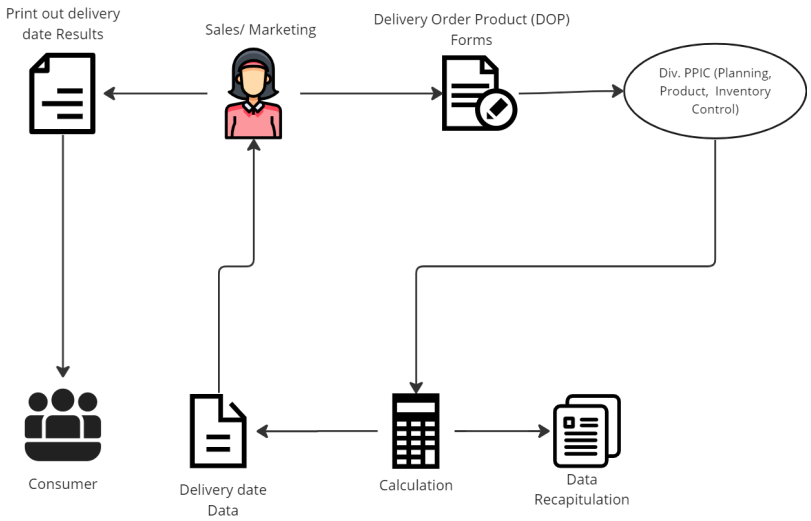

Figure 1. Fabric Ordering Process Diagram

3.2. Respondent Characteristics

From a total of 15 respondent data, it is known that the total number of female respondents is greater than the number of male respondents. There are eight female respondents, accounting for 53%, and 7 male respondents, accounting for 47%. From a total of 15 respondents, it is found that most respondents are aged between 20-30 years and 41-50 years, each comprising five individuals or equivalent to 33%. Furthermore, there are four respondents aged 31-40 years, accounting for 27%. Lastly, 1 respondent aged 51-60 years, accounting for 7%.

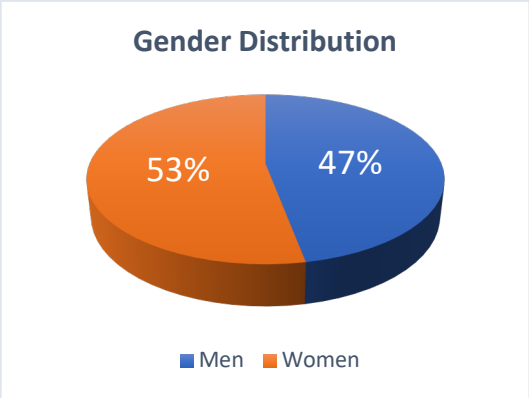

Figure 2. Pie Chart of Gender Distribution

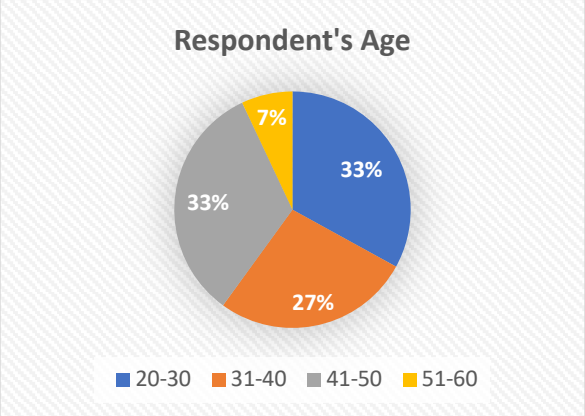

Figure 3. Respondents' Age Pie Chart

3.3. Calculation of the average

The calculation of the average satisfaction of the effectiveness of utilizing the fabric order production information system at PT Ateja Tritunggal using the PIECES method (Performance, Information, Economy, Control, Efficiency, Service), using the End User Computing Satisfaction (EUCS) model and Likert scale for answer alternatives, is conducted using Microsoft Excel to find the average. Below are the analysis results:

Table 4. Calculation of the Average Satisfaction

No.	Dimension	Average	Percentage	Criteria
1	Performance	3,73	74,67%	Satisfied
2	Information	3,72	74,33%	Satisfied
3	Economy	3,67	73,33%	Satisfied
4	Control	3,83	76,67%	Satisfied
5	Efficiency	3,73	74,67%	Satisfied
6	Service	3,80	76,00%	Satisfied
The overall average		3,75	74,94%	Satisfied

3.4. The Results of the Validity and Reliability Test of the Research Instrument

Correlations

		P1	P2	P3	P4	P5	P6	Total_P
P1	Pearson Correlation	1	,328	-,051	,026	,314	,539*	,556*
	Sig. (2-tailed)		,232	,857	,926	,255	,038	,031
	N	15	15	15	15	15	15	15
P2	Pearson Correlation	,328	1	,442	,397	,060	,548*	,687**
	Sig. (2-tailed)	,232		,099	,142	,832	,035	,005
	N	15	15	15	15	15	15	15
P3	Pearson Correlation	-,051	,442	1	,505	,066	,302	,645**
	Sig. (2-tailed)	,857	,099		,055	,815	,273	,009
	N	15	15	15	15	15	15	15
P4	Pearson Correlation	,026	,397	,505	1	,237	,000	,622*
	Sig. (2-tailed)	,926	,142	,055		,394	1,000	,013
	N	15	15	15	15	15	15	15
P5	Pearson Correlation	,314	,060	,066	,237	1	,164	,547*
	Sig. (2-tailed)	,255	,832	,815	,394		,560	,035
	N	15	15	15	15	15	15	15
P6	Pearson Correlation	,539*	,548*	,302	,000	,164	1	,627*
	Sig. (2-tailed)	,038	,035	,273	1,000	,560		,012
	N	15	15	15	15	15	15	15
Total_P	Pearson Correlation	,556*	,687**	,645**	,622*	,547*	,627*	1
	Sig. (2-tailed)	,031	,005	,009	,013	,035	,012	
	N	15	15	15	15	15	15	15

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 4. Validity Test of the Performance Dimension (P1-P6)

Correlations

		I1	I2	I3	I4	Total_I
I1	Pearson Correlation	1	,253	,170	,441	,627*
	Sig. (2-tailed)		,363	,544	,100	,012
	N	15	15	15	15	15
I2	Pearson Correlation	,253	1	,466	,218	,681**
	Sig. (2-tailed)	,363		,080	,436	,005
	N	15	15	15	15	15
I3	Pearson Correlation	,170	,466	1	,533*	,743**
	Sig. (2-tailed)	,544	,080		,041	,002
	N	15	15	15	15	15
I4	Pearson Correlation	,441	,218	,533*	1	,799**
	Sig. (2-tailed)	,100	,436	,041		,000
	N	15	15	15	15	15
Total_I	Pearson Correlation	,627*	,681**	,743**	,799**	1
	Sig. (2-tailed)	,012	,005	,002	,000	
	N	15	15	15	15	15

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 5. Validity Test of the Information Dimension (I1-I4)

Correlations

		EC1	EC2	Total_EC
EC1	Pearson Correlation	1	,076	,713**
	Sig. (2-tailed)		,787	,003
	N	15	15	15
EC2	Pearson Correlation	,076	1	,753**
	Sig. (2-tailed)	,787		,001
	N	15	15	15
Total_EC	Pearson Correlation	,713**	,753**	1
	Sig. (2-tailed)	,003	,001	
	N	15	15	15

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 6. Validity Test of the Economy Dimension (EC1-EC2)

Correlations

		C1	C2	Total_C
C1	Pearson Correlation	1	-,094	,777**
	Sig. (2-tailed)		,738	,001
	N	15	15	15
C2	Pearson Correlation	-,094	1	,553*
	Sig. (2-tailed)	,738		,032
	N	15	15	15
Total_C	Pearson Correlation	,777**	,553*	1
	Sig. (2-tailed)	,001	,032	
	N	15	15	15

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 7. Validity Test of the Control Dimension (C1-C2)

Correlations

		EF1	EF2	Total_EF
EF1	Pearson Correlation	1	,141	,832**
	Sig. (2-tailed)		,617	,000
	N	15	15	15
EF2	Pearson Correlation	,141	1	,666**
	Sig. (2-tailed)	,617		,007
	N	15	15	15
Total_EF	Pearson Correlation	,832**	,666**	1
	Sig. (2-tailed)	,000	,007	
	N	15	15	15

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 8. Validity Test of the Efficiency Dimension (EF1-EF2)

Correlations

		S1	S2	S3	Total_S
S1	Pearson Correlation	1	,264	-,082	,612*
	Sig. (2-tailed)		,342	,772	,015
	N	15	15	15	15
S2	Pearson Correlation	,264	1	,066	,636*
	Sig. (2-tailed)	,342		,816	,011
	N	15	15	15	15
S3	Pearson Correlation	-,082	,066	1	,609*
	Sig. (2-tailed)	,772	,816		,016
	N	15	15	15	15
Total_S	Pearson Correlation	,612*	,636*	,609*	1
	Sig. (2-tailed)	,015	,011	,016	
	N	15	15	15	15

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 9. Validity Test of the Service Dimension (S1-S3)

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	15	100,0
	Excluded[a]	0	,0
	Total	15	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
,717	19

Figure 10. Reliability Test for All Variables

4. CONCLUSION

Based on the research conducted at PT Ateja Tritunggal, The fabric ordering process at PT Ateja Tritunggal that is currently in place is as follows: Sales marketing creates fabric orders to PPIC by inputting design names, length in meters, and requested completion dates in the DOP (Delivery Order Product) form in the IBM Lotus Notes application. PPIC (Planning Product Inventory Control) receives the orders inputted by sales marketing, calculates the raw material and auxiliary material requirements, and determines the delivery date. Then, the orders are checked and prepared for monitoring and completion. After the calculation is completed, PPIC updates the received orders in the summary data and informs sales marketing of the delivery date. The order summary data is used by sales marketing and PPIC to monitor the orders made to ensure they are completed on time. It also monitors the availability of raw materials for order completion to prevent any issues.

REFERENCES

[1] X. Chen and X. Shu, "The Scientific and Technological Innovation Performance of Chinese World-Class Universities and its Influencing Factors," *IEEE Access*, vol. 9, pp. 84639–84650, 2021, doi: 10.1109/ACCESS.2021.3087659.

[2] R. Yuliana and B. Rahardjo, "Agile Data Architecture in Mining Industry for Continuously Business-IT Alignment: EA Perspective," *Jurnal Online Informatika*, vol. 3, no. 1, p. 48, 2018, doi: 10.15575/join.v3i1.213.

[3] Y. Guo, N. Wang, Z.-Y. Xu, and K. Wu, "The internet of things-based decision support system for information processing in intelligent manufacturing using data mining technology," *Mech Syst Signal Process*, vol. 142, p. 106630, 2020.

[4] G. S. Kearns and R. Sabherwal, "Strategic Alignment Between Business and Information Technology: A Knowledge-Based View of Behaviors, Outcome, and Consequences," *Journal of Management Information Systems*, vol. 23, no. 3, pp. 129–162, 2006, doi: 10.2753/MIS0742-1222230306.

[5] A. Sani, A. Budiyantara, T. Haryanto, N. Wiliani, K. Manaf, and E. Firmansyah, "Influences of the Environmental Context on the Acceptance and Adoption Technology among SMEs in Indonesia," *Test Engineering & Management*, vol. 83, pp. 22283–22293, 2020.

[6] M. Irfan, J. P. Syopiansyah, and A. R. Muhammad, "The Readiness Model of Information Technology Implementation among Universities in Indonesia," *IOP Conf Ser Mater Sci Eng*, 2018.

[7] A. J. Fernandes, H. Hartono, and C. Aziza, "Assessment IT governance of human resources information system using COBIT 5," *International Journal of Open Information Technologies*, vol. 8, no. 4, pp. 59–63, 2020.

[8] M. J. Mcgee and M. J. Mcgee, "Information Technology Management Strategies to Implement Knowledge Management Systems This is to certify that the doctoral study by," 2017.

[9] R. S. Perdana, "Audit Keamanan Sistem Informasi Akademik Menggunakan Framework NIST SP 800-26 (Studi Kasus: Universitas Sangga Buana YPKP Bandung)," *Infotronik: Jurnal Teknologi Informasi dan Elektronika*, vol. 3, no. 1, pp. 9–14, 2018.

[10] E. Vasile and D.-O. SIMION, "THE ROLE OF INFORMATION SYSTEMS IN ECONOMIC ORGANIZATIONS FOR THE STRATEGIC MANAGEMENT.," *Internal Auditing & Risk Management*, vol. 14, no. 2, 2019.

[11] S. S. Hussein *et al.*, "Towards designing an EA readiness instrument: A systematic review," *Colloquium in Information Science and Technology, CIST*, pp. 158–163, 2017, doi: 10.1109/CIST.2016.7805034.

[12] A. S. Aydiner, E. Tatoglu, E. Bayraktar, S. Zaim, and D. Delen, "Business analytics and firm performance: The mediating role of business process performance," *J Bus Res*, vol. 96, pp. 228–237, 2019.

[13] G. Kiradoo, "A Study on Management Information Systems Role and Adoption in Managerial Decision Making," *International Journal of Management (IJM)*, vol. 11, no. 3, 2020.

[14] H. Hanafiah, "Perencanaan Strategis Sistem Infomasi Dan Teknologi Informasi (SI/TI) Perpustakaan Di SMA Negeri Satu Baleendah," *J-SIKA| Jurnal Sistem Informasi Karya Anak Bangsa*, vol. 2, no. 01, pp. 34–41, 2020.

[15] N. M. B. Aditya and J. N. U. Jaya, "Penerapan Metode PIECES Framework Pada Tingkat Kepuasan Sistem Informasi Layanan Aplikasi Myindihome," *Jurnal Sistem Komputer dan Informatika (JSON)*, vol. 3, no. 3, pp. 325–332, 2022.

[16] B. Subaeki, A. A. Rahman, S. J. Putra, and C. N. Alam, "Success model for measuring information system implementation: Literature review," in *Journal of Physics: Conference Series*, IOP Publishing, 2019, p. 077015.

[17] D. W. T. Putra, H. Bulkis, P. Mandarani, and A. Syahrani, "Metode Pieces Dalam Mengukur Tingkat Kepuasan Pengguna Portal Akademik," *J. Sains dan Teknol. J. Keilmuan dan Apl. Teknol. Ind*, vol. 21, no. 1, p. 50, 2021.
[18] R. Al Hakim, I. Mustika, and W. Yuliani, "Validitas dan reliabilitas angket motivasi berprestasi," *FOKUS (Kajian Bimbingan & Konseling Dalam Pendidikan)*, vol. 4, no. 4, pp. 263–268, 2021.
[19] A. E. Pratiwi and S. Susanti, "Evaluasi Kinerja Sistem Informasi Akuntansi Accurate Accounting Enterprise Menggunakan Metode Pieces," *Jurnal Responsif: Riset Sains Dan Informatika*, vol. 3, no. 1, pp. 63–74, 2021.