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THE ROLE OF INFORMATION TECHNOLOGY IN KNOWLEDGE MANAGEMENT IN SMALL MEDIUM ENTERPRISE

[1]SUHARDI, [2]HAPOSAN BANJARNAHOR, [3]STEFFI ADAM, [4]ADE KURNIAWAN

(Corresponding author: Ade Kurniawan)

[1]University of Putera Batam, Department of Management, Kepri, Indonesia

[2]University of Putera Batam, Departement of Accounting, Kepri, Indonesia

[3]Departement of System Information, Universal University, Kepri, Indonesia

[4]Department of Informatics Engineering, Universal University, Kepri, Indonesia

E-mail: pb11539@univpb.onmicrosoft.com, [2]haposan@puterabatam.ac.id, [3]steffiadam.ssi@gmail.com,

[4]ade.kurniawan@uvers.ac.id

ABSTRACT

The existence of Small Medium Enterprise (SME) has become a support and has a major influence on Indonesia's economic growth. Furthermore, the general problems and challenges of SMEs in several cities in Indonesia are lack of knowledge and low competitiveness. There were 57.8 million SME practitioners in Indonesia, with employment of 114 million people. Therefore, the purpose of this study was to determine the role of information technology (IT) on knowledge management applied by SME actors in Batam City, Riau Islands, Indonesia. This study involved 30 of 1006 SMEs in the entire city of Batam Kepri, Indonesia with 5 types of businesses including industry, services, trade, fisheries, plantations, agriculture, and livestock. The method used is multiple regression analysis with T-Test and F Model Test. Researchers want to assess the influence of information technology variables through IT knowledge, IT Operations, and IT Infrastructure variables on knowledge management in SME. The results of this study show at the 0.05 level of significance IT knowledge, IT Operations, and IT Infrastructure has a positive and significant effect on knowledge management. The results of the descriptive analysis state that the Acquisition and/or development of knowledge provides the largest contribution in the application of knowledge management for SMEs in Batam City.

Keywords: *IT knowledge, IT operations, IT Infrastructure, Knowledge Management, Small Medium Enterprise*

1. INTRODUCTION

At present, the economy has been based on Digital, where information and knowledge are the important resources and assets in the company [1]. Knowledge is the process of translating information such as data and previous experience into a set of relationships which can be understood and applied by individuals [2]. The concepts and definitions of knowledge management are put forward by experts [3] who states that knowledge management as a system that allows companies to absorb the knowledge, experience and creativity of their staff for company improvement, another opinion is stated by [4] that knowledge management is an approach that systemic to manage intellectual assets and other information so as to provide a competitive advantage for the company [5]. From this definition, it can be seen that management of the company is needed to provide benefits for the company.

In the new Knowledge-based-economy era (KBE), one of the indicators of competitiveness of a nation or company is knowledge. The existence of KBE and IT plays an important role in knowledge management [6]. Information Technology is used as a tool and technique to facilitate the knowledge management process. Various types of IT such as telephone, e-mail, video conferencing and so on are used in the process of managing knowledge [7]. With this IT, the knowledge management process

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can be carried out quickly, effectively and efficiently [6] [7].

Furthermore, in 2018 the contribution of SME to the Indonesian economy is very large [9]–[11]. Small Medium Enterprise (SME) was recorded at 57.8 million units at the end of 2017, and the existence of SME as a support for Indonesia's economic growth with a total workforce of 114 million. Common problems and challenges of SMEs in Indonesia according to [10] [12] is the lack of knowledge and low competitiveness [13] [14]. Therefore, in this study, we want to answer how the role of Information Technology (IT) is to improve SME competitiveness and manage the knowledge possessed by SMEs.

In this study, we took the data population in 1006 SME perpetrators in Batam City, Riau Islands, Indonesia. The SME is divided into 5 types of businesses including various businesses, industries, services, trades, fisheries, plantations, agriculture, and livestock. From the field observations of 1006 SMEs, it appears that information technology in knowledge management has not been maximized towards the sustainability of its business, this is because the investments made in the application of information technology require a cost that is not small or large and it also appears that staff who manage IT lack understanding Technical matters such as knowledge or skills regarding computer-based systems.

So that a problem formulation can be drawn on how the influence of IT Knowledge, IT Operations and IT Infrastructure on knowledge management for SME actors in Batam City, Riau Islands, Indonesia. The results obtained from this study are that IT Knowledge, IT Operations, and IT Infrastructure have positive and significant effects on knowledge management and competitiveness for Batam City SMEs.

This paper is structured as follows, in Section 2 we describe Knowledge Management, Methods and Tools in the Application of Knowledge Management, Information Technology, and Small Medium Enterprise (SME). In Section 3 we describe Methodology. In Section 4 which is the result of an analysis of the findings of this paper. Section 5 is part of the Conclusion and Future Work.

2. BASIC THEORY

2.1 KNOWLEDGE MANAGEMENT

In general definition in the midst of society, knowledge is divided into two definitions, some call it wisdom and on other occasions, knowledge refers to information. Part of the difficulty of defining knowledge arises from its relationship to two other concepts, namely data and information. According to [15] and [16] reinforce the definition of data, information and knowledge by giving emphasis as follows: data are facts and numbers that convey something specific but do not provide further information about patterns, contexts, etc. Data have become information which have to be contextualized, categorized, calculated and abstracted. Therefore, information paints a bigger picture; namely data with relevance and purpose. Information can convey trends which are happening for a certain period of time.

Knowledge is closely related to doing and demonstrating knowledge and understanding (know-how) [17]. Shown in Figure 1, which is known as "Knowledge Pyramid" according to [15]. Knowledge Pyramid's explanation is for KM to succeed, people need a comprehensive understanding of what constitutes knowledge. Clear boundaries of what knowledge, information and data will help to go further and see the forms in which knowledge is located, and how to access it in various ways, then how to share it.

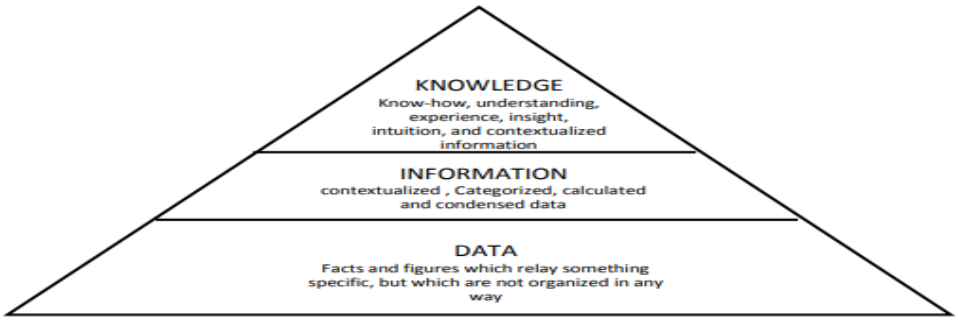

Figure 1: Knowledge Pyramid

According to [18], basically there are two kinds of sharing knowledge within the organization, namely tacit and explicit knowledge. Both types of knowledge are the continuum. Explicit knowledge can be expressed in words and numbers which can be presented in the form of data, scientific formulas,

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specifications, manuals and so on. This type of knowledge is ready to be transmitted between individuals formally and systematically. Tacit knowledge is personal and difficult to formalize, making it difficult to communicate and share with others. Tacit knowledge contains subjective insights, is intuitive, and is rooted in behaviour and experience. Whereas implicit knowledge is a knowledge that can actually be articulated but not yet done. Its existence is implied or inferred from observable behaviour or performance. Implicit knowledge is typically controlled by experts. However, not the same as tacit knowledge, implicit knowledge can be taken from people who are experts through a process called knowledge engineering. For more details on how explicit, tacit and implicit knowledge can be shown in Figure 2.

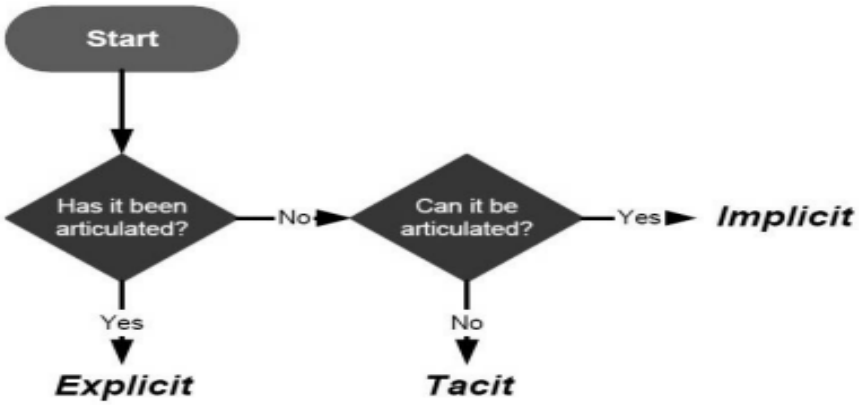

Figure 2: Explicit, Tacit and Implicit knowledge

The biggest challenge faced by organizations is how to convert tacit knowledge to explicit knowledge, or vice versa. Organizations are required to be able to translate knowledge in individuals, groups or teams, and the organization becomes real in the form of products and services produced. In order for the conversion to work properly, according to [19] introducing four basic patterns of knowledge creation known as The Spiral of Knowledge as shown in Figure 3

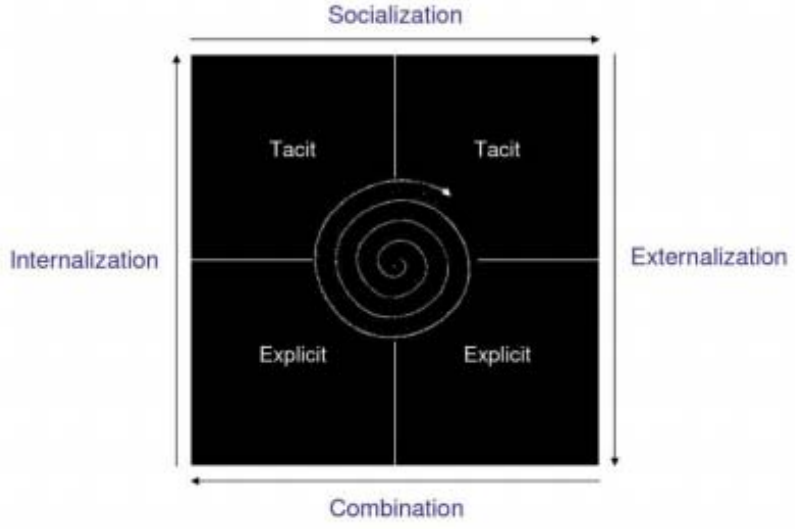

Figure 3: The Spiral of Knowledge

According to [20], explaining the important things to note from Knowledge Management is that the goal of Knowledge Management is to develop knowledge strategies that facilitate easy access to valuable knowledge. Therefore, it is very important to be able to classify what knowledge is important so that employees have the awareness to properly manage their knowledge of both how to distribute it and use it. There are three main reasons why actively applying KM is so important for the success of the company [21], namely: facilitating decision-making ability, building learning organizations by making

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"learning" a routine, stimulating cultural change and innovation

2.2 Methods and Tools in the Application of Knowledge Management

According to [22], there are methods, tools and techniques in the implementation of knowledge management, especially for small and medium businesses. The methods, tools and techniques are divided into two, namely using information technology and those that do not use information technology. The following is an explanation of each method, tool and technique:

1. Brainstorming.

Brainstorming is a simple way to help a group of people to produce new ideas or unusual (creative) ideas. This process is actually divided into two phases, namely divergence and convergence.

2. Learning and Idea Capture

They are aspect keys of knowledge management (KM), at the personal and team level to be more 'collective and systematic' captures ongoing learning and ideas.

3. Peer Assist

This is a technique used by the project team to ask for help from colleagues and subject matter experts regarding the significant problems the team is facing.

4. Learning Reviews.

They are techniques used by the project team to assist teams and individual learning during the work process. Learning Review differs from Active Action Review (AAR)

5. After Action Review

It is a technique for evaluating and taking lessons at project completion. This allows project team members to find out for themselves what happened, why it happened, and how to maintain strength and correct weaknesses.

6. Storytelling.

It is a powerful technique for sharing and transferring knowledge, especially tacit experience and knowledge. Literally telling a story: someone who has valuable knowledge tells his story/experience in front of people who want to gain knowledge.

7. Collaborative Physical Workspace.

It is a sharing or creating knowledge, usually interacting with others through communication, dialogue, or just asking questions.

8. APO Knowledge Management Assessment Tool.

It is a survey questionnaire designed to help organizations conduct readiness assessments for Knowledge Management. The assessment was carried out at the beginning of the KM program. Before starting the KM journey, organizations need to know the strengths and opportunities for improvement.

9. Knowledge Café.

It is a knowledge cafe is a way to have group discussions, to reflect, and to develop and share thoughts and insights that will emerge, in a very non-confrontational way.

10. The community of Practice.

COP is a group of people who have a concern or passion for something they do and learn how to do it better when they interact regularly. In the context of KM, COP is formed intentionally or spontaneously to share and create general skills, knowledge and expertise among employees

11. Taxonomy.

Taxonomy is a technique that provides a structure for managing information, documents, and libraries in a consistent manner. This structure helps people to efficiently navigate, store, and retrieve data and information needed throughout the organization.

12. Social Network Services.

It is a group of people who have social networking services. Core services are used to find people who have the same interests or needs; combining people into groups, or subgroups, and being able to communicate with groups; and Sharing content, such as document links to relevant sites, or even videos.

13. Expert Locator.

It is an information technology tool (IT) to enable effective and efficient use and/or share existing knowledge by connecting people who need knowledge and people who have certain knowledge. Sometimes, this system helps build new teams/projects by looking for the various skills needed.

14. Collaborative Virtual Workspaces

It is the essence of a collaborative virtual workspace is that it allows people to work together, regardless of where they are physical. Practically, this means that it must involve a combination of document sharing, collaborative editing, and audio/video conferencing.

2.3 Information Technology/IT

When getting information is no longer a problem, the difficulty lies in obtaining quality information, where quality is measured in terms of accuracy, reliability, precision, timeliness, and the extent of relevant information in decision making [23]. Referring to the theory put forward by [24],

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this study defines IT competencies as how companies use technology to manage information effectively.

This study distinguishes three dimensions in the concept of competence, namely IT Knowledge, IT Operations, and IT Infrastructure. This dimension represents resources which demonstrate the organization's ability to understand and use the tools needed to manage information about markets and customers. In addition, although these three dimensions are independent, they must be present in the company to achieve IT competencies. These three dimensions are used as independent variables in order to help and respond to existing problems. Explanation of the three independent variables will be explained below:

1. IT Knowledge

Knowledge of Communication information technology (ICT) is conceptualized as the extent to which a company has an organ of technical knowledge about objects such as computer-based systems. IT Knowledge is defined as a set of principles and techniques that are useful for bringing the change towards the desired goals.

2. IT Operations

Technical operations, or techniques, consist of activities carried out to achieve specific objectives [25]. Referring to [26], operational technical can be considered as the methods, skills, and processes needed to complete a focal assignment. Whereas according to [27] shows that the technique consists of heterogeneous processes, most of which are directed at the production of goods and services of economic value. This conceptualization is in line with the idea of a technological process, which is a set of ideas or steps used to achieve a goal (for example, a finished product). Technical operations are also considered as a manifestation of technical knowledge so that the implementation of technical knowledge will result in technical operations or skills [27]. With superior IT knowledge, this skill can be "T-shaped." That is, skills not only represent a certain deep understanding of the "knowledge domain," but also reflect the ability to export [25]. In this study, IT operations are conceptualized as the extent to which a company uses IT to manage market and customer information, improve effectiveness and decision making.

3. IT Infrastructure

IT infrastructure acts as an enabler, and a broader role is in increasing interest in the production and dissemination of information [28]. IT infrastructure refers to artefacts, tools and resources that contribute to the acquisition, processing, storage, distribution and use of information. According to this definition, IT infrastructure includes elements such as hardware, software and support staff[29]

2.4 Small Medium Enterprise (SME)

According to the Ministry of State for Cooperatives and Small and Medium Enterprises of the Republic of Indonesia (Menegkop and UKM), what is meant by Small Business is a business entity that has a net assets of not more than Rp 200,000,000, (13,819 USD) excluding land and buildings for business, and has annual sales of a maximum of Rp. 1,000,000,000 (69,087 USD). Meanwhile, Medium Enterprises are business entities owned by Indonesian citizens who have a net worth greater than Rp. 200,000,000. Rp 10,000,000,000 (690,859 USD) excluding land and buildings.

Based on the development of SMEs in Indonesia Differentiated into 4 Criteria, namely [30]:

1. Livelihood Activity is a Small and Medium Enterprise that is used as a job opportunity to earn a living, which is more commonly known as the informal sector. Examples are street vendors.
2. Micro Enterprise, is a Small and Medium Enterprise that has the nature of craftsmen but does not have the entrepreneurial nature.
3. Small Dynamic Enterprise, is a Small and Medium Enterprise that has an entrepreneurial spirit and is able to receive subcontracts and exports
4. Fast Moving Enterprise, is a Small and Medium Business that has an entrepreneurial spirit and will transform into a Big Business.

3. METHODOLOGY

This research is based on several theories [4], [6] [22], [22] [24], and [31], states the importance of knowledge management in an organization and the use of information technology to manage knowledge. SMEs as a form of profit organizations begin to realize the importance of managing knowledge using information technology. Unfortunately, the facts in the field show that the application of information technology in knowledge management for SMEs is still not maximally implemented.

According to [31], there are 79 instruments in researching knowledge management for Small and Medium Enterprises (SMEs) and the theory put forward by [22] which states there are 20

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knowledge management methods consisting of 11 methods that do not involve information technology and 9 methods involve information technology. Furthermore, the theory put forward by [24] which measures information technology based on measurable indicators of IT Knowledge, IT Operations and IT Infrastructure. This study uses 30 measurable indicators that correspond to the state of the object of research, used 8 methods that do not involve information technology and 6 methods involving information technology.

The next stage is the data collection process. For this purpose, the researcher uses a questionnaire research instrument. So that the instrument can be trusted, the researcher tests the validity and reliability of the instrument. Validity test using Pearson Moment Product and reliability testing using Cronbach's Alpha. Data Normality Test uses Kolmogorov 46 Smirnov to test the normality of residual data used for regression and Multicollinearity as a regression condition. After the data is collected, the next step is to analyze the data.

Data analysis uses SPSS 17.0 software with statistical data analysis method in the form of Multiple Regression Test, Partial T-Test and Simultaneous F Test to test the proposed model. The data that has been analyzed is then presented and discussed. Presentation of data using tables, graphs and pie charts. After the research results are given a discussion, and then it can be concluded. The conclusions contain short answers to each problem formulation and after that provide suggestions based on the results of the study.

1.1 Operasional Variabel

According to [32], providing an understanding of operational definitions is an element of research which tells how to measure a variable, in other words, an operational definition is a kind of implementation guide on how to measure a variable. Whereas according to [33] Definition of variables is an attribute or nature or value of a person, object or activity that has a certain variation set by the researcher to be studied and drawn conclusions. Based on the relationship between one variable and another variable, the types of variables in this study can be divided into:

1.1.1 Variable Dependent

The dependent variable is also called the dependent variable, the variable that is influenced by the independent variable [33]. In this study, the dependent variable is knowledge management as shown in Table 1.

Table 1: Dependent Operational Variables

Variable	Dimensions	Measured Indicator	Measurement Scale
Knowledge Management	*Evaluating knowledge and determining the knowledge gap*	• Conduct business exhibition visits • Have an archive of employee curriculum vitae • Use email to store new knowledge • Conduct discussion or question and answer with consumers • Establish good relationships with business advisors • Conduct comparative studies with other businesses • Be open to experts in the business field • Conduct an idea gathering session	Interval and Likert
	Acquisition and/or development of knowledge	• Transfer employees to other parts periodically • Conducting trials of products produced • Facilitate employees who study alone • Conduct learning for themselves and employees • Invite students who are currently working • Conduct market research • Conduct activities to produce business product development • Make regular training plans for yourself and	Interval and Likert

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		others • Conduct job exchanges for employees • Finding out knowledge about customers and suppliers • Do learning while doing • Supervise in the business environment • Recruit trainers to conduct training	
	Knowledge Sharing	• Train old employees for new employees • Assisting employees • Hold production and sales meetings	Interval and Likert

1.1.2 Independent Variable

Independent variables are also called independent variables, where independent variables that determine a particular direction or change in the dependent variable, while the independent variable is in a position that is independent of the influence of the dependent variable [33]. In this study, as shown in Table 2 there are three independent variables, namely IT Knowledge, IT Operations, and IT Infrastructure.

Table 2: Operational Independent Variables

Variable	Sub Variables	Indicator	Measurement Scale
Information Technology	***IT Knowledge* (X1)**	• IT technical support staff have sufficient knowledge to handle computer-based systems • Have high computer-based technical expertise • Understanding (knowledgeable) about new innovations in the field of computers	Interval and Likert
***IT Operations* (X2)**		• Routinely use a computer-based system to access information from a database (database) • Use computer-based systems to analyze customers and market information. • Utilizing decision support systems (decision support systems) when managing customer information • Procedures established to collect customer information from online sources	Interval and Likert
***IT Infrastructure* (X3)**		• Has an official Information Systems Management department in the Organization structure • Employing a manager who is primarily responsible for managing information technology • ICT equipment in companies connected to computer/internet networks • There is a flexible application software that can be adjusted as needed	Interval and Likert

Furthermore, in Table 3 it can be seen in this study. This will also examine the knowledge management methods and tools that involve information technology and those that do not involve information technology.

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Table 3: Operational Knowledge Management Methods and Tools

Variable	Category	Method / Tool	Answer Options
Information Technology	Involving Information Technology	*Document library leading to a document management system*	Yes or no
		Blogs	Yes or no
		Social media	Yes or no
		Voice dan Video Over Internet Protocol	Yes or no
		Advanced search tools	Yes or no
		Building knowledge cluster	Yes or no
	Without involving Information Technology	*Brainstorming*	Yes or no
		Learning and idea capture,	Yes or no
		Peer Assist	Yes or no
		Learning Review	Yes or no
		After Action Review,	Yes or no
		Storytelling	Yes or no
		Collaboration Physical Workspace	Yes or no
		Knowledge Caf	Yes or no

1.2 Research model

This research model is shown in Figure

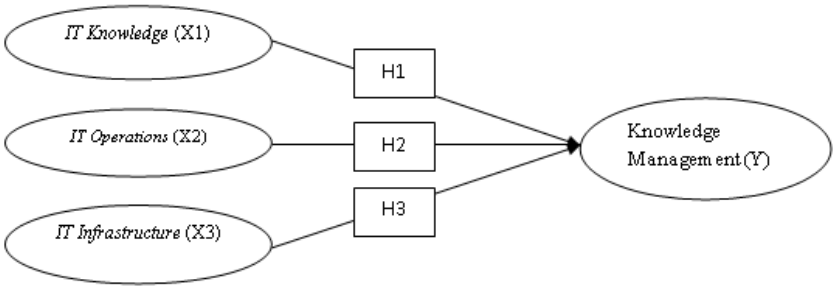

Figure 4: Research model

Based on Figure 4, the research assumptions can be formulated as follows:

- Research hypothesis for T-1: IT Knowledge has a positive and significant effect on knowledge management.
  - Ho = IT Knowledge does not have a positive and significant effect on knowledge management.
  - Ha = IT Knowledge has a positive and significant effect on knowledge management.
- The research hypothesis for T-2: IT Operations has a positive and significant effect on knowledge management
  - Ho = IT Operations do not have a positive and significant effect on knowledge management
  - Ha = IT Operations have a positive and significant effect on knowledge management
- The research hypothesis for T-3: IT Infrastructure has a positive and significant effect on knowledge management
  - Ho = IT Infrastructure does not have a positive and significant effect on knowledge management
  - Ha = IT Infrastructure has a positive and significant effect on knowledge management

1.3 Technical Data Analysis

Data Analysis Methods used in this research are quantitative analysis methods/techniques. According to [33], states that quantitative analysis techniques are also called statistical techniques and are used to analyze data in the form of numbers, both the measurement results and the results of transforming qualitative data into quantitative data

3.3.1 Data Quality Test

Data Quality Test is used to obtain quality data in research. The data quality test was carried out using data validity test and data reliability test. Data validity test is a test intended to determine the extent to which the measuring device is able to measure what you want to measure [34]. In determining the level of feasibility and whether or not an item to be used is usually tested the significance of the correlation coefficient at the

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level of 0.05, meaning that an item is considered to have a level of acceptance or valid if it has a significant correlation to the total item score.

Table 4: Correlation Coefficient And Relationship Level

No	Value of Correlation Coefficient	Relationship Level
1	0,800-1,000	Very high
2	0,600-0,799	High
3	0,400-0,599	High enough
4	0,200-0,399	Low
5	0,000-0,199	Very low

Data Reliability Test is a term used to indicate the extent to which a measurement result is relatively consistent if the measurement is repeated twice or more [33], [34]. Reliability can also mean an index that shows the extent to which the measuring device can show trustworthiness or not. This test is used to determine and measure the level of consistency of measuring instruments.

The test value will be proven using a two-sided test at a significance level of 0.05. Criteria for whether or not a data is received or reliable or not a data can be seen if the alpha value is greater than the critical value of the product moment or the value of r table. It can also be seen using the value of the determinant limit, for example, 0.6. A value of less than 0.6 is considered to have less reliability, while a value of 0.7 is acceptable and 0.8 is considered good. The following is shown in Table 5 the recommended values by comparing the values with the following reliability coefficient index table:

Table 5: Value Of Reliability Interval And Criteria

No	Interval Value	Criteria
1	< 0,20	Very low
2	0,20 – 0,399	Low
3	0,40 – 0,599	Enough
4	0,60 – 0,799	High
5	0,80 – 1,00	Very high

1.4 Population and Sample

The population in this study are SMEs in the type of food production business whose businesses are still running and active and using information technology. From the data obtained there are 286 SMEs. Of the 286 registered SMEs whose businesses are still running at least 6 months, there are 153 SMEs. Of the 153 SMEs that conduct their business management activities which are assisted with information technology, both SMEs, in this case, the owner or employees are 56 SMEs.

4. RESULTS AND DISCUSSION

Respondents of this study were the Small and Medium Enterprises with the type of food production business in Batam City. Questionnaires were distributed at a predetermined time according to the research schedule, which was in September 2017 to January 2018. The number of respondents who filled out questionnaires was 30 respondents. From the results of filling out the questionnaire, the respondent's profile is obtained as follows:

1. Based on Type of Business, the type of business was carried out by respondents who filled the questionnaire 100% or as many as 30 businesses including small businesses.
2. Based on the Form of Business in this study, the form of business was carried out by respondents is as follows:
3. Respondents whose businesses are in the form of Commanditaire Vennootschap (CV) are 8 businesses.
   a. Respondents whose businesses are in the form of Limited Liability Company (Ltd) are 0 businesses.
   b. Respondents whose businesses are in other forms are 22 businesses.
4. Based on Position As many as 30 respondents or 100% of respondents who filled out the questionnaire were the owners of each business that was running.
5. Based on Age Profiles of respondents as follows;
   a. Respondents with age <25 years are 2 businesses.
   b. Respondents with age 25-35 years were 15 businesses.
   c. Respondents with age> 35 years were 13 businesses.
6. Based on Gender, the profile of research respondents by sex is as follows:
   a. Male respondents were 8 respondents.
   b. Female respondents were 22 respondents
7. Based on the Latest Education, the profile of research respondents on the latest education are as follows:
   a. Respondents with the most recent high school education were 9 people.
   b. Respondents with the last S1 degree were 4 people.

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c. Respondents with the last education were 17 people.**4.1 Data Quality Test Results**

Data quality tests which are performed to obtain results are data validity and data reliability testing. The following results of the validity test for each research variable consisting of independent variables and dependent variables are shown in Table 7, 8, and 9.

1. IT Knowledge Validity Test *(Table 7)*

   Following are the results of the validity test of the IT Knowledge independent variable

Table 6: It Knowledge Validity Test Results

No	Variable	Correlation Coefficient	Standard	Information
1	X1.1	0,798	0,3	Valid
2	X1.2	0,938	0,3	Valid
3	X1.3	0,910	0,3	Valid
4	X1.4	0,661	0,3	Valid

2. Test Validity of IT Operations (Table 8)

The following are the results of the validity of the IT Operations independent variables.

Table 7: It Operations Validity Test Results

No	Variable	Correlation Coefficient	Standard	Information
1	X2.1	0,888	0,3	Valid
2	X2.2	0,932	0,3	Valid
3	X2.3	0,858	0,3	Valid
4	X2.4	0,894	0,3	Valid

3. Test of IT Infrastructure Validity (Table 9)

The following are the results of the validity test of the IT Infrastructure independent variable

Table 8: It Infrastructure Validity Test Results

No	Variable	Correlation Coefficient	Standard	Information
1	X3.1	0,806	0,3	Valid
2	X3.2	0,867	0,3	Valid
3	X3.3	0,801	0,3	Valid
4	X3.4	0,826	0,3	Valid

The following results of Validity Test for dependent variable Knowledge Management are shown in Table 10

Table 9: Knowledge Management Validity Test Results

No	Variable	Correlation Coefficient	Standard	Information
1	Y.1	0,487	0,3	Valid
2	Y.2	0,607	0,3	Valid
3	Y.3	0,762	0,3	Valid
4	Y.4	0,466	0,3	Valid
5	Y.5	0,714	0,3	Valid
6	Y.6	0,568	0,3	Valid
7	Y.7	0,467	0,3	Valid
8	Y.8	0,484	0,3	Valid
9	Y.9	0,512	0,3	Valid
10	Y.10	0,487	0,3	Valid
11	Y.11	0,465	0,3	Valid
12	Y.12	0,476	0,3	Valid
13	Y.13	0,635	0,3	Valid
14	Y.14	0,456	0,3	Valid
15	Y.15	0,483	0,3	Valid
16	Y.16	0,634	0,3	Valid
17	Y.17	0,452	0,3	Valid
18	Y.18	0,501	0,3	Valid
19	Y.19	0,482	0,3	Valid
20	Y.20	0,467	0,3	Valid
21	Y.21	0,516	0,3	Valid
22	Y.22	0,559	0,3	Valid
23	Y.23	0,451	0,3	Valid
24	Y.24	0,510	0,3	Valid
25	Y.25	0,538	0,3	Valid
26	Y.26	0,492	0,3	Valid
27	Y.27	0,490	0,3	Valid
28	Y.28	0,472	0,3	Valid
29	Y.29	0,583	0,3	Valid
30	Y.30	0,765	0,3	Valid

Reliability Data Test is used to measure whether the research instrument is reliable or is suitable for use as a measuring instrument. The following results of the reliability data test of the research variables are shown in Table 10

Table 10: Reliability Test Results

No	Variable	Number of Samples	Cronbach's Alpha value	Standard	Information
1	*IT Knowledge* (X1)	30	0,843	0,6	Reliable
2	*IT Operations*(X2)	30	0,916	0,6	Reliable
3	*IT Infrastructure*(X3)	30	0,843	0,6	Reliable
4	Knowledge Management (Y)	30	0,910	0,6	Reliable

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Assumption Test is used to provide a pre-test, or initial test of a device or instrument used in data collection, data form, and type of data will be further processed from an initial data collection which has been obtained so that the requirements for obtaining data are not can be fulfilled. The Classical Assumption Test used in this study is as follows;

a. Data Normality Test Results (Table 9)

Data Normality Test is used to see whether the residual values (differences that exist) which are studied have normal or abnormal distribution.

Table 11: Data Normality Test Results

One-Sample Kolmogorov-Smirnov Test

		Standardized Residual
N		30
Normal Parameters[a,,b]	Mean	.0000000
	Std. Deviation	.94686415
Most Extreme Differences	Absolute	.131
	Positive	.131
	Negative	-.088
Kolmogorov-Smirnov Z		.715
Asymp. Sig. (2-tailed)		.685

a. Test distribution is Normal.
b. Calculated from data.

From table 11 above, the Kolmogorov-Smirnov value has a significance level of 0.685. The results of the normality test using the Kolmogorov-Smirnov method showed that the variables X1, X2 and X3 had a significance value> 0.05, which was 0.685. This shows that the residual values (differences that exist) which are studied have a normal distribution.

b. Multicollinearity test is used to test whether the regression model found a correlation between independent variables (independent variables) as shown in Table 12. A good regression test model should not occur multicollinearity

Table 12: Multicollinearity Test Results

No	Variable	Sig value	VIF value	Standard	Information
1	*IT Knowledge* (X1)	0,019	1,406	<10	Between X1 and X2 there is no colinearity
2	*IT Operations* (X2)	0,000	1,424	<10	
3	*IT Infrastucture* (X3)	0,018	1,016	<10	

4.2 The Role of Information Technology on Knowledge Management

The role of information technology in knowledge management applied by Small and Medium Enterprises (SMEs) in Batam City is formulated with multiple linear regression models as follows.

$$Y = 25{,}563 + 1{,}684X1 + 2{,}921X2 + 1{,}303X3$$

This equation Y represents the knowledge management variable, X1 represents the IT Knowledge variable, X2 represents the IT Operations variable, and X3 represents the IT Infrastructure variable. To explain the ability of the independent variable (X) to explain the behaviour of the dependent variable Y, the regression significance coefficient is partially and simultaneously tested (model). Test the significance of each regression coefficient is needed to determine the significance or not the influence of each independent variable (Xi) on the dependent variable Y. Because there are three independent variables (Xi), then for each independent variable coefficient (Xi) is tested partial significance, following test results:

a. Test the significance of IT Knowledge variables on knowledge management in this significance test is the null hypothesis and alternative hypothesis which are formulated.

$$H0: b1 = 0$$

$$H1: b1 \neq 0$$

Based on the results of linear regression, the result has been carried out to obtain t_{count} of 2.503. This t_{count} is greater than the value of t_{table}, which is 2.042. Based on the criteria of $t_{count} > t_{table}$, the decision can be taken that H0 is rejected and H1 is accepted which means that the regression coefficient value in the IT Knowledge variable is not zero.

b. Test the significance of variable IT Operations on knowledge management in this

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significance test is the null hypothesis and alternative hypothesis which are formulated.

H0: b2 = 0

H1: b2 ≠ 0

Based on the results of linear regression, the result has been carried out obtained t_{count} of 6.229. This t_{count} is greater than the value of t_{table}, which is 2.042. Based on the criteria of $t_{count} > t_{table}$, the decision can be taken that H0 is rejected and H1 is accepted which means that the regression coefficient value on the IT Operations variable is not zero.

c. Test the significance of IT Infrastructure variables on knowledge management. In testing this significance, the null hypothesis and alternative hypothesis are formulated.

H0: b3 = 0

H1: b3 ≠ 0

Based on the results of linear regression, the result has been done, it is obtained that the t_{count} is 2.518. This tcount is greater than the value of t_{table}, which is 2.042. Based on the criteria of $t_{count} > t_{table}$, it can be decided that H0 is rejected and H1 is accepted which means that the regression coefficient value on the IT Infrastructure variable is not zero.

After a partial test of significance is carried out, a simultaneous significance test is also called a model test. In simultaneous testing of significance, this null hypothesis and alternative hypothesis are formulated.

H0: b1 = b2 = b3 = 0

H1: at least one coefficient of bi ≠ 0

Based on the results of linear regression, the result has been done, it is obtained that the Fcount value is 16.964. This F_{count} value is greater than F_{table} which is 2.92, so the decision can be taken that H0 is rejected and H1 is accepted which means that the coefficient value of at least one regression coefficient is not zero. After testing the model simultaneously, then based on this matter also tested the hypothesis to test the hypothesis that has been formulated as follows:

a. The research hypothesis for T-1 is Accepted: IT Knowledge has a positive and significant effect on knowledge management Ho = IT Knowledge has no positive and significant effect on knowledge management Ha = IT Knowledge has a positive and significant effect on knowledge management. In testing this hypothesis, the results of the study reject H0 and accept H1. This is based on the t-test which is done where $t_{count} > t_{table}$ and sig value <0.05. This means that IT Knowledge has a positive and significant influence on knowledge management.

b. Research hypothesis for T-2 is Accepted: IT Operations has a positive and significant effect on knowledge management Ho = IT Operations has no positive and significant effect on knowledge management Ha = IT Operations has a positive and significant effect on knowledge management. In testing this hypothesis, the results of the study reject H0 and accept H1. This is based on the t-test which is done where $t_{count} > t_{table}$ and sig value <0.05. This means that IT Operations have a positive and significant effect on knowledge management.

c. The research hypothesis for T-3 is Accepted: IT Infrastructure has a positive and significant effect on knowledge management Ho = IT Infrastructure have no positive and significant effect on knowledge management Ha = IT Infrastructure has a positive and significant influence on knowledge management. In testing this hypothesis, the results of the study reject H0 and accept H1. This is based on the t-test which is done where $t_{count} > t_{table}$ and sig value <0.05. This means that IT Infrastructure has a positive and partially significant effect on knowledge management.

Based on the results of the analysis which has been done, taking into account the size of the regression coefficients of each independent variable can be seen that all the independent variables consisting of IT Knowledge, IT Operations and IT Infrastructure have an influence on the dependent variable namely knowledge management. The significance test results show that the effect is not accidental, but is statistically real. Of the three independent variables, the coefficient that has the largest and most significant value is IT Operations. That is, among these three variables, IT Operations variables are the most dominant variables affecting knowledge management

5. CONCLUSION AND FUTURE WORK

Based on research and data processing which has been carried out in accordance with the methods described, it can be concluded as follows:

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a. IT Knowledge has a positive and significant influence on knowledge management for Batam City SMEs.

b. T Operations have a positive and significant effect on knowledge management for Batam City SMEs.

c. IT Infrastructure has a positive and significant effect on knowledge management for Batam City SMEs.

d. Application of knowledge management for Batam City SMEs is good. Acquisition and/or development of knowledge has the greatest contribution to the application of knowledge management.

e. The use of advanced search tools is a method of knowledge management involving information technology that has the highest percentage of use, while Peer Assist is a method of knowledge management without involving the technology with the greatest percentage of use for SMEs in Batam City.

For further research, SMEs can also be examined about information technology that can help SMEs in improving the management of knowledge management to support the growth and development of SMEs.

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