

Data Analytics in an Operational System with FMEA in a Healthcare Organization

Kesorn Thongngen

The Cluster of Logistics and Rail Engineering
Faculty of Engineering, Mahidol University
Nakhon Pathom, Thailand
kesngen@gmail.com

Duangpun Kritchanchai

Mahidol University, Department of Industrial Engineering, Faculty of Engineering,
25/25 Phutthamonthon 4 Road, Salaya, Nakhon Pathom, 73170, Thailand
duangpun.skr@mahidol.ac.th

Abstract

The purpose of this research is to analyze the causes of potential failure, failure modes and effects models in the operational data system. We use failure mode and effect analysis theory based on qualitative data analysis for an assessment from in-depth interviews with experts from the healthcare organization utilizing non-probability random sampling and purposive sampling

The data operating system process in healthcare organization, according to the research findings, consists of 4 factors includes databases, data management, staff, and data utilization. As a result, potential failure, failure modes and effects models were 19 variables identified when considering the values S, O, and D, as well as the risk priority number.

Then we analyze the outcomes of the factors obtained by identifying solutions and taking actions to improve the data operational system of the healthcare organization by displaying the results: 1) The database by setting up a database to manage the data the center collects. A database system exists that enables multiple users to work simultaneously. 2) Data management includes managing data structures for input and output data in the input-process-output pattern, where there is a relationship between the information and a clear connection between various pieces of information. 3) Staff should be the framework, scope, and division of the work must all be clearly stated. However, the operation needs a mentor to help it work and guide activities on the right path including training employees talents and acquiring their experience in the following duties. 4) Data utilization development of people operating systems has modernized the use of information. Create a data operating system so that data may be examined, distilled, and grouped before use. To suit user needs, provide a system with staff that can input and export data. Along with the use of technology to generate data to import and export data consistently, and the systematic of the data by combining the necessary data to analyze the data. Furthermore, the study outcomes can be reinforced to assist organizations to see the whole link between the data operating system front end and back end processes.

Keywords

Failure mode and effect analysis, Operational system, Healthcare organization

1. Introduction (12 font)

The most valuable economic resource is data, according to Gerd Leonhard (2013). Along with the quick transition from the analog to the digital era of technology. The importance of data increases with its impact on corporate operations. An idea to build a platform to support the business new business model emerged as it started to transform. The business gets more difficult as a result, giving it an advantage.

Entrepreneurs concentrate on building competitive advantages when faced with company obstacles to establish a leading company and develop aggressive prospects for current and future business growth. As an alternative, businesses must manage both the front and back ends of operational systems (Nattanaphat Ratchatawiwat, 2021). It is difficult to manage the enormous volume of data generated every second in the form of documents, text,

figures, photos, and videos without being able to spot the point of data manipulation. Because it couldn't keep up the organization had to develop a new system using technology to analyze data. A lack of competent personnel has an impact on the likelihood of rivalry aimed at achieving corporate goals. The Office of Disease Prevention and Control 6 located in the Chonburi province is a known academic institution monitoring prevention and control of regionally based health concerns and disease outbreaks both locally and internationally. Whenever a business has a lot of raw data every work group stores its data separately. It is impossible to find a consolidated corporate database. Starting with the primary problem is that the organization has an enormous amount of data saved but is unable to use it for its intended purpose and proceeding backward, this results in the organization continuing to have problems. Your organization, therefore requires a tool new technology is being introduced to process and utilize such data more efficiently recognizing the appropriate inaccuracy of the collected data has trouble performing data analysis. The data would have been incomplete or nonexistent if the informant had refused to cooperate. Secondary problems, such as varied information, and inadequate data resolution, would have resulted from this. There is an enormous amount of data despite the absence of data collection and maintenance. However, a scheme that promotes data usage is still lacking, and a lack of comprehension of proper business management.

The researcher is interested in looking into how health organizations use their information systems for the reasons mentioned above. The researchers anticipated these issues with Failure mode and effects analysis (FMEA) from the beginning to the end of the process of operating health organizations data that shows the root of the issue, the fault that manifests. Additionally, the results that follow also reduce the possibility of generating future issues. Finding solutions and changes for shortcomings is also helpful for long term competitive advantage. All employees will be able to get beneficial data quickly and health organizations will be able to have an effective connected data processing system. Being able to use the knowledge and observe outcomes right away.

The purpose of this research is to analyze the causes of failure and the effects of applying the Failure mode and effects analysis (FMEA) theory of the health organization information operational system. And, to find solutions and improvements for issues with the organization healthcare data operating system.

2. Literature Review

2.1 Operational system in a healthcare organization

An operating system for health organizations, case study, Office of Disease Prevention and Control 6 Chonburi Province within the departments data on imports and exports is organized by distinct groupings and outside the company in 8 provinces. The organization is in charge of and accountable for the volume of data coming from numerous sources and flowing into each of its work groups each set of data the organization work groups in charge of that data set must all take action. It resembles operating management (Asdech Vanichchinchai, 2010) or other comparable system software when used with an operating system. It begins with the import of data and continues through the steps of data gathering, validation, analysis, processing, preparation, and use. To make finding something easier searching for and using data by connecting data from all workgroups that have access to stored data at any time facts from the past and the present. Additionally, security from users and stability. The decision to use the data will thereafter be made by the management after consideration. Using data to its fullest potential is important for effective dissemination, broadcasting, and public relations.

2.2 Supply chain and logistics in the operation system

The supply chain in the operation system (Thai Industrial Standards Institute ISO 9001:2015, page 11) is essential for taking action by utilizing of data sources from both inside and outside the organization, such as planning begins with data collection both internal and external the organization, and sourcing begins with data collection from a variety of sources used for data procurement, data verification, processing data, data preparation by executives requirements the dissemination, delivery data, and publicizing of each set of information according to the preferences of the data user through internal and external communication channels. It is essential to staff that the operational information system and supply chain are easily accessible. Because personnel can lower risks and operational errors with real-time information access to make quicker and more accurate decisions. Additionally, it empowers staff to independently and proactively tackle issues. The organization can also benefit the company and help in decision-making.

Based on incoming and outgoing data processes, there are three activities in terms of logistics and information operational systems input, processing and output wherein each set of data that has completed the operational procedure has enabled the data to be utilized and distributed effectively necessitating feedback (Skawarat Bothaisong, 2017). For enhancing the data import and export process as well as other information flow the front-end and back-end processes have a clear end-to-end connection from the start to the active point. Considering user demands and

delivering activities to the very last mile operation. Additionally, professionals across the board of the organization are aware of the holistic lessen the severity of operational issues and assist companies in understanding linked processes from upstream to downstream. Along with managing the efficiency and efficacy of data systems, it can also improve the operations of logistics operators (Stank and Goldsby, 2000; Mason and Lalwani, 2006).

3. Methods

Failure Modes and Effects Analysis (FMEA) focuses on characteristics of potential failure, failure modes and effects from design, production and service. After that, it explores how potential failure, failure modes and effects. And lastly, it results in the discovery of solutions to avoid the development of problem prevention (Automotive Industry Action Group; AIAG, 1993). In this study, FMEA steps are provided as follows.

Step 1: Planning and preparation of process is "Healthcare Organization Data Operational Process" in the root cause analysis in this study. Executives at the operational level of the Office of Disease Prevention and Control 6 Chonburi Province with more than five years of work experience and identify the date, month and year.

Step 2: Structure analysis with Integration Definition Function Modeling Type 0 (IDEF0) it serves as a tool for business process diagramming to help in the study and enhancement of organization procedures.

Step 3: Function analysis with analysis to cause and effect diagram. It is a technique that shows how a problem and its potential causes are related. It analyzes multiple procedures that cause the data operating system to find root causes in other processes. Using the 4M principle, which includes man, machine, material and method to identify the input variables on the fishbone diagram (Wanrat Chantakij, 2010).

Step 4: Failure analysis by determining the root cause of potential failure, failure modes and effects on each healthcare organization data operating process four process such as databases, data management, staff, and data utilization.

Step 5: FMEA risk analysis determines the risk assessment criteria including severity (S), Occurrence (O), and Detection (D) using the formula $RPN = S \times O \times D$ and Borda Count technique (Lansdowne, 1996) analyze the risk scores provided by respondents at the operational management level to 13 individuals in this study, calculation of the average value from the most weight and ranked after that.

Step 6: Optimization with Causal Loop Diagrams (CLD) to detect potential connections and interactions between variables where the reinforcing loop will cause changes to go in the same direction (Sirichai Permkanchana, 2012). two steps are involved:

Step 6.1: Determine the root of the problem and identify solutions for internal data processes.

Step 6.2 Use a causal loop diagram to examine the root causes of failures and solutions. Link the variables together in the writing so that it finally diagrams around to cause and effect. To determine the type of causal loop diagram come out first. The following conditions must be met to determine the type of causal loop diagram. It is a reinforced loop if all of the arrows are positive or if the number of negative arrows is even (the positive arrows are dismissed). However, a balancing loop is present if there are an odd number of - arrows (the presence of + arrows is neglected).

Step 6.2.1 demonstrates the FMEA and CLD for the healthcare organization data operating system in Figure 1.

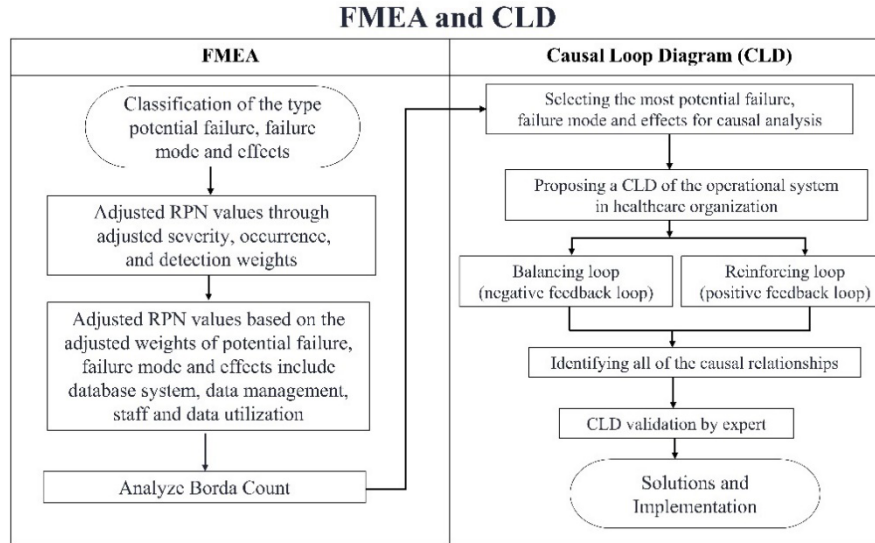


Figure 1. FMEA and CLD for the healthcare organization data operating system

Step 6.2.2 Analyze CLD is a tool that shows how the parts of a system are thought to interact (Cordon, 2013). Considering the components systems thinking provides a framework for development and examination of the connections between the internal components that make up a system. Based on the failure analysis subsystems from the failure root cause. It's possible to identify issues within the system and have them successfully solved as a result of the failure and its potential effect.

4. Data Collection

Phase I: Sampling by non-probability random sampling, respondents from the Office of Disease Prevention and Control 6 Chonburi Province with more than five years of work experience. The purposive random sample was used to choose respondents at each level including 13 operational executives.

Phase II: Content Analysis The interview was semi-structured when it involved in-depth interview by face-to-face interviews. Allowing the interviewee the best information is the goal of the questions. An open-ended interview question is being posed.

Phase III: Content Validity The information collected from the questionnaire to the CLD diagram was examined by 13 specialists. By analyzing and implementing solutions for the operation systems of healthcare organizations.

5. Results and Discussion

To identify the root causes of failures, the study " Data Analytics in an Operational System with FMEA in a Healthcare Organization" was conducted. Find a technique to implement the Failure Modes and Effects Analysis (FMEA) that occurs with the organization system of operation for handling healthcare data. Based on data collected from 13 samples in total 11 samples were received, accounting for 84.6% of all interviews. The researcher created a causal loop diagram using the VENSIM tool and then reported the results of the data analysis as follows:

5.1 Correlation Analyze

Table 1. Shows the questionnaire questions with a correlation between 0.5 and 0.8 levels.

No.	Related questions	Correlation 0.5 levels	Related questions	Correlation 0.8 levels
1	2,3,5,7,8,18	0.72,0.50,0.52,0.69,0.62	-	-
2	4,5,6,7,8,10,14,18,19	0.55,0.79,0.67,0.83,	7,8	0.83,0.91

No.	Related questions	Correlation 0.5 levels	Related questions	Correlation 0.8 levels
		0.92,0.56,0.63,0.59,0.56		
3	5,6,8,10,11,13, 14,15,16,17,18,19	0.65,0.73,0.54,0.81,0.50, 0.66,0.75,0.75,0.83,0.90, 0.87,0.66	10,16,17,18	0.81,0.83, 0.90,0.87
4	5,6,7,12,13, 14,15,16,17,18,19	0.70,0.61,0.82,0.64,0.69,0.82, 0.55,0.53,0.50,0.55,0.87	7,14,19	0.82,0.82,0.87
5	6,7,8,10,13, 14,15,16,17,18,19	0.83,0.75,0.81,0.64,0.72, 0.80,0.59,0.54,0.57,0.75,0.74	6,8,14	0.83,0.81,0.80
6	7,8,10,12,13, 14,15,16,17,18,19	0.69,0.82,0.86,0.64,0.91, 0.83,0.67,0.67,0.77,0.82,0.81	8,10,13, 14,18,19	0.82,0.86,0.91 ,0.83,0.82,0.81
7	8,9,13,14,18,19	0.71,0.54,0.58,0.77,0.60,0.73	-	-
8	10,13,14,18,19	0.78,0.60,0.62,0.73,0.57	-	-
9	14	0.52	-	-
10	11,13,14, 15,16,17,18,19	0.56,0.69,0.66,0.58, 0.67,0.78,0.86,0.55	18	0.86
11	15,17	0.65,0.54	-	-
12	13,14,15, 16,17,18,19	0.78,0.59,0.64,0.74, 0.65,0.55,0.73	-	-
13	14,15,16, 17,18,19	0.84,0.81,0.78, 0.81,0.70,0.89	14,15,17,19	0.84,0.81, 0.81,0.89
14	15,16,17,18,19	0.78,0.77, 0.83,0.82,0.92	17,18,19	0.83,0.82, 0.92
15	16,17,18,19	0.92,0.90,0.72,0.73	16,17	0.92,0.90
16	17,18,19	0.93,0.81,0.74	17,18	0.93,0.81
17	18,19	0.84,0.74	18	0.84
18	19	0.74	-	-
19	-	-	-	-

The questionnaire questions linked to the failure cause, failure modes and potential effects are shown in Table 1. Correlation values were used by the researcher to validate the variables. The 0.5 level which included all 110 variables and the 0.8 level which included 30 variables had two levels of association. Because it was connected with fewer factors and fewer variables in the loop, the researcher selected a correlation level of 0.8 because it could clearly limit the scope of issue solving. The 0.5 correlation with many factors led to a large number of variables in the loop which required complicated problem solving. Additionally, the scope of the issue solution is unclear. In this regard, analyzing and developing a diagram around the cause and results of the operating system of the health organization, covered in accordance with the factors in each area and the problem clearly is not possible given the relationship of the questions from the questionnaire. The outcomes of the healthcare organization data operation system and the failure modes that caused them have a comparatively high association. Therefore, in factor ranking analysis these variables need to be studied with the Borda Count method. The organization healthcare data system was created with the weighted ranking concept and a causal loop diagram.

5.2 Borda Count Analyze

Analyzing factors with Borda Count method was applied to analyze factor rankings by the healthcare organization data operating system. Using the weighted ranking technique. The risk priority number (RPN) of responders, which ranges from 0 to 1000 points, provides the basis for the ranking criteria. The order of weighting was applied in this study, with the first selection receiving 1 point, the second receiving 2 points, the third receiving 3 points, and the fourth receiving 4 points up till the last selection result is 5 points, as shown in Table 2.

Table 2. Risk priority number (RPN) criteria

Scoring Criteria	Counting the Questions	Ranking	Interpretation
801-1000	0	1	Very high
601-800	10	2	High
401-600	8	3	Moderate
101-200	32	4	Low
1-100	74	5	Lowest

Table 3. To determine the weights of the health organization data operating system for each factor, the total scores were analyzed.

Factors	Scoring	Counting	Ranking	Weight	%Weight	No.
Database	401-600	1	3	3	19.13%	3
	201-400	7	2	14		
	1-200	36	1	36		
	Total			53		
Data Management	401-600	1	3	3	30.69%	2
	201-400	17	2	34		
	1-200	48	1	48		
	Total			85		
Staff	401-600	6	3	18	34.30%	1
	201-400	17	2	34		
	1-200	43	1	43		
	Total			95		
Data Utilization	401-600	1	3	3	15.88%	4
	201-400	9	2	18		
	1-200	23	1	23		
	Total			44		
Total				277		

From Table 3, it appears that the staff factor scored first when the weighting of the healthcare organization data operation system for all 4 factors was analyzed representing a 34.30 percent weight. Data Management factors come in second, with a weight of 30.69 percent. Database factors in third with a weight of 19.13 percent. And data utilization factors in the fourth which represent a weight of 15.88 percent, respectively. The causal factors that resulted in the potential failures, failure modes and effects were analyzed using all four factors on the causal loop diagram.

5.3 Failure Modes and Effects Analysis (FMEA) and Causal Loop Diagrams (CLD) with VENSIM Program

Analysis of failures and findings of potential failures, failure modes and effects on a healthcare organization data operation system. Each factors content needs to be changed to take the design of a narrative sentence. Causal loop diagrams were processed with the VENSIM program to develop, as shown in Table 4.

Table 4. Modifying the context of the potential failures, failure modes and effects in operating systems for organization healthcare data.

Data operational system in healthcare organization	Potential failures	Failure Modes	Effects
Database	Data complication	Sharing information	Duplicate data inconsistencies are caused by the collection, storage, and updating of data.
	The amount of data is incomplete or inaccurate	Variety of data	Benefiting from data
	Centralized control	Security in data access from the data	Attack and leak data
	Data security	Damage data	Change the usage code
Data Management	Data Independence	Dataset correlation	Impact data related
	Data integrity	Missing data	Errors in data analysis and data use
	Analyze data	Data sources and structure are different	Data analysis incorrect
	Data processing	Ineffective dataset processing	Data comparison, computation, and correlation errors
	Data creation	Several data sources	Variety of formats
	Operative process prototypes	Absence of resolution careful planning and performance	Mistakes in staff operations
Staff	Experienced work	The operator does not comprehend how to carry out the task in accordance with the commanders goals or objectives	Mange data to conform to standards
	Work quickly	Work prioritization	Lack of credibility and late submission of work
	Sufficient knowledge	Wrong data was entered	Lack of data availability and data utilization
	Decision-making	Data damaged	Dataset lacks reliability and validity
	Expertise with work procedures and knowledge of personnel	Perform work and deliver work delayed	Work process effectiveness
	Clarity of duty	Operations and personnel Some of them still do not have a duty to work clearly	Malfunctions and performance do not meet the target
Data utilization	Utilizing data in a modern way	Search delay data	Delayed processing and was a change in the work process each time
	Convenient data	Collection and sorting order of data	Consistency of data
	Data systematization	Searching for data	Planning and completeness of data

Following are the four factors that the VENSIM program separated into Table 4 to develop causal loop diagrams:

1. Database factors causal loop diagram appears are 11 loops includes 4 balancing loops: data subject to attacks and data leakage 1 loop, data insufficient or inaccurate 2 loops and data control from the center 1 loop. There are 5 loops total of the reinforcing loop: data control from the center 1 loop, data security 1 loop, incomplete or inaccurate data 1 loop, and data utilization 1 loop, as shown in Figure 2.

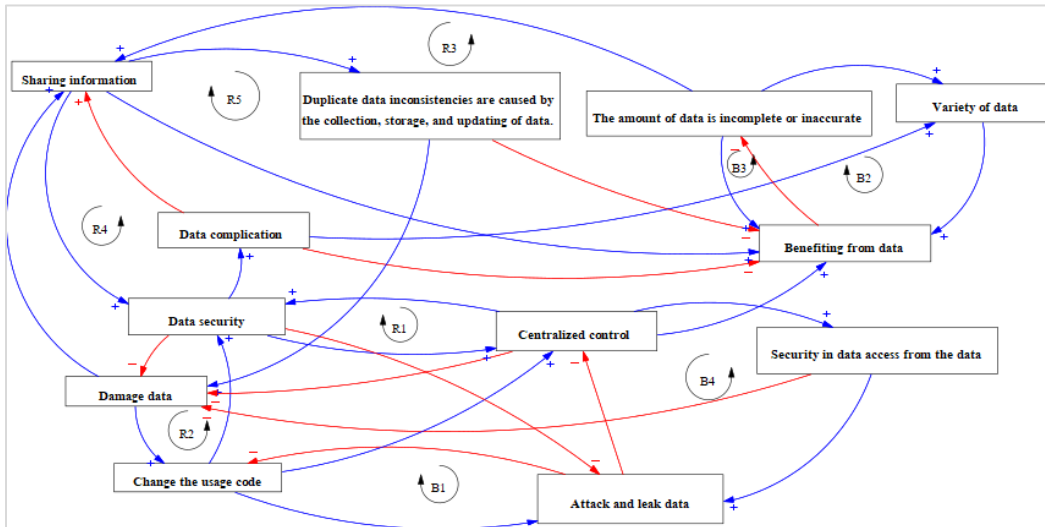


Figure 2. shows the causal loop diagram analysis of the database.

2. Data Management factors causal loop diagram appear are 15 loops including 4 balancing loops: data integrity 1 loop, data source 1 loop, data processing inefficiency 1 loop and data processing completion 1 loop. There are 11 loops total in the reinforcing loop including: data integrity 3 loops, mistakes data for comparing, calculating, and determining the relationship between the data 2 loops, data missing 1 loop, data set relationship 1 loop, data analysis process 2 loops, different data source 1 loop and creating data, as shown in Figure 3.

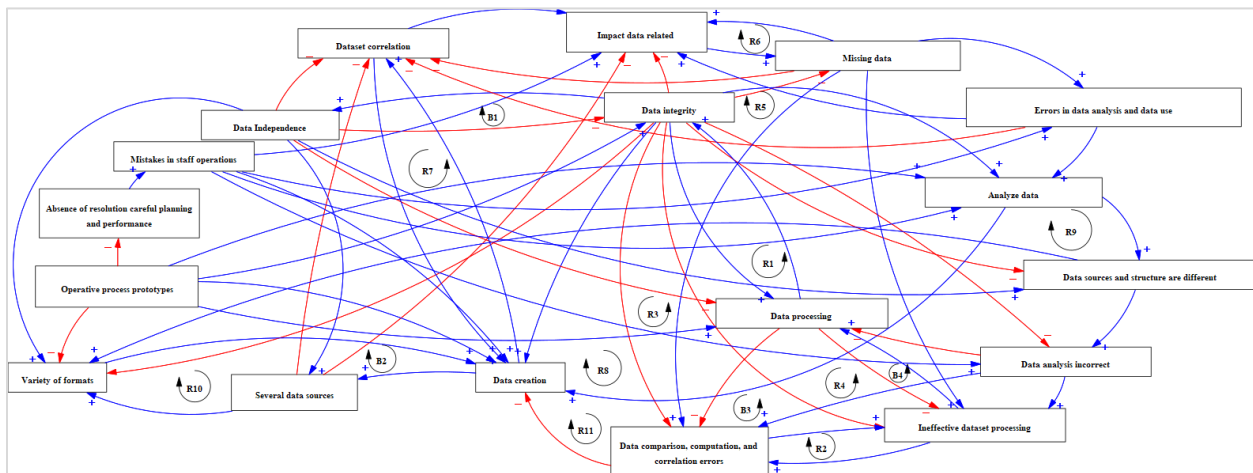


Figure 3. shows the causal loop diagram analysis of the data management

3. Staff factors causal loop diagram appears are 21 loops including 3 balancing loops: priority task 1 loop and decision-making 1 loop. There are 18 loops total in the reinforcing loop including work experience 3 loops, working quickly 1 loop, knowledge sufficiency 1 loop, clear duty 2 loops, decision-making 2 loops, data management standard 3 loops, work process performance 2 loops, data set unreliable and inaccurate 1 loop, data visualize damaged 1 loop, problem and does not perform properly 1 loop and workflow priority 1 loop, as shown in Figure 4.

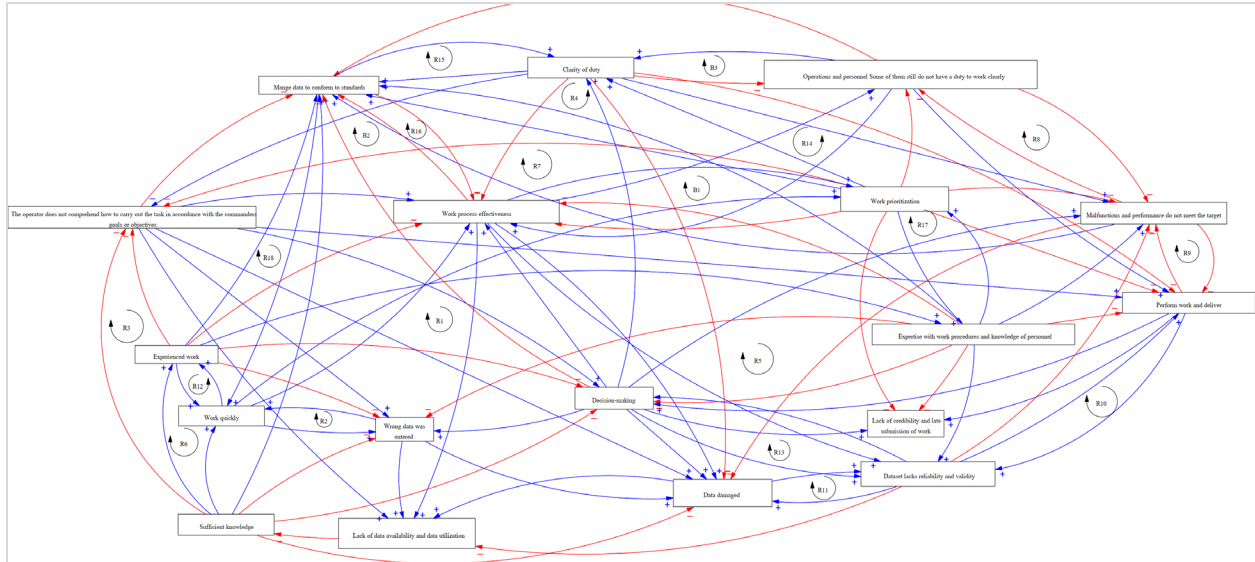


Figure 4. shows the causal loop diagram analysis of the staff

4. Data utilization causal loop diagram appears are 14 loops including 7 balancing loops: changes to the workflow and a delay in processing 2 loops, data usage modernization 1 loop, data ready for usage 1 loop, data consistency 1 loop and data collection and sequencing 1 loop. There are 7 loops total in the reinforcing loop including workflow changes every time, and processing cycles are delayed 2 loops, data ready to use 3 loops, data systematics 1 loop and modernizing data usage 1 loop as shown in Figure 5.

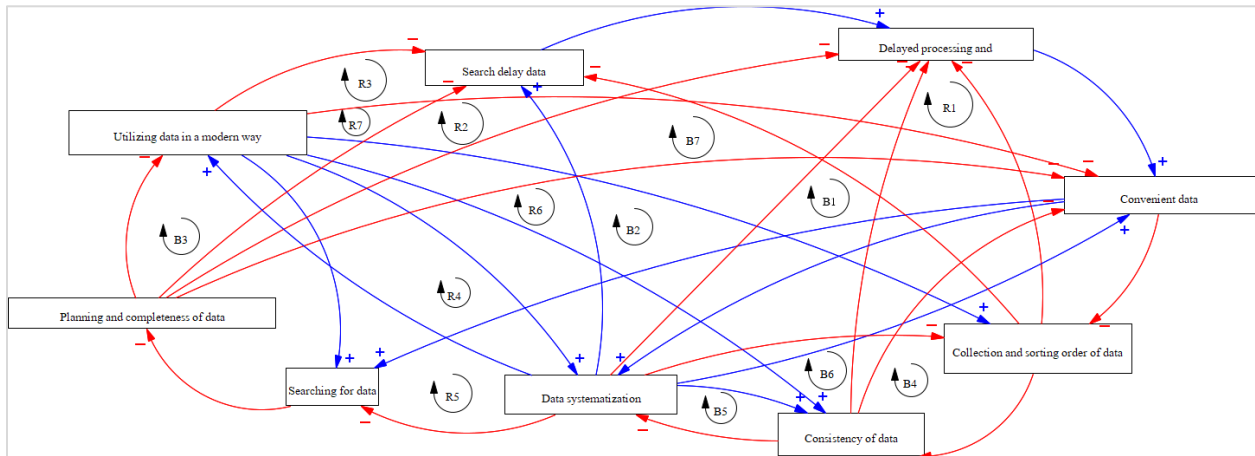


Figure 5. shows the causal loop diagram analysis of the data utilization

5.4 Finding solutions and implementing failure mode and effects for data operational system in the healthcare organization

It is a study of the potential failures, failure modes and effects with causal loop diagram data operational system in healthcare organization all 4 factors. For help in identifying solutions and failure modes data operational systems in healthcare organizations are as follows:

1. Database presents procedures and guidelines for resolving failure modes caused by database factors as shown below.

Table 5. Shows solutions for issues utilizing database factors.

Loops	Solutions for issues utilizing
Data complication	<ol style="list-style-type: none"> 1. Create a centralized database to manage data sources that are collected to respond to the system efficient use and to lessen data duplication, including information disputes that arise inside the organization. 2. The utilization of data in the database is under centralized control. 3. The database system can accommodate the real-time use of several users.
The amount of data is incomplete or inaccurate	<ol style="list-style-type: none"> 1. Define and set a size limit for the data from the input volume. 2. Define methods and procedures for data import to prevent potential data entry errors. 3. Review the data as the recorder is recording to eliminating data entry mistakes.
Centralized control	<ol style="list-style-type: none"> 1. Define who has the authority to restrict how each user may run and view data from the center. 2. Define user and data editor rights the operation is methodical for system access, guiding and managing the task in accordance with the goal.
Data security	<ol style="list-style-type: none"> 1. Create useable manuals, guidelines, methods, and processes. 2. Define the data legal usage can only be used for the rights mentioned. Usage rights make it clear who may use what information and what portion of the data. 3. Define who has the right to update information, verify and confirm user access to the system and to their user account information. To avoid loss data theft, user and operational errors.

2. Data management presents procedures and guidelines for resolving failure modes caused by data management factors as shown below.

Table 6. Shows solutions for issues utilizing data management factors.

Loops	Solutions for issues utilizing
Data Independence	<ol style="list-style-type: none"> 1. Identify the necessary input and output data, as well as any linked or editable data components. 2. Setting up the procedures and format for obtaining import and export data from modifications to the data structure give a connection.
Data integrity	Define and format the data recording to avoid errors in the data import, data entry, and data logger.
Analyze data	<ol style="list-style-type: none"> 1. Verify the data from the data import using the sources of information collected. 2. Filter the data for analysis to fulfill the goals and demands of data users
Data processing	<p>A method for data analysis needs to be devised when there is a lot of data as follows:</p> <ol style="list-style-type: none"> 1. Group information to prepare the data for processing must be categorized sort data 2. After being grouped, the data must be sorted by order, category and category to make retrieval simpler and save time.
Data creation	<ol style="list-style-type: none"> 1. Define the format and procedure for data preparation by creating the standard data format you intend to utilize. 2. To facilitate use store the data format in proportion. 3. Calculate data obtained from collecting a lot of data such as numerical data that can be calculated to discover the results and then bring the results to find the relationship of the data. 4. Outcomes the data in this overview to spread the word about it in many ways.

3. Staff presents procedures and guidelines for resolving failure modes caused by staff factors as shown below.

Table 7. Shows solutions for issues utilizing staff factors.

Loops	Solutions for issues utilizing
Experienced work	A mentor is necessary to oversee the practice before it begins. and collaborating given that every individual has a unique background in knowledge work. As a result, the work plan and work procedures need to be established and work process so that workers work efficiently and in the same direction
Work quickly	<ol style="list-style-type: none"> 1. Define the worker job description scope for the task to be finished quickly. 2. Set work hours. 3. Set task priorities. 4. Assess the teams capabilities and teach them how to operate using the mentoring method.
Sufficient knowledge	<p>1. Prior operation</p> <ol style="list-style-type: none"> 1.1 To have training officers before beginning actual work each agency must change the framework. to comprehend the structure. 1.2 Once assigned an operational manual is required for the organization or documents relevant to the operation. <p>2. During work</p> <ol style="list-style-type: none"> 2.1 During the work have coaching to direct the work every time to make each operation efficient. <p>3. After work</p> <ol style="list-style-type: none"> 3.1 Develop staff so they are knowledgeable about their operations by outlining who needs to receive training in areas like planning and systematic thinking coordination and spirit of teamwork.
Decision-making	<p>1. Operation system</p> <ol style="list-style-type: none"> 1.1 Develop a guidebook for using the system that includes courses, process diagrams, tables and procedures. The steps must be completed and cleared in the correct order. It must make clear what the user has to be aware of. To lessen the likelihood of errors brought on by individual misconceptions the activity must be performed under specific supervision or with easy to understanding terminology. <p>2. Operations Director</p> <ol style="list-style-type: none"> 2.1 Clearly state objectives or outcome expectations. 2.2 Should appropriately manage and allocate each operator workload. 2.3 Continue the task regularly before sending the work to the outside to evaluate the worker performance and guide the job direction. 2.4 Assess the employees performance making judgments should be guided by a benchmark by assessing the workers performance Use KPIs (Key Performance Indicators) to measure, analyze and discover strategies to reduce operational errors. The framework is separated into the first six months and the last six months. <p>3. Worker</p> <ol style="list-style-type: none"> 3.1 Develop knowledge, practice hard and soft skills and rely on the operators potential. 3.2 Encourage positive behaviors at work interaction among coworkers, enjoyment of the work and the creation of a pleasant workplace as ways to motivate your team.
Expertise with work procedures and knowledge of personnel	<ol style="list-style-type: none"> 1. Define each employees job description. 2. Define protocols and frameworks to ensure that everyone is working in the same direction.
Clarity of duty	<ol style="list-style-type: none"> 1. Define a structure for working with operators. 2. Define the operators action plans scope.

4. Data utilization presents procedures and guidelines for resolving failure modes caused by data utilization factors as shown below.

Table 8. Shows solutions for issues utilizing data utilization factors.

Loops	Solutions for issues utilizing
Utilizing data in a modern way	<p>1. Develop staff operational system</p> <p>1.1 Collect the data and keep it in the corporate data center or in the department that is in charge of the data as a convenience</p> <p>1.2 Create a structure for the operational system of staff in each department that is effective and efficient by entering data into the data preparation process and exporting data to those who need it promptly, timely and with a greater capacity to compete for the organization.</p> <p>2. Construct a data operating system</p> <p>2.1 Inspect the organization internal working procedures</p> <p>2.2 Study and select the most practical and platform technology for the organization work system.</p> <p>2.3 Define protocols, access techniques and safety measures for user access.</p> <p>2.4 Recall users in each department on how the system is actually being used. The administrator must assess the degree of complexity of use and evaluate the outcomes from actual users because employees understanding of the information operating system varies. Additionally, individual employees find it difficult to quickly transition from analog to digital work systems.</p>
Convenient data	<p>1. Before using the data confirm the raw data and group and distill it.</p> <p>2. Develop a system with staff that can import and exports data to satisfy user needs.</p>
Data systematization	Bring the information you intend to utilize for data analysis and the technology together to produce data input and output in a methodical manner.

5.5 Discussion

Findings of the investigation of the failure mode and effect of the healthcare organization data system. In the operating system of the healthcare organization, it was discovered that: planning and preparation, structure analysis function analysis, failure analysis, FMEA risk analysis and optimization. Since from database, data management, staff, and data utilization an analysis of the failure mode and effect. Utilize data users to their fullest potential and maximize efficiency, data analysts group of information operating system designers and developers. The outcomes of the analysis of the health organization data operating system. It was determined that the analysis of the drawbacks and effects of the health organization information system served as the foundation for the investigation to develop remedies in advance. To reduce operating system issues or prevent them able to recognize and rank failure mode and effect that result from them. The organization also has the ability to exchange resources inside both strategically and tactically also executive level. Therefore, the study of healthcare organizations findings suggested that the reason for the failure could be determined to encourage process optimization so that the system can better support the operator work across the entire data operating system process and assisting in information delivery to junior, middle, and senior executives.

6. Conclusion

Outcome of Failure Modes and Effects Analysis (FMEA) with Causal Loop Diagrams (CLD) by VENSIM program and study of the potential failures, failure modes and effects with causal loop diagram data operational system in healthcare organization all 4 factors. For help in identifying solutions and failure modes data operational systems in the healthcare organization are as follows:

Factors 1 Database: There are approaches to solving the failure modes and effects database are supplying a database for the centralized administration of the sources of acquired data and data complexity is reduced. A database system develops that enables multiple users to work simultaneously. Mentioning that the amount is insufficient or if the data is inaccurate data volume input size should be kept to a minimum. As the recorder is in use, import data and check the data. A centralized area can be used to assign rights to manage who can access and view each users data and create data editors and user rights. Creating useable manuals, guidelines, strategies, and processes for information security give people the ability to modify, update, confirm, and verify access to user accounts and system access rights.

Factor 2 Data Management: There are approaches to solving the failure modes and effects of data management are format import data gathering process and ensuring data independence The data is taken out of the data structure update. Specifying and formatting data recording to maintain data integrity. The data input is verified as part of the data analytics process using the data source that was collected and screening the facts that will be analyzed. Development groups data for processing, sorting, calculating, analyzing, and creating data the process of preparing data by creating a common data format that must be utilized consistently and proportionally store the data format.

Factor 3 Staff: There are approaches to solving the failure modes and effects of staff are which is professional experience, which before beginning work, a mentor is required to oversee the practice, work, work plan, and work steps and work procedures for operators to use. The operators job description, work schedule, and task prioritization all affect how quickly work is completed. A mentorship system that has a framework is in place to train the operation and evaluate the teams skills and body of knowledge prior to working, and instruct operators. There is always a mentor present to monitor the work as it is being done. Additionally, training has been devised to become proficient in operations and make poor selections after work should have a system work on creating a functional handbook with an inhole system, types of descriptions, diagrams, methods, tables, and procedures. Important details that explain what the user must pay attention to or oversee while working must be put out thoroughly and clearly in order. Use clear terminology when communicating. The operators performance standards are determined by the director. To assist in monitoring, assessing, and performing of the practitioners worker, regularly administer and manage the division of job duties and evaluate the follow up. Occasionally, ways are sought to enhance and resolve operational errors, as well as knowledge creation, training, and practice for both soft and hard skills, as well as the ability of workers to inspire work motivation, the knowledge and aptitude of personnel about Work procedures, and the expertise and aptitude of personnel by defining the scope of work of each personnel. and clarity of the performance of duties has an outline, the extent of the action plan to the operators, and assigned work.

Factor 4 Data Utilization: There are approaches to solving the failure modes and effects of data utilization depending on how information is used modernizing staff operational systems and data usage, creating a data operating system, ready-to-use data by evaluating raw data and categorizing data before using it. Create a system with staff for products imports and exports data that brings the desired information to fulfill the users and the information system goals. It was used to develop input and output data in an organized manner using technology and data analysis.

7. Development and Implementation

Database policy (Digital Government Development Agency, 2019) establishes an exchange central data link and develops an infrastructure and centralized platform that can be used continuously. Data management policy (Digital Government Development Agency, 2019) data management improvements in a central location and development data management platform with links for automatic data exchange that go through a single data exchange hub. Staff (Government Institute for the Promotion of Big Data Analysis and Management: GBDi Digital Economy Promotion Agency, 2019) develop a framework for the analysis and use of data in personnel operations. The three phases of the operational framework are short-term to the improvement of staff skills, medium-term implement a mechanism for managing the workforce, and long-term expansion of the duration of consultancy lead results encourage outside workers or the private sector to contribute to bettering the organization's operations. Data Utilization (Digital Government Development Agency, 2019) develop platform-based technology that can connect applications and promote business innovation growth through public-private partnerships.

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Biographies

Kesorn Thongngen graduated from Mae Fah Luang University with a School of Health Sciences in Bachelor of Public Health. She currently has a Master’s Degree from the Cluster of Logistics and Rail Engineering, Faculty of Engineering, Mahidol University, Thailand. Her research interests are supply chain and logistics topic is based on data analytics in an operational system in a healthcare organization in Thailand. She has experience Department of disease control.

Duangpun Kritchanhai obtained her Ph.D. in Operations Management from the University of Nottingham, UK. Her research interests are in supply chain management, information technology in logistics and supply chain, and healthcare supply chain. She is currently serving at Mahidol University, Thailand in the capacity of Associate Professor and Director in the Centre of Logistics Management, as well as holding the position of Coordinating Chair of Logistics Research Group, Thailand Research Fund. (10 font)