Article

Analysis of Data Center Information System Feasibility by using TELOS method (Case Study: Department of Information System UIN Suska Riau)

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ABSTRACT

This research uses the TELOS approach to assess the risks and feasibility of developing current systems as part of the information systems study program. The examination begins with technical feasibility, followed by economic feasibility, legal feasibility, operational feasibility, and time-frame feasibility. Observational and interview-based methods for data collecting. The research's findings demonstrate that the development of the data center information system is ELIGIBLE.

A. INTRODUCTION

Information technology has been used by higher education as a tool as well as a support, but also as a key operational and highly powerful strategic function that may be used to enhance efficiency and output[1]. The Sultan Syarif Kasim State Islamic University (UIN Suska Riau) is currently utilizing an academic information system known as IRAISE, which provides very comprehensive features such as student data, curriculum history KRS, KHS, Grade Transcripts, Schedules, Electronic Classes, Applications for Leave and Graduation. However, the Study Program (Prodi) has a tough time monitoring other key statistics, particularly for the Information Systems study program, such as the accomplishments, organization, publications, and devotion of lecturers and students.

The difficulty is the lack of well-organized information, such as lecturer publications, community work, and student accomplishments; if there is no container that stores and maintains the data, then the recording will occur frequently and take a long time, since it comes from several sources. The data center is an information system that delivers the necessary data [2][3]. The data center plays a crucial role in guaranteeing the service quality and dependability of the business's information system [4]. This is due to the fact that the data center provides facilities and technology that can ensure data security and integrity, as well as maintain the company's information system working at peak performance [5]. According to the result of this research, the establishment of a data center Information System as part of the Information Systems

study program can make it simpler to locate the necessary data.

When developing an information system, the first step is to do a feasibility analysis[6]. The purpose of a feasibility study is to determine whether system development should continue or cease. The feasibility study that was carried out during the research had the aim of knowing the value of the readiness stage of the Information Systems Research Program at UIN Suska Riau in the use of information technology. In this step, the TELOS technique determines if the information system may be built or discontinued. The topics covered in this TELOS feasibility factor include technological, economic, legal, operational, and time-sensitive. Technical feasibility is determined by the necessity to utilize the technically developed system, the system's profitability, and its potential for the future [7].

In research [8] that intends to perform a feasibility study on the mapping point system for small and medium businesses (MSMEs) to map the location of MSMEs in Malang City, there are various prior studies that examine the TELOS feasibility approach. This feasibility analysis attempts to establish the level of system development's feasibility and related hazards. In addition, a study titled Feasibility Study of Implementing a Web Mapping System Using the Telos Method [9] was conducted. Ability and preparedness of the user to use the system are the barriers encountered during the installation process. Additionally, the TELOS technique may be used to the construction of academic information systems such as research databases [10] this modeling, which gives the result that the layout of the academic information system is in accordance with the statutes and procedure manuals, can be used as an alternative approach to address the problems encountered in Jambi Dinamika Bangsa STIKOM Information Systems Masters Study Program, particularly those associated with academic data processing and reporting.

Based on this description, the title of this final paper is "The Analysis of Data Center Information System Feasibility by using TELOS method".

I. LITERATURES REVIEW

A. Data Center
Data Center is a central storage, both physical and virtual, for storage media and management of data and information in certain institutions or businesses [2].

B. Telos feasibility
During the development of a system, the feasibility analysis is a vital step. This is performed to determine whether or not the system can be built. This evaluates several factors, including economic, technological, operational, temporal, and legal feasibility. TELOS (*Technical, Economic, Law, Operational, dan Schedule*) is the acronym for a feasibility study comprising five categories of feasibility [11].

C. Technical Feasibility
Technical Feasibility focuses on system requirements that are established from the perspective of the technology that will be employed. The suggested system is technically practicable if the required system development technology is readily available and simple to implement [12].

D. Economic Feasibility
If the benefits obtained exceed the expenses of constructing the system, then the system is economically feasible [13].

E. Legal Feasibility
A legal Feasibility study is deemed appropriate if the system implemented from system development does not violate applicable laws and regulations [9].

F. Operational Feasibility
The operation's Feasibility is stated to be practicable if the resulting system can be operated and run [14].

G. Schedule Feasibility
The purpose of schedule Feasibility is to examine if a system can be finished

within the stated timeframe and within the expected timeframe [14].

H. Payback Period

Payback Period is a way for calculating the amount of time necessary to recoup the system's capital expenditures. Determination of refund feasibility[15].

$$Payback\ Period = \frac{investment}{benefit}$$

I. Return of Investment

Used to determine the proportion of expenses linked with benefits produced [16]. The formula used to calculate *Return on Investment* (ROI) is

$$ROI = \frac{Total\ benefit - Total\ cost}{total\ cost} \times 100\%$$

As for the Feasibility assessment for ROI if:
1. If ROI is more than 0 then it is eligible.
2. If ROI is less than 0 then it is not eligible.

J. PIECES

The PIECES framework is a method used to classify problems, opportunities, guidance, analysis, and system design. In PIECES, six variables are used for analysis (Performance, information, economy, control, efficiency, and service) [17].

II. METHODS

A. The Planning

The Planning stage is the first step in the analysis. The steps you take begin with a problem definition and the information needed to define the problem.

1. Problem Identification

   The data collection method consists of finding and investigating problems that occur in the Department of Information System.

2. Defining the Problem

Determining the problem is used as a formulation of the problem by observing the system that is currently running in the Department of Information System and determining what problems exist in the system that is being used.

3. Determining Research Objectives

   Defining research objectives means explaining the objectives to be achieved. This phase also helped redefine the framework used in this study.

B. Data Collection Stage

The purpose of this step is to learn more about the problem to be studied. Based on the data obtained about the system currently used. Obtain data from the system used through direct interviews and direct observation at the location. The data collected can define the problem starting with the following steps:

1. Observation

   Data was collected by visiting research sites and collecting data at the location by observing the processes that occur in the Department of Information System.

2. Interview

   Question and answer process with the head of the study program.

C. Analysis Stage

The TELOS framework is used at the analysis stage to measure the feasibility of the information system. The feasibility factor is related to the successful development and use of information systems and the feasibility factor of using TELOS. The TELOS factor consists of:

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Table 1. Telos Feasibility Assessment

Factor	Benchmark	Value Score	
		Exist	No Exist
Technical	Can the proposed system be built and deployed with current technology, or will new technology be required	9 - 10	6 - 8
Economic	Funding commitment of the organization, and whether adequate money is available to cover the projected system's expenses.	9 - 10	5 - 8
Legal	Is there a conflict between the system that has been deemed illegal and the company's capacity to fulfill its obligations	9	10
Operations	Existing processes and personal competencies adequate to run the proposed system, or will additional procedures and competencies be provided.	8 - 10	5 - 7
Schedule	A timeline exists for system design and development, and the proposed system must be implemented within a reasonable time range.	8 - 10	5 - 7

Source: [18]

The final value of the Telos Feasibility factor is calculated by summing all the values of the Feasibility factors and dividing by the number of feasibility criteria.

$$Telos\ Value = \frac{1}{5}(TV + EV + LV + OV + SV)$$

Description:
TV = Technical Value
EC = Economic Value
LV = Legal Value
OV = Operational Value
SV = Schedule Value

III. RESULT

A. Technical Feasibility
Personal computers and a reliable system network infrastructure are needed for this web-based information system.
1. Hardware

Table 2. Hardware Specifications

No	Hardware	Specifications
1	Processor	Intel Core i3 5005U 2.0 Ghz
2	Memory	4 GB DDR3
3	Hard Disk	512 GB SATA
4	Graphic Card	Intel HD Graphic 5500
5	Keyboard	Integrated Keyboard
6	Mouse	Optical Mouse

2. Software

Table 3. Software

No	Software	Utility
1	Windows	Sistem Operasi
2	Balsamiq Mockup	Desain Interface
3	Microsoft Visio	Perancangan Sistem
4	Google Chrome	Web Browser
5	XAMPP	Web Server
6	MySQL Server	Database Server
7	VS Code	Code Editor
8	Code Igniter	Framework

3. Database
Database maintained by UIN Sultan Syarif Kasim Riau provides data about the faculty, staff, and students of UIN Suska Riau. The Information Systems study program supports all academic initiatives of the UIN Suska Riau Information Technology Centre and Database (PTIPD).

4. Technical Feasibility Assessment
The proposed system will be constructed using standard technologies. Because the system may be accessed with just a web browser and an internet connection. Owned devices have access to the system's

technologies. Therefore, the system engineering evaluation of Feasibility is 9.

B. Economic Feasibility

Quantitative criterion used to determine the amount of time necessary to recoup the investment expenditures incurred in submitting granted applications. Using *Payback Period* and *Return of Investment*, an Feasibility analysis is conducted.

1. Return of Investment
   Biaya tahun 1 = Rp. 850.000
   Biaya tahun 2 = Rp. 950.000 +
   Total   = Rp. 1.800.000

   Manfaat tahun 1 = Rp. 2.500.000
   Manfaat tahun 2 = Rp. 3.000.000 +
   Total   = Rp. 5.500.000

   $$ROI = \frac{5.500.000 - 1.800.000}{1.800.000} \times 100\% = 2,05$$

   2,05 > 0 = eligible

2. Payback Period
   Total Cost 1.800.000
   Total Benefits 5.500.000
   $$PP = \frac{1.800.000}{5.500.000} = 0,32$$
   0,32 means 3,8 months

3. Economic Feasibility Assessment
   Based on the findings of ROI and PP calculations, it has been determined that the created expenses and benefits fall into the logical category, although funds do not yet exist. The study program is very supportive of the presence of the to-be-developed system in order to provide value. Feasibility evaluation is 7.

C. Legal Feasibility

1. Legal feasibility
   Legal feasibility or legal weight. In other words, the planned information system must comply with all applicable laws, including both government and organizational rules. According to the terms of the existing license, lawfully generated system projects are deemed practicable because the utilized software is authorized. And for programs or software built utilizing open-source software, which implies the software is legally permissible.

Table 4. Application Used

No	Open Source	Licensed
1	XAMPP	Balsamiq Mockup
2	My SQL Server	Microsoft word
3	VS Code	Microsoft Visio
4	Google Chrome	Windows

2. Legal Feasibility Assessment
   The system will be constructed with software that does not breach intellectual property rights. The data that will be utilized in the creation of the system are not sensitive or require particular security. However, the system will continue to secure data by restricting access to certain individuals. Based on the examination of legal Feasibility, the legal Feasibility evaluation is 9.

D. Operational Feasibility

The PIECES framework includes:
1. Performance
   Determines if the system produces rapid data. Student lecturer data summaries were not previously organized in a logical fashion. Therefore, when it is required for reporting, it takes a considerable amount of time to summarize the information since it must first be sorted. The search is also highly time-consuming due to the need to consult several sources. Due to its classification based on necessity, reporting and information retrieval in the to-be-developed system will require very little time.
2. Information
   Information is used to determine if the system provides the user with the information they require. In the Material Systems study program, it has previously been challenging to deliver needed information in its whole. Because it is important to locate information individually or to summarize it.

Additionally, the grouping of professor and student data must be manually generated. In the system that will be constructed, data will be organized according to requirements. On a computer or cellular phone, data may be tracked and accessed.

3. Economic

Economics in order to determine if the system delivers services that allow it to cut expenses and boost revenues. Due to the frequent occurrence of mistakes, the current method is extremely paper-intensive. The proposed system must decrease mistakes and paper usage. Due to the comprehensiveness of the offered information, it is believed that the system will also provide extra benefits to lecturers, students, and the Information Systems study program in particular.

4. Control

Control decides if the to-be-built system will have a control system to safeguard data, limit system access privileges, and restrict employee usage.

5. Efficiency

To assess the system's effectiveness in achieving objectives, efficiency is used. Recap process data handling is very time-consuming and prone to error. Each individual will input data into the to-be-built system, lowering the likelihood of mistakes.
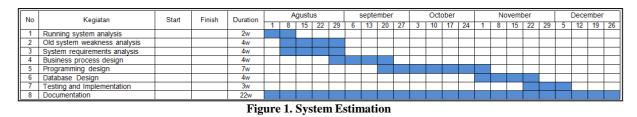
6. Services

Service to determine whether the system provides the desired service. The Head of Study Program believes that the current method for providing services to Study Programs is insufficient. For instance, the research program requires student and lecturer accomplishment data, which takes a considerable amount of time to get. This is supposed to be overcome by the system to be created. The system can provide research programs with improved and more comprehensive information services.

7. Operational Feasibility Assessment

According to the operational Feasibility analysis results, it is recognized that the new system has the ability to enhance study program performance. The new system is also ready for use by study programs, since they are familiar with the utilized technology and gadgets. However, some new users, notably new students, have not been taught to use the system. Based on this information, the operational Feasibility evaluation is 8.

E. Schedule Feasibility

1. Schedule Feasibility

The Feasibility schedule is utilized to determine if system development can be completed within a certain timeframe. It is anticipated that system development will be finished in 22 weeks. The estimated phases of system development are as follows:

Figure 1. System Estimation

2. Schedule Feasibility Assessment

Since development is measured in months, the needed estimation error for design and implementation is minimal. The value is 9.

The final value of the Feasibility factor for TELOS is calculated by summing all the Feasibility factor values and dividing by the number of feasibility elements.

F. Final Score of TELOS Feasibility

$Feasibility\ factor\ value =$
$\frac{9+7+9+8+9}{5} = 8,4$

IV. CONCLUSION

It may be inferred that the System Development that will be undertaken is in the practicable category with an average value of > 5 based on the total SCORE of the Feasibility factor value of 8.4, signifies that the design of the information system development that is being examined ELIGIBLE with a relatively minimal system development risk. There are no accessible finances, but the information systems research program supports the presence of this data center information system, thus the economic Feasibility score is 7.

REFERENCES

[1]   R. R. Rerung and Y. R. Ramadhan, "Rancang Bangun Sistem Informasi Akademik Dalam Penerapan Smart Campus Untuk Meningkatkan Pelayanan Akademik," *JTERA (Jurnal Teknol. Rekayasa)*, vol. 3, no. 2, p. 191, 2018, doi: 10.31544/jtera.v3.i2.2018.191-210.

[2]   A. Triwahyuni, "Pengembangan Sistem Informasi Data Center Sebagai Penyedia Data Penyusunan Borang Akreditasi," *Telematika*, vol. 11, no. 1, 2015, doi: 10.31315/telematika.v11i1.510.

[3]   G. M. Rizqy, A. P. Kurniawan, and M. Qana'a, "Aplikasi Pengajuan Pendaftaran Kegiatan di Pusat Data dan Informasi Kementerian Kesehatan Republik Indonesia," *eProceedings …*, vol. 5, no. 3, pp. 2037–2041, 2019, [Online]. Available at: https://openlibrarypublications.telkomuniversity.ac.id/index.php/appliedscience/article/view/11379https://openlibrarypublications.telkomuniversity.ac.id/index.php/appliedscience/article/download/11379/11236.

[4]   I. D. P. G. W. Putra and M. D. W. Aristana, "Perancangan Desain Ruangan Data Center Menggunakan Standar Tia-942," *J. Resist. (Rekayasa Sist. Komputer)*, vol. 2, no. 1, pp. 1–5, 2019, doi: 10.31598/jurnalresistor.v2i1.370.

[5]   S. Rahma and D. Rachman, "Perancangan Aplikasi Pelayanan Informasi Kesehatan Ibu Kota Makassar," *Peranc. Apl. Pelayanan Inf. Kesehat. Ibu Kota Makassar*, no. 1, pp. 6–8, 2015.

[6]   D. N. Larasati and D. Widyawati, "PENERAPAN APLIKASI AKUNTANSI BERBASIS ANDROID SIAPIK (Studi pada UMK Kerupuk Ikan Surabaya)," *J. Ilmu dan …*, no. 2018, 2022, [Online]. Available at: http://jurnalmahasiswa.stiesia.ac.id/index.php/jira/article/view/4765http://jurnalmahasiswa.stiesia.ac.id/index.php/jira/article/download/4765/4765.

[7]   W. J. Syaifullah, "STUDI KELAYAKAN SISTEM INFORMASI AKADEMIK BERBASIS WEB PADA POLTEKES KEMENKES RIAU DENGAN MENGGUNAKAN METODE KELAYAKAN TELOS," *J. Sains, Teknol. dan Ind.*, vol. vol 11, no. no 2, pp. 200–211, 2014.

[8]   D. L. Sari, "Studi Kelayakan Sistem Mapping Point UMKM Kota Malang dengan Menggunakan Metode Kelayakan Telos," *Semin. Nas. Teknol. dan Rekayasa 2017*, pp. 1–7, 2017.

[9]   A. R. Chrismanto, H. B. Santoso, A. Wibowo, and R. Delima, "Studi Kelayakan Penerapan Web Mapping System Menggunakan Metode Telos (Studi Kasus : Kelompok Tani Harjo dan Rahayu)," *Semin. Nas. Din. Inform.*, no. May, pp. 67–73, 2020.

[10] M. R. Pahlevi and M. Istoningtyas, "Perancangan Sistem Informasi Akademik Prodi Magister Sistem Informasi STIKOM Dinamika Bangsa Jambi," *J. Ilm. Media SISFO*, vol. 12, no. 1, 2018, [Online]. Available at: http://ejournal.stikom-db.ac.id/index.php/mediasisfo/article/view/337/273.

[11] H. Damayanti, "Pengembangan E-Commerce Untuk Penjualan Furniture Menggunakan Studi Kelayakan Telos," *J. Pusdansi*, vol. 1, no. 2, pp. 1–11, 2021, [Online]. Available at: http://pusdansi.org/index.php/pusdansi/article/view/36.

[12] A. Prambayun and P. Maharani, "Analisis Kelayakan Pengembangan Sistem Informasi Akademik STMIK Lembah Dempo Menggunakan TELOS Framework," *J. Siskomti*, vol. 3, no. 1, pp. 16–30, 2020.

[13] P. A. Christianto, Restyandito, E. B. Susanto, and M. Reza, "Pengujian Kelayakan Telos Pada Aplikasi Pendeteksi Keaslian Batik Asli (E-Label Batik)," *Edusaintek*, no. 2, pp. 191–200, 2019, [Online]. Available at: https://prosiding.unimus.ac.id/index.php/edusaintek/article/view/320.

[14] D. A. Perkasa *et al.*, "Sistem Ujian Online Essay Dengan Penilaian Menggunakan Metode Latent Sematic Analysis (Lsa)," *J. Rekayasa dan Manaj. Sist. Inf.*, vol. 1, no. 1, pp. 1–9, 2015, [Online]. Available at: http://ejournal.uin-suska.ac.id/index.php/RMSI/article/view/1313.

[15] R. Kurniawan, "Analisis Studi Kelayakan Keuangan Sentra Peningkatan Performa Olahraga Indonesia (SP2OI) di Menara Mandiri," *Fair Value J. Ilm. Akunt. dan Keuang.*, vol. 2, no. 1, pp. 23–36, 2019, [Online]. Available at: https://journal.ikopin.ac.id/index.php/fairvalue/article/view/61.

[16] E. F. H. Samudra, "Analisis Return On Investment (ROI) Dan Residual Income (RI) Dengan Pendekatan Du Pont System Untuk Menilai Kinerja Keuangan Pada PT. Gudang Garam Tbk. Yang Terdaftar Di Bursa Efek Indonesia," *J. Ilm.*, vol. 16, no. 2, pp. 180–187, 2019.

[17] R. Prayogi, K. Ramanda, C. Budihartanti, and A. Rusman, "Penerapan Metode PIECES Framework Dalam Analisis dan Evaluasi Aplikasi M-BCA," *J. Infortech*, vol. 3, no. 1, pp. 7–12, 2021, doi: 10.31294/infortech.v3i1.10122.

[18] M. Lestari, E. Haryani, and T. Wahyono, "Analisis Kelayakan Sistem Informasi Akademik Universitas Menggunakan PIECES dan TELOS," *J. Tek. Inform. dan Sist. Inf.*, vol. 7, no. 2, pp. 373–380, 2021, doi: 10.28932/jutisi.v7i2.3612.