

Feasibility of Using V-SAT Satellites in Library Services

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Abstract

Objective: The main goal of this research is to assess the feasibility of V-Sat satellites in the information services of university libraries.

Methodology: The research method is a survey and using the TOPSIS model is used which indicates it as an optimal method for supplying the internet which has the most distance from the negative factors and the least from the positive ones. In this research the opinions of the user organizations which are the university libraries and the information centers are reviewed in order to make clear the necessity of using this method and its specifications and benefits in comparison to other methods of supplying the internet .

Findings: The V-sat satellite internet was compared to other services including ADSL, Light Fiber, Wi-Fi and Wi-Max which eventually by evaluating them. The following results were made that the V-sat satellite internet and criterion including: the privacy and service security. And eventually the priority of the strategies for supplying the library internet using the Topsis analysis is as follow: The V-sat satellite, The Light Fiber, The ADSL service, The Wi-Max service, The Wireless service.

Conclusion: The results indicate that the VSAT satellite network, having advantages in the use of Internet services by libraries, plays an important role in improving the quality of these services.

Keywords: Information Services, Internet Services, Academic Libraries, V-Sat Satellite

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Introduction

Academic libraries are a great source of information and knowledge to provide a wide range of services to meet the needs of the end user (Iqbal et al., 2020). These libraries have a fundamental role for the educational and research activities of their institutions (Corrall & Jolly, 2019) and mainly have a great influence in the fields of information (educational, research and information abilities of users), cultural and scientific society. This is why the analysis of the most important research methods and indicators on the impact of university libraries in these areas is significant (Głowacka, 2019).

While promoting professional development among library staff is a priority for many academic libraries, library administrators often discuss the challenges of designing flexible and sustainable professional development programs that meet the diverse needs and interests of library staff (Carroll & Mallon, 2021).

Also, academic libraries face similar challenges around the world. Academic library management requires innovative skills and competencies, effective communication abilities and a new way of thinking to face challenges and create a willingness to adapt to changes (Aslam, 2020), and for this reason, libraries need to keep up with major changes and trends in the fields. Information science and higher education in general are facing challenges (Saunders, 2020).

On the one hand, studies show that shared vision is the key to university library leadership that prepares staff for organizational changes and reduces resistance to transformation. Skills development is a top priority for library managers at all levels (Aslam, 2019), and on the other hand, data plays a major role in helping to clearly understand the changing needs of university library users and helping libraries to innovate in their services and procedures. For strategic planning and decision-making, data must be transformed into information (Hamad et al., 2021).

Meanwhile, rapidly changing technologies in areas such as social media and mobile technologies are affecting how, where and when students and staff access university services. Basically, the services that academic libraries have traditionally provided can be seen as under threat. The resources and support provided by libraries in the digital age can often be face-to-face. Students and researchers increasingly find their information skills insufficient, and the importance of the role of the library as a physical entity has diminished, with [digital] information resources instead (Atkinson, 2019).

The use of information and communication technology has started an era characterized by creativity in free access to information resources. The development of technology has added new dimensions to the management of scientific content in academic libraries (Chisita & Chiparausha, 2019). The

development of social media in academic libraries is a means of achieving the goals of libraries, especially in terms of facilities and services. In addition, academic librarians use social media as a key medium for marketing, communication and collaboration (Magoi, Aspura & Abrizah, 2019) and despite the capacity of social networking services as a means of communication between academic libraries and users, many libraries Academics have not yet successfully optimized these services (Fong et al., 2020).

Therefore, digital developments have had a significant impact on the nature of learning and have provided new opportunities for academic libraries to change the way they interact with learning, teaching and research in universities (Llewellyn, 2019). Professors are among the users of library services. Faculty members expect more from academic libraries in various aspects of supporting research activities. However, most faculty members believe that university libraries meet their educational needs (Klain Gabbay & Shoham, 2019).

Therefore, paying attention to the needs of users, including students, professors, and researchers, is of great importance, and planning to strengthen library services and provide information resources and develop various types of information services plays an important role in this.

With regular planning and effective participation between the stakeholders of the main library and the satellite library, it is possible to serve the university more than providing research resources (Turner, 2017) and the services of satellite-based libraries can play an effective role in improving the status of university libraries. Among the effective tools to facilitate communication needs, telecommunication systems have a unique position. This special position is due to the advantages of satellite communication in terms of variety of services, flexibility, influence of natural resources, high speed of communication, wide coverage and relatively low cost in long distances.

From another point of view, satellites play a major role in the field of human life as well as creating new facilities in the field of trade, education and industry, and due to their wide and diverse applications, they have caused the development of ground receiver technology. Data distribution through the Internet, video conferencing and distance education services, remote medicine, meteorology, geology, mapping and mobile satellite services are among the main applications whose valuable role in terms of saving money, time and increasing the security factor is undeniable.

Therefore, the current study deals with the feasibility of using VSAT satellites in information services. In this research, seven indicators are considered, which include confidentiality, service, security, quality, support, reliability and cost. VSAT satellite network is a dedicated two-way digital network, which has received attention in many countries, including Iran, in recent years

and has been widely used in various fields of telecommunications, especially data transmission, under different protocols.

Literature Review

Research on the use of new technologies shows that the problem of many small university libraries is to provide face-to-face library education to students without having the resources and/or staff to do this. In order to better guide them in the activities of information technology, satellites play an important role in this. The results show that satellite technology can support students' needs to send information and resources well and help to optimize their library skills.

The results of this study showed that, regardless of the level of technology, the most preferred method of providing library education to students is through technology and software that can be adapted to satellite-based information services (Ismail, 2016). In another research, the status of satellite libraries has been used, the results show that it is necessary to support the main library to achieve the vision and mission of these types of libraries. Hence, their inefficiency affects the parent institution. Also, the findings indicate that satellite libraries are consistent with organizational goals in realizing the vision and mission. The management and challenges of satellite libraries are more than the main libraries of the mother organization, and it requires planning and providing necessary training for librarians and information science specialists so that they can work better with these libraries and have more appropriate activities (Filson & Edumadze, 2017). A subsequent research on the evaluation of the capacity of open source libraries to manage satellite data resources has been carried out, the results of which show that the traditional methods of managing information data provided by libraries are less effective than providing information resources through satellite. Also, remote satellite data management increases the demand for library information services and provides better conditions for their activities. In addition, various software for metadata generation, data organization, cataloging, and data retrieval through satellite services provide better conditions for optimal information services (Sharma et al., 2017). In another study, regarding the role of satellite in regular planning, effective participation between the stakeholders of the main library and the satellite library, the results showed that satellite libraries have a positive impact as a beneficial factor in the development of the university library system for extensive sharing and collaboration of resources. It was also found that the role, structure, usefulness and support of satellite libraries in universities are welcomed by librarians and are used in many activities for holding conferences, professional services, and specialized activities. Satellite libraries that use software facilities and new technologies to identify teaching

and research materials are physically and administratively separated from the main university library, but they are recognized as a library in the university campus and are supported by the organization to discover users. They have the possibility of optimal support of library services and materials (Turner, 2017) .In the research that has been done about the role of innovation in the technologies needed by libraries, the results indicate that the real change is not only through technology, but the way we use it. Libraries have always been places of innovation and education, and academic librarians have contributed greatly to the development of electronic technology .One of these technologies is in the field of satellite, and the results show that the use of data with the help of satellite technology can increase the level of quality of information services and provide better grounds for library activity. The results showed that moving in the smart environment of new technologies based on satellites means changing the paradigm of information resources and services (Rognoni & Pastorini, 2019) .In a research conducted on satellite library services at Savannah State University, the results indicate that the use of satellite facilities in the library creates a new librarian position, and increases access to the library and advances information literacy programs in the library, and develops There are social spaces throughout the campus. In addition, it has led to the development and improvement of research services, supported new information programs in virtual services and library spaces and other places of the university (Koopmans, 2020) .The results of another research about the Internet with regard to the satellite approach in the library, show that the advancements of space technology, with the activity of several companies planning in the field of satellite to provide broadband Internet services, there are many uncertainties about the design of these networks. The analysis carried out indicates that inter-satellite links significantly reduce the delay in Internet time changes, have more flexibility and can provide more than 3 times the throughput obtained for Internet services (Hauri et al., 2020).

The review of studies and research shows that the use of satellites in libraries has an effective role in providing services and using the Internet, and this technology can greatly expand the needs of users to take advantage of library services. Also, internet services and satellite technologies are effective in developing the professional activities of libraries and information centers and make their activities better.

Purpose of the Study

The reasons for encouraging the use of this type of internet in libraries and comparing it with other methods of providing internet such as ADSL, Wi-Fi, WiMAX, and fiber optic using the TOPSIS method which is based on measuring the minimum distance to It compares and examines the positive ideal solution (the best possible state) and the farthest distance from the

negative ideal solution (the worst possible state). The general purpose of the research is to investigate the feasibility of using VSAT satellite in information services. The research questions are: 1. What are the criteria and indicators investigated regarding the provision of internet for information centers? and 2. Is the use of satellite internet a suitable alternative for other means of providing internet for libraries and information centers?

Method

The current research is applied in terms of nature, and in terms of hypothesis analysis, it is background research. TOPSIS model has been used to check the feasibility of using Westat satellite in information services in university libraries. This technique is based on the concept that suitable options are options that have the least distance to the positive ideal solution (the best possible state) and the farthest distance to the negative ideal solution (the worst possible state). The TOPSIS model is completed in 6 steps:

First step: identification of criteria and options; Second step: preparation of unscaled matrix; The third step: preparation of balanced scaleless matrix; Fourth step: calculation of positive and negative ideals; Fifth step: calculating the distance of each option from positive and negative ideals; And the sixth step: calculating the ideal solution.

The statistical population of the research consists of all informatics managers of 12 universities in Tehran and Qom (8 public universities, 5 Islamic Azad universities and 1 non-profit university), whose total number is 12 according to the statistics obtained. 9 libraries were central type and 2 were faculty libraries. According to the characteristics of the statistical society, the random sampling method is simple. Jersey Morgan's sample size estimation table was also used to determine the sample size. The tool for collecting information is a questionnaire. The validity of the questionnaire was done based on the face validity method by a number of experts in information science and epistemology, and based on their opinion, some questions were deleted, some were added, and some were combined. The reliability of the questionnaire was also determined by Cronbach's alpha test, and its value was determined as 0.812.

Results

The descriptive statistics of the seven research variables have been examined in terms of importance in Table 1.

Table 1: Descriptive statistics of research variables in the sample - degree of importance

Row	Components	Average	Standard Deviation	Min.	Max.
1	Security	4.45	0.688	3	5
2	Importance of Confidentiality	4.52	0.305	4	5
3	Service and Support	4.20	0.179	4	4/4
4	Cost	3.89	0.387	3/5	4/5
5	Reliability	3.86	0.529	3/25	4/75
6	Service	4.50	0.314	4	5
7	Quality	4.24	0.565	3/5	5

According to the data in Table 1, it has obtained the highest average in terms of the degree of importance of confidentiality with an average of 4.52. After that, service is placed with an average of 4.5 and then security with an average of 4.45. Reliability is at the lowest level with an average of 3.86.

Table 2: Descriptive statistics of research variables in the sample - current situation

Row	Components	Average	Standard Deviation	Min.	Max.
1	Security	2/45	1/128	1	4
2	Importance of Confidentiality	2/77	0.984	1/25	4
3	Service and Support	2/73	0.484	1/8	3/4
4	Cost	2/43	0.531	1/75	3/63
5	Reliability	3/4	0.451	2/75	4/25
6	Service	3/67	0.634	1/6	3/6
7	Quality	2/97	0.547	2/17	3/67

In terms of the current situation, the service is at the highest level with an average of 3.67 and the cost is at the lowest level with an average of 2.43.

The answer to the first question of the research: What are the criteria and indicators to be studied regarding the Internet provision of information centers?

Regarding the answer to the above question, it is necessary to use the degree of importance and the need of the information centers regarding the provision of the Internet. Due to the fact that the degree of importance of the criteria and indicators under investigation regarding internet provision of information centers has a normal distribution, therefore, the parametric t test of one sample will be used for the test. Now, if we assume that: The real average of the importance of the criteria and indicators under study regarding the provision of Internet information centers in the society under study, the results are presented in the table below.

Table 3: The results of Student's t-test for the degree of importance of the criteria and indicators under investigation regarding the provision of internet in information centers.

Components	Average	Standard Deviation	Statistics T	Degrees of Freedom	Meaningful Level
Security	٤/٤٥	٠/٢٨٨	٧/٠٢	١٠	٠/٠٠٠٠١
Importance of Confidentiality	٤/٥٢	٠/٣٠٥	١٤/٥٤	١٠	٠/٠٠٠٠١
Service and Support	٤/٢	٠/١٧٩	٢٢/٢٥	١٠	٠/٠٠٠٠١
Cost	٣/٨٩	٠/٣٨٧	٧/٧	١٠	٠/٠٠٠٠١
Reliability	٣/٨٦	٠/٥٢٩	٥/٤٢	١٠	٠/٠٠٠٠١
Service	٤/٥	٠/٣١٤	٥/٩١	١٠	٠/٠٠٠٠١
Quality	٤/٢٤	٠/٥٢٥	٧/٣	١٠	٠/٠٠٠٠١

As can be seen from the results of Table 3, since the significance level is lower than 0.05 in all cases, therefore, we reject the null hypothesis and accept the opposite hypothesis, i.e. the degree of importance of the criteria and indicators under investigation regarding the provision of internet for information centers. It is high. But now the question arises as to which of these criteria are more important. For the answer, it is necessary to determine the priorities using the Friedman test.

Table 4: The results of Friedman's test for the priority of importance of criteria and indicators The subject of investigation regarding the provision of internet for information centers

Row	Statistics	Quantity
١	Friedman test	١٤/٩٤٥
٢	Degrees of freedom	٤
٣	Meaningful Level	٠/٠٠٩

As seen in Table 4, since the significance level of Friedman's test is equal to 0.009, therefore, we reject the null hypothesis and accept the one hypothesis. It means there is a priority.

Table 5: Average ranks and rank for the priority of the importance of criteria And the investigated indicators regarding the provision of internet for information centers

Components	Average Rank	Priority
Security	٤/٥٩	3rd
Importance of Confidentiality	٥/١٤	1st

Service and Support	٣/٦٤	5th
Cost	٢/٥٩	7th
Reliability	٢/٦٨	6th
Service	٥/١٣	2nd
Quality	٤/٢٣	4th

According to the results of the Friedman test, the priorities are as follows: 1. Confidentiality; 2. Services; 3. Security; 4. Quality; 5. Service and support; 6. Reliability; 7. Cost.

Answer to the second question of the research: Is the use of satellite internet a suitable substitute for other means of providing internet to libraries and information centers?

Regarding the answer to the above question, it is necessary to use the existing situation of information centers regarding internet provision. Due to the fact that the existing status of the criteria and indicators under investigation regarding the provision of Internet in information centers has a normal distribution, therefore, the one-sample parametric t test will be used for the test. Now, if we assume that: The real average of the current status of the standards and indicators under investigation regarding the provision of Internet information centers in the society under investigation, the results can be seen in Table 6.

Table 6: The results of Student's t-test for the current status of criteria and The investigated indicators regarding the provision of internet for information centers

Components	Average	Standard Deviation	Statistics T	Degrees of Freedom	Meaningful Level
Security	٢/٤٥	١/١٢٨	-١/٦	١٠	٠/٩٣

Importance of Confidentiality	٢/٧٧	٠/٩٨٤	-٠/٧٧	١٠	٠/٧٧
Service and Support	٢/٧٣	٠/٤٨٤	-١/٨٧	١٠	٠/٩٥
Cost	٢/٤٣	٠/٥٣١	-٣/٥٥	١٠	٠/٩٩
Reliability	٣/٤	٠/٤٥١	٣/٠١	١٠	٠/٠٠٦٦
Service	٣/٦٧	٠/٦٣٤	-١/٧١	١٠	٠/٩٤
Quality	٢/٩٧	٠/٥٤٧	-٠/١٨	١٠	٠/٥٧

As can be seen from the results of the table above, because the significance level is greater than 0.05 in all cases except for reliability, therefore, we do not reject the null hypothesis and accept it, that is, the current status of the criteria and indicators under study regarding the provision Internet information centers are not enough. Only reliability is optimal. Now, by using the gap between the degree of importance and the existing status of the criteria and indicators under study regarding the provision of Internet for information centers, we will present a way to show the importance of the attitude towards the criteria.

Table 7: The results of Faridman's test for the importance gap priority and the existing situation The criteria and indicators to be studied regarding the provision of internet for information centers

Row	Statistics	Quantity
١	Friedman test	٢٤/٧
٢	Degrees of freedom	٦
٣	Meaningful Level	٠/٠٠٠

As can be seen from the above table, because the significance level of the Friedman test is equal to 0.009, therefore, we reject the null hypothesis and accept the 1 hypothesis; It means there is a priority.

Table 8: Average ratings and rating for the priority of the importance gap and the existing situation, the criteria and indicators studied regarding the provision of Internet in information centers.

Components	Average Rank	Priority
Security	5/05	1st
Importance of Confidentiality	4/82	3rd
Service and Support	3/91	5th
Cost	4/5	4th
Reliability	1/45	7th
Service	5/09	2nd
Quality	3/18	6th

According to the results of the Friedman test, the priorities are as follows: 1. Security; 2. Services; 3. Confidentiality; 4. Cost; 5. Service and support; 6. Quality; 7. Reliability. Now we are choosing the appropriate internet provision method using TOPSIS technique.

Choosing the right internet provision method using TOPSIS technique:

In this research, TOPSIS technique has been used to choose the appropriate internet provisioning method. The best way to provide internet is the way that has the most distance from negative factors and the least distance from positive factors.

Discussion

---The first step: identifying criteria and options

The main indicators (criteria) and options (methods of internet provision) have been identified. Therefore, the scoring matrix of the options has been formed based on the criteria. A 9-point Likert scale has been used to score internet provision methods based on each criterion. The appropriate score for each of the Internet provision methods based on the indicators according to the geometric mean of the experts' opinions is presented in Table 9:

Table 9- TOPSIS technique decision matrix

Components	Security	Importance of Confidentiality	Service and Support	Cost	Reliability	Service	Quality
ADSL	۷/۷۶۰	۴/۹۳۹	۰/۷۲۴	۶/۰۰۰	۷/۰۳۹	۸/۱۶۰	۷/۷۸۹
V-Sat	۷/۰۶۰	۰/۸۲۷	۶/۰۹۳	۰/۷۴۸	۶/۷۲۲	۶/۳۲۰	۶/۰۴۴
Light Fiber	۷/۸۹۲	۷/۳۳۱	۶/۰۷۰	۶/۲۳۳	۷/۲۳۷	۷/۶۱۰	۷/۴۰۶
Wimax	۷/۷۶۰	۷/۳۰۰	۸/۳۶۰	۷/۰۶۰	۸/۳۸۶	۷/۸۹۲	۷/۷۸۹
Wireless	۶/۳۸۲	۰/۴۲۶	۶/۶۷۳	۰/۰۴۷	۶/۰۰۴	۶/۰۰۴	۰/۶۰۰

In order to calculate these values, a questionnaire composed of 33 questions was used, which evaluates each of the seven criteria for making a decision about the Internet provision method. When the opinion of more than one expert is used to determine the priority of criteria and sub-criteria, there are several techniques to reach a general view. Axel and Saati (1983) have introduced the use of geometric mean as the best method for combining pairwise comparisons. For this reason, the geometric mean has been used in this study. The values listed in Table 1 must be scaled for use in the TOPSIS technique.

---The second step: preparing the unscaled matrix

In the second step, the de-scaling of the decision-making matrix has been done with a norm. If each element of the descaled matrix is denoted by \tilde{a}_{ij} and each corresponding element in the original matrix is represented by a_{ij} , then each element \tilde{a}_{ij} by dividing the corresponding

element in the original matrix by the square root of the sum of the squares of the corresponding column elements is calculated as follows:

$$n_{ij} = \frac{a_{ij}}{\sqrt{\sum_1^m a_{ij}^2}}$$

For example, the α_{11} wireless technology score is based on the security standard, which is calculated as 7.65. To calculate the unscaled equivalent of the α_{11} value, which is shown as n_{11} , the number 7.65 must be divided by the square of the sum of the second power of each value in the column related to security. Its mathematical expression is as follows:

$$n_{11} = \frac{7.765}{\sqrt{(7.765)^2 + (7.560)^2 + (7.892)^2 + (7.765)^2 + (6.382)^2}} = 0.463$$

This operation has been done for each matrix listed in Table 10. Therefore, the output of TOPSIS software for the scaleless matrix N is as follows:

Table 10- Scaleless decision matrix

Components	Security	Importance of Confidentiality	Service and Support	Cost	Reliability	Service	Quality
ADSL	0.473	0.304	0.379	0.429	0.437	0.497	0.491
V-Sat	0.401	0.447	0.437	0.400	0.473	0.443	0.473
Light Fiber	0.471	0.020	0.437	0.440	0.448	0.473	0.470
Wimax	0.473	0.023	0.004	0.044	0.020	0.481	0.491
Wireless	0.381	0.389	0.442	0.396	0.406	0.399	0.306

---The third step: preparing the balanced scaleless matrix

In the third step, the dimensionless matrix (N) should be converted into the weighted dimensionless matrix (V). In order to obtain the weighted dimensionless matrix, we must have the weights of

the indices. The weight of each index has been calculated using the Friedman test, which is shown in Table 11.

Table 11- The weight of the main criteria and the normalized value

Components	Friedman test	Normal value
Security	۳/۵	۰/۱۲۵
Importance of Confidentiality	۴/۰۹	۰/۱۴۶۰۷
Service and Support	۳/۹۱	۰/۱۳۹۶۴
Cost	۲	۰/۰۷۱۴۳
Reliability	۵/۷۳	۰/۲۰۴۶۴
Service	۳/۳۲	۰/۱۱۸۵۷
Quality	۵/۴۵	۰/۱۹۳۶۴

For this purpose, we multiply the unscaled matrix in the square matrix ($W_{n \times n}$) whose main diagonal elements are the weights of the indices and the other elements are zero. The resulting matrix is called weighted scaleless matrix and is denoted by V . (Momini and Sharifi, 1389: 153)

$$V = N \times W_{n \times n}$$

The result of this calculation is summarized in the following table:

Table 12- Weighted scaleless matrix

Component s	Security+	Importance of+ Confidentiality	Service and + Support	Cost-	Reliability+	Service+	Quality+
ADSL	/0.079 .	/0.017 .	/0.031 .	/0.304 .	/0.894 .	/0.092 .	/0.907 .
V-Sat	/120. .	/0.602 .	/0.611 .	/0.323 .	/0.949 .	/0.028 .	/0.923 .
Light Fiber	/0.069 .	/0.602 .	/0.61. .	/0.316 .	/0.919 .	/0.001 .	/0.916 .
Wimax	/0.079 .	/0.079 .	/0.764 .	/0.384 .	/0.618 .	/0.072 .	/0.907 .
Wireless	/0.476 .	/0.068 .	/0.619 .	/0.281 .	/0.833 .	/0.470 .	/0.694 .

---Fourth step: Calculation of positive and negative ideals

In this step, a positive ideal (V+) and a negative ideal (V-) are calculated for each index. In the present decision, the indicators of security, confidentiality, service and support, reliability, service and quality are positive and only the cost indicator is negative. Now it is necessary to obtain positive and negative ideals for each indicator.

-For each positive index, the positive ideal is the largest value of the corresponding column in the v matrix.

-For each positive index, the negative ideal is the smallest value of the corresponding column in the v matrix.

-For each negative index, the positive ideal is the smallest value of the corresponding column in the v matrix.

-For each negative index, the negative ideal is the largest value of the corresponding column in the v matrix.

Therefore, the ideal positive and negative value for this decision making situation is as follows:

Table 13 - Negative and positive limit

V+	0.1250	0.652	0.764	0.281	0.949	0.592	0.957
V-	0.476	0.517	0.531	0.384	0.618	0.475	0.694

---The fifth step: calculating the distance of each option from positive and negative ideals

The distance of each option from the positive ideal is shown by d^+ and the distance from the negative ideal is shown by d^- . The output of TOPSIS software for these equations is in the form of the following table:

Table 14 - Calculations d^+ & d^-

Components	d^+	d^-
ADSL	0.720	0.492
V-Sat	0.1737	0.8898
Light Fiber	0.6828	0.4329
Wimax	0.7084	0.3820
Wireless	0.8004	0.2082

----Step six: Calculate the ideal solution

In this step, the relative closeness of each option to the ideal solution is calculated. For this, we use the following formula:

$$CL^*_i = d^- / (d^- + d^+)$$

CL value is between zero and one. The closer this value is to one, the solution is closer to the ideal solution and is a better solution. (Habibi, 1390: 1) These values are given in the following table:

Table 6 - Calculations d^+ & d^-

Internet services	CL value
ADSL	0,3664
V-Sat	0,8367
Light Fiber	0,3880
Wimax	0,3358
Wireless	0,2329

Therefore, according to the calculated values listed in Table 6, it can be concluded that the best option is to use the services of Wiset. The priority of solutions using TOPSIS analysis is as follows:

- 1- - His services are;
2. fiber optic;
3. EDSL services;
4. Wimax services;
5. Wireless services.

In addition to determining the priority of internet provisioning methods based on all the identified criteria, based on each of the identified criteria, the priority of internet provisioning methods was determined. For this purpose, the descaled matrix of the second step has been used, with the difference that the values in this table must be normalized. After normalizing, the sum of the elements of each column should be 1.

In the right column of each criterion, the score related to the Internet provision method using that criterion is entered, and under the left column of each criterion, the rank related to the Internet provision method using that criterion is entered. According to the calculations made, West method based on service and support criteria, cost, trust and quality is the best method of internet provision and it has the second priority in other criteria as well. Therefore, the results of this research based on determining the priority of internet provisioning methods based on all the studied criteria are not far from expected. And it can be expected that Wiset technology is the best option for internet provision.

Conclusions and Implications

Various criteria and indicators are used to evaluate and inform about the current status of internet provider services. It was found that the degree of importance of the investigated criteria and indicators regarding the provision of internet for information centers has a normal distribution. The results show that regarding the measurement of the seven factors,

The significance level is lower than 0.05 in all cases, which means that the degree of importance of the investigated criteria and indicators regarding the provision of internet for information centers is at a high level. The results of the Friedman test presented the priorities as follows: 1. Confidentiality; 2. Services; 3. Security; 4. Quality; 5. Service and support; 6. Reliability and 7. Cost.

Feasibility assessment of using VSAT satellites to measure the current and optimal situation and evaluate the methods used by libraries to provide their internet, the results indicate that the VSAT satellite network has advantages in the use of Internet services by libraries and plays an important role in improving the quality. It has services. This type of internet does not require cabling and the limitations of wiring networks and the related areas of this system. In fact, a VSAT can be installed and launched anywhere on the earth's surface that the satellite covers.

Facilitating the use and improving the conditions of using this type of satellite internet service can save money on physical costs and its structure. At the same time, it has a positive and favorable effect in saving manpower and energy for the desired activity. This finding is consistent with the research results (Sharma et al., 2017) regarding the benefits of satellite internet

In addition, VSAT is able to send and receive any type of information content at a high speed regardless of proximity to the telecommunication switch center. This is of great importance in providing library services and tools used to strengthen their information infrastructure. Performing specialized activities is always accompanied by technical support. In such a way that the level of service increases and provides better user satisfaction. This category is aligned with the research results of (Ismail, 2016) and (Koopmans, 2020) regarding the dimensions of services and professional activities based on satellites.

Also, being economical in Internet costs, and reducing the budget in this field can bring good conditions for the financial management of the library. The discussion of financial management is always very important in the administration of libraries. This category helps library management to meet other needs in different parts of the library by optimizing costs. Also, regarding the participation and cooperation between libraries, the influence of this factor is significant. The use of modern technologies in this system has

led to the development of professional cooperation and will improve the quality of librarians' work and expertise in their duties.

This is in common with the research results (Turner, 2017). Among the other advantages of using VSAT satellite internet is the very good quality of data communication, reliability (reliability coefficient more than 95.99%), ease and speed in changing the system configuration, provision of different communication speeds and protocols. The stated technical issues play an important role in supporting library services. These categories increase the quality of work in libraries and place technological processes in the right direction. Basically, technology plays an important role in improving the quality of professional activities of librarians and informants.

Today, information services are provided to the user through various technological tools. Information search and exploration in the web environment and databases, digital content production, use of library software, current awareness methods and selective information dissemination, and other library services are provided in the context of technology. This category, i.e. the role of satellite internet in improving the quality of using technology, is aligned with the researches of (Rognoni & Pastorini, 2019) and (Hauri et al., 2020).

It was found that the wide security capabilities of data exchange, speed in diagnosing and fixing defects, expandability, diverse telecommunication services, centralized management, the possibility of monitoring the network's real-time performance and diagnosing possible problems have caused this use of VSAT satellites based on service and support standards. Cost, reliability and quality should be recognized as among the best and best methods of providing internet.

Considering the organizational goals and missions of libraries, these categories have commonalities with research (Filson & Edumadze, 2017) and technical aspects with scientific study (Rognoni & Pastorini, 2019). Therefore, based on the results obtained in this research, based on determining the priority of Internet provision methods based on all the studied criteria, it can be expected that West Satellite Internet technology is one of the reliable and desirable options for providing Internet to libraries and information centers.

Based on the research findings, it is suggested:



The specialized services of university libraries based on essential information technologies are explained and their compatibility with satellite internet facilities is examined in terms of costs. In case of appropriate compliance, this type of satellite internet service should be used.

Also, considering the positive and acceptable uses of satellite internet, the use of this type of internet service is on the agenda of libraries and the necessary planning should be done for its use.

Numerous components in terms of technical issues, expandability, reliability, centralized management regarding the services of university libraries in connection with satellite internet should be analyzed and analyzed in detail with the opinion of experts in the field of information technology.

In their strategic and operational planning, academic libraries should pay attention to the Internet, related infrastructures and technologies, according to their activity levels.

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