

# Students Perception of Technology-Assisted Services and Readiness of Employee Digital Competencies in Covid-19 Pandemic Era

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**Abstract:** Policy in the midst of covid-19 pandemic pressure, with the implementation of health protocols certainly makes access to services to students limited. This can be used as an effort for service organizers to maximize services by switching to an online system. The objectives in this study are to know the level of readiness of employees' digital competencies, their influence on the quality of technology-assisted services and the satisfaction of students in the education administration department of the faculty of education of unfortunate public universities, which is pursued quantitatively. A total of 152 students were taken using purposive random sampling techniques. Data is analyzed with descriptive analysis techniques and path analysis with the help of SPSS 24.0 and SEM AMOS 24 applications. The results showed the level of readiness of digital competencies of employees, the quality of service, and student satisfaction are in the category very well, there is a direct influence of employee digital competency readiness on the quality of technology-assisted services, there is a direct influence on the quality of technology-assisted services on student satisfaction, the readiness of employees' digital competencies has a direct and indirect influence on student satisfaction through the quality of technology-assisted services.

**Keywords:** technology-assisted service, employee readiness, digital competencies, service quality, student satisfaction

## 1. INTRODUCTION

The world is being horrified by the emergence of the Coronavirus Virus Disease (Covid-19), which has had a significant impact on world change including Indonesia [1]. Starting from the aspects of education, economy, social, to daily life, almost nothing can be complicated from the emergence of this Covid-19 virus. Various ways were done by the Indonesian government in suppressing the outbreak, resulting in new policies. The policy is, among others, Work from Home (WFH), social distancing, physical distancing up to Large-Scale Social Restrictions (*Pembatasan Sosial Berskala Besar* / PSBB) [2]. The government is implementing a variety of ways to suppress the outbreak. The goal is for the implementation of public services to run as they were. However, if it is understood more deeply many public services are starting to be curtailed. Whereas administrative affairs still need to be

served even done quickly in line with the dynamic of people. So, don't let it be because of the Covid-19 outbreak, the administration's services are ignored.

People tend to access public services directly, while supporting infrastructure for online-based public services is still not optimal both in terms of organizers and socialization in the community towards access to public services online. Policy in the midst of covid-19 pandemic pressure, with the implementation of health protocols certainly makes access to public services to the community limited [3]. This can be used as an effort for public service operators to maximise public services by switching to an online system that has been running for a long time [4]. This transitional effort must be accompanied by massive education/understanding and socialization to all elements of society that will access public services to take advantage of the online system in every public service that will be accessed so that public services in the midst of a new living

order “new normal” are not disrupted and become more effective and efficient.

Employee digital competency readiness is one of the keys in optimizing online services performed by institutions including universities [4], [5]. In providing services online, mastery of this information technology must have an impact. Utilization of big data, cloud, social networks, and mobile devices should be able to achieve a higher level of collaboration than ever before [6]. Every employee needs to experience the benefits of being in this digital world. The BYOD (bring your own device) trend needs to be felt as useful to the individual, and make life easier, for example, in reaching customers and interacting with them. This is the opportunity for service operators to reach clients in a more practical and focused way. So, it is necessary to be able to continue to improve competency digital employees. The concept of digital competency is the target of multi-faceted movement, which covers many fields and skills and is growing rapidly as a new technology emerges [7]. Digital Competencies are converged from several fields so that this digital competency implies the ability to understand media (such as most media or digital), which is used to search for information and be critical about what to take from the internet (given the infinite absorption of the Internet) and to be able to communicate with others using various digital tools and applications (Mobile, internet).

The quality of a college is determined by the quality of service provided, where quality service can be identified through customer satisfaction in this case is a student [8]. For universities satisfaction services are more oriented to students. The concept of service quality dimensions is formulated into five dimensions, namely [9], [10]: (1) tangible (direct evidence) includes physical facilities, equipment, employees, and means of communication; (2) reliability, i.e. the ability to provide promised services immediately, accurately, and satisfactorily; (3) responsiveness, i.e. the desire of staff to help customers and provide services with responsiveness; (4) assurance, including knowledge, competence, decency, and trustworthy nature of the staff, free from harm, risk, or incompetence; and (5) empathy, including ease of relationships, good communication, personal attention, and understanding of the individual needs of customers.

The good quality of service and professional supported with the help of technology in a college will cause customer satisfaction (students) and the effect will have an effect on behavioral intentions (desire to behave from the student) [11]. Behavioral intentions that will explain whether a student will give positive or negative recommendations to fellow students or prospective students who want to continue studying in Universitas Negeri Malang especially the Department of Educational Administration, Faculty of Education. Student satisfaction is a mission that must be realized if an educational institution wants to be accepted by the community and can continue to exist and develop amid community support

[12]. Forms of service received by students in universities can include academic, student and administrative services. Based on the exposure, it is considered important to prepare the digital competencies of employees and know the effect on the quality of technology-assisted services and student satisfaction.

## 2. METHOD

Quantitative approaches with the facto expost type were used in this study. Researchers do not directly control free variables because their activities have already occurred [13], [14]. Based on the literature review of researchers compiling the theoretical framework model proposed in this study, the model includes the effect of employee digital competency readiness, and the quality of service on student satisfaction. The theoretical skeletal model in this study can be seen in Figure 1. The population of this study is Department of Educational Administration, Faculty of Education, Universitas Negeri Malang (UM). The sampling technique uses purposive random sampling, with a total of 152 respondents.

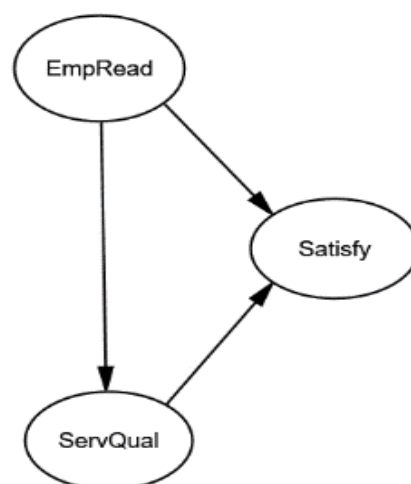


Figure 1 The Proposed Theoretical Model

Research data collection instruments using closed polls through the utilization of google form media. The poll was developed based on a theory that understands research variables [14], [15]. Good instruments must be valid as well as reliable [16]. The validity rate of instrument statement items is used by Pearson product moment correlation technique using the help of SPSS 24.0 program. The criteria item statement is declared valid if the value of the significance is  $< 0.05$  [17]. Based on the stated validity test results all statement items are declared valid, further reliability tests are performed. Reliability tests are performed using Cronbach's alpha with the help of the SPSS 24.0 program, where the instrument is declared reliable when Cronbach's alpha value is 0.600 [18]. Cronbach's alpha value of all research variable instruments  $> 0.600$  in detail values Cronbach's alpha per variable as follows: (1) employee digital competency readiness: 0.778;

(2) service quality: 0.852; and (3) student satisfaction: 0.912.

The data analysis in this study uses descriptive analysis and path analysis, with the help of SPSS 24.0 for descriptive analysis and AMOS 24.0 for CFA and SEM. This method helps researchers to build complex contribution models and can be used to analyze direct and indirect contributions [19], [20]. The measurement model discusses and evaluates the reliability and validity of indicators to measure hypothetical constructs, while structural models discuss contributions between unobserved variables and relate to contributions between variables according to the hypothetical submission [20].

### 3. RESULTS

#### 3.1 Data Description

The data description in this study was obtained through a questionnaire instrument submitted to 152 respondents. In detail based on Table 1 it can be explained that the level of readiness of digital competencies of employees is obtained mean by 24.32 means that when viewed in Table 1 the value is at intervals of 23-28 in the category very well. It can be concluded that the level of readiness of employees' digital competencies is seen from the mastery of technology, utilization of digital technology tools, and supporting facilities and infrastructure fall into the category very well. Based on Table 1 it can be explained that the level of quality of service provided to students is obtained mean by 38.06 meaning that when viewed in Table 1 the value is at intervals of 36-44 in the excellent category. It can be concluded that the level of service quality based on tangible indicators, reliability, responsiveness, assurance, and empathy belongs to the category very well. Based on Table 1 it can be explained that the level of student satisfaction obtained means that 41.58 means that when viewed in Table 1 the score sits at intervals of 39-48 in the excellent category. It can then be concluded that the level of student satisfaction seen from capacity indicators, information technology tools, comfort, communication and response belong to the category very well. In detail the distribution of frequency, mean, and variable research can be seen in Table 1.

#### 3.2 Normality and Outlier Test

Data normality tests are performed to see whether or not the data obtained is normal, because if the data obtained is abnormal it can cause serious bias in the parameters estimated, making the analysis results less reliable [20], [21]. Data is said to be distributed normally if the critical ratio skewness value is below + 2.58 [22]. Based on the normality test results in this study, the critical ratio (C.R) value for the skewness and kurtosis of each indicator is not greater than + 2.58, so it can be inferred normal distributed data at univariate levels [21]. While on the multivariate kurtosis line also shows a C.R value of

2.3560 ( $< + 2.58$ ), can be concluded normal distributed data at multivariate level, then the data is worth using and can be used for further analysis.

**Table 1 Principal Performance**

Variable	Interval	Category	f	Mean	Description
Readiness of Employee Digital Competencies	7-12	Very Not Good	0	24,33	Very Good
	13-17	Not Good	5		
	18-11	Good	37		
	23-28	Very Good	110		
Service Quality	11-18	Very Not Good	0	38,06	Very Good
	19-26	Not Good	2		
	27-35	Good	29		
	36-44	Very Good	121		
Student Satisfaction	12-20	Very Not Good	0	41,58	Very Good
	21-29	Not Good	4		
	30-38	Good	41		
	39-48	Very Good	107		

N: 152

To see the multivariate outlier is done by looking at the value of Malahanobis distance. Malahanobis distance value compared to the value of chi-square, when the value of Malahanobis distance ( $>$  chi-square) means a multivariate outlier problem occurs [22]. Based on the provision stipulated in this study obtained a chi-square value of 53,587 and the largest value at Malahanobis distance of 48,306, it can be concluded there is no problem of multivariate outlier.

#### 3.3 Evaluating the Measurement Model

The validity of the measurement model depends on establishing an acceptable goodness of fit level for the model, and finding specific evidence of construct validity. To evaluate the validity of the measurement model, a test of the validity of the construct is conducted, consisting of convergent and discrimination validity. The variables in the study were measured using 14 indicators. The convergent validity of the model is evaluated through Confirmatory Factor Analysis (CFA) using AMOS 24. Indicators that have a loading value of  $> 0.5$  are included in the test [20], and AVE size (Average Variance Extracted) at required  $> 0.5$ .

**Table 2 Results of the Measurement Model**

Factor	Item Code	Loading	AVE	CR
Employee Readiness in Digital Competencies	EmpRead1	0.784	0.684	0.866
	EmpRead2	0.892		
	EmpRead3	0.801		
Service Quality	ServQual1	0.799	0.651	0.903
	ServQual2	0.916		
	ServQual3	0.802		
	ServQual4	0.766		
	ServQual5	0.740		
Student Satisfaction	Satisfy1	0.762	0.638	0.914
	Satisfy2	0.828		
	Satisfy3	0.757		
	Satisfy4	0.782		
	Satisfy5	0.841		
	Satisfy6	0.819		

Note: N = 152, AVE = Average Variance Extracted, CR = Construct Reliability

Reliability is assessed based on Composite Reliability (CR) which must each exceed ( $> 0.70$ ). Table 2 shows convergent validity and satisfactory reliability, due to the loading value factor, CR and AVE meet and significant. Goodness of fit indices based on Table 3, it can be seen that all indices are within the recommended criteria [20]–[22], i.e.  $\chi^2 = 53,587$ ; RMSEA= 0,046; GFI= 0,932; AGFI= 0,916; CMIN/DF= 1,396; TLI= 0,964; CFI = 0,972.

Table 3 The Fit Indices of The Model

Goodness of Fit Indices	Results of the Testing Model	Cut-Off Value	Decision
X <sup>2</sup> Chi Square	53,587	$\leq 55,189$	Good
Probability	0,064	$\geq 0,050$	Good
RMSEA	0,046	$\leq 0,080$	Good
GFI	0,932	$\geq 0,900$	Good
AGFI	0,916	$\geq 0,900$	Good
CMIN/DF	1,396	$\leq 2,000$	Good
TLI	0,964	$\geq 0,950$	Good
CFI	0,972	$\geq 0,950$	Good

### 3.4 Interpretation of Structural Models

Based on the evaluation of the measurement model presented earlier, the next stage that must be done is the interpretation of the model. Figure 2 shows the results of the SEM test using the help of the AMOS 24 application. The results of the research hypothesis test can be seen in Table 4. The model needs to be interpreted to know the amount of direct, or indirect influence as summarized in Table 5.

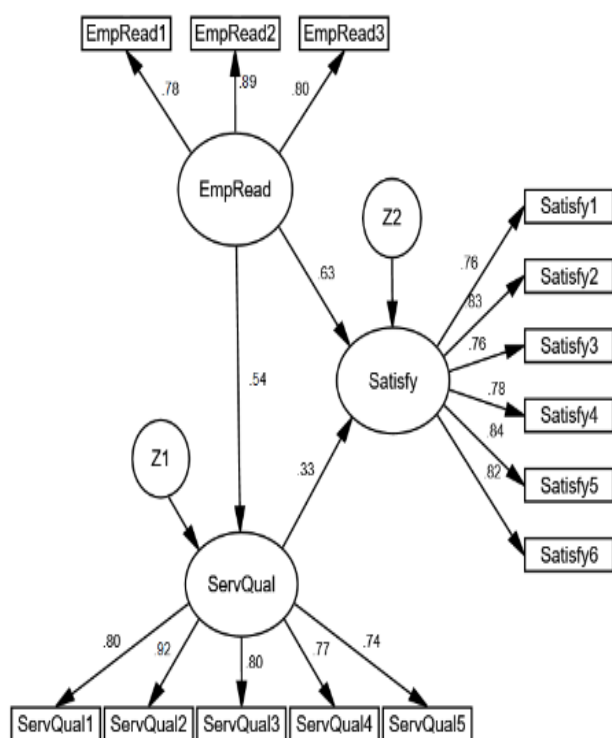


Figure 2 SEM Test Results

Table 4 Hypothesis Testing Results

Variable	P value	Cut of Value	Decision
EmpRead → ServQual	0,000	0,050	H1 Accepted
ServQual → Satisfy	0,000	0,050	H2 Accepted
EmpRead → Satisfy	0,000	0,050	H3 Accepted
EmpRead → ServQual → Satisfy	0,000 (Sobel Test)	0,050	H4 Accepted

Table 5 Summary of Direct and Indirect Effects between Research Variables

Variable	Effect		Total
	Direct	Indirect	
EmpRead → ServQual	0,541	-	0,541
ServQual → Satisfy	0,329	-	0,329
EmpRead → Satisfy	0,628	0,178	0,806

Based on Table 4, Table 5, and Figure 2. interpretation of the results of the analysis as follows:

- Employee digital competency readiness (EmpRead) has a direct influence on the quality of service (ServQual) because the value of p value  $0,000 < 0,050$ , means statistically the higher the level of readiness of digital competency of employees, the more improved the quality of service, with a line coefficient of 0.541.
- The quality of service (ServQual) has a direct influence on student satisfaction (Satisfy) because the p value is  $0,000 < 0,050$ , meaning that statistically the higher the quality of service provided to students, the more satisfaction students, with a coefficient of 0.329 lines.
- Employee digital competency readiness (EmpRead) has a direct influence on student satisfaction (Satisfy) because the p value is  $0,000 < 0,050$ , meaning the higher the level of readiness of digital competency employees, then the increased student satisfaction, with a line coefficient of 0.628.
- Employee digital competency readiness (EmpRead) has an indirect influence on student satisfaction (Satisfy), through the quality of service (ServQual), because based on the results of sobel test calculations, the p value is  $0,000 < 0,050$ , with a coefficient of 0.178, while the relationship of total employee digital competency readiness (EmpRead) to student satisfaction (Satisfy) with a large coefficient of line 0.806.

## 4. DISCUSSION

The flow of digital change is unstoppable, including by the organizers of the education ministry in this case the college [23]. The system or technology of its main service in the context under the pressure of the covid-19 pandemic in the future should no longer be limited to physical encounters by applying health protocols, but services can be done from anywhere. Mastery of technology in this service system, has the aim to realize employees who are in the direction of dynamism in the digital age. The preparation of employee digital competency is a must in an

institution, so it impacts on the quality of service assisted technology that goes well that will certainly increase student satisfaction performance is shown.

Based on the results of this study the level of readiness of digital competencies of employees directly affects the quality of technology-assisted services, some previous research supports the results of this research namely the readiness of employees to influence the quality of its main services in the context of utilization of information technology [24]–[26]. Based on the results of this study the level of readiness of digital competencies of employees is seen from the mastery of technology, utilization of digital technology tools, and supporting facilities and infrastructure fall into the category very well. Employees must master the knowledge of technology and its utilization, this causes an employee in an agency to be supported with adequate facilities and infrastructure in order to optimize the quality of technology-assisted services [7], [27].

Employee competencies in information technology are divided into three categories: IT knowledge, IT operations, and IT objects. IT knowledge relates to the introduction of experience, including the whole process of work, especially technical knowledge. Technical knowledge is the knowledge and ability to use IT with various techniques to solve problems and achieve goals, such as learning and using computer systems. IT operations include competencies needed to implement IT knowledge for successful applications and enterprise strategy completion. IT objects describe specific hardware or software tools or techniques that help you run your business properly. In addition, IT objects include IT support staff who assist with [28].

Based on the results of this study, there is a direct influence of the quality of technology-assisted services on student satisfaction. This research is similar to some previous studies that show the quality of service has an influence on student satisfaction. Research conducted in India found a positive relationship between quality of service and student satisfaction [29]–[31]. The results also showed that the level of technology-assisted services has been very good. Judging by the improved infrastructure, employee reliability, responsiveness, and assurance provided.

Employee digital competency readiness has a direct and indirect influence on student satisfaction through the quality of technology-assisted services. Employee digital competency readiness is one of the keys in optimizing online services performed by institutions including universities. In providing services online, mastery of this information technology must have an impact. Utilization of big data, cloud, social networks, and mobile devices should be able to achieve a higher level of collaboration than ever before [6]. As the results of previous research that stated the digital competence of employees affects the quality of technology-assisted services, the next directly and indirectly affects student satisfaction [32][33]. Student

satisfaction in this study is seen from capacity, information technology tools, comfort, communication and response, which of course this will not be achieved if employees do not have digital competencies and services that are not quality.

## 5. CONCLUSION

The good quality of service and professional supported by the help of technology and the readiness of digital competencies of employees in a college will cause customer satisfaction (students). Based on the results and discussion, the conclusion of this study is, the level of readiness of digital competencies of employees, the quality of service, and the satisfaction of students in the education administration department environment is in the category of very good there is a direct effect of the readiness of digital competencies of employees on the quality of technology-assisted services, there is a direct influence on the quality of technology-assisted services on student satisfaction, the readiness of digital competencies of employees has a direct and indirect influence on student satisfaction through the quality of technology-assisted services.

## REFERENCES

- [1] UNESCO, 'COVID-19 Educational Disruption and Response', Unesco.org, 2020. .
- [2] M. Septiani, 'Urgentitas Penyelenggaraan Pelayanan Publik yang dinamis dalam Menghadapi Wabah Covid-19', Ombudsman RI, 2020. [Online]. Available: <https://ombudsman.go.id>. [Accessed: 28-Aug-2020].
- [3] F. Firman and S. Rahayu, 'Pembelajaran Online di Tengah Pandemi Covid-19', *Indones. J. Educ. Sci.*, vol. 2, no. 2, pp. 81–89, 2020, doi: 10.31605/ijes.v2i2.659.
- [4] C. J. Wang, C. Y. Ng, and R. H. Brook, 'Response to COVID-19 in Taiwan', *JAMA*, vol. 323, no. 14, pp. 1341–1353, 2020, doi: 10.1001/jama.2020.3151.
- [5] W. Bao, 'COVID -19 and Online Teaching in Higher Education: A Case Study of Peking University', *Hum. Behav. Emerg. Technol.*, vol. 2, no. 2, pp. 113–115, 2020, doi: 10.1002/hbe2.191.
- [6] Z. Nyikes, 'Contemporary Digital Competency Review', *Interdiscip. Descr. Complex Syst.*, vol. 16, no. 1, pp. 124–131, 2018, doi: 10.7906/index.16.1.9.
- [7] L. Tirabeni and K. E. Soderquist, 'Connecting the Dots: Framing Employee-Driven Innovation in Open Innovation Contexts', *Int. J. Innov. Technol. Manag.*, vol. 16, no. 4, 2019, doi: 10.1142/S0219877019500317.
- [8] and M. A. K. Mahi Uddin, Kalsom Ali, 'Impact of Service Quality (Sq) on Student Satisfaction : Empirical Efidence in the Higher Education Context of Emerging Economy', *J. Islam. Soc. Sci. Humanit.*, vol. 16, no. sp, pp. 31–67, 2018.
- [9] P. Kotler, *Marketing Insights from A to Z*. New York: Wiley Blackwell, 2003.
- [10] S. Carter and A. C. Yeo, 'Students-as-Customers' Satisfaction, Predictive Retention with Marketing Implications: The Case of Malaysian Higher Education Business Students Abstract', *Int. J. Educ. Manag.*, vol. 29, no. 5, pp. 695–709, 2016.

- [11] T. Chandra, M. Ng, S. Chandra, and Priyono, 'The Effect of Service Quality on Student Satisfaction and Student Loyalty: An Empirical Study', *J. Soc. Stud. Educ. Res.*, vol. 9, no. 3, pp. 109–131, 2018, doi: 10.17499/jsser.12590.
- [12] M. A. Adha, S. Gordisona, N. Ulfatin, and A. Supriyanto, 'Analisis Komparasi Sistem Pendidikan Indonesia dan Finlandia', *J. Stud. Manaj. Pendidik.*, vol. 3, no. 2, pp. 145–160, 2019, doi: <http://dx.doi.org/10.29240/jsmp.v3i2.110>.
- [13] J. C. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 4 Edition. London: Sage Publications, 2014.
- [14] R. B. Johnson and L. Christensen, *Educational Research: Quantitative, Qualitative, and Mixed Approaches* (fifth edition). Los Angeles: Sage, 2014.
- [15] B. B. Wiyono, *Metodologi Penelitian (Pendekatan Kuantitatif, Kualitatif, dan Action Research)*. Malang: FIP Universitas Negeri Malang, 2007.
- [16] I. Gunawan, *Statistika untuk Kependidikan Sekolah Dasar*. Yogyakarta: Penerbit Ombak Yogyakarta, 2013.
- [17] S. Santoso, *Buku Latihan SPSS Statistik Parametrik*. Jakarta: Gramedia, 2010.
- [18] S. Arikunto, *Prosedur Penelitian: Suatu Pendekatan Praktik*. Jakarta: Rineka Cipta, 2010.
- [19] S. Al-husseini and I. Elbeltagi, 'Evaluating the Effect of Transformational Leadership on Knowledge Sharing Using Structural Equation Modelling: the Case of Iraqi Higher Education', *Int. J. Leadersh. Educ.*, vol. 21, no. 4, pp. 506–517, 2018, doi: 10.1080/13603124.2016.1142119.
- [20] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate Data Analysis* (7th Ed.). New Jersey: Pearson Prentice Hall, 2009.
- [21] B. M. Byrne, *Structural Equation Modeling With AMOS: Basic Concepts, Applications, and Programming*, 3rd editio. New York: Routledge, 2016.
- [22] I. Ghazali, *Model Persamaan Struktural Konsep & Aplikasi dengan Program AMOS 19.0*. Semarang: Universitas Diponegoro, 2011.
- [23] UNESCO & IESALC, 'COVID-19 and Higher Rducation: Today and Tomorrow. Impact Analysis, Policy Responses and Recommendations', *Iesalc*, pp. 1–46, 2020.
- [24] R. Fenech, P. Baguant, and D. Ivanov, 'The Changing Role of Human Resource Management in an Era of Digital Transformation', *J. Manag. Inf. Decis. Sci.*, vol. 22, no. 2, pp. 176–180, 2019.
- [25] E. Vasilieva, V. Pulyaeva, and V. Yudina, 'Digital Competence Development of State Civil Servants in the Russian Federation', *Bus. Informatics*, vol. 4, no. 1, pp. 28–42, 2018, doi: 10.17323/1998-0663.2018.4.28.42.
- [26] T. B. Chui, M. S. bin Ahmad, F. binti A. Bassim, and N. binti A. Zaimi, 'Evaluation of Service Quality of Private Higher Education Using Service Improvement Matrix', *Procedia - Soc. Behav. Sci.*, vol. 224, no. August 2015, pp. 132–140, 2016, doi: 10.1016/j.sbspro.2016.05.417.
- [27] M. A. Adha, M. Mustiningsih, and M. Maisyaroh, 'Hubungan Pelaksanaan Sistem Informasi Manajemen Berbasis Komputer dan Keefektifan Kinerja PNS Di Perguruan Tinggi', *J. Adm. dan Manaj. Pendidik.*, vol. 1, no. 2, pp. 124–131, 2018, doi: <http://dx.doi.org/10.17977/um027v1i22018p124>.
- [28] V. Siddoo, J. Sawattawee, W. Janchai, and O. Thinnukool, 'An Exploratory Study of Digital Workforce Competency in Thailand', *Heliyon*, vol. 5, no. 5, pp. 1–12, 2019, doi: 10.1016/j.heliyon.2019.e01723.
- [29] S. Annamdevula and R. S. Bellamkonda, 'Effect of Student Perceived Service Quality on Student Satisfaction, Loyalty and Motivation in Indian University', *J. Serv. Manag.*, vol. 11, no. 2, pp. 446–462, 2016, doi: <http://doi.org/10.1108/MBE-09-2016-0047>.
- [30] P. O. Duarte, M. B. Raposo, and H. B. Alves, 'Using a Satisfaction Index to Compare Students' Satisfaction During and After Higher Education Service Consumption', *Tert. Educ. Manag.*, vol. 18, no. 1, pp. 17–40, 2012, doi: <http://doi.org/10.1080/13583883.2011.609564>.
- [31] S. Khoo, H. Ha, and S. L. T. McGregor, 'Service Quality and Student/Customer Satisfaction in the Private Tertiary Education Sector in Singapore', *J. Serv. Manag.*, vol. 9, no. 3, pp. 109–131, 2015.
- [32] M. Coccoli, A. Guercio, P. Maresca, and L. Stanganelli, 'Smarter Universities: A Vision for the Fast Changing Digital era', *J. Vis. Lang. Comput.*, vol. 25, no. 6, pp. 1003–1011, 2014, doi: 10.1016/j.jvlc.2014.09.007.
- [33] J. Martins et al., 'Assessing the Success Behind the Use of Education Management Information Systems in Higher Education', *Telemat. Informatics*, vol. 38, no. 1, pp. 182–193, 2019, doi: 10.1016/j.tele.2018.10.001.