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Review Article

Optimization Of Online Motorcycle Taxi Driver Partner Registration Services At PT XYZ Bali Branch Office

Ni Kadek Ratna Puspitasari [1]*, Ni Ketut Purnawati [2]

1 Manajemen, Fakultas Ekonomi dan Bisnis, Universitas Udayana, Indonesia
e-mail : nikadekratna47@gmail.com
2 Manajemen, Fakultas Ekonomi dan Bisnis, Universitas Udayana, Indonesia
e-mail : m_purnawati@unud.ac.id

* Corresponding Author : Ni Kadek Ratna Puspitasari

Abstract: This study aims to determine the optimal queue system configuration for online motorcycle taxi driver partner registration services at the PT XYZ Bali Branch Office using a quantitative approach. Data on arrival time, service time, and operational costs were analyzed through queuing theory using the POM-QM software. The analysis results show that although phases 1, 2, and 4 meet efficiency criteria (utilization below 70%), reducing the number of servers in phases 1 and 2 can lower operational costs, as the queuing cost is lower than the service cost. Meanwhile, phase 3 shows a high utilization rate (80%), but adding a server increases the total cost. Therefore, the study recommends implementing an interchange schedule to dynamically allocate servers during peak hours to maintain a balance between cost efficiency and service capacity. Additionally, the implementation of self-service in phase 2 is proposed to enhance efficiency without reducing service capacity, with experimental results showing an increase in service rates from 2 to 7 registrants per hour. These findings contribute to the development of a more efficient and applicable queuing model and serve as a reference for companies in improving service quality and registrant satisfaction.

Keywords: Cost Efficiency, Interchange Schedule, Queuing System, Queuing Theory, Service Optimization

1. Introduction

Providing excellent customer service is a crucial factor in the service industry, as service quality significantly influences customer satisfaction. Companies that can deliver the best service will gain customer loyalty and a stronger competitive edge. In the service industry, the dimensions of reliability and responsiveness are key aspects in determining service quality. Waiting time in queues often affects customer experience, as longer queues lead to greater discomfort for consumers. This queuing phenomenon occurs across various public services and businesses, including online transportation companies.

PT XYZ, as an online transportation service provider, faces challenges in managing the driver partner registration queue, particularly in Denpasar, Bali. With a 58.82% increase in PT XYZ's app users in 2023, demand for transportation services has also risen, requiring the company to expand its driver partner network. According to interviews with company representatives, the fulfillment rate stands at 80%, meaning that 20% of service requests remain unfulfilled. To enhance service quality, the company has reopened driver partner registrations to better align supply with existing demand.

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The public's interest in becoming a driver partner is relatively high due to the job's flexibility and easy requirements. Based on Garda (2022) data, the number of online motorcycle taxi drivers in Indonesia has reached 4 million. In Bali, PT XYZ's driver partner registration also receives a positive response, averaging 97 applicants per day. However, long registration queues pose a challenge for both the company and prospective driver partners. Initial observations indicate that applicants experience long waiting times, leading to complaints. Therefore, this study aims to gain deeper insights into the existing queuing system and find optimal solutions to improve registration efficiency.

A preliminary survey involved 50 driver partner applicants, consisting of 68% two-wheeler applicants and 32% four-wheeler applicants. Survey results indicate that 72% of respondents find the queue too long, while 28% consider the queuing system reasonable. The data further reveals that 38% of respondents complained about queues during the account verification phase, while 30% complained about queues during the account registration phase. Additionally, 46% of respondents were dissatisfied with the service received during the registration phase, and 26% had complaints about the service during account verification. These findings validate that the online motorcycle taxi driver partner registration queue at PT XYZ Bali is excessively long.

On average, an applicant spends 5 hours and 34 minutes from arrival to document verification and final account activation, while the actual service time received is only 1 hour and 2 minutes. This indicates that applicants spend significantly more time waiting than receiving service at each registration phase. The tabulated survey data is presented in Table 1 below.

Table 1. Applicant Assessment of the Online Motorcycle Taxi Registration Queue System at PT. XYZ Bali Office

Number of Complaints About Queues	**Amount**	**Percentage**
File Verification	2	4
Account Registration	15	30
Account Activation	19	38
Purchase Attributes	0	0
Amount	**36**	**72**
Number of Complaints Regarding Services		
File Verification	0	0
Account Registration	23	46
Account Activation	13	26
Purchase Attributes	0	0
Amount	**36**	**72**

Source: Processed Data, 2024

Based on unstructured interviews conducted with driver partner registration service officers at the PT. XYZ Bali office, as many as 60 percent of prospective driver partners who came to register knew the registration information and wanted to register through an invitation from a colleague. This can be a reference for PT. XYZ Bali to improve the quality of their queue service in order to obtain more driver partner registrants. Because, when the quality of service received by someone is good, someone's assessment of the company will also be good(Vidananda & Setiawan, 2021). It is therefore important for companies to take appropriate action in addressing this queue issue in order to improve the quality of their registration services.

The most frequently used approach to solving this queueing problem is the mathematical model of queueing theory. Queuing theory helps provide an overview of what service providers need to make decisions about waiting lines, such as the average customer waiting time.(Sugiari et al., 2021).The results of the analysis using queuing theory provide several mathematical models that are used to determine the characteristics of a queuing system and as material for decision making so that the system is optimal.(Siregar et al., 2020).

Several recent studies using queuing theory have found recommended solutions to existing queuing problems. Research by(Rukito et al., 2019);(Damayanti & Astuti, 2023);(Yuliani et al., 2021); And(Ramadhan et al., 2017)with the queue theory found that the queue system studied was not optimal and still had opportunities for improvement. Recommended improvement opportunities include adding servers or changing the system from single channel to multiple channels. Further research byMtonga et al. (2022)The queue system studied is also not optimal, but the recommendations given are not limited to increasing the number of servers like other studies. This study recommends staff scheduling that is in accordance with customer arrival trends.

2. Research Methods

This study employs a descriptive research design with a quantitative approach. Based on the problem statement and research objectives, this study aims to describe the queuing system that needs to be developed to optimize queues and to determine the costs required for queue optimization. By utilizing the chosen research methodology, the study seeks to analyze and optimize the queuing system at the PT XYZ Bali Branch Office using a quantitative approach. This research is conducted due to the high density of driver partner registration queues at the office, which plays a crucial role in the company's operations. By identifying various variables such as arrival time, service time, waiting costs, and service costs, this study strives to find optimal strategies for queue management to reduce both waiting time and costs for the company and applicants.

The study involves a population of driver partner applicants over a 25-day working period, using a non-probability sampling method, specifically accidental sampling. The sample size consists of 50 respondents, with 10 samples collected per day over 5 days. The data collected includes primary data from direct observations and interviews with applicants and operational managers, as well as secondary data from the company regarding service facility costs and the queuing system in use.

For data analysis, this study employs mathematical queuing models to measure average waiting time, the number of applicants in the queue, and service efficiency. Through this approach, the study aims to determine the optimal number of service facilities to minimize total costs. The results of this research are expected to provide a more efficient solution for the company in managing queues, thereby enhancing customer satisfaction and improving operational efficiency.

3. Results And Discussion

Goodness of Fit Test

1) Arrival Distribution Suitability Test

H0: arrival distribution is not Poisson distributed

H1: arrival distribution is Poisson distributed

Table 2. Arrival Distribution Suitability Test

		IK1	IK2	IK3	IK4
N		50	50	50	50
Poisson Parametera,b	Mean	2.78	4.02	3.76	4.54
Most Extreme Differences	Absolute	.166	.135	.105	.244
	Positive	.166	.135	.105	.244
	Negative	-.040	-.072	-.045	-.077
Kolmogorov-Smirnov Z		1.172	.955	.740	1,728
Asymp. Sig. (2-tailed)		.128	.321	.645	.005

a. The test distribution is Poisson.

b. Calculated from data.

Source: Processed Data (2025) Appendix 9

Based on Table 2, the P value (sig.) for each arrival interval is, phase 1 is worth 0.128; phase 2 is worth 0.321; phase 3 is worth 0.645; and phase 4 is worth 0.005. The P value for phases 1-3 is greater than 0.05 as a critical value and phase 4 is worth the same as 0.05. This is in accordance with the acceptance requirements of H1, which means that the distribution of arrivals in each phase has been distributed poisson so that the data obtained can be continued to be tested using the M/M/s module.

2) Service Distribution Suitability Test

H0: service distribution is not exponentially distributed

H1: service distribution is exponentially distributed

Table 3. Service Distribution Suitability Test

		WP_S1	WP_S2	WP_S3	WP_S4
N		50	50	50	50
Exponential Parametersa,b	Mean	3.38	27.28	12.60	10.34
	Std. Deviation	1,048	6,471	3.232	2,745
Most Extreme Differences	Absolute	.183	.077	.113	.111
	Positive	.182	.077	.110	.109
	Negative	-.183	-.064	-.113	-.111
Kolmogorov-Smirnov Z		1.294	.545	.801	.783
Asymp. Sig. (2-tailed)		.070	.927	.543	.572

a. Test distribution is Exponential.

b. Calculated from data.

Source: Processed Data (2025) Appendix 9

The P (sig.) values for each phase in sequence are, phase 1 is 0.70; phase 2 is 0.927; phase 3 is 0.543; and phase 4 is 0.572. All P (sig.) values for phase 1-4 services are greater than 0.05 (a). Thus, H0 is rejected, and H1 is accepted. This means that each phase has a service that follows an exponential distribution. Service level data can be used to test the M/M/s waiting line model to find optimal results.

Queue System Analysis Using POM-QM

1) Queuing System Analysis – Phase 1

Table 4. Current Phase 1 Queue System Analysis Results

Parameter	Mark	Parameter	Mark	Minute	Second
M/M/s		**Average server utilization**	**0.31**		
Arrival rate(λ)	**22**	**Average number in queue(Lq)**	**0.06**		
Service level(μ)	**36**	**Average number in the system(L)**	**0.67**		
Number of servers	**2**	**Average time in queue(Wq)**	**0.0**	**0.17**	**10.3**
		Average time in system(W)	**0.03**	**1.84**	**110.3**
		Probability (% time) of empty system (P0)	**0.53**		

Source: Processed Data (2025) Appendix 10

Based on Table 4, the results of the analysis with the help of POM-QM with the waiting line module, the average server utilization value is at 0.31 or 31%, this indicates that the system still has the capacity to serve more registrants without experiencing overload, with this condition the performance of the queue system in phase 1 can be categorized as good. The average number of registrants in the queue (Lq) is 0.06 registrants, or almost equivalent to no registrants waiting in the queue. The average number of registrants waiting in the system (L) is 0.67 which indicates that the system often experiences emptiness as indicated in the probability value of the empty system (P0) of 0.53 or 53%. The time spent by a registrant in phase 1 to queue (Wq) is 0.17 minutes or 10.3 seconds indicating that the queue is almost non-existent. With an average time spent in the system is 1.84 minutes.

2) Queuing System Analysis – Phase 2

Table 5. Current Phase 2 Queue System Analysis Results

Parameter	Mark	Parameter	Mark	Minute	Second
M/M/s		**Average server utilization**	**0.47**		
Arrival rate(λ)	**15**	**Average number in queue(Lq)**	**0.13**		
Service level(μ)	**12**	**Average number in the system(L)**	**2.0**		
Number of servers	**6**	**Average time in queue(Wq)**	**0.01**	**,51**	**30.64**
		Average time in system(W)	**0.13**	**8.01**	**480.64**
		Probability (% time) of empty system (P0)	**0.15**		

Source: Processed Data (2025) Appendix 10

Through the results of the queuing system analysis using POM-QM with the waiting line module, it can be found that the average server utilization is 0.47 or 47% which indicates that the system is still in the efficient range. The average number of registrants queuing (Lq) is 0.13, indicating that there are almost no registrants queuing, and the average number of registrants in the system (L) is 2 (two) people. The system in phase 2 is busier than phase 1 because the probability value of the system is empty or idle time (P0) is only at 15%. The time a registrant waits in line (Wq) is 0.51 minutes and the average time a registrant spends in the system (W) is 8 minutes per hour.

3) Queuing System Analysis – Phase 3

Table 6. Current Phase 3 Queue System Analysis Results

Parameter	Mark	Parameter	Mark	Minute	Second
M/M/s		**Average server utilization**	**0.8**		
Arrival rate(lambda)	**16**	**Average number in queue(Lq)**	**2.84**		
Level of service(mu)	**10**	**Average number in the system(L)**	**4.44**		
Number of servers	**2**	**Average time in queue(Wq)**	**0.18**	**10.67**	**640**
		Average time in system(W)	**0.28**	**16.67**	**1000**
		Probability (% time) of empty system (P0)	**0.11**		

Source: Processed Data (2025) Appendix 10

Based on the results of the waiting line model analysis, it can be seen that the average server utilization in phase 3 is quite high with a value of 0.8 or 80%, the empty system probability value (P0) of 0.11 or 11% also indicates that the system is more often busy. The average number of registrants in the queue (Lq) is 2.84≈ 3 people and the average number in the system (L) is 4.44 ≈ 5 people. The average time in line (Wq) of a registrant is 10.67 minutes and the average time in the system (W) is 16.67 minutes.

4) Queuing System Analysis – Phase 4

Table 7. Current Phase 4 Queue System Analysis Results

Parameter	Mark	Parameter	Mark	Minute	Second
M/M/s		**Average server utilization**	**0.54**		
Arrival rate(lambda)	**13**	**Average number in queue(Lq)**	**0.45**		
Level of service(mu)	**12**	**Average number in the system(L)**	**1.53**		
Number of servers	**2**	**Average time in queue(Wq)**	**0.03**	**2.08**	**124.57**
		Average time in system(W)	**0.12**	**7.08**	**424.57**
		Probability (% time) of empty system (P0)	**0.3**		

Source: Processed Data (2025) Appendix 10

The analysis results show that in phase 4 the average server utilization is 0.54 or 54% which indicates that the system is quite capable of serving arrivals and has a probability value of an empty system (P0) of 30%. The average number of registrants queuing per hour (Lq) is 0.45 registrants or almost no queues and the average number of registrants in the system (L) is 1.53 ≈ 2 registrants. The average queuing time (Wq) in phase 4 is relatively low at 2.08 minutes, and the time spent in the system (W) is 7.08 minutes.

System Optimization

System Optimization – Number of Servers

1) System Optimization – Number of Servers Phase 1

Table 8. Phase 1 Server Count Analysis

Parameter	Number of Servers				
	1	2	3	4	5
Average server utilization	**0.61**	**0.31**	**0.2**	**0.15**	**0.12**
Average number in queue(Lq)	**0.96**	**0.06**	**0.01**	**0**	**0**
Average number in the system(L)	**1.57**	**0.67**	**0.62**	**0.61**	**0.61**
Average time in queue(Wq)	**0.04**	**0.0**	**0**	**0**	**0**
Average time in system(W)	**0.07**	**0.03**	**0.03**	**0.03**	**0.03**

Source: Processed Data (2025) Appendix 11

Based on the analysis results, the number of servers in phase 1 of 2 servers is optimal with an average server utilization rate of 31%, with the M/M/s analysis the system is considered capable of being served by only 1 server which produces a server utilization rate of 61%, meaning the system operates quite well without too long queues because it is still in the range below 70%. It can be concluded that the registration system in phase 1 is optimal and has the opportunity to reduce the number of servers to 1 person, especially during hours with low arrival rates, considering that phase 1 is the first phase that must be passed and has a probability of an empty system with a level of 53% so that 1 other server can be allocated to another phase that is busier.

2) **System Optimization – Number of Servers Phase 2**

Table 9. Phase 2 Server Count Analysis

Parameter	Number of Servers						
	4	5	6	7	8	9	10
Average server utilization	**0.94**	**0.63**	**0.47**	**0.38**	**0.31**	**0.27**	**0.23**
Average number in queue(Lq)	**13.61**	**0.65**	**0.13**	**0.03**	**0.01**	**0.0**	**0**
Average number in the system(L)	**15.48**	**2.52**	**2.0**	**1.9**	**1.88**	**1.88**	**1.88**
Average time in queue(Wq)	**,91**	**0.04**	**0.01**	**0.0**	**0**	**0**	**0**
Average time in system(W)	**1.03**	**,17**	**,13**	**,13**	**,13**	**,13**	**,13**

Source: Processed Data (2025) Appendix 11

The number of servers available in phase 2 is currently 6 servers with a utilization rate of 47% indicating that the system is effective in serving the arrivals per hour. Although the number of servers is 5 (five) people, the utilization rate is still below 70%, the server should not be reduced because the analysis tendency shows that the probability of an empty system is quite low, namely 15% indicating that the system is more often busy. Reducing the number of servers to 5 (five) people will actually increase the length of the queue and the risk of registrants not being able to be served if a situation occurs such as a certain technical problem.Based on the utilization level, the current system performance is optimal.

3) **System Optimization – Number of Servers Phase 3**

Table 10. Phase 3 Server Count Analysis

Parameter	Number of Servers					
	2	3	4	5	6	7

Average server utilization	**0.8**	**0.53**	**0.4**	**0.32**	**0.27**	**0.23**
Average number in queue(Lq)	**2.84**	**0.31**	**0.06**	**0.01**	**,0**	**0**
Average number in the system(L)	**4.44**	**1.91**	**1.66**	**1.61**	**1.6**	**1.6**
Average time in queue(Wq)	**0.18**	**0.02**	**0.0**	**0**	**0**	**0**
Average time in system(W)	**0.28**	**0.12**	**0.1**	**0.1**	**0.1**	**0.1**

Source: Processed Data (2025) Appendix 10

In the 3rd phase of online motorcycle taxi driver partner registration, the number of servers currently available is 2 (two) people. Based on the results of the analysis above, it can be seen that the server utilization rate is too high, which is 80% which is at a value above 70% as the utilization rate limit. Thus, the system needs to add servers to improve service and reduce queues. The results of the analysis show that by adding 1 server so that the number of servers becomes 3 (three), the utilization rate decreases significantly to 53% and the average number in the queue and system also decreases rapidly, each at 0.31 from the previous 2.84 and 1.91 from the previous 4.44. The number of servers above 3 also reduces system activity but not significantly enough. The final decision on the number of servers that should be added depends on the aspects of the lowest cost and the most optimal system performance.

4) **System Optimization – Phase 4 Server Count**

Table 11. Phase 4 Server Count Analysis

Parameter	**Number of Servers**				
	2	**3**	**4**	**5**	**6**
Average server utilization	**0.54**	**0.36**	**0.27**	**,22**	**0.18**
Average number in queue(Lq)	**0.45**	**0.06**	**0.01**	**,0**	**0**
Average number in the system(L)	**1.53**	**1.15**	**1.09**	**1.08**	**1.08**
Average time in queue(Wq)	**0.03**	**0.0**	**0**	**0**	**0**
Average time in system(W)	**0.12**	**0.09**	**0.08**	**0.08**	**0.08**

Source: Processed Data (2025) Appendix 10

At this time, the number of servers provided in phase 4 is 2 (two) people. Based on the analysis results, the current number of servers can be said to be optimal because the utilization rate is at 54%, this value is still below 70%. Increasing the number of servers by 1 (one) person in phase 4 can reduce the system's busyness level quite significantly, namely at 36%. The decision whether the number of systems should be increased depends on the amount of costs that will be spent if the server is added.

System Optimization – Cost Value

1) **System Optimization – Phase 1 Cost Value**

Table 12. Phase 1 Cost Analysis

Number of Servers	**Total cost Wait (Rp)**	**Total Service Cost (Rp)**	**Total Queue Cost (Rp)**
1	**10,003**	**98.134**	**108,137**
2	**625**	**196,268**	**196,893**

3	104	294,402	294,506
4	0	392,536	392,536
5	0	490,670	490,670

Source: Processed Data (2025) Appendix 12

Based on the analysis results with the M/M/s model, the system in phase 1 has optimal performance if the number of servers is reduced to 1 person, with a utilization rate of 61% which is still below 70%. Based on the results of the total cost comparison analysis, the lowest cost is found in the number of servers as many as 1 (one) person. This is because the tendency of queuing costs in the queuing system is much smaller than the cost of service. So, when viewed based on the analysis of costs and system performance, phase 1 is optimal even if only served by one server. This means that the system should reduce one server to be able to reduce costs so that the optimal condition of the system can be achieved.

2) **System Optimization – Phase 2 Cost Value**

Table 13. Phase 2 Cost Analysis

Number of Servers	Total Cost of Waiting (Rp)	Total Service Cost (Rp)	Total Queue Cost (Rp)
4	141,816	392,536	534,352
5	6,773	490,670	497,443
6	1.355	588,804	590.159
7	313	686,938	687.251
8	104	785,072	785,176

Source: Processed Data (2025) Appendix 12

The results of the queue cost analysis for phase 2 show that the lowest cost occurs when there are 5 servers. The number of registrants queuing in the system (Lq) decreases drastically from 13.61 ≈ 14 registrants to 0.65 or almost nothing when there are 5 servers. This results in a large decrease in queue costs, the decrease in queue costs tends to be greater than the increase in service costs so that the total queue cost decreases when there are 5 servers. Thus, it can be assessed that the optimal system with 5 servers and the system will have an average utilization performance of 63%, the current system should be reduced by one server.

3) **System Optimization – Phase 3 Cost Value**

Table 14. Phase 3 Cost Analysis

Number of Servers	Total Cost of Waiting (Rp)	Total Service Cost (Rp)	Total Queue Cost (Rp)
2	29,593	196,268	225,861
3	3.230	294,402	297,632
4	625	392,536	393,161
5	104	490,670	490,774
6	0	588,804	588,804

Source: Processed Data (2025) Appendix 12

The system in phase 3 is the system with the busiest situation. With the current number of servers of 2 (two) people, the utilization rate is 80%, this value exceeds the recommended performance limit of 70%. The system needs to consider adding servers so that the queue is not too long. However, based on the results of the queue cost analysis, the system does not work optimally if the servers are added to 3 (three) because the decrease in queue costs is lower than the increase in service costs. Although the system has a high utilization rate, the scenario of adding servers will increase the cost burden more so that the number of servers in phase 3 should not be added to avoid cost burden inflation.

4) System Optimization – Phase 4 Cost Value

Table 15. Phase 4 Cost Analysis

Number of Servers	Total Cost of Waiting (Rp)	Total Service Cost (Rp)	Total Queue Cost (Rp)
2	4.689	196,268	200,957
3	625	294,402	295,027
4	104	392,536	392,640
5	0	490,670	490,670
6	0	588,804	588,804

Source: Processed Data (2025) Appendix 12

Registration of driver partners in phase-4 with the current number of servers of 2 (two) people has an optimal utilization rate of 54%. The total cost at the server level of 2 (two) people is IDR 200,957, this cost is the lowest cost in this phase. Thus, the number of servers in phase 4 must be maintained at 2 (two) people because it is already at the optimal level.

Discussion of Research Results

Based on the queuing system analysis for each phase of the online motorcycle taxi driver partner registration process at PT XYZ, it was found that the queuing system in phases 1, 2, and 4 operates optimally at the current arrival rate, with utilization rates of 31%, 47%, and 54%, respectively. This indicates that the existing service capacity is adequate, as a utilization rate below 70% is often used as an indicator of an efficient system with a low risk of queue buildup (Gross et al., 2018:63).

However, cost analysis results indicate that phases 1 and 2 have higher operational costs compared to scenarios where the number of servers is reduced by one per phase, while system performance remains mathematically sufficient. This is due to the comparison between queuing costs and service costs, where lower queuing costs compared to additional server costs make server reduction more economical. In contrast, phase 4 has already achieved a balance between system efficiency and operational costs, making further adjustments unnecessary, meaning this phase is already optimal.

Although phase 3 has a utilization rate of 80%, the system can still operate optimally since lower costs remain the primary consideration while queues remain within acceptable limits. A utilization standard of 70-100% is often used to assess system workload, but it should not always be a strict limit. Previous studies have shown that high utilization rates can be acceptable as long as the system functions without significant stagnation. For example, research has demonstrated that a utilization rate of 93.75% can still be considered optimal as long as average customer waiting time remains within an acceptable range (Nahda et al., 2018). In phase 3, the average waiting time per hour is 0.18 hours, or in some cases, no queue is observed within an hour of monitoring. Since the trade-off between queuing costs and service costs is lower, the system should reduce the number of servers, even if a queue still occurs.

To ensure that the queuing system analysis results can be implemented without reducing service capacity, an alternative approach is needed to maintain efficiency without significantly increasing operational costs. This would allow the registration system to operate more effectively while maintaining service capacity for applicants.

4. Conclusion

1. The current registration system exhibits varying performance across different phases:
   - Phase 1: The system operates optimally with a server utilization rate of 31% and an empty system probability (P_0) of 53%, meaning queues rarely occur.
   - Phase 2: With an average utilization rate of 47% and an average of 2 applicants in the system per hour, this phase is also considered operationally optimal.
   - Phase 3: The system experiences high utilization (80%), leading to a significant increase in queues and waiting times.
   - Phase 4: The system operates at a moderate utilization rate of 54% with two servers.
2. Based on M/M/s method analysis and server count scenario comparisons, it was found that the current number of servers in Phase 4 is already optimal, as the utilization rate is below 70% and the current number of servers results in the lowest total cost, meaning no additional servers are needed. However, in phases 1 and 2, cost analysis indicates that each system should reduce one server to lower expenses. In phase 3, despite high system utilization, cost analysis suggests that the lowest cost scenario occurs with the current number of servers (two servers).
3. The current registration system is not yet cost-optimal, as the number of servers results in excessive operational costs. Therefore, the system should reduce the number of servers by one in phases 1 and 2 to reach an optimal level.

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