THE INFLUENCE OF OPERATIONS MANAGEMENT ON SERVICE DELIVERY: THE CASE OF A SOUTH AFRICAN MUNICIPALITY

P.P. Potlaki[1] & S. Naidoo[1]

ARTICLE INFO

Article details
Submitted by authors 29 Feb 2024
Accepted for publication 28 Oct 2024
Available online 13 Dec 2024

Contact details
* Corresponding author
Naidos1@unisa.ac.za

Author affiliations
1 Department of Operations Management, University of South Africa, Pretoria, South Africa

ORCID® identifiers
S. Naidoo
https://orcid.org/0000-0003-4284-516X

P.P Potlaki
https://orcid.org/0009-0009-4937-7654

DOI
http://dx.doi.org//10.7166/35-4-3016

ABSTRACT

Local government municipalities have not only authority and functionality but also the responsibility to carry out their duties in difficult circumstances. In addition, the current state of operations management and its influence on municipality service delivery is largely limited or undefined. Consequently, this study's purpose is to assess the operations management factors that affect service delivery in a local municipality in South Africa. The aim of this study was to help the management of municipalities to gain a better understanding of the influence of operations management and the degree to which operations management factors affect service delivery. The study used a positivistic lens, and adopted an online survey instrument to solicit information from respondents in a municipality in South Africa. The findings revealed a significant and positive correlation between operations management factors and service delivery. Therefore, the management of municipalities could enhance their organisations' performance and service delivery by implementing an effective operations management system and by considering the factors developed by this study.

OPSOMMING

Plaaslike regeringsmunisipaliteite het nie net gesag en funksionaliteit nie, maar ook die verantwoordelikheid om hul pligte in moeilike omstandighede uit te voer. Boonop is die huidige stand van bedryfsbestuur en die invloed daarvan op munisipaliteit dienslewering grootliks beperk of ongedefinieer. Hierdie studie se doel is daarom om die operasionele bestuursfaktore wat dienslewering in 'n plaaslike munisipaliteit in Suid-Afrika beïnvloed, te assesseer. Die doel van hierdie studie was om die bestuur van munisipaliteite te help om 'n beter begrip te verkry van die invloed van operasionele bestuur en die mate waarin operasionele bestuursfaktore dienslewering beïnvloed. Die studie het 'n positivistiese lens gebruik en 'n aanlyn opname-instrument gebruik om inligting van respondente in 'n munisipaliteit in Suid-Afrika te verkry. Die bevindinge het 'n betekenisvolle en positiewe korrelasie tussen operasionele bestuursfaktore en dienslewering aan die lig gebring. Daarom kan die bestuur van munisipaliteite hul organisasies se prestasie en dienslewering verbeter deur 'n effektiewe bedryfsbestuurstelsel te implementeer en deur die faktore wat deur hierdie studie ontwikkel is, in ag te neem.

1. INTRODUCTION

The focus of this study was to investigate how operations management affects the provision of services in a local municipality. Government institutions have been operating in difficult environments, with constrained budgets as a result of the general economic slowdown and an increased demand for services, as more people have lost their source of income because of the Covid-19 pandemic [1]. By examining data from 2016–2021 from a local municipality in South Africa, the researchers revealed whether effective operations management could aid the improvement of service delivery by government institutions such as municipalities.

In a global context, municipalities not only have power and functionality, but are also expected to function in adverse conditions [1]. Accountability remains the most powerful tool in local government for delivering public services to communities [2]. Ineffective service delivery has been one of the major problems facing successive post-apartheid governments in South Africa [3], and has been a common feature of both central and local government [4]. For many municipalities, the quality of services being delivered has declined over the years [4]. Table 1 shows some aspects of service delivery that have been concerns in the municipality that formed the research setting for this study.

Table 1: Selected components of service delivery concerns for the municipality

Service component	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	% change p.a.
Service delivery protests per year	4	3	3	4	5	6%
Operational services budget (R'000 m)	1 891	1 937	2 047	2 194	2 304	5%
Overspending (R'000)	241	104	186	257	265	2%
Municipal employees	1 638	1582	1 964	2 023	2 084	6%
Municipality population (000)	248	255	265	293	302	5%
Households without water	349	349	617	636	655	17%
Households without electricity	4 320	3 685	2 625	2 644	2 663	-11%
Schools in the municipality	63	63	63	63	63	0%
Clinics/hospitals in the municipality	6	6	6	6	6	0%

Table 1 shows that, despite an annual average 5% increase in population and in the municipality's operational budget, the number of schools and clinics remained constant from 2016 to 2021. Consequently, it is unlikely that the existing health facilities are able still to provide adequate health services to such a growing population. While the number of households without electricity decreased over the period under review, there are still a significant number of households without electricity, and those without clean water – also a basic need – increased at an average annual rate of 17%. While failing to provide these basic services to all residents, the local municipality has been overspending its operational budget by an average of 5% per year. As a result of declining service delivery levels, the local municipality has faced an average of four service delivery protests per year. If this negative trend continued, the municipality could face more service delivery protests and eventually become unsustainable.

This leads to the primary research question: *What is the influence of operations management on municipal service delivery, and how could the effective implementation of operations management improve the functioning of a local municipality?*

2. LITERATURE REVIEW

This section presents a review of the available literature on both operations management and service delivery. The review is aimed at developing a theoretical framework and identifying existing research gaps.

2.1. Theoretical framework

This study viewed the research area through the following lens:

- **Stakeholder theory** is the effective management of an organisation's stakeholder relationships, which is the primary responsibility of management and at the centre of value creation. Stakeholder theory promotes the idea that organisations that care specifically for a large group of their stakeholders (i.e., customers, suppliers, employees, communities) would operate more efficiently and thus create more value [7].
- In **transformational leadership theory**, leaders strive to clarify their vision, share it with their employees, and maintain it over the long term. It is said that this would increase employee involvement in public services and lead to a willingness to do good for others and for society [8]. In addition, the effectiveness of leadership is crucial to the survival and growth of an organisation, and encourages others to exceed their roles and expectations [7].

2.2. Operations management

The term 'operations management' consists of two interrelated words, namely 'operations' and 'management'.

Operations are the part of an organisation that is responsible for the transformation of organisational inputs into outputs (or services) of the requisite level of quality. In other words, operations can only be seen as being effective if the outputs meet the expectations of the organisation and its stakeholders. While quality inputs are important, quantity also matters, since it determines the adequacy of the service being delivered to those who depend on it [9].

The term 'management' refers to the process that "combines and transforms various resources used in the operations subsystem of the [organisation] into [value-added] services in a controlled manner as per the policies of the [organisation]" [9]. In other words, management involves combining the various operations in the organisation to deliver a service to its stakeholders. This process requires that the management functions of planning, controlling, organising, staffing, and leading be carried out [10].

Operations management can therefore be seen as a process of managing the transformation of various organisational inputs into outputs of the desired quality and quantity as defined by the organisation and its stakeholders.

2.2.1. Operations management model

The operations management process uses two types of resource: transformed and transforming resources. The transformed resources are turned into outputs using the transforming resources [11].

According to [11], the design, planning, control, and improvement of an organisation's performance to create items and provide services of the desired quality and quantity are all part of operations management.

- Designing products and services: Design is a critical activity that always safeguards the organisation's long-term success.
- Planning and controlling the operation: Following design, the delivery of services and products from manufacturers and the structure of the business delivering to customers must be planned and controlled.
- Improving the performance of the operation: Operations managers are responsible for improving process performance by developing the capabilities of their processes, thereby ensuring that things are not simply done the way they always have been done, but are continually refined and improved upon.

Thus the local municipality has the mandate to ensure that the delivered services are of an improved value to the public so as also to improve the organisation's performance.

The operations management model [11], seen in Figure 1, is important because it helps the organisation to manage operations effectively and, in doing so, they are able to deliver the required services reliably. In

following this model, resources are also better managed to maximise their potential and use of labour. It also allows the organisation to deliver effective and efficient service promptly. However, the model has some limitations, such as multiple dependency factors – that is, a large number of procedures are required to carry out effective plans. Humans tend to make mistakes and delay processes in an organisation's operations.

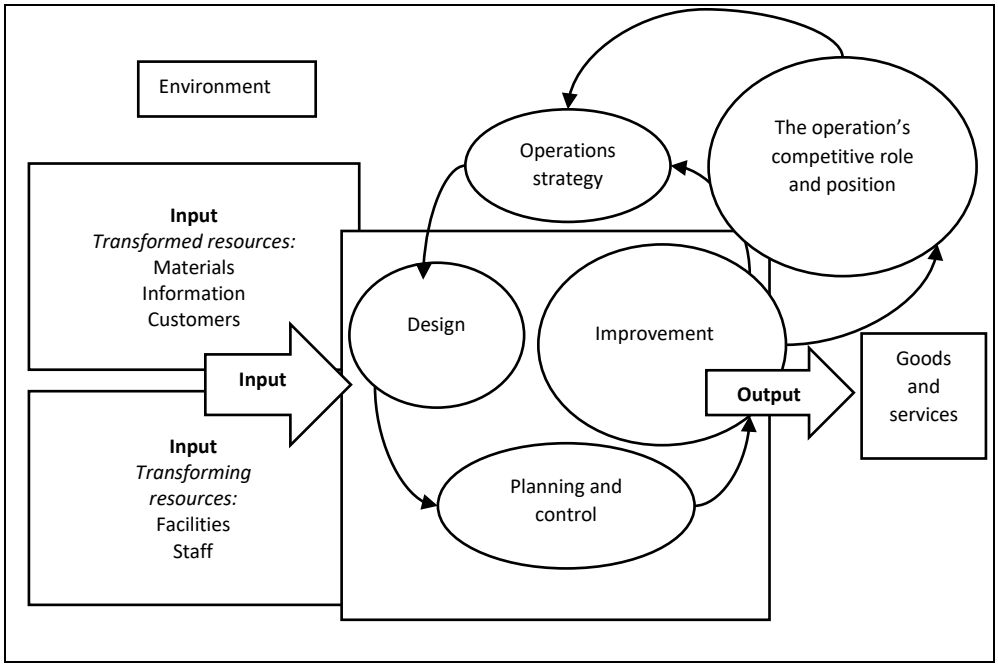

Figure 1: Operations management model [11]

2.3. Service delivery

One of the earliest contemporary definitions of service delivery can be traced back to [12], who defined service delivery as the utility derived by the public from the services delivered by a public-sector organisation. Service delivery can also be viewed as the delivery of a product or service by a municipality to the community [4]. Therefore, service delivery can be seen as a process by which public organisations provide services from which the public can derive value. For organisations such as the local municipality, such services include housing, health, safety, water, and sanitation.

From a perspective of service delivery at the local municipality level, poor service delivery is a frequent complaint [13]. This could justify the protests against poor service delivery in predominantly black local communities in all of South Africa's provinces. The service provided by public-sector organisations is frequently referred to as public value [4; 13]. As the local municipality works to incorporate the investment approach and to build risk resilience and public safety into their policy and service delivery, public value is highly relevant.

For this study, service delivery was viewed as a process by which local government provides services to the public that have some value. Housing, health, safety, water, and sanitation were examples of such services provided by organisations such as the local municipality.

2.4. Organisational performance

'Organisational performance' refers to the actual organisational output measured against the desired output. It is also the ability to achieve an organisation's goals efficiently and effectively [14]. This means that the first step in measuring organisational output is to outline the desired output. Organisational performance is a chain of events that connects organisational vision, missions, values, and strategic goals to divisional, unit-level, and individual objectives, goals, and activities [15].

Organisational performance in the context of the performance hierarchy is best explained by [16] in the following way:

- The first step in managing organisational performance is to set the organisation's mission and express it in a mission statement. The mission statement aims to provide employees and stakeholders with clarity about the overall purpose of the organisation. A mission statement clarifies the reason for the organisation's existence [17]. For local government organisations such as the local municipality, the mission should be derived from both the national aspirations enshrined in the South African constitution and the aspirations of those being served by the local government.
- Once the mission has been set, the organisation needs to set out objectives, which are statements of specific outcomes that the organisation seeks to achieve [10]. For instance, one of the objectives of the local municipality in this study was to achieve a crime-free community by 2025. The objective was specific, measurable, attainable, realistic, and time-bound.
- Achieving strategic objectives requires the organisation to use its critical success factors (CSFs). These are those processes, procedures, and service features that the organisation needs to perform well in order to achieve its stated objectives [17]. For instance, one of the local municipality's CSFs may be the availability of budget surpluses to weather the effect of unforeseen events such as the Covid-19 pandemic. CSFs can also be the quality of the organisation's intellectual resources that allow it to deliver quality services.
- Last, to monitor the progress in using CSFs to achieve the organisation's mission and objectives, key performance indicators (KPIs) need to be set. KPIs are a set of performance targets that the organisation sets for its various units, the achievement of which leads to overall organisational performance [16]. For instance, one of the local municipality's KPIs might be to build at least three new schools every year. Thus, at the end of every year the number of schools actually constructed would be compared with the specific target of building three schools.

The performance hierarchy is an important model for public-sector organisations such as local municipalities because it ensures that their activities are directly linked to their purpose. In other words, the performance hierarchy ensures that operations management is directed towards achieving the strategic mission of the organisation.

3. METHODOLOGY

Research methodology is a method of data collection, analysis, and interpretation plans and procedures that range from broad assumptions to detailed methods for analysing and interpreting data [18].

3.1. Choice of philosophy

In this study, the researchers did not seek to develop any new theory, since plausible theories on organisational performance and operations management already exist. Instead, the research study sought to test empirically the influence of operations management on service delivery. As a result, this study adopted a positivist philosophical position [18].

3.2. Research approach

It has already been noted that the study aimed to test the influence of operations management on service delivery in a South African local municipality. Such testing required the collection and analysis of objective data [19]. As a result, the proposed study adopted a quantitative research approach.

3.3. Research design

A research design can be defined as the specific method with a broader approach that is used to collect research data [18].

3.3.1. Population of the study

This study's population consisted of 1 538 employees in the municipality.

3.3.2 Sample and sampling

The stratified sampling technique was chosen for this study because it ensured that employees at all levels of the organisation were included in the sample in order to enhance the validity of the collected data [19].

Table 2 shows the sample framework that resulted from the study.

Table 2: Population and sample framework

Operational unit	Total population	Sample size	% of population	Sampling method
Municipal manager's office	21	21	100%	Census
Infrastructure and services department	616	243	39%	Random sampling
Community services department	634	245	39%	Random sampling
Financial services department	267	160	60%	Random sampling
Total	**1 538**	**669**	**43%**	Random sampling

The table shows that the target sample was 669 respondents. This was calculated by applying the central limit theorem (CLT) formula to each of the strata [20]. It should be noted that, while the sample size was ambitious, this was well above the sample size of 317 required for a total population of 1 538. Therefore, the pooled results of the study would have been valid, as measured from the CLT perspective, if the response rate were around 21% of the target population (317/1 538). The sample was selected by sending the questionnaire link to all the respondents after receiving approved ethical clearance from the university's research ethics committee.

3.4. Data analytics

Since the proposed study was quantitative, the data were analysed through statistical tools to facilitate the answering of the research question.

3.4.1. Stage 1: Sample analysis

At this stage, statistical measures were used to analyse the sample. More specifically, descriptive statistics (frequency, mean, and standard deviation) were used to understand the sample [18; 19].

3.4.2. Stage 2: Instrument reliability analysis

The instrument used was tested for inter-rate and construct reliability using Cronbach's alpha coefficient (α). This is a measure of the closeness of the relationship of a set of items as a group [18]. As a rule of thumb, an instrument is reliable if the alpha coefficient is at least 0.70 [21].

3.4.3. Stage 3: Instrument reliability analysis

The mean and standard deviation of each of the items in the instruments used to measure the variables were calculated. While the mean showed the general level of respondents' perceptions, the standard deviation was used to measure the level of agreement of respondents' views on any given item [21].

3.4.4. Stage 4: Regression and correlation analysis

This analysis was aimed at evaluating the existence of any potential cause–effect relationship between the factors of the study. Regression analysis was used to evaluate the extent to which given levels of operations management could predict the quality and quantity of service delivered to the population of the researched municipality [18]. Reliability can be defined as measures of the quality of the research [19]; and in this study internal consistency was measured through Cronbach's alpha.

4. RESULTS AND DISCUSSIONS

The influence of operations management on service delivery at the municipality was evaluated using correlational analysis and regression modelling.

4.1. Questionnaire results

4.1.1. Sample analysis

Of the 669 invitations that were issued, only 120 valid responses were received. Thus the response rate was 18%. This was significantly lower than the average response rate of around 55.6% reported by [22]. However, the sample size was significantly higher than the 60 respondents required for a valid quantitative study [20].

4.1.2. Education

Table 3 shows the total respondents in respect of education, of whom 94% had a degree, implying that the majority of them had at least some level of education necessary to understand what operations management and service delivery entail.

Table 3: Education

	Bachelor's degree	High school diploma or equivalent qualification	Honours/PGD/ doctoral degree	No degree
Community services	31%	56%	6%	0%
Corporate services	8%	22%	25%	50%
Financial services	23%	0%	25%	50%
Infrastructure and services	31%	22%	31%	0%
Municipal manager's office	0%	0%	6%	0%
Strategy, economic development and planning	8%	0%	6%	0%

4.1.3. Instrument reliability

Table 4 shows that all the instruments had reliability coefficients that were greater than 0.70. Thus all the instruments used to measure the variables and the operations management factors could be deemed to be reliable [21].

Table 4: Reliability assessment

Instrument	Mean	SD	Cronbach's alpha index
Operations management instrument	Organisational strategy		
	3.21	1.01	0.93
	Operations management strategy		
	2.98	0.99	0.949
	Operations management inputs		
	2.75	1.02	0.831
	Operations management design		
	3.30	0.89	0.918
	Operations management planning and control		
	3.75	1.04	0.832
	Operations management improvement		
	2.77	1.03	0.811
	Total operations management instrument		
	3.33	1.27	0.966
	Service delivery instrument		
	3.99	1.45	0.905

4.1.4. The quality of operations management in the municipality

This section presents descriptive statistics for the operations management instrument to assess the current level of operations management in the studied municipality.

Table 5: Descriptive statistics per item: Supply chain management

Instrument/item	Mean	SD
Organisational strategy		
Our organisation has a clear mission for its future.	3.25	1.28
Our organisation has detailed long-term objectives.	3.15	1.25
Our organisation has strategies to achieve its stated objectives and mission.	3.15	1.23
Leaders in our organisation clearly communicate the organisation's mission, objectives, and long-term plans.	2.63	1.39
Operations management strategy		
Our organisation has a clear operations management strategy.	2.78	1.19
The operations management strategy of our organisation is aligned with the long-term strategies of our organisation.	2.95	1.24
Operations management objectives in our organisation are aligned with the overall operations management strategy of the organisation.	2.75	1.19
The operations management strategies of our organisation clearly identify service quality as a key priority.	3.00	1.26

Operations management inputs		
The organisation provides adequate material resources for the efficient running of operations.	2.60	1.03
Information is made available to operations management employees to ensure the efficient and effective execution of their duties.	2.83	1.06
Our organisation solicits client input into its operations management.	2.50	1.04
The organisation has adequate infrastructure to support the execution of operations.	2.45	0.99
There are adequate operations management staff to ensure efficient and effective execution of operations.	2.78	1.19
Operations management design		
Processes carried out in our organisation are aimed at satisfying the needs of stakeholders.	3.05	1.08
The operational activities in our organisation are designed to ensure the efficient use of resources.	2.88	1.14
The design of operations in our organisation minimises waste of time and resources.	2.50	1.11
Operations management in our organisation is designed to minimise error and operational breakdowns.	2.58	1.06
Operations management planning and control		
There are standard operating procedures for operations management activities in our organisation.	3.33	1.21
Management constantly measures actual operational performance against planned performance.	2.88	1.07
Operational employees have targets for heir sections.	3.13	1.16
Operations management improvement		
There is clear plan in our organisation to continuously improve operations.	2.85	1.19
Our organisation uses results from the comparison of actual performance and planned operational performance to identify gaps in operations.	2.85	1.12
Operational deviations are resolved promptly in our organisation.	2.68	1.12
Improvement of operational performance is the responsibility of everyone in our organisation.	3.43	1.34

Organisational strategy

The first section of the four items measured the extent to which the respondents perceived the municipality as having a well-defined organisational strategy. The first section of the four items measured the extent to which the municipality had a well-defined organisational strategy, measuring participants' perceptions of whether the municipality was clear about its mission (Item 1), detailed long-term objectives (Item 2), strategies to achieve its stated objectives and mission (Item 3), and whether the municipality clearly communicated the organisation's mission, objectives, and long-term plans (Item 4). The results in Table 5 show that all the mean scores were above 2.5, implying that the participants believed that the municipality had a defined organisational strategy. As indicated in the literature review, the starting point of an effective operations management system is having a clearly defined and communicated organisational strategy. The score for Item 4 ("Leaders in our organisation clearly communicate the organisation's mission, objectives, and long-term plans") was the lowest (Mean = 2.63, SD = 1.39). While this was above half of the possible mean score (2.5), the municipality needed to work on improving this area. It needed to improve its communication of the organisation's mission, objectives, and long-term plans, as part of improving the effectiveness of its operations management.

Operations management strategy

Items 5 to 6 required respondents to rate the municipality's current operations management strategy. Generally, the level of operations management strategy was seen as moderate, with the mean scores ranging between 2.75 and 3.00. Thus the perceived level of the municipality's operations management strategy was lower than the perceived level of its organisational strategy. The municipality should, however, be applauded for the fact that its operations management strategy, despite its shortcomings, was perceived as identifying service quality as a key priority – an important aspect of public management according to [12].

Operations management inputs

The third section of the instrument solicited respondents' perceptions of the level of operations management inputs in the studied municipality. The results were mixed. Fair results were found for Items 9, 10, and 13, with mean scores ranging between 2.60 and 2.83. That meant that the respondents felt that the municipality provided fair material resources for the efficient running of operations (Item 9: mean = 2.60; SD = 1.03); that fair information was provided to operations management employees to ensure the efficient and effective execution of their duties (Item 10: mean = 2.83; SD = 1.06); and that the municipality had adequate operations management staff to ensure efficient and effective execution of operations. Again, the level of stakeholder engagement was found to be fair (Item 11: mean = 2.50; SD = 1.04). In other words, the respondents felt that the municipality was not doing enough to solicit client input into its operations management. Stakeholder engagement was identified by [5; 12] as the management of public-sector operations and gaining stakeholder buy-in. The lowest mean score in the operations management input section was found in Item 12 ("The organisation has adequate infrastructure to support the execution of operations"). Without adequate infrastructure such as roads, water reticulation plants, and schools, it is difficult to have an effective operations management system.

Operations management design

The design of operations management was also identified as being critical in determining the effectiveness of the operations management system [12]. Again, the mean scores for this section were fair, ranging between 2.50 and 3.05. Quality of service and the value created seemed to be defined internally, with little input from external or other stakeholders. This directly contradicted the outside-in approach recommended by authors such as [9]. Such an approach requires that the organisation understand what value means from the perspective of stakeholders – internal and external – and uses that as a basis for formulating an operating management strategy and designing the operations management system.

In line with what was highlighted in the problem statement, the design of operations management in the municipality was such that minimising wastages in time and resources was not achieved, as can be seen from the low mean score of 2.50 (SD = 1.11) for Item 16 ("The design of operations in our organisation minimises wastages in time and resources"). With irregular spending having been reported as part of the problem in this municipality, the organisation may need to redesign its operations management system such that it more effectively minimises wastage.

Operations management planning and control

Once the operations management system has been set up, the next step is its control. The operations management planning and control factor in the study was generally high, with two of the three items that measured this factor recording mean scores above 3.0. For a public-sector organisation, it would be expected that the organisation would have standard operating procedures for operations management activities (Item 18). The mean score for this item was the highest at 3.33 (SD = 1.21). In addition, the respondents generally agreed that the municipality had targets for employees in their sections (mean = 3.13; SD = 1.16). However, the municipality needed to ensure that actual operational performance was constantly measured against planned performance (Item 19), because this item yielded the lowest mean score in the operations management planning and control [9] section of the instrument (mean = 2.88; SD = 1.07).

Operations management improvement

Finally, an effective operations management system is capable of evolving along with changes in the organisation's environment [17]. In this study, the last section of the operations management instrument contained items that measured operations management improvement. Generally, the mean scores show that respondents' perceptions were that the municipality generally improved its operations management system.

4.1.5. The level of service delivery in the municipality

The level of service delivery in the studied municipality was measured through a nine-item instrument. The descriptive statistics for this instrument are shown in Table 6.

Table 6: Descriptive statistics per item: Service delivery instrument

Item code	Item	Mean	SD
SdL1	Education services	2.95	0.96
SdL2	Water and sanitation	2.33	0.89
SdL3	Health services	2.68	0.97
SdL4	Collection of rates and taxes	2.73	1.18
SdL5	Sports and recreation	2.60	0.98
SdL6	Public safety and security, prevention of crime, and securing law and order	2.25	0.98
SdL7	Infrastructural and amenities development	2.25	1.03
SdL8	Social cohesion and integration	2.58	0.98
SdL9	Protection of the natural environment	2.30	1.11

The respondents were asked to rate the current level of the named services that ought to be provided by the municipality. The results showed that the mean scores for the service delivery components were generally lower than those for operations management. More specifically, none of the services mentioned had a mean score of 3.0 or higher, as was the case in the operations management instrument. Respondents thus did not feel that operations management had been able to improve these services significantly during the few years before the study.

4.2. The influence of operations management on service delivery

To investigate the extent to which operations management influenced the delivery of service in the municipality, a correlation analysis was conducted.

4.2.1. Correlation analysis

Pearson's correlation coefficient was used to test the correlation; the results are given in Table 7.

The results in Table 7 indicate that all the correlations were positive, implying that the variables had positive effects on one another. More importantly, a large correlation was reported between service delivery and all the factors of operations management.

Table 7: Correlation results

	1	2	3	4	5	6	7	8
1. OgS	1							
2. OpS	.814**	1						
3. OpI	.693**	.786**	1					
4. OpD	.712**	.765**	.825**	1				
5. OpC	.666**	.766**	.714**	.778**	1			
6. OiP	.654**	.803**	.828**	.828**	.871**	1		
7. OpMan	.608**	.484**	.493**	.532**	.451**	.383*	1	
8. SdL	.518**	.634**	.527**	.631**	.671**	.553*	.564**	1

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

Where:

- OgS = Organisational strategy
- OpS = Operations management strategy
- OpI = Operations management inputs
- OpD = Operations management design
- OpC = Operations management planning and control
- OiP = Operations management improvement
- OpMan = Total operations management
- SdL = Service delivery

The design of the operations management system has also been proposed as having a positive effect on organisational performance [14; 15]. This assertion was confirmed in this study, as the operations management design factor was found to have a large, positive, and statistically significant correlation with service delivery ($r = 0.631$, $p < 0.01$).

Having effective operations management was also found to depend on the extent of operations management improvement processes, so that the system would evolve along with an evolving operations management environment [11]. This was confirmed in this study, with operations management improvement found to have a large, positive, and statistically significant effect ($r = 0.553$, $p < 0.01$).

Finally, the operations management variable was found to have a large effect on service delivery ($r = 0.564$, $p < 0.01$). These findings confirm the findings of earlier studies such as [4; 13] that operations management has an impact on organisational performance. In this study, the performance was measured through the 'quality of service delivery' variable.

This implies a positive relationship, but does not imply that operations management determines the level of service delivery. To confirm the extent to which operations could influence service delivery, regression modelling was performed.

4.2.2. Regression modelling

Regression modelling was performed to assess the extent to which operations management could influence service delivery, thus allowing the influence of operations management on the level of service delivery to be assessed. The summary of the regression model is presented in Table 8.

Table 8: Regression model

Model summary									
Model	R	R square	Adjusted R square	Std. error of the estimate	Change statistics				
					R square change	F change	df1	df2	Sig.
1	0.383[a]	0.147	0.124	6.43	0.147	6.540	1	38	0.01
2	0.451[b]	0.204	0.161	6.30	0.057	2.649	1	37	0.11
3	0.565[c]	0.320	0.263	5.90	0.116	6.130	1	36	0.02
4	0.594[d]	0.353	0.279	5.84	0.033	1.809	1	35	0.19
5	0.605[e]	0.366	0.273	5.86	0.013	0.695	1	34	0.41
6	0.661[f]	0.437	0.335	5.61	0.071	4.169	1	33	0.04
a. Predictors: (Constant), OgS									
b. Predictors: (Constant), OgS, OpC									
c. Predictors: (Constant), OgS, OpC, OpD									
d. Predictors: (Constant), OgS, OpC, OpD, OpI									
e. Predictors: (Constant), OgS, OpC, OpD, OpI, OpS									
f. Predictors: (Constant), OgS, OpC, OpD, OpI, OpS, OpM									
Where: OgS = Organisational strategy OpS = Operations management strategy OpI = Operations management inputs OpD = Operations management design OpC = Operations management planning and control OpP = Operations management improvement OpM= Total operations management									

Hierarchical multiple regression was used, with each of the operations management factors being entered progressively at each stage. Since there was more than one independent variable, the adjusted r-squared was used rather than r-squared [21]. In the first model (Model 1), organisational strategy was entered. The model showed that organisational strategy was a significant predictor of service delivery (adjusted r-squared = 0.124, $p < 0.05$). The findings confirmed the assertion by [11], who indicated that defining and clarifying an organisational strategy was critical to having an effective operations management system that could positively influence organisational performance.

In the second model (Model 2), operations management planning and control were entered, and the model's predictive value increased (adjusted r-squared = 0.161, p 0.11). That meant that operations management planning and control could account for an additional 3.7% (0.161–0.124) of the variations in service delivery. However, the contribution of operations management planning and control was found to be statistically insignificant ($p > 0.05$). The fact that the coefficient of determination was found to be insignificant was contrary to assertions by prior scholars such as [13], who found that operations management and control significantly influenced organisational performance.

Operations management design was entered in the third model (Model 3), and the model's predictive value increased to 0.263, implying that an additional 11.6% of the variations in service delivery could be accounted for by variations in operations management design (adjusted r-squared = 0.263, $p < 0.05$). The p-value was less than 0.05, implying that the contribution of operations management design was statistically significant. These findings confirmed prior studies such as [14; 15].

Moreover, when the factor operations management inputs were entered into the model (Model 4), the adjusted r-squared value improved to 0.279, meaning that operations management inputs contributed an additional 3.3% to the model's predictive value (adjusted r-squared = 0.279, $p > 0.05$). However, the contribution was not statistically significant, given that the p-value was greater than 0.05. These findings were not in line with prior studies such as those by [11; 12], which found that operations management inputs such as human capital, materials, and process design could have a positive effect on organisational performance.

Operations management strategy was entered in the fifth model (Model 5), reducing the model's predictive value to 0.273 (adjusted r-squared = 0.273, $p > 0.05$). That meant that operations management strategy did indeed harm the model's predictive value. [12] found that the need to define an operations management strategy that cascades down from the organisation's strategy influenced organisational performance.

Finally, Model 6 included all the operations management factors. This model could predict 33.5% of the variations in service delivery (adjusted r-squared = 0.335, $p > 0.04$). Thus, overall, operations management was found to influence service delivery positively. It could, therefore, be concluded that operations management has a positive effect on organisational performance in general and on service delivery in particular. Therefore, the overall findings of this study support the studies by [12; 13; 14; 17], who asserted that organisational performance could be improved by improving the effectiveness of operations management systems in the organisation.

5. RECOMMENDATIONS

Given that operations management has been found to have the ability to influence service delivery, the following are some suggestions about how operations management could be improved in the studied municipality – knowing, on the basis of the results of this study, that such improvements in operations management would ultimately lead to improvements in service delivery.

Communication of strategies: The results revealed that the level of communication of the municipality's strategies within the organisation is low. Thus the organisation would need to work on its communication strategies to ensure that crucial information, such as strategic initiatives, was properly disseminated. Platforms such as social and electronic media could also be effectively used for this purpose. Depending on the availability of financial resources, having a community radio could also help to ensure that there is two-way communication between municipality stakeholders.

Stakeholder engagement: There is a need to involve the organisation's stakeholders, particularly residents' clients, to ensure that they feel that their interests are also given priority in addition to the municipality's other priorities. Increased engagement would address the concerns of stakeholders by prioritising the concerns of key stakeholders, followed by those who are lower on the stakeholder hierarchy, until all have been engaged. Programmes such as service delivery open days could help to bring stakeholders together. Future studies should include the stakeholders and, more importantly, the customers of the municipality.

Programme of continuous improvement: The municipality needs to reflect on how it could improve its operations. It would not be enough simply to have effective operations management systems. Such systems would need to be continually improved so that they evolved along with changes in the municipal environment. The adoption of international best standards such as ISO, even though it would not be for certification, may assist greatly.

The recommendations in this section are not meant to be complete, but to provide a foundational indication of what municipalities may need to do to improve their operations management and, ultimately, their service delivery.

6. LIMITATIONS OF THE STUDY

The actual sample size was significantly smaller than the target population. That means that the results in this study are conservative. Nonetheless, the sample was large enough to perform statistical analyses on the resultant data, based on advice from research scholars such as [20]. Also, the study focused on employees of the municipality only, and not on customers.

The quantitative method adopted in this study ensured that results were rigorous and were tested for their statistical significance. However, it meant that the study did not include the reasons for the views that respondents expressed in the survey. Future studies could benefit from conducting a qualitative or a mixed methods approach to enquire about the qualitative factors that could underlie the relationship between operations management and service delivery.

7. CONCLUSION

The main purpose of this article was to determine the relationship between operations management and service delivery in a South African municipality. The literature review provided a sound theoretical base for the quantitative methodological approach to be used. Thereafter, the results and a discussion of the empirical findings were presented. With quality of service delivery being the bottom line for the municipality, it could be concluded that, in the public sector, high levels of operations management are generally related to high levels of organisational performance. This culminated in the recommendations and a statement of the limitations of the article. Overall, the results show that operations management significantly influences service delivery.

REFERENCES

[1] **Sutcliffe, M. & Bannister, S.** 2020. Research on exploring factors affecting governance in local government institutions. *LGSETA/GOVERNANCE/10/0028, City Insight*, March, pp. 1–125.

[2] **Ndzelu, L.** 2016. The effect of legislative compliance on infrastructure service delivery: The case of Matatiele Local Municipality. Master's thesis, Stellenbosch: Stellenbosch University. https://scholar.sun.ac.za/items/4f5c7ea8-0781-496b-90d3-0d5c186bdbc0

[3] **Dyantyi, D.** 2015. Transformation in the petroleum retail sector - making black entrants linger longer, Cape Town: University of Cape Town.

[4] **Naidoo, C. & Ramphal, R.R.** 2018. The factors that affect public participation for effective municipal service delivery: A case of ward committees. *South African Journal of Industrial Engineering*, 29(4), pp. 82–93. https://doi.org/10.7166/29-4-1948

[5] **Fassin, Y., De Colle, S. & Freeman, R.E.** 2017. Intra-stakeholder alliances in plant-closing decisions: A stakeholder theory approach. *Business Ethics*, 26(2), pp. 97–111. https://doi.org/10.1111/beer.12136

[6] **Katywa, Z. & Strydom, K.** 2021. Transformational leadership as a catalyst for efficient service delivery in the Buffalo City Metropolitan Municipality. *Journal of Public Administration*, 56(2), pp. 213–232.

[7] **Taamneh, M.M., Alshboul, A.Z. & Almaaitah, M.F.** 2021. Transformational leadership and its impact on the job performance at great municipalities in Jordan. *Academy of Strategic Management Journal*, 20(Special Issue 2), pp. 1–11.

[8] **Andersen, L.B., Bjørnholt, B., Bro, L.L. & Holm-Petersen, C.** 2018. Leadership and motivation: A qualitative study of transformational leadership and public service motivation. *International Review of Administrative Sciences*, 84(4), pp. 675–691. https://doi.org/10.1177/0020852316654747

[9] **Kumar, S.A. & Suresh, N.** 2019. *Operations management*, 3rd ed. New Age International.

[10] **Louw, L. & Venter, P.** 2018. *Strategic management: Developing sustainability in Southern Africa*, 4th ed. Oxford University Press.

[11] **Slack, N.** 2019. *Operations management*, 9th ed. Pearson PDF eBook.

[12] **Moore, G. & Moore, M.** 2005. *Creating public value through state arts agencies*, 2nd ed. Arts Midwest.

[13] **Masiya, T., Davids, Y.D. & Mangai, M.S.** 2019. Assessing service delivery. *Theoretical and Empirical Researches in Urban Management*, 14(2), pp. 20–40. https://doi.org/10.2307/26633007

[14] **Naidoo, S.** 2022. The mediating effect of standardisation effort on standardisation and innovation to improve organisational performance post COVID-19. *International Journal of Business Innovation and Research*, 28(4), pp. 525–541.

[15] **Naidoo, S. & Govender, V.** 2023. A Fourth Industrial Revolution approach to total quality management on innovation performance: Evidence from South Africa. *International Journal of Business Excellence*, 29(1), pp. 61–79.
[16] **Kaplan, R.S.** 2009. Conceptual foundations of the balanced scorecard. In *Handbook of management accounting research*, vol. 3, Elsevier, pp. 1253–1269.
[17] **Johnson, G., Whittington, R., Scholes, K., Angwin, D. & Regnér, P.** 2017. *Exploring Strategy*, 11th ed. Pearson Education.
[18] **Creswell, J.** 2012. *Educational research: Planning, conducting and evaluating quantitative and qualitative research*, 4th ed. Pearson.
[19] **Leedy, P.D. & Ormrod, J.E.** 2015. *Practical research planning and design*, 11th global ed. Pearson Education.
[20] **Islam, M.R.** 2018. Sample size and its role in central limit theorem (CLT). *Computational and Applied Mathematics Journal*, 4(1), pp. 1–7.
[21] **Ursachi, G., Horodnic, I.A. & Zait, A.** 2015. How reliable are measurement scales? External factors with indirect influence on reliability estimators. *Procedia Economics and Finance*, 20, pp. 679–686. https://doi.org/10.1016/s2212-5671(15)00123-9
[22] **Baruch, Y.** 2019. Response rate in academic studies — A comparative analysis. *Human Relations*, 52(4), pp. 421–438.