

## Impact of supply chain quality assurance on performance of Kenyan education ministry state agencies: An empirical analysis

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**Abstract:** *Purpose:* This study examines the effect of supply chain quality assurance on the performance of state agencies under Kenya's Ministry of Education. *Methodology:* A descriptive-correlational research design was employed. Data was collected through questionnaires from a sample of 212 staff members across 8 state agencies, selected using stratified purposive sampling. Both descriptive and inferential statistics were used for analysis. *Results:* The findings revealed that state agencies did not effectively embrace supply chain quality assurance practices. A strong positive correlation was found between supply chain quality assurance and agency performance. The ineffective implementation of quality assurance was identified as a critical factor in the declining performance of these agencies. *Theoretical contribution:* This study contributes to the literature on supply chain quality management in the public sector, particularly in developing countries. It provides empirical evidence supporting the Expectation Confirmation Theory in the context of educational institutions. *Practical implications:* The study recommends that state agencies in Kenya's education sector prioritize implementing supply chain quality assurance practices, including ISO certification and staff training, to improve their overall performance and service delivery.

**Keywords:** supply chain quality management, supply chain quality assurance, state agencies, ministry of education

**Sustainable Development Goals (SDGs):** **SDG 4:** Quality Education; **SDG 8:** Decent Work and Economic Growth; **SDG 9:** Industry, Innovation and Infrastructure; **SDG 16:** Peace, Justice and Strong Institutions

## **1. Introduction**

### **1.1. Background of the study**

Public institutions have increasingly adopted supply chain quality management (SCQM) to improve performance. Soares, Soltani, and Liao (2017) highlight that SCQM practices like supplier development and customer focus significantly impact performance through supply chain networks. Effective quality management is crucial for consistently supplying high-quality products and services. Hong, Zhang, and Shi (2018) also emphasize the positive effect of SCQM on operational performance, particularly in the education sector.

Truong, Sampaio, and Carvalho (2018) argue that supplier development, customer focus, internal process control, support services, and inspections enhance firm performance by reducing operational costs and lead time and improving supply quality. Zeng, Phan, and Matsui (2017) highlight the importance of internal, upstream, and downstream quality management in improving conformance quality and customer satisfaction. Song et al. (2017) suggest that SCQM, measured through factors like supplier partnership, process management, and leadership, improves cost efficiency. Shah and Shrivastava (2016) add that integrating quality techniques reduces waste and standardizes processes for improved quality assurance.

Quality assurance refers to a firm's mechanism for preventing production errors (Nemkova, Souchon & Micevski, 2015). According to the ISO 9000 definition, quality assurance is a critical component of quality management that instills organizational customers' confidence that the product or service quality requirement is adhered to (Iwaro & Mwashu, 2016). It refers to procedural and administrative activities that an organization implements to meet its goals product and service requirements and enhance customer satisfaction. Arif (2015) defined it as a systematic process of evaluation, monitoring, and providing feedback on identified loop-holes in the production process that can be rectified to improve product efficiency and quality standards.

Quality assurance can be categorized into right-first time and fit-for-purpose production. To fit-for-purpose, a particular product or service should meet its intended purpose. Otherwise, right-first-time focuses on eliminating errors or mistakes that occur during production. Moreover, quality assurance entails managing the quality of production materials and processes and conducting thorough inspections of production processes to enhance the efficient delivery of services to customers or consumers (Mwinyipembe & Orodho, 2018).

If product inspection fails to meet the set quality standards, the quality of a particular product is compromised. Quality assurance focuses on understanding consumers' behaviors or perceptions of the utilization of a particular commodity that can be used to improve the quality of products and performance among organizational customers (Kiplagat, 2017). The management of particular organizations needs to ensure adoption of quality policies that guide the staff in adhering to quality standards during production activities. Section 5.2 of the ISO 9001:2015 stipulates that organizational quality standards should be comprehensive and well communicated to all employees to ensure that the organization adheres to quality standards (Ochieng, Muturi & Njihia, 2015).

In Kenya, education is considered one of the most promising paths for individuals to realize better, more productive lives and is one of the primary drivers of national economic development (Zeng, Phan & Matsui, 2013). As such, the citizens and the government of Kenya have invested a lot in improving both the access and quality of education, in an effort to realize the promise of education and achieve the education-related Millennium Development Goals and Vision 2030. Indeed, primary school enrolment and attendance improved vastly after free primary education was announced in 2001. However, access to education may not be the real issue plaguing the education sector – high enrolment rates and full classrooms do not necessarily translate into knowledge or quality. Kenyans are focusing more on quality, as indicated by an increase in the number of ISO-certified firms.

### **1.2. Statement of the problem**

In a bid to strengthen the country's education system, the Government of Kenya established several state agencies under the Ministry of Education (MOE) to improve the quality, efficiency, and effectiveness of the education sector (GOK, 2017; MOEST, 2019). However, these agencies have

experienced declining performance, threatening the sector's success. Meru and Kinoti (2022) highlight poor service delivery, unmet timelines, overpriced supplies, and declining customer service and revenue generation. According to the Public Service Commission (2019), efficiency in service delivery and resource use in MOE agencies dropped from 62% in 2018 to 46% in 2019, while service delivery costs increased by 28% and 32% over the same period. The quality of services fell by 23%, and customer satisfaction dropped from 76% to 64%.

Additionally, the Auditor General (2019) reported misappropriation through overpriced supplies, and UNESCO (2020) rated Kenya's education quality at 54%, below the global average of 79%. These findings raise concerns about the effectiveness of MOE agencies in driving the country's educational agenda. On the other hand, supply chain quality assurance has been found to be instrumental in driving the effectiveness of critical institutions like the state agencies under the Ministry of Education. As Wijewickrama et al. (2021) noted, supply chain quality assurance ensures that supply chain operations and processes are undertaken optimally and efficiently to strengthen the seamless flow of goods and services. Further, Rohman et al. (2023) noted that Supply Chain Quality Assurance (SCQA) enhances the performance of public entities by ensuring that goods, services, and processes meet established standards, leading to better service delivery, cost efficiency, and risk management. According to Li, Maiti, Springer, and Gray (2020), supply chain quality assurance improves transparency and accountability, reduces waste, and enhances supplier performance through continuous monitoring and evaluation. SCQA helps public entities avoid legal risks and maintain public trust by ensuring compliance with regulatory standards. While addressing the effect of supply chain quality assurance, Andriansyah, Taufiqurokhman, and Wekke (2019) established that SCQA is integral in promoting operational efficiency by reducing delays, streamlining processes, and improving resource utilization, ultimately boosting overall public confidence and the quality of services provided. While the studies portray the essence of supply chain quality assurance in promoting performance, the studies have been carried out in varied contexts as the current study; thus, this paper aims to assess the role played by supply chain quality assurance in the performance of state agencies under the Ministry of Education in Kenya.

### **1.3. Objectives of the study**

- i. To determine how much state agencies under the Ministry of Education have embraced supply chain quality assurance in their supply chain network.
- ii. To evaluate the status of performance of state agencies under the Ministry of Education in Kenya
- iii. To examine the relationship between supply chain quality assurance and the performance of state agencies under the Ministry of Education in Kenya.

## **2. Literature review**

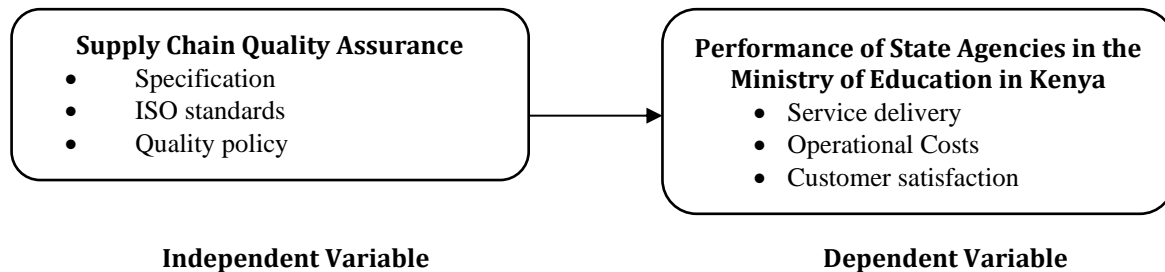
### **2.1. Theoretical review**

The study was grounded on the expectation–confirmation theory, also known as disconfirmation theory, developed by Oliver (1977). The theory states that expectation and perceived performance result in customer post-purchasing satisfaction. According to Han and Ellis (2018), the theory explains how post-purchasing affects customers' purchasing power. The theory has four basic constructs: perceived performance, expectations, client satisfaction, and disconfirmation of perceptions or beliefs (Tsao, 2017). In the context of this study, the customers of agencies in the Ministry of Education could have divergent opinions before purchasing a particular product from the agencies. Therefore, when customers purchase a particular product or service, they compare the performance of a particular product or service with their perception (Han & Ellis, 2018; Fu & Hung, 2015). If the product or service performs better than expected, the customers are said to have a positive disconfirmation. Therefore, agencies in the Ministry of Education in Kenya should ensure that their clients have positive disconfirmation through adopting quality assurance techniques such as top management leadership, continuous improvement on products or services, and staff training to improve their competency skills, which ultimately results in improvement in performance. This study used the theory to inform

the need for supply chain quality assurance as a fundamental component of supply chain quality management in influencing the performance of state agencies in the Ministry of Education in Kenya.

## 2.2. Conceptual framework

**Figure 1: Conceptual framework**



## 2.3. Empirical literature review

Iwaro and Mwashia (2016) studied the impact of ISO certification on the performance of construction projects in Jamaica, focusing on contractors, engineers, and project team members. Using a sample of 254 respondents, the study adopted a mixed research design and used inferential and descriptive statistics. The results showed that ISO-certified projects outperformed non-ISO-certified ones, and ISO certification improved staff performance. Arif (2015) examined the relationship between quality assurance and performance in Malaysian SMEs, finding that ISO-certified SMEs performed better in career management and quality orientation. Mwinyipembe and Orodho (2018) investigated the effect of quality assurance on student performance in Nakuru, Kenya, showing that schools using supervisory reports from Quality Assurance and Standards Officers (QASOs) performed better. Kagumba and George (2017) assessed the impact of quality assurance on the performance of Kenyan universities. Using a descriptive case study design, they sampled 400 respondents, including students, management, and staff at Kenyatta University. The study found that ISO certification and adherence to quality assurance standards significantly improved staff and student performance. The authors emphasized the need for broader awareness of ISO certification beyond the management level to ensure complete organizational alignment with ISO standards.

Ochieng, Muturi, and Njihia (2015) explored the effects of implementing ISO 9001 on organizational performance in Kenya. Analyzing web content from multiple organizations, the study found that ISO 9001 implementation led to increased net assets and improved customer satisfaction. The authors recommended the adoption of ISO 9001 across various sectors to enhance organizational performance and quality management. Maiyo (2015) studied the effect of ISO certification on Kenyan organizations, finding that ISO 9001:2000 certification improved organizational performance, market share, and product quality. Kiplagat (2017) examined ISO 9001 certification's impact on commercial state corporations in Kenya, revealing that it positively influenced financial performance, return on assets, and sales growth. The study recommended the effective implementation of ISO standards to drive long-term competitiveness and success.

## 3. Research methodology

The study utilized a descriptive-correlational research design. This design comprises two designs (descriptive and correlational), thus enabling the study to have a wide dimension of answering the research questions. Using both descriptive and correlational research designs enabled the study to address the study problem extensively.

The study targeted the eight Ministry of Education(MOE), Kenya agencies. These vital strategic organizations enable the MOE to meet its mandates, thus fostering quality education in the country. The units of observation were the staff members in all eight (8) agencies because they are directly involved in the supply chain processes and operations in their respective agencies, including supply

chain quality management. According to the Ministry of Education (2023) and the respective agencies' human resource departments, the eight agencies in the Ministry of Education have a cumulative of 3678 employees attached to various departments across the agencies.

This study used a stratified purposive sampling technique to select the sample size from the target population. This study utilized Nassiuma's (2000) formula to determine the sample size.

$$n = \frac{Nc^2}{c^2 + (N - 1)e^2}$$

Where:

n = sample size,

N = target population

c = covariance

e = standard error.

The sample size was therefore computed as follows:

$$n = \frac{3678 * 0.3^2}{0.3^2 + (3678 - 1)0.02^2}$$

$$n = 212.08$$

Using the formula as illustrated above, a sample size of 212 respondents was computed. Stratified random sampling was then used to pick the respondents from each state agency that was part of the strata. A proportionate number was purposively picked from each stratum, where only the respondents who were senior and demonstrated adequate understanding of the supply chain process and particularly the supply chain quality management were selected.

The study utilized primary data collected through a questionnaire. The questionnaire contained close-ended and open-ended questions comprising 7 sections. The first section sought general information, and the other six obtained data on the four independent variables, the moderating variable, and the dependent variable. The questionnaire was administered using the physical distribution of 'drop and pick' using research assistants.

The collected data was analyzed using both qualitative and quantitative techniques. Qualitative data obtained from open-ended questions was analyzed using thematic analysis, and the results were presented in narrative form. Quantitative data was analyzed using descriptive and inferential analysis through the help of Statistical Package for Social Sciences (SPSS) version 27.

## 4. Findings and discussions

### 4.1. Response rate

The study had a sample of 212 respondents drawn from the 8 state agencies under the Ministry of Education, Kenya, who were surveyed using a structured questionnaire. Of the 212 issued questionnaires, 179 were duly filled out and picked for analysis. This represented a response rate of 84.4%. According to Saunders et al. (2017), a response rate of above 60% is an adequate representation of the sampled population. Kothari (2014) indicates that a response above 50% is a good representation of the sample size. This implied that the response rate obtained in this study was adequate for analysis. Table 1 outlines the response rate.

**Table 1: Response rate**

Sample Size	Response		Non-Response	
	f	%	f	%
212	179	84.4%	33	15.6%

## 4.2. Supply chain quality assurance in state agencies under the Ministry of Education

The study's first objective was to examine the extent to which the state agencies under the Ministry of Education in Kenya had embraced supply chain quality assurance in their supply chain network. The respondents were asked to indicate their agreement or disagreement on critical statements addressing the objective. Table 2 shows the findings. Most respondents felt that their agencies did not provide sufficient information on service and product specifications, nor did they adhere to set specifications or enforce supplier compliance. Most respondents disagreed that the organizations strictly followed user specifications or assisted customers with respect, and the services offered often fell short of customer expectations. Furthermore, many respondents felt their agencies did not operate according to ISO 9000 certification guidelines. The study also highlighted that many organizations lacked a well-articulated quality policy, did not base policies on current values and goals, and did not regularly review or effectively communicate new policies to staff. These findings align with Benton et al. (2020), who noted that failure to integrate quality assurance processes, such as ISO certifications, negatively impacts supply chain performance and overall effectiveness.

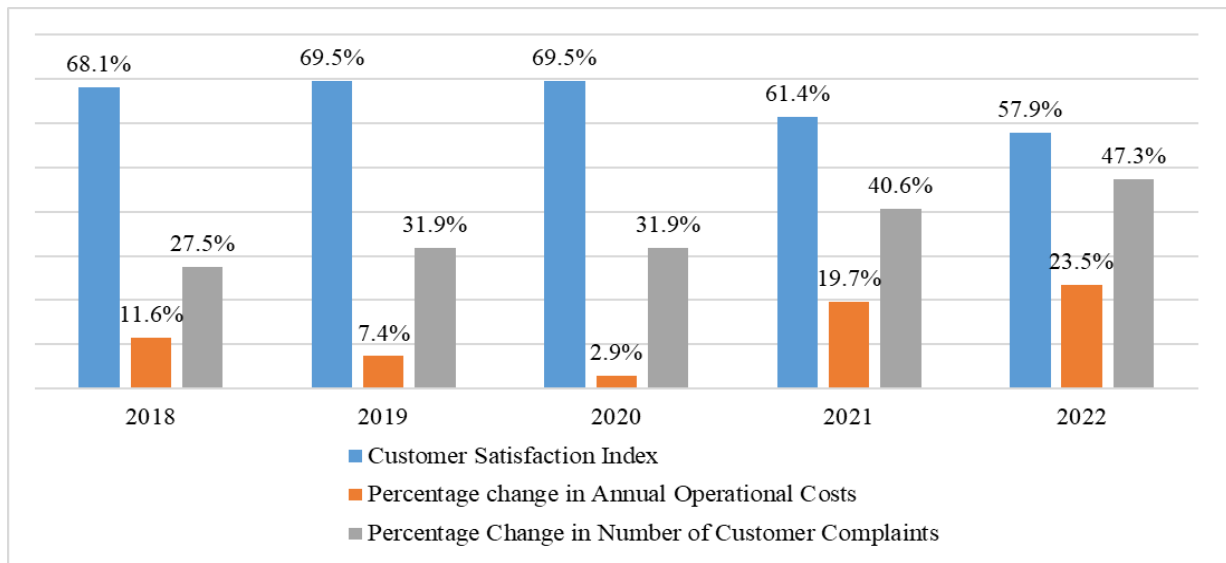
**Table 2: Descriptive statistics on supply chain quality assurance**

Statements	Mean	Std. Dev.
The organization provides adequate information to every stakeholder on the specifications of its services and products	2.81	1.37
There are set specifications of the supply chain processes that the organization upholds	2.94	1.30
Suppliers are required to uphold key specifications provided by the agency when procuring	2.86	1.31
Our organization strictly adheres to specifications given by our target users, such as schools	2.76	1.38
Staff assist organizational customers with dignity in their routine duties	2.36	1.31
Services offered in our firm match with customers' expectation	2.50	1.42
Our organization has been operating as per the ISO 9000 certification guidelines	2.46	1.41
Our organization has a quality policy statement as articulated by the top management	2.46	1.46
Policies in our firm are based on current corporate values and goals	2.40	1.34
Quality Policies in our organization are periodically reviewed for sustainability	2.57	1.37
Our organization ensures that new policies are effectively communicated and understood among the staff	2.35	1.35
<b>Overall Mean and Std. Dev.</b>	<b>2.58</b>	<b>1.36</b>

## 4.3. Performance of state agencies in the Ministry of Education

The study sought to assess the performance of state agencies in the Ministry of Education in Kenya. In this study, the performance of state agencies was assessed through service delivery, the cost of operations and services, and customer satisfaction. To confirm the trend in performance of state agencies under the Ministry of Education, secondary data was collected regarding the customer satisfaction index, annual operational costs, and the number of customer complaints. The findings revealed that the trend in the customer satisfaction index had increased from 68.1% in 2018 to 69.5% in 2020 but declined to 61.4% in 2021 and further to 57.9% in 2022. This shows a downward trend, indicating that the agencies had not effectively embraced efforts to strengthen customer satisfaction. The findings further revealed that the operational costs reduced from 11.6% in 2018 to 7.4% in 2019 and a further decline of 2.9% in 2020. The steady decline in 2020 resulted from the suspension of most of the learning activities due to the COVID-19 Pandemic. In 2021, the percentage increase in operational costs was 19.7%, and in the year 2022, the operational costs increased by 23.5%. This is evidence that the operational costs among the state agencies under the Ministry of Education have been increasing. This goes against the UNESCO and ISO standards expectations of declining operational costs as public agencies and institutions seek more sustainable ways of carrying out their mandates. The trend of customer complaints also increased, with complaints increasing from 27.5% in 2018 to 47.3% in 2022. This shows a declining performance of the state agencies under the Ministry of Education in the context of supply chain management.

Figure 2: Performance of state agencies



#### 4.4. Relationship between supply chain quality assurance and performance of state agencies

The study's third objective was to establish the statistical relationship between supply chain quality assurance and Performance of state agencies in the Ministry of Education in Kenya. The model summary as shown in Table 3 revealed that the R-Square for the model was 0.535. This is an indication that 53.5% variation in performance of state agencies in the Ministry of Education is as a result of supply chain quality assurance. The ANOVA results revealed that the F-statistics for the model was 203.362 at a significant level of  $0.000 < 0.05$ . This is an indication that the model is statistically significant to predict the relationship between supply chain quality assurance and Performance of state agencies in the Ministry of Education in Kenya.

The regression coefficients revealed that the Beta coefficient ( $\beta$ ) for supply chain quality assurance was 0.906. This is an implication that a unit change in supply chain quality assurance would influence the performance of state agencies in the Ministry of Education in Kenya by 0.906 units. The P-value for the variable was 0.000 which is less than the standard p-value of 0.05. This implies that there is a significant relationship between supply chain quality assurance setting and Performance of state agencies in the Ministry of Education in Kenya. The findings concur with those by Wijewickrama *et al.* (2021) who revealed that supply chain quality assurance had a significant impact on accountable and responsible supply chain processes and quality suppliers which are essential for firm performance.

Table 3: Regression model results on the relationship between supply chain quality assurance and performance of state agencies under the Ministry of Education

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.731 <sup>a</sup>	.535	.532	.64683	
ANOVA					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	85.085	1	85.085	203.362	.000 <sup>b</sup>
1 Residual	74.055	177	.418		
Total	159.140	178			
Regression Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.448	.180		2.482	.014
1 Supply chain quality assurance	.906	.064	.731	14.260	.000

a. Dependent Variable: Performance of state agencies under the Ministry of Education

## 5. Conclusions

From the results, it was established that supply chain quality assurance significantly impacted the performance of state agencies in the Ministry of Education. This confirmed that the declining performance of state agencies under the Ministry of Education was greatly associated with a low embrace of supply chain quality assurance.

The study concluded that supply chain quality assurance significantly influenced state agencies' performance in the Ministry of Education, Kenya. The study showed that most agencies lacked articulate specifications of products, processes, and services. Moreover, most agencies did not effectively uphold ISO certification guidelines. Most agencies lacked set internal policies and frameworks that assured their users of quality in given products and services. The study concluded that the ineffective embrace of supply chain quality assurance significantly influenced most state agencies' declining performance in the Ministry of Education.

Based on the study's findings, we conclude that supply chain quality assurance significantly influences the performance of state agencies in Kenya's Ministry of Education. The research revealed a concerning trend of declining performance in these agencies, strongly associated with inadequate implementation of supply chain quality assurance practices.

Key findings include:

1. Many agencies lack clear product and service specifications and do not effectively adhere to or enforce supplier compliance standards.
2. ISO certification guidelines are inconsistent, and many organizations lack well-articulated quality policies.
3. Customer satisfaction has declined, while operational costs and complaints have increased recently.
4. There is a strong positive correlation between supply chain quality assurance and agency performance, with quality assurance explaining 53.5% of the variation in performance.

These findings have significant implications:

*Practical implications:*

- State agencies in Kenya's education sector urgently need to prioritize implementing robust supply chain quality assurance practices.
- There is a clear need for staff training programs focused on quality assurance techniques and ISO standards.
- Agencies should develop and communicate clear internal quality policies and frameworks.
- Scientific implications:
- This study contributes to the literature on supply chain quality management in the public sector, particularly in developing countries.
- It provides empirical evidence supporting the Expectation Confirmation Theory in the context of educational institutions.
- The research highlights the need for further investigation into effective quality assurance implementation strategies in resource-constrained environments.

*Limitations and future research:*

While this study provides valuable insights, it is limited to state agencies in Kenya's education sector. Future research could explore similar dynamics in other sectors or countries or investigate the long-term impacts of implementing quality assurance measures. Additionally, qualitative studies could provide deeper insights into the challenges of implementing quality assurance practices in these contexts.

In conclusion, this study underscores the critical importance of supply chain quality assurance in driving the performance of state agencies in Kenya's education sector. By addressing the identified shortcomings and implementing robust quality assurance practices, these agencies can significantly improve their efficiency, effectiveness, and overall contribution to Kenya's educational goals.

## 6. Recommendations

The study recommends that supply chain managers uphold key measures that assure their target users of the quality standards of their goods, works, and services. Implementing quality certifications such as the ISO certification would be essential in assuring the target users of the quality of services, works, and goods the agencies offer. Further, the supply chain and other top managers should be at the forefront in formulating internal policies that define the quality standards of the agencies' products and services. This would be integral in enabling the agencies to have a conformity framework to strengthen their supply chain quality assurance. The management of state agencies in the Ministry of Education ought to invest in training programs for staff and management to better understand and implement quality assurance practices. This should include training on ISO standards and quality management techniques. It is also essential to support staff in effectively implementing and adhering to quality assurance practices.

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### Conflicts of Interest

The authors declare no conflict of interest.

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