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RESEARCH ARTICLE

An Analysis of How Logistics Integration Affects Organizational Performance in Kenya's Clearing and Forwarding Sector. A Structural Equation Modelling Approach

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ABSTRACT

The performance of logistics service providers in Kenya is marred by poor customer satisfaction, stemming from delays experienced in port clearance, disintegrated clearance systems, complex regulations, inefficient document processing and lack of integrated information systems. This study examined the effect of logistics integration on organizational performance among the Clearing and Forwarding firms in Kenya. It adopted a cross-sectional design and collected primary data through structured questionnaires. Simple and stratified random sampling were used to select respondents and ethical approvals obtained before collecting data using structured questionnaires. Data were collected from 298 employees from the operations, customer service, and finance departments. Using SPSS and SPSS AMOS 29, the study used descriptive statistics and structural equation modelling. The study findings revealed a disparity in the level of logistics integration among different Clearing and Forwarding firms in Kenya. This variance in logistics integration significantly impacts the overall organizational performance of these firms. From SEM analysis, the study established that logistics integration has positive and significant effect (Path coefficient = 0.791, C.R = 5.664, P-value < 0.001) on organizational performance of C&F companies in Kenya. The study concludes that enhancing logistics integration will lead to a substantial improvement in the organizational performance of C&F companies in Kenya. Thus, managers responsible for strategy should aim to collaborate with strategic partners such as state corporations managing ports and customs processes (KRA and Kenya Ports Authority), shipping lines, transportation companies, and other key stakeholders in the C&F supply chain in integrating logistics systems and processes.

Keywords: *Logistics Integration, Supply Chain Integration, Organizational Performance, Clearing and Forwarding*

I. INTRODUCTION

The concept of Organizational Performance (OP) in logistics firms has been extensively studied worldwide, encompassing critical functions in Human Resources (HR), Marketing, Operations management, International Business, Strategy, and Information Systems (Singh et al., 2015). The measurement of performance in the past primarily focused on financial indicators, but current approaches consider both financial and non-financial aspects due to the multidimensional nature of performance (Mishra et al., 2018). Three commonly utilized frameworks for performance measurement are the Analytic Hierarchy Process (AHP) by Saaty (2006), the Balanced Score Card (BSC) approach introduced by Kaplan and Norton (1992), and the Analytic Network Process (ANP) proposed by Saaty (2006). In this study, the BSC-ANP integration approach is employed, classifying organizational performance indicators into financial, learning and growth, internal process, and stakeholders' perspectives (Kucukaltan et al., 2016).

Being central to a firm's survival (Baraza et al., 2022), the challenge in business and management research lies in aggregating its level to encompass crucial aspects that ensure firm survival. This need for a comprehensive approach to enhance organizational performance brings the focus to Supply Chain Integration (SCI). SCI involves the strategic collaboration of supply chain stakeholders to optimize internal and external operations. Novais et al. (2019) define SCI as a deliberate process in which an enterprise cooperates strategically with its supplier network, jointly handling intra-organizational and inter-organizational procedures to achieve successful and effective integration of physical, information, and financial transactions. Tarifa-Fernandez and De Burgos-Jiménez (2017) view SCI as the coordination of production, inventory, location, and transportation among supply chain participants to achieve the best mix of responsiveness and efficiency for the market being served. Vhanda et al. (2022) provide a holistic definition, terming it as the coordination, collaboration, and cooperation of systems and business processes among supply chain stakeholders to support company performance.

Within this context, logistics integration plays a pivotal role, facilitating the seamless coordination between logistics services providers, agents, transport companies, and other institutions such as government agencies and third-party logistics providers (Liu & Lee, 2018). Logistics integration entails combining these collaborators' logistics operations and information systems, fostering effective feedback exchange, and allocating costs to logistics services, thereby supporting the expansion of third-party logistics providers' service networks and minimizing the effects of inter-organizational differences on service performance (Prajogo et al., 2016). Key indicators of logistics integration encompass systems evaluating alternative routes, collaboration with strategic channel members, benchmarking logistics options, promoting integration activities, and identifying least-cost options (Wang et al., 2020).

This paper adds to the existing body of supply chain research by contending that Clearing and Forwarding firms in Kenya can benefit from firm logistics integration. Resource Dependence Theory (RDT) elucidate the critical role of logistics integration in attaining diverse corporate objectives. The theory proposes that organizations lacking essential resources to achieve their desired organizational outcomes will seek to establish relationships with others to obtain the needed resources (Pfeffer & Salancik, 1978). This concept applies to integrated logistics where supply chain partners share resources such as logistical equipment, testing facilities, information systems and warehouses (Tsou *et al.*, 2015).

Through collaboration and interdependence, integrated logistics allows firms to access critical resources, leading to improved operational efficiency and the attainment of diverse corporate objectives (Jajja *et al*., 2017). Embracing logistics integration becomes not only a means to optimize resource utilization but also a path to enhanced competitiveness and overall success in the dynamic business environment (Radhakrishnan *et al*., 2018).

While logistics integration offers potential benefits in terms of resource-sharing and collaboration, RDT also highlights the potential risks and drawbacks associated with such interdependence. For instance, if one company's logistics network experiences a disruption, it could cascade and affect the operations of the other company, leading to significant delays and losses (Tsou *et al.*, 2015; Radhakrishnan et al., 2018). Kim et al. (2020) asserted organizations should carefully weigh the advantages and disadvantages of logistics integration and consider potential alternatives to mitigate the risks and maintain a balance between resource optimization and maintaining strategic autonomy.

From a policy standpoint, the effectiveness of logistics integration in clearing and forwarding operations in Kenya remains inadequate, leading to diverse financial and operational outcomes for the companies involved. The disintegration of systems within Clearing and Forwarding firms in the country has resulted in low logistics integration, contributing to variations in their financial performance. This can be observed from the financial reports of 2020, where 15 large logistics companies reported losses during that year, while 25 others documented profits for the same period. Chepchirchir (2018) highlights that the performance of logistics service providers in Kenya is marred by poor customer satisfaction, stemming from delays experienced in port arrivals, complex regulations, inefficient document processing, and compliance checks. These issues collectively lead to underperformance of logistics companies and revenue losses for government agencies, such as the Kenya Revenue Authority (KRA). To further elucidate the challenges, Kabui et al. (2019) conducted research revealing the complexities and significant bottlenecks in cargo clearance processes in Kenya's supply chain. These bottlenecks are primarily attributed to delays caused by semi-automated processes and governmental policies. Moreover, Pakurár et al. (2019) observe that in logistics and supply chains lacking integration, distinct teams within an organization operate in isolation, with limited insights into each other's plans and strategies. Consequently, these disparate groups operate in silos, prioritizing their individual interests, even if it negatively affects other crucial operations. The cumulative effect of these logistical issues underscores the urgent need for enhanced logistics integration in the clearing and forwarding sector in Kenya.

The Kenya Revenue Authority (KRA) acknowledges that the disintegration of its systems has created opportunities for rogue agents to collude with unscrupulous traders, leading to erroneous declarations. This collusion has resulted in significant revenue losses for the government, amounting to Kes 100 Billion annually from import taxes (TMEA, 2019) and Kes 12 Billion from transit cargo, as reported by the KRA Tax evasion report of 2021. To address these disintegration challenges, the KRA sees the implementation of the Integrated Management Customs System (ICMS) as a potential game changer for goods clearance. The existing Simba system 2005/2014 operates on numerous sub-systems with multiple feeder systems that lack integration, leading to further collusion and delays in customs and port clearance.

In contrast, the new ICMS is a robust intelligent system designed to consolidate all cargo clearing points into a unified platform, potentially reducing clearance time by up to 60 percent and enhancing customer satisfaction. However, to the best of the researcher's knowledge, there exists no documented study examining the influence of logistics integration on organizational of C&F firms in Kenya. Thus, this study examined the intricate relationship between logistics integration and organizational performance, thereby unearthing potential avenues for enhancement and optimization within the Kenyan C&F industry. The study sought to test the null hypothesis (**H_{O1}**) that logistic system integration has no statistically significant influence on organizational performance of C&F firms in Kenya.

II. METHODOLOGY

Study Location, Population and Sample Size

The study was conducted in Kenya focusing on 88 clearing and forwarding firms that are certified by KRA as AEO. The study target population comprised of 1,919 employees from operational, customer service, and finance departments of 88 registered and licensed clearing and forwarding (C&F) firms. A sample size of 331 was derived from the target population using Yamane formula. The study excluded 33 respondents who participated in pilot study and the main study sample size was 298. The sampling technique employed was stratified random sampling, with employees selected based on size, value chain, and operations to ensure representative sample representation. The selection of managers from these departments was based on their possession of critical supply chain operations and organizational performance information, which was vital for achieving the study objectives and addressing the research problem. Ultimately, 232 questionnaires were returned out of the 298 administered, resulting in a response rate of 77.85%.

Data Collection Tools

In this study, primary data was collected using structured questionnaire with a likert scale format of 1 to 5, where 1 represented strongly disagree, 2 represented disagree, 3 represented not sure, 4 represented agree, and 5 represented strongly agree. To test for data reliability, the study adopted internal consistency using Cronbach's alpha accepting alpha value of greater than 0.7 as evidence of data consistency and reliability. Also, three categories of validity namely face, construct and convergent were used to assess the instruments validity. Standard factor loadings greater than 0.5 were accepted for convergent validity.

Data Collection Procedure

The physical administration of structured questionnaires was carried out by a primary researcher and three trained research assistants using both drop-and-pick and email methods to selected respondents. Pilot study was conducted to test for reliability and validity of the instruments.

Data Analysis

Descriptive statistical analysis and structural equation modelling (SEM) were used for data analysis. Microsoft Excel and Statistical Package for Social Sciences (SPSS) AMOS version 29 were used to analyse the data with each question having a unique identifier and coded on a likert scale of 1 to 5. Mean and standard deviation were used to measure the distribution and normality of the data. Those items with a mean greater than 3.75 showed that the responses were on the agreement side and standard deviation of less than 2 shows that the responses are closer to the mean.

Prior to SEM, tests for outliers, normality, on-response bias, data factorability, measurement model, and model fit assessment were conducted. Structural equation modelling involves measurement model (Confirmatory Factor Analysis), where the analyses establishes convergent, discriminant validity, construct reliability and model goodness of fit. After establishing satisfactory measurement model, the last step is to fit the regression paths between concepts. The significant of the path coefficients for the models were examined using critical ratio greater than 2 and a p-value less than 0.05 indicating significance at 5% significant level. The decision is to reject null hypothesis was approved if $p<0.05$ and failure to reject the null hypothesis was approved if $p>0.05$ (Chen, 2022).

Ethical Considerations

The researcher demonstrated a strong commitment to research integrity by meticulously acknowledging the contributions of other researchers and avoiding any form of plagiarism. Prior to initiating the research, all necessary permissions and licenses were diligently obtained to uphold regulatory compliance. A research permit was secured from the Chandaria School of Business at United States International University, granting permission for data collection and proposal approval. Additionally, the National Commission for Science, Technology, and Innovation (NACOSTI) was approached to obtain the requisite research permit or license number 446116, adhering to established protocols. Participants were provided with clear and comprehensive information about the research's purpose, methodologies, and data collection procedures. Participation was voluntary and contingent upon the signing of a consent form.

III. RESULT

Non-Response Bias

To ensure that the data was free from any non-response bias, two waves of responses (First 100 responses = 1st Wave, the remaining 132 responses = 2nd Wave) were compared using independent t-tests. The p-values obtained from the independent t-tests indicated the level of statistical significance in comparing the two waves of responses. This suggested that there was no statistically significant difference between the two waves of responses for these variables, hence giving assurance that non-response bias was not a concern for the study.

Descriptive Statistics: Items and Scale Reliability

The findings, as presented in Table 1, reveal a mixed agreement among respondents regarding various aspects of organizational performance (Aggregate mean = 3.32, Std = 1.21). In terms of financial performance, perceptions are neutral, with some respondents agreeing with positive indicators while others may have reservations. Learning and growth show a moderate level of agreement, except for using social media for brand building, which has lower agreement or reservations. This implies that C&F firms in Kenya have varied organizational performance. In addition, the scale consisted of 17 items for organizational performance obtained an Alpha value of 0.713, indicating that the scale was reliable.

Table 1:
Organizational Performance Items and Scale Reliability

Statements	Mean	Std
Our company transaction costs are low	3.2	1.2
We record profits every financial period	3.3	1.2
We report increased sales and profits year on year	3.3	1.2
Our customers decline to refund storage and demurrage costs when process delays occur	3.0	1.1
We have proper function and effective IT infrastructure	3.3	1.2
Our employees are highly educated and motivated to learn more	3.4	1.2
Our managers exhibit high managerial skills	3.5	1.2
We use social media usage for brand building.	2.8	1.3
Our services are on-time delivery	3.5	1.3
The circumstances of service delivery are always as promised	3.5	1.1
We have sufficient vehicles/trucks for transport	3.7	1.4
We have sufficient warehouse capacity/space	3.3	1.2
Our customers are always satisfied with our services	3.3	1.2
Our investors and owners of the company are satisfied with business profits	3.3	1.2
The government agencies are satisfied with the way we conduct our business and operations	3.4	1.2
Our employees are highly satisfied with our business performance.	3.3	1.2
Our partner(s) are highly satisfied with our systems and efficiency levels	3.4	1.2
Aggregate	3.32	1.21
Number of Items	17	
Cronbach Alpha	0.713	

Exploratory Factor Analysis Results

Table 2 shows that on aggregate, the mean score for logistics integration was 2.83 (SD = 1.43), indicating low level of integration across C&F companies in Kenya. The finding suggests that there is a low level of logistics integration within the surveyed C&F companies in Kenya. This implies that these companies may not have fully integrated their logistics processes, systems, and activities to achieve optimal coordination and efficiency. The low aggregate mean score indicates a need for improvement in logistics integration practices. Logistics integration had 8 items and an Alpha value of 0.961, indicating a relatively high level of internal consistency for the items within this variable. The study established that logistics integration consisting of 8 items has the KMOMSA value of 0.960, and the BTS value is 0.000. Similarly, the organizational performance has KMOMSA has 0.692 and the BTS is 0.000. In EFA, logistics integration generated 1 factor and the items explained 78.733% total variance of the construct which is more than the cumulative variance of 60%. In addition, items under organizational performance generated 4 factors and explained 62.068% of the total variance of the construct. Five items under organizational performance were dropped due to cross-loading and low factor loadings.

Table 2:
Logistics Integration Items and Scale Reliability

ID	Statements	Mean	Std
LI1	Our internal systems are highly integrated with Kenya Revenue Authority.	2.8	1.6
LI2	Our internal systems are highly integrated with our transporters and shippers	3.1	1.5
LI3	Our internal systems are highly integrated with Kenya Ports Authority.	2.6	1.4
LI4	Our company has established highly integrated systems with all suppliers to ensure seamless and efficient coordination of the supply chain.	2.9	1.3
LI5	We have high levels of trust with suppliers/shippers and government regulators.	2.5	1.4
LRC1	Our company has financial capability to meet customer disbursement needs.	2.8	1.6

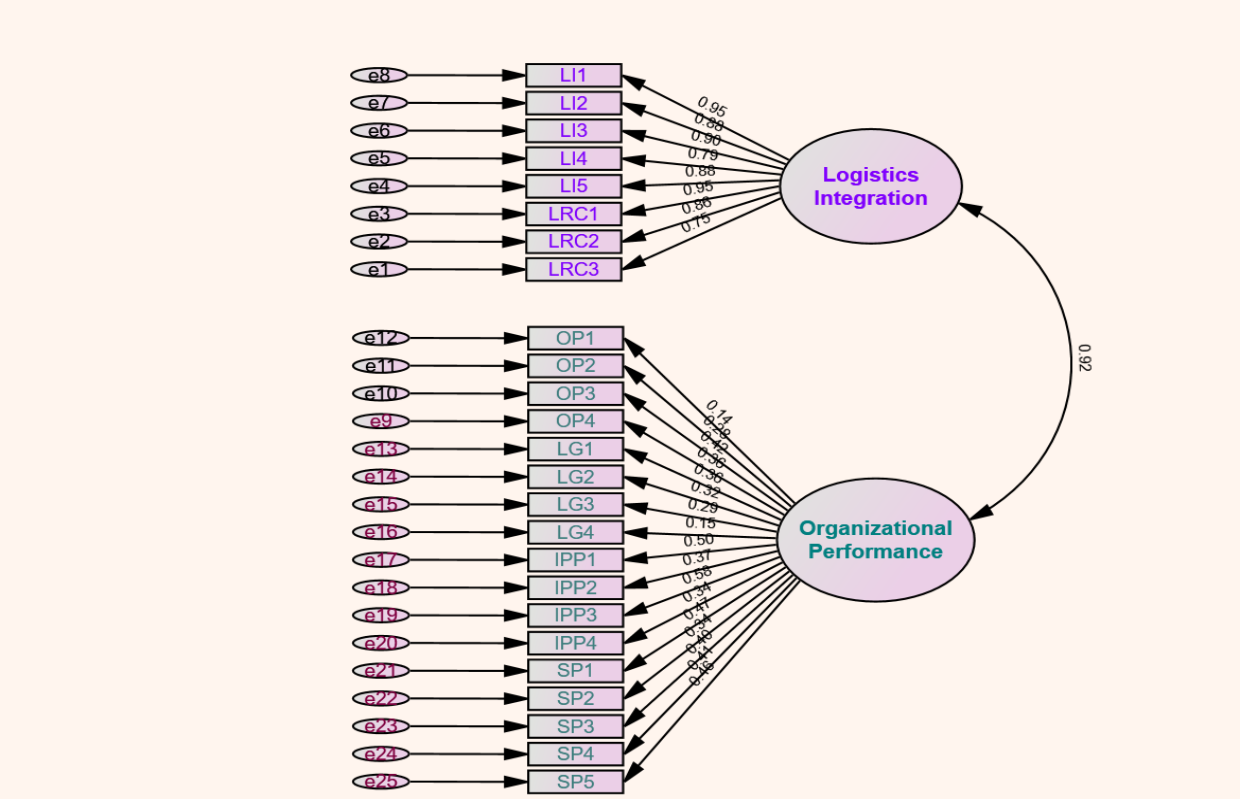
LRC2	Our company has sufficient assets infrastructure and skilled staff to meet customer needs	3.1	1.4
LRC3	Leveraging on our resource capabilities, we are able to select the least cost logistics option for our customers.	2.8	1.2
	Aggregate	2.83	1.43
	Number of Items	8	
	Cronbach Alpha	0.961	

Analysis of Measurement Model

Convergent validity

Figure 1 shows the measurement model factor loadings. All items for logistics integration had SFL greater than 0.4. For organizational performance, items OP1, OP2, OP4, LG2, LG3, LG4, IPP2, IPP4, SP1, SP2 & SP3 had an SFL of less than 0.4, hence were dropped to improve construct convergent validity. In addition, the study used Average Variance Extracted from the factor loadings to establish convergent validity. Upon dropping the items with low factor loadings, both logistics integration and organizational performance achieved an AVE greater than 0.5. According to Hair et al. (2020) an AVE greater than 0.5 indicates that the construct has significantly converged, hence proving construct convergent validity.

Figure 1:
Measurement (CFA)



Discriminant validity

Discriminant validity holds that the square root AVE for each construct is greater than the correlation between the respective construct with the other constructs. The study established the square root AVE for logistics integration is 0.871, which was greater than the correlation coefficient (0.755) between logistics integration and organizational performance indicating that the model has no discriminant validity concerns.

Model Goodness of Fit

Table 3 shows the goodness-of-fit indices, RMSEA, CFI and PCFI, indicate that the model has an admissible fit. These indices collectively indicate that the model adequately represents the observed data and can be used for further analysis and interpretation. These indices collectively indicate that the model adequately represents the observed data and can be used for further analysis and interpretation.

Table 3:

Model Fit Assessment Results

Goodness of Fit Indices	Value	Decision
RMSEA	0.037	The recommended value is < 0.08. Hence the model fit is admissible
CFI	0.982	The recommended value is > 0.9. Hence the model fit is admissible
PCFI	0.820	PCFI should be greater than 0.5. Hence the model fit is admissible

Structural Equation Model Output

The study sought to test the hypothesis **H_{O1}** that there is no statistically significant influence of logistics integration on the organizational performance of C&F firms in Kenya. As shown in Table 4, the estimate for the path from LI to OP is 0.407, with a standard error of 0.087. The critical ratio (C.R.) is 5.664, indicating that the estimate is highly significant at the 0.01 level. The p-value associated with this estimate is also highly significant (***), providing strong evidence of a significant relationship between logistics integration and C&F organizational performance. The standardized estimate for this path is 0.791, revealing a strong positive correlation between logistics integration and organizational performance. Specifically, when logistics integration increases by 1 standard deviation, C&F organizational performance also improves by 0.791 standard deviations. Thus, the hypothesis (**H_{O1}**) is rejected based on the significant path estimate, indicating support for the hypothesis that logistics integration has a positive effect on organizational performance of C&F companies in Kenya. The optimal regression model is as shown in equation 1.

$$OP = 0.823 + 0.791LI + \varepsilon \quad \text{..... (1)}$$

Table 4:

SEM Output

Path Direction			Estimate	S.E.	C.R.	P. value	Standardized Estimates	Hypothesis Result
LI	→	OP	0.407	0.087	5.664	***	0.791	Reject **H_{O1}**
Intercept	→	OP	0.823	0.084	9.798	***		
Squared Multiple Correlations = 0.86								
Correlation Results (r)			= 0.625			***		

*Where **LI** is Logistics Integration and Organizational Performance, ******* is significant at 0.01 significant level, ****** is significant at 0.05 significant level and ***** is significant at 0.1 significant level.*

IV. DISCUSSION

The SEM results suggests that improvement in logistics integration will significantly improve the organizational performance of C&F companies in Kenya. This is because by integrating their internal systems with external entities such as the Kenya Revenue Authority, transporters, shippers, and the Kenya Ports Authority, C&F companies can streamline their operations and enhance efficiency. This integration allows for seamless coordination of the supply chain, ensuring smooth interactions with stakeholders involved in the clearance and forwarding processes (Wang *et al*., 2020). In addition, establishing highly integrated systems with suppliers enables C&F companies to improve coordination and collaboration, leading to a more efficient supply chain. Thus, C&F companies can better track and manage the movement of goods, reducing delays and increasing customer satisfaction (Prajogo *et al*., 2016). Abdalla (2021) also noted that logistics integration facilitates the development of trust among suppliers, shippers, and government regulators.

High levels of trust enable effective communication, sharing of information, and collaboration, which are crucial for smooth operations and problem-solving within the supply chain. Also, Lyu et al. (2019) noted that logistics integration provides C&F companies with the financial capability to meet customer disbursement needs and the necessary assets, infrastructure, and skilled staff to fulfil customer requirements. This enables them to deliver services promptly and efficiently, enhancing customer satisfaction and loyalty. Further, Resource dependence theory (RDT) provides insights into the beneficial effects of logistics integration on organizational performance within the framework of supply chain management. According to RDT, organizations depend on external entities for resources needed to ensure their viability and mitigate uncertainties. In the context of logistics integration, organizations engage in strategic relationships and resource sharing with logistics partners, such as transporters, shippers, ports authorities, and revenue authorities. This integration allows organizations to access critical resources like efficient transportation systems, streamlined customs processes, and coordinated supply chain operations. However, the study focused on large C&F firms in Kenya, and even though that helps in generalization within that context, it may lead to over-specification. Thus, these results cannot be interpreted to fit the context beyond Clearing and Forwarding (C&F) firms in Kenya. Additionally, the study was cross-sectional in nature which implies that the research was not able to capture the industry dynamics, hence the results might be incorrect in the long-run.

Conclusion

The study concludes that while some C&F firms in Kenya showcased a commendable level of logistics integration, it exhibited a rather limited integration with government agencies such as KRA and KPA. C&F firms that had effectively integrated their logistics achieved a higher level of organisational performance. This variance in logistics integration appeared to exert a significant influence on the overall organizational performance of these firms.

Recommendations

This finding has a number of managerial implications. First, the study recommends C&F firms to collaborate with strategic partners such as state corporations managing ports and customs processes (KRA and Kenya Ports Authority), shipping lines, transportation companies, and other key stakeholders in the C&F supply chain in integrating logistics systems and processes. Building strong partnerships based on trust, shared goals, and mutual benefits will promote smoother

interactions, faster customs clearance, and improved overall supply chain performance. Secondly, managers in C&F should devise integration strategies that maximise utilisation of logistics resources so as to enhance performance. These partnerships and resource utilisation strategies can lead to cost savings, shared resources, and increased operational efficiency.

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Competing interests
Authors declare no competing interests.

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