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Supply Chain Continuity Planning and Performance of Retail Chain Stores in Kenya: A Multilevel Analysis

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Abstract

Retail businesses operate in an environment characterized by numerous risks, including political instability, terrorism, natural disasters, pandemics, corruption, and unpredictable weather patterns. Such disruptions can interrupt daily operations, lower customer satisfaction, weaken organizational credibility and reduce revenue streams. In today's dynamic environment, supply chains have little tolerance for downtime, necessitating the adoption of continuity planning strategies. Supply Chain Continuity Planning (SCCP) provides organizations with tools to enhance resilience, reduce turnaround time, optimize costs, and sustain customer satisfaction. This study examined the influence of SCCP on the performance of retail chain stores in Kenya. The strategies under review were assessed through both primary and secondary data. Results from the mixed-effects model indicated a significant fixed effect of SCCP on performance at level 1 ($\beta = 0.751$, $Z = 19.450$, $p < 0.001$), alongside a significant random effect across entities at level 2 (ICC = 47.5%, LR statistic = 112.99, $p < 0.05$). Further regression analysis of secondary data confirmed a strong relationship ($R^2 = 52.8\%$, ANOVA F-statistic = 15.660, $\beta = 1.368$, $t = 3.960$, $p = 0.001$). The findings demonstrate that SCCP plays a critical role in improving resilience, minimizing disruption, and sustaining competitiveness. The study concludes that SCCP adoption significantly enhances profitability, operational efficiency, and customer responsiveness among Kenyan retail chain stores, making it an indispensable tool for long-term sustainability.

Keywords

Business Continuity Management, Retail Chain Stores, Supply Chain

Resilience, Supply Chain Risk Management, Supply Chain Risk Management Strategies (SCRMS), Supply Chain Vulnerability, Organizational Performance

1. Introduction

The wholesale and retail trade sector remains one of the key drivers of Kenya's economic growth. According to the Kenya Economic Survey (2012), it contributed 18.5% to GDP growth in the previous five years, second only to the transport sector at 20%. This underscores the importance of retail chains in supporting national economic development. However, in recent years, retail chain stores have experienced declining performance, shrinking profitability, and in some cases, closure. These challenges have been attributed to turbulent operating environments, aggressive competition, mismanagement, and uncontrolled expansion (Panigrahi, Bahinipati, & Jain, 2019). To reverse this trend and restore profitability, adoption of best practices such as Supply Chain Continuity Planning (SCCP) is increasingly necessary.

Kenya's business landscape has witnessed several major disruptions over the past two decades. Examples include the 2007 Budalangi floods that displaced thousands, the 2011 Sinai fire tragedy that claimed over 100 lives, the 2012 Murang'a landslides, the 2013 Westgate terrorist attack that severely affected Nakumatt supermarket, the 2013 KEMSA fire that destroyed critical medical supplies, and the 2014 Mpeketoni terrorist attacks in Lamu. Such disruptions have had devastating effects, ranging from human suffering and loss of property to significant interruptions of supply chains and the movement of production inputs. These incidents highlight the vulnerability of supply chains and the urgent need for robust continuity strategies (Okuna, 2014).

Several once-dominant Kenyan retail chains (including Nakumatt, Uchumi, Tuskys, and Choppies) are currently under receivership or on the verge of collapse due to liquidity crises and their inability to manage operational risks. These failures underline the importance of understanding supply chain risks, the strategies available for mitigation, and their overall impact on retail performance. This study therefore sought to establish the relationship between SCCP adoption and the performance of retail chain stores in Kenya. Specifically, it aimed to determine whether continuity strategies enhance profitability, improve service delivery, and promote resilience in a sector that has become highly vulnerable to disruptions.

2. Theoretical Review

2.1. Transaction Cost Theory

Transaction Cost Theory, originally advanced by Coase (1937), addresses the fundamental question of how firms organize economic activities: whether to internalize operations within the firm or rely on the market. The theory assumes that transaction partners pursue efficiency and profitability while managing risk. Key characteristics of transactions include their frequency and volume, which directly influence costs. Two main uncertainties affect transactions: behavioral uncertainty, stemming from opportunistic tendencies by actors, and environmental uncertainty, caused by external shocks and unpredictable conditions. Ketokivi and Mahoney (2020) explain that information asymmetry (where some actors possess information not shared across the transaction) raises costs and risks.

Venkataraman (2019) adds that such asymmetry undermines efficiency, as not all parties operate with the same knowledge base. To mitigate these risks, transaction cost theory proposes governance mechanisms that lower uncertainty and facilitate transparent, validated, and secure information flows across the supply chain. In the context of supply chains, Cuypers et al. (2021) note that strategists must address transaction risks to design economic safeguards. Schmidt and Wagner (2019) further show that the theory is valuable in shaping governance decisions that support resilience and continuity. This makes transaction cost theory particularly useful in evaluating how SCCP strategies reduce opportunism, improve information sharing, and enhance overall performance.

2.2. The Kraljic Matrix

The Kraljic Portfolio Matrix, developed by Peter Kraljic (1983), is a strategic tool that helps organizations classify purchases based on two dimensions: supply risk and profit impact. Items are categorized into four quadrants—non-critical, leverage, bottleneck, and strategic—depending on their importance and the complexity of their supply markets. This approach allows managers to tailor procurement strategies to the level of risk and the potential effect on performance. Wildgoose et al. (2012) emphasize that the matrix advances continuity strategies by enabling organizations to identify critical suppliers and manage them proactively. Cheverton and Van Der Velde (2010), however, caution that the model may oversimplify reality, as it provides a static snapshot that does not capture all evolving risks.

Harrison et al. (2019) argues that globalization and technological advances increase the need to revisit and adapt Kraljic's framework for continuity planning. According to Azadegan et al. (2020), using the Kraljic model strengthens continuity management by prioritizing supplier relationships and aligning risk strategies with organizational goals. Bailey (2015) adds that it enables managers to assess the suitability of adopting continuity practices across different organizational contexts. Overall, the Kraljic Matrix provides a structured way to incorporate SCCP into supplier management by focusing resources on high-risk, high-impact areas.

2.3. High Reliability Theory

High Reliability Theory (HRT) emerged as a response to Perrow's (1984) Normal Accident Theory, which argued that accidents are inevitable in tightly coupled, complex systems. Rijpma (1997) and Roberts (1990) argue that while systems may be complex and interdependent, organizations can still prevent major accidents by adopting structures and practices that enhance reliability. Such practices include decentralized decision-making, redundant safety mechanisms, and continuous learning. Van Den Eede et al. (2006) suggest that HRT provides a multidisciplinary framework that risk managers can use to build resilience. Linnenluecke (2017) further emphasizes that, unlike NAT's pessimistic outlook, HRT assumes disruptions can be minimized through organizational design.

Sawyerr and Harrison (2020) argue that principles of high reliability (such as sensitivity to operations, commitment to resilience, and deference to expertise) can be transferred to supply chain contexts to guide the development of robust continuity strategies. Ali et al. (2017) and Tukamuhabwa et al. (2017) demonstrate that HRT can strengthen supply chain resilience by encouraging proactive detection and response to warning signals. Bode and Wagner (2015) add that decentralization improves responsiveness, as decisions made closer to suppliers enhance agility during disruptions. Datta (2017) also highlights the usefulness of the Cynefin framework for categorizing crises and designing targeted responses (**Figure 1**). Thus, HRT underscores the importance of organizational structures and practices that not only anticipate disruptions but also ensure that retail supply chains remain reliable, adaptive, and sustainable under stress.

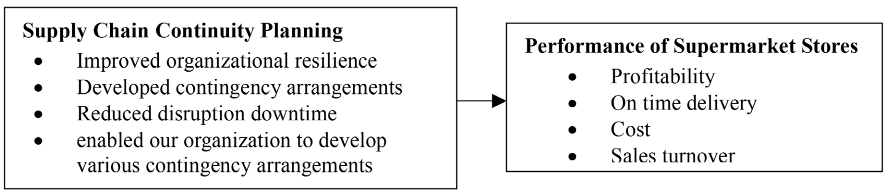

Figure 1. Conceptual framework.

2.4. Empirical Review

Supply Chain Continuity Planning (SCCP) refers to a holistic process that identifies potential threats to an organization, assesses their likely impact on business operations, and develops frameworks that enhance organizational resilience and effective response capabilities to safeguard stakeholders, reputation, brand, and value-creating activities (International Organization for Standardization (ISO) 22301:2019). SCCP enables organizations to prepare for, respond to, and recover from disruptions while ensuring continuity of critical business functions (Cerullo & Cerullo, 2004; Speight, 2011; Azadegan et al., 2020).

In this study, SCCP was conceptualized through three dimensions: improved organizational resilience, developed contingency arrangements, and reduced disruption downtime. Improved organizational resilience refers to the ability of retail chain stores to anticipate, absorb, adapt to, and recover from disruptions (Ali et al., 2017; Adobor & McMullen, 2018). Developed contingency arrangements refer to the existence of documented continuity plans, emergency procedures, backup systems, and recovery mechanisms designed to maintain business operations during disruptions (Cerullo & Cerullo, 2004; Bailey, 2015). Reduced disruption downtime refers to the organization's ability to restore critical operations within acceptable recovery periods following a disruptive event (Speight, 2011; Azadegan et al., 2020). These dimensions were measured using questionnaire items relating to continuity planning, preparedness for disruptions, contingency arrangements, organizational adaptability, and recovery effectiveness.

Performance was defined as the accomplishment of organizational objectives measured against predetermined standards of accuracy, completeness, cost, and speed (Daniel, 2019). From a supply chain perspective, performance reflects the extent to which an organization achieves operational efficiency, customer satisfaction, profitability, and competitive advantage (Gunasekaran et al., 2004; Neely et al., 2005). The construct was operationalized using four dimensions: profitability, on-time delivery, cost efficiency, and sales turnover. Profitability refers to the organization's ability to generate financial returns from its operations and was measured through items relating to gross profit margins and revenue growth (Richard et al., 2009; Kaplan & Norton, 1996).

On-time delivery refers to the ability of the organization to consistently fulfill customer orders within agreed timelines and was measured through delivery reliability and lead-time performance indicators (Gunasekaran et al., 2004; Tarafdar & Qrunfleh, 2017). Cost efficiency relates to minimizing operational and supply chain costs while maintaining desired service levels and was measured through resource utilization and cost reduction indicators (Christopher, 2016; Chopra & Meindl, 2019). Sales turnover reflects the volume and value of sales generated by the organization and was measured through growth in sales volume, market share, and sales revenue (Venkatraman & Ramanujam, 1986; Richard et al., 2009). Collectively, these dimensions provided a comprehensive measure of retail chain store performance and enabled assessment of the influence of SCCP on organizational outcomes.

Supply chain continuity planning (SCCP) is increasingly recognized as an essential practice for ensuring the resilience of organizations in the face of disruptions such as natural disasters, pandemics, cyberattacks, and geopolitical shocks. Blos, Hoeflich, and Miyagi (2015) define SCCP as the process of creating strategies to guarantee that supply chains remain functional during and after crises. Its primary goal is to reduce disruption impacts on operations, financial performance, and reputation. The key steps include identifying critical suppliers, assessing risks, formulating contingency plans, and continuously testing and improving these plans (Cerullo & Cerullo, 2004; Pitt & Goyal, 2004; Speight, 2011). Katsaliaki, Galetsi, and Kumar (2022) stress that proactive continuity planning provides firms with a competitive advantage by minimizing the negative effects of disruptions.

While some risks originate within firms, many are external. Increasing reliance on suppliers and partners means that disruptions in inbound logistics or supplier failures can ripple across the entire value chain, causing severe operational challenges (Pereira, da Silva, Tate, & Christopher, 2020). Hale and Moberg (2005) developed a decision model emphasizing the secure location of critical inventory to improve disaster preparedness, while Hiles (2010) underscored the need for structured handbooks to guide continuity management. Similarly, Gurning and Cahoon (2011) demonstrated how analytical models can quantify SCCP's effect on supply chain costs.

Azadegan, Syed, Blome, and Tajeddini (2020) point out that operational risks—such as technical failures, natural disasters, and deliberate attacks—require diverse mitigation measures depending on their impact. Awareness, prevention, and remediation are seen as the foundation of risk management (Zsidisin & Smith, 2005; Margherita & Heikkilä, 2021). Sharma and Srivastava (2018) highlight the usefulness of tools such as Failure Mode and Effect Analysis (FMEA) and Ishikawa cause-effect diagrams in proactively identifying and addressing potential weak points.

Etemad (2020) explains crises as multi-stage events, starting with warning signals (prodromal), followed by acute and chronic phases, and culminating in recovery. Liou (2015) adds that effective SCCP depends on the ability to detect weak signals before crises escalate. Ojha et al. (2013) further demonstrate that SCCP creates competitive advantage by reducing response times and enhancing supply chain flexibility. Similarly, Adobor and McMullen (2018) conceptualize resilience as a multidimensional construct strengthened by continuity strategies.

Despite global recognition, empirical research on SCCP has been uneven. Most studies rely on case analyses, with limited use of survey methodologies to validate findings across diverse firms. Ojha and Gokhale (2009) were among the first to operationalize SCCP constructs through surveys, while Ponis and Ntalla (2016) emphasized learning from major global crises to enhance continuity frameworks. Palaniappan (2014) and Pagach and Warr (2011) found that firms adopting continuity planning improved accountability, governance, and profitability.

Within Africa, supply chain continuity research has highlighted both challenges and opportunities. Tukamuhabwa, Stevenson, and Busby (2017) found that Ugandan firms improved resilience by investing in redundancy, collaboration, and flexibility. Pereira, Christopher, and Da Silva (2014) emphasized procurement's role in strengthening resilience through strategic sourcing practices. However, many African firms struggle with resource constraints and infrastructural limitations, which reduce their ability to operationalize continuity frameworks effectively.

In Kenya, several disruptions have exposed the fragility of retail supply chains. The collapse of Nakumatt, Uchumi, and Tuskys has been partly attributed to inadequate continuity strategies, weak governance, and liquidity crises. Okuna (2014) argued that public institutions such as the Kenya Bureau of Standards also lacked continuity mechanisms, compromising service delivery. Sakura (2018) demonstrated that private security firms in Nairobi improved efficiency and profitability by embedding business continuity management practices. More recently, retail chains like Naivas and Quickmart have shown resilience by integrating risk management and continuity planning into operations. These cases illustrate that SCCP is not only relevant but critical for the survival of retail businesses in Kenya's turbulent environment.

Although significant literature exists globally, African and Kenyan contexts remain underexplored. Many prior studies have focused on manufacturing, logistics, or public sector organizations, leaving a gap in the retail sector. Moreover, while conceptual and case-based research dominates, few studies use large-scale survey data or advanced statistical modeling to test SCCP's impact. This study addresses these gaps by applying a quantitative research approach, incorporating both primary and secondary data, and analyzing the effect of SCCP adoption on the performance of retail chain stores in Kenya.

2.5. Research Methodology

This study adopted a longitudinal survey design, guided by a positivist research philosophy, to evaluate the effect of Supply Chain Continuity Planning (SCCP) on the performance of retail chain stores in Kenya. The longitudinal design was chosen because it enables data collection from multiple respondents over an extended period, enabling the assessment of trends, changes, and causal relationships among study variables between SCCP and performance. The study examined 17 retail chain stores in Kenya. From a target population of 23,031 employees, a sampling frame of 1730 managers, supervisors, and supply chain personnel was established. Using the Krejcie and Morgan (1970) sampling technique, a sample of 315 respondents was selected through a multistage sampling approach. In the first stage, retail chain stores were treated as clusters and respondents were stratified into three categories: managers, supervisors, and supply chain personnel. In the second stage, employees were selected from the respective clusters using probability proportional to size (PPS) to ensure adequate representation across the participating retail chain stores. A total of 284 usable questionnaires were obtained, yielding a response rate of 90.16% and providing sufficient data for the multilevel analysis.

Data were collected using a structured Likert-scale questionnaire that was pilot-tested with 33 respondents from selected Nairobi retail chain stores to enhance clarity, sequencing, and content validity. Secondary data were collected from the financial statements, operational reports, and internal records of 16 retail chain stores over a five-year period. Performance was measured using objective indicators such as gross profit margin, delivery time ratios, and order lead times, while SCCP was measured using aggregated survey scores on organizational resilience, contingency arrangements, preparedness, and recovery effectiveness. The aggregated SCCP scores were then regressed against the five-year performance data to assess their influence on organizational performance.

Descriptive statistics (means, standard deviations, and frequencies) summarized responses, while inferential statistics tested hypotheses. Given the nested structure of the data (employees nested within organizations), the study employed Multilevel Modeling (MLM) to estimate effects at both the individual (Level 1) and organizational (Level 2) levels. Descriptive statistics (means, standard deviations, and frequencies) summarized responses, while inferential statistics tested hypotheses. Given the nested structure of the data (employees nested within organizations), the study employed Multilevel Modeling (MLM) to estimate effects at both the individual (Level 1) and organizational (Level 2) levels.

Mixed-effects models were used to test the study hypotheses by examining both the fixed effects of Supply Chain Continuity Management strategies on performance and the random effects across retail chain stores. Model appropriateness was assessed using Intraclass Correlation Coefficients (ICC), Likelihood Ratio (LR) tests, and model fit indices (AIC and BIC), with the best-fitting model adopted for hypothesis testing based on the significance of the estimated coefficients (Dennis et al., 2019).

This study examined the influence of Supply Chain Continuity Management strategies on the performance of retail chain stores in Kenya using a two-level hierarchical data structure. Level 1 comprised employee respondents who provided perceptions on the study variables, while Level 2 comprised the retail chain stores within which the employees were nested. The multilevel structure enabled the assessment of both employee-level effects and variations across the 17 retail chain stores included in the study.

Mixed-effects models were estimated using Maximum Likelihood Estimation (MLE). Model selection and comparison were conducted using Likelihood Ratio (LR) tests, Akaike Information Criterion (AIC), and Bayesian Information Criterion (BIC), which are appropriate for comparing nested multilevel models estimated using ML. Following model selection, bootstrapped standard errors were computed to improve the robustness of parameter estimates and statistical inference in the presence of minor deviations from normality. Consequently, all reported LR tests, AIC values, BIC values, and hypothesis tests are based on models estimated using Maximum Likelihood Estimation (MLE).

The random-intercept model at the employee level with 1 level 1 predictor would be specified at level 1 and level 2 in hierarchical form separately as;

$$Y_{ij} = \gamma_{0j} + \beta_1 X_{ij} + \varepsilon_{ij}$$

$$\gamma_{0j} = \beta_{0j} + \mu_{0j}$$

The second equation can be substituted into the 1st equation to yield a formulation given by;

$$Y_{ij} = \beta_{0j} + \beta_1 X_{ij} + \mu_{0j} + \varepsilon_{ij}$$

In the equations:

Y_{ij} is the performance as perceived by employee i nested for entity j;

X_{ij} is the measurement of predictor variable X as perceived by employee i nested for entity j;

β_1 is the coefficient of X at level 1;

γ_{0j} is the intercept which has a separate specification equation due to the 2 levels assumed to cause variation in performance. In the intercept equation;

β_{0j} is the level 1 intercept which is the average performance for the entire population; and

μ_{0j} is the entity specific effect (cluster specific) random intercept.

The independent predictor of the study is the Supply Chain Continuity planning. Strategies are however covariates that are expected to impact performance of the retail chain store thus variation in performance as influenced by predictors are not just due level 1 effects but due to variations of the independent variables as level 2 random effect covariates. The study thus adopted multilevel random coefficient modelling (MRCM) as the technique model's random coefficient estimates as proposed by Nezlek (2012). The correct specification would therefore include the covariates (independent variables) in the intercept equation as;

$$Y_{ij} = \gamma_{0j} + \beta_1 X_{1ij} + \varepsilon_{ij}$$

$$\gamma_{0j} = \beta_{0j} + \mu_{1j} X_{1ij} + \mu_{0j}$$

The second equation can be substituted into the 1st equation to yield a formulation given by;

$$Y_{ij} = \beta_{0j} + \beta_1 X_{1ij} + +\mu_{1j} X_{1ij} + \mu_{0j} + \varepsilon_{ij}$$

where;

Y_{ij} Performance as perceived by employee *i* nested for entity *j;*

X_{ij} Measurement of predictor variable *X* as perceived by employee *i* nested for entity *j;*

β_1 Coefficients (slope) of the predictors at level 1;

μ_{1j} Cluster-specific random slope (coefficients) of the predictor;

γ_{0j} intercept which a separate specification equation due to the 2 levels has assumed to cause variation in performance. In the intercept equation;

β_{0j} Level 1 intercept which is the average performance for the entire population; and

μ_{0j} The entity specific effect (cluster specific) random intercept.

3. Findings

To assess the effect of Business continuity on the Performance of Retail Chain stores, a bivariate regression model was fitted with SCCP as the predictor. First, the SCCP was included in the model (M11) as a level 1 predictor to assess the fixed effects without including it as a level 2 covariate. The results of this model are presented in Appendix I, which demonstrates a significant fixed effects model with a significant random intercept at level 2. To assess the level 2 random effect of SCCP on the Performance of Retail Chain stores, the predictor was included in the random effect component of the model (M12) as a random covariate.

The results of the analysis are shown in **Table 1**. According to the results, SCCP has a significant fixed effect (level 1) coefficient estimate ($\beta = 0.751$, $Z = 19.450$, p-value = 0.000). The random effect component of the model (level 2) was also found to be significant, with both random intercepts and random slopes included. The intra-class correlation (ICC) due to entities (retail chain stores) is 47.5%. The LR statistic is 112.99, with a p-value less than 0.05, indicating a significant random effects component in the model. The variance attributed to the SCCP covariate at level 2 is 0.490, implying a substantial contribution of SCCP to the performance

Table 1. Effect of supply chain continuity planning on performance of retail chain stores.

Mixed-effects REML regression				Number of obs		=	264
Group variable: Retail store				Number of groups		=	16
		Obs per group		Min		=	8
				Avg		=	16.5
				Max		=	48
				Wald chi^2 (1)		=	378.23
Log restricted-likelihood = −225.12168				Prob > chi^2		=	0.000
	Observed	Bootstrap			Normal-based		
Performance (fac1_1_y)	Coef. (β)	Std. Err.	Z	$p > z$	[95% Conf. Interval]		
SCCP (fac1_1)	0.751	0.039	19.450	0.000	0.675	0.827	
_cons	−0.040	0.019	−2.060	0.039	−0.077	−0.002	
	Observed	Bootstrap		Normal-based			
Random-effects Parameters	Estimate	Std. Err.		[95% Conf. Interval]			
Retail store							
sd(fac1_1)	0.490	0.061		0.383	0.626		
sd(_cons)	0.582	0.030		0.526	0.645		
sd(Residual)	0.507	0.035		0.443	0.579		
LR test vs. linear regression: chibar2 (01) = 112.99 Prob >= chibar2 = 0.000							
Level	ICC		Std. Err.	[95% Conf.		Interval]	
Retail store	0.475		0.026	0.423		0.526	
Likelihood-ratio test			LR chi^2 (1)	=		39.760	
(Assumption: M11 nested in M12)			Prob > chi^2	=		0.000	
Model	Obs	ll(null)	ll(model)	Df	AIC	BIC	
M11	264	.	−245.000	4.000	498.001	512.305	
M12	264	.	−225.122	5.000	460.243	478.123	

of Retail Chain stores across the retail chain. The random component, however, remains significant, as indicated by the LR statistic, which has a p-value less than 0.05 and an intra-class correlation of 47.5%.

To confirm whether the level-2 variation due to the independent variable SCCP was significant, a likelihood ratio test was conducted to assess the change in the random component of the model resulting from the addition of SCCP as a level-2 covariate. The LR test is also presented in Table 1, where model M11, with no random slope, is nested within model M12, which includes a random slope due to SCCP. The results indicate a significant improvement in the model resulting from the addition of the level-2 SCCP covariate. The addition reflects a 39.760 change in the LR chi.

Furthermore, the Bayesian information criterion (BIC) of model M12 (478.123) is lower than that of model M11 (512.305), indicating that model M12 is a better model. Thus, a significant random slope is due to SCCP. This confirms that SCCP has both a significant fixed effect on Performance of Retail Chain stores at level 1 and a significant random effect across the entities. The model (M12), which considers both effects due to SCCP, was thus adopted. The resulting equation from the model with fixed effects of SCCP within and random intercepts across the retail chain stores is given by the equation below.

$$Y_{ij} = \gamma_{0j} - 0.040 + 0.751X_{ij} + \varepsilon_{ij}$$

$$\gamma_{0j} = 0.582 + 0.490X_{0j} + \mu_{0j}$$

The bivariate analysis is based on a multi-level mixed-effects model, which shows that SCCP reflects both a significant fixed effect and a significant random covariance with the Performance of Retail Chain stores across the retail chain. The results of this bivariate analysis were used to test hypothesis H_{01}.

H_{01}: There is no significant influence of Supply Chain Continuity Planning on supply chain performance.

From the mixed-effects model, the *p*-value of the fixed effect coefficient of SCCP was found to be 0.000, which is less than 0.05. The null hypothesis was therefore rejected, and the alternative hypothesis was accepted, leading to the conclusion that SCCP has a significant influence on the Performance of Retail Chain stores. The significant fixed effect coefficient estimate was 0.751, implying that increasing the levels of the SCCP as perceived by a respondent by one unit would result in a 0.751-unit increase in the level of supply chain perceived performance.

The model results also showed significant random covariance between SCCP and the Performance of Retail Chain stores across the clusters of respondents (retail chain stores). Thus, the variation and levels of Performance of Retail Chain stores across the retail chain stores are also explained by the variation in SCCP across the entities. This is reflected in **Figure 2**, which shows a significant fixed effect, characterised by a generally increasing slope, and random effects, represented by equal slopes across retail chain stores. Each line in the figure represents the within-entity influence of SCCP on the Performance of Retail Chain stores. The lines have varying slopes for each entity, implying changes (random covariance effect) on the Performance of Retail Chain stores due to changes in SCCP across entities.

Table 2 presents the regression model results, addressing the objective of Supply Chain Continuity Planning in relation to performance based on secondary data on performance. The secondary data was regressed on the primary data collected for the independent variable, Supply Chain Continuity Planning. According to the results, the R-squared value of the model indicates that the variation in Supply Chain Continuity Planning explains 52.8% of the variation in performance. The ANOVA F-statistic of 15.660 with a *p*-value of 0.001, which is less than 0.05, implies that the model is generally significant; thus, the model coefficient is at

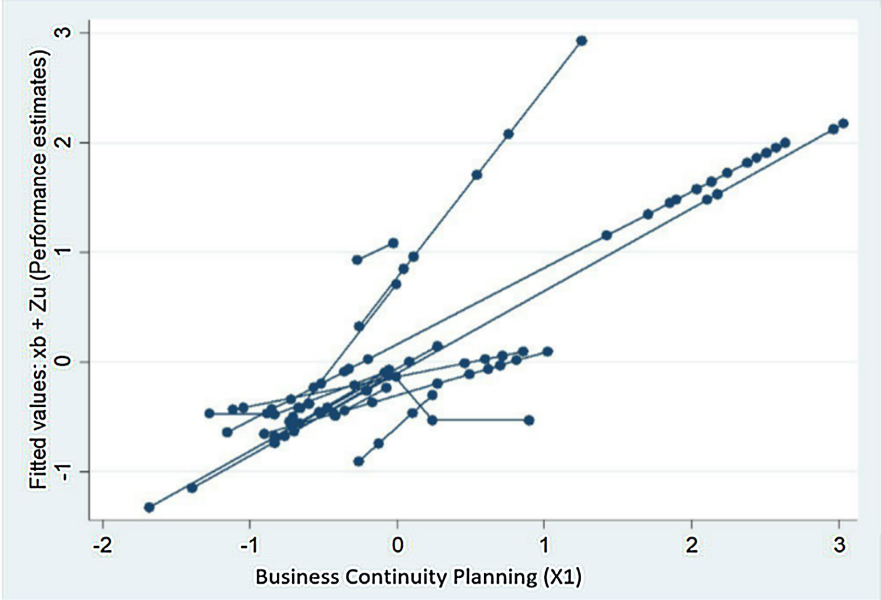

Figure 2. Mixed effects of SCCP on supply chain performance.

Table 2. Effect of supply chain continuity planning on performance of retail chain stores.

Model Summary						
Source	SS	df	MS	Number of obs	=	16
Model	0.150	1	0.150	F (1, 14)	=	15.660
Residual	0.134	14	0.010	Prob > F	=	0.001
Total	0.284	15	0.019	R-squared	=	0.528
				Adj R-squared	=	0.494
Model Coefficients						
Performance	Coef.	Std. Err.	t	$p > t$	[95% Conf.	Interval]
SCCP	1.368	0.346	3.960	0.001	0.627	2.110
_cons	0.488	0.027	18.060	0.000	0.430	0.545

least not equal to zero. The coefficient of Supply Chain Continuity Planning (β = 1.368, t = 3.960, p-value = 0.001) shows that the results are in line with the results based on the primary data on performance. Based on the secondary data of performance, this model suggests that Supply Chain Continuity Planning has a significant influence on the gross profit margin. The results show that increasing the level of Supply Chain Continuity Planning by one unit would result in a 1.368-unit increase in the gross profit margin.

4. Conclusion

The study set out to evaluate the influence of Supply Chain Continuity Planning (SCCP) on the performance of retail chain stores in Kenya. Drawing on both primary and secondary data, the findings revealed that SCCP significantly enhances organizational performance. At the employee level, SCCP had a strong fixed effect on performance, while at the organizational level, it accounted for nearly half of the observed variation across retail chains. Regression analysis further confirmed that SCCP adoption improves profitability, with gross profit margins increasing steadily over the five-year review period. In addition to financial gains, SCCP was shown to improve operational efficiency by reducing delivery lead times, enhancing accuracy in shipment tracking, strengthening supplier-customer relationships, and improving communication during disruptions.

These findings demonstrate that SCCP not only strengthens resilience against risks but also provides firms with a competitive advantage by enabling continuity of operations in uncertain environments. In conclusion, the study establishes that SCCP adoption is a vital strategic tool for retail chain stores in Kenya. By embedding continuity planning into organizational processes, firms can minimize the adverse impact of disruptions, enhance responsiveness, and sustain growth and competitiveness in a turbulent operating environment. Based on the findings, the study offers the following recommendations: adoption of proactive contingency planning; institutionalize business continuity frameworks; enhance training and awareness; leverage on international standards, invest in technology and data analytics; and strengthen collaboration with stakeholders.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix I: Models with Random Intercepts and No Random Slopes

Model M11: Effect of Supply Chain Continuity Planning on Supply Chain Performance

Mixed-effects REML regression				**Number of obs**		**=**	**264**
Group variable: Retail store				Number of groups		=	16
		Obs per group		Min		=	8
				Avg		=	16.5
				Max		=	48
				Wald chi^2 (1)		=	485.28
Log restricted-likelihood = −245.000				Prob > chi^2		=	0.000
	Observed	**Bootstrap**			**Normal-based**		
Performance (fac1_1_y)	**Coef.**	**Std. Err.**	**z**	$p > z$	**[95% Conf. Interval]**		
SCCP (fac1_1)	0.727	0.033	22.030	0.000	0.662	0.792	
_cons	−0.021	0.037	−0.560	0.576	−0.094	0.052	
	Observed	**Bootstrap**		**Normal-based**			
Random-effects Parameters	**Estimate**	**Std. Err.**		**[95% Conf. Interval]**			
Retail store							
sd(_cons)	0.293	0.055		0.203		0.422	
sd(Residual)	0.324	0.044		0.249		0.422	

LR test vs. linear regression: chibar2 (01) = 73.24 Prob ≥ chibar2 = 0.000.