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CLOSED-LOOP SUPPLY CHAIN ADOPTION AND THE MEDIATING EFFECT OF GREEN CAPABILITIES - EVIDENCE FROM MALAYSIA

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Abstract

The concept of a closed-loop supply chain (CLSC) is concerned with the recovery of value from returned consumer products via resales. The rapidness of economic growth gives manufacturers no option but to shorten the product life cycle. Consequently, new versions following product upgrades happen too fast, increasing product returns in the form of End-of-Life (EOL) or End-of-Use returns. This issue has become crucial with a lack of processes for effectively handling product returns in Malaysia; thus, firms often use a third party, although this is considered improper by global standards. Therefore, this research aims to clarify the connection between Institutional Theory and the Natural Resource-Based View (NRBV) Theory in light of CLSC adoption in Malaysia. The findings highlight the role of government in overpowering competitors and customers in adopting a CLSC. The study's limitations include presenting a formation of ideas that haven't been previously linked in a research framework, setting the stage for more research in this area.

Keywords: Closed-loop Supply Chain, Green capabilities, Natural Resources Based View, Institutional Theory, PLSSEM

Abbreviations: Closed-loop supply chain (CLSC), Resource Based View (RBV), Natural Resource Based View (NRBV)

INTRODUCTION

Closed-Loop Supply Chain (CLSC) has acquired increasing prominence in the field of supply chain and operations management due to public awareness and government legislation forcing producers to protect their End of Life (EOL) products. The situation is mainly due to strict legislation and profit margins in reverse flow activities and after-sales services. In essence, the CLSC is the traditional forward supply chain plus additional reverse supply chain management that oversees product regeneration and collects values from

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products that customers consume and use. Products are divided into different levels during the recovery process: module, part, and material. The goal of reprocessing is to return a product to its original state, whether its original functionality, an improved state, or a state where it is indistinguishable from brand new (Govindan et al., 2015).

In previous research, there has been extensive discussion on various hypotheses and frameworks pertaining to product returns in reverse supply chains. Interestingly, Mazaheri (2021) discovered that China is the most productive country with 269 publications in CLSC study. Ranked second to fifth are USA, Iran, India and UK, according to the top 15 countries, extracted based on the number of outputs. The United States of America has been cited more than twice as many times as China, receiving 5015 citations. These studies include the industrial ecosystem, product lifecycle stage management, CLSC, green or sustainable supply chains, and integrated supply chain management (Seuring, 2004). The primary objective is to address environmental concerns throughout the production chain. Product returns have the potential to produce unique value during the reverse flow in a CLSC, as stated by Mondragon et al. (2011). This value might be produced by prolonging the product lifecycle in the supply chain.

Studies in Malaysia have demonstrated the firms' reactive approach to managing their product returns (Eltayeb et al., 2010, 2011; Nik Abdullah et al., 2011; Olugu et al., 2010) due to the lack of return capabilities (Eltayeb et al., 2011), high-cost returns operations (Eltayeb et al., 2011; Khor & Udin, 2013), and challenges in obtaining sufficient volume and proper timing of returns (Shaharudin et al., 2015). In addition, some businesses do not have the infrastructure necessary to manage product returns because it is not one of their core competencies. Despite this, the current objective is to cut production costs, shorten product life cycles, influence consumer preferences, and provide a response to legislation related to end-of-life (EOL) products. This has resulted in the expansion of the product return programme and CLSC adoption (Shaharudin et al., 2019).

According to Shaharudin (2019), Malaysia is not very aggressive when it comes to recovering or recycling End-of-Life (EOL) products or returned products that have a large residual value. The treatment of waste, which is not sustainable, contributes to environmental crises like illegal dumping and the expansion of landfills, both of which are detrimental to human health and the environment (Mohamed et al., 2008). Therefore, Malaysia must develop a clean production system and effectively implement CLSCs to monitor goods and the forward and reverse movement of materials. Past studies have also stated that green capabilities which respond to customers' and other stakeholders' environmental interests are essential enablers of a CLSC (Robotis et al., 2012). Specifically, Hofmann, Schmeichel, & Baddeley (2012) highlighted firm-specific capabilities that encourage embracing environmental movements. Secondly, Guide & van Wassenhove (2009), and Mitra, (2014) stated that green capabilities should not be implemented separately when executing CLSC effectively. Due to the problem discussed above, the objectives of this paper are as follows:

1. To identify the relationship of regulatory pressure, customer pressure, and competitive pressure towards green capability in CLSC adoption.
2. To assess the relationship between green capability and CLSC adoption.
3. To measure the mediating effect of green capabilities in the relationship between regulatory pressure, customer pressure, competitive pressure, and CLSC adoption.

LITERATURE REVIEW

Institutional Theories

The Institutional Theories of organizations create novelty, a concept developed by DiMaggio & Powell (1983) to portray organizational diversity. Institutional Theory has gained interest, specifically in moving towards and sustaining isomorphic

institutional environments (Kondra & Hinings, 1998). Oates, (2013) elaborated that Institutional Theory proposes another valuable method of clarifying factors affecting the acceptance of regularities in organizations. The primary forms of Institutional Theory stress the presumption of the nature of institutional rules, myths, and beliefs, as a collective social reality and mechanisms whereby organizations remain instilled with a meaningful and social significance (Scott, 1987).

Past studies in Institutional Theory identified three mechanisms whereby institutional changes happen to encourage similarities in structures and processes. For instance, DiMaggio & Powell (1983) explained that Institutional Theory indicates three isomorphic bodies impacting the orientation of the competitive organisational climate: normative, coercive and mimetic pressure (Zhu et al., 2013a; Zsidisin et al., 2005).

1. Coercive Isomorphism

The first isomorphic form was explained by Zsidisin et al., (2005), whereby the result of coercive isomorphism is the operating pressure from other organisations (buyers, government agencies, regulatory norms, and others) formally and informally based on the society's cultural expectations within the organization's role. Generally, the pressure stems from political influence and legitimacy issues.

2. Mimetic Isomorphism

Mimetic isomorphism is due to the uncertainty of anything happening, leading to imitation because of the organizational values and beliefs (Kauppi, 2013; Zsidisin et al., 2005). Furthermore, DiMaggio & Powell (1983), and Liang et al. (2007) stated that mimetic isomorphism results from impersonating other organizations' actions. Organizations may 'transplant' successful practices from other firms, an imitation due to formal benchmarking and understanding the compelling method from literature. Therefore, mimetic isomorphism arises when a company is influenced by an uncertain environment to imitate business methods from other companies, that they believe would benefit their company (Kauppi, 2013; Zsidisin et al., 2005).

3. Normative Isomorphism

Normative isomorphism is an outcome of the professionalization of fields and disciplines. Liang et al., (2007) mentioned that working conditions, working methods, and direct potential practitioners, by legitimacy, define members' overall struggle of occupation to control 'the production of producers', and develop a cognitive basis and legitimization for their occupational autonomy.

Resource Based View (RBV) and Natural Resource-Based View (NRBV)

The concept of a Resource-Based View (RBV) must first be discussed before elaborating with the NRBV. The first scholar establishing the RBV theory was Edith Penrose (Penrose, 1959), who highlighted the significance of resources as a competitive advantage for organizations to sustain. According to Penrose (1959), a firm is both an administrative organization and a set of productive resources (both human and material). The company can gain a wide range of value-added services from its land, buildings, and machinery, as well as from its employees.

Curado & Bontis (2006) stated that similar resources could be used differently based on numerous ideas on how to apply them. Similarly, Barney (1991) highlighted that a firm's resources were its assets, capabilities, organizational processes, attributes, information, and knowledge.

1. Capabilities

Capabilities are typically defined as an organization's ability to organize its actions and make use of its assets through a collection of skills and knowledge (Day, 1994). Additionally, capabilities include a firm's ability to deploy capital, normally consistent with the organizational processes to meet the end objectives. Amit & Schoemaker (1993)

added that the capabilities involve know-how skills such as technical or managerial ability. Eventually, information-based tangible or intangible processes specific to the firm are formed through complex interactions between the company's resources.

2. Natural Resource-Based View (NRBV)

Hart (1995) mentioned that the Resource-Based View (RBV) presumes that organizational capabilities derive from resources and influence competitive advantage significantly, yet RBV excludes the element of the environment as a key difference from NRBV. In addition, the RBV disregards how waste management and environmentally friendly design capabilities may represent a future advantage. Dealing with the environment and generating this as a strategic process is needed for organizational capabilities with adequate green resources (Judge & Douglas, 1998).

Recovery is one of the elements of green capability, while the same goes for integration and production, which address ambiguities in product returns. Effective CLSC depends on these elements. Consequently, NRBV facilitates comprehension of these capabilities regarding product stewardship (Hart and Dowell, 2011). Due to this, product life cycle expenses can be improved, and market repositioning expended after adopting a CLSC. The value chain system will transform into a better development (Miemczyk et al., 2016).

RESEARCH FRAMEWORK

Based on the two underpinning theories, external antecedents affect the creation and deployment of green capabilities, which nurture the need to manage CLSC adoption effectively. The study examines the relationship between external and internal antecedents towards CLSC management. Figure 1 presents the connections between external antecedents (regulatory, competitive, and customer pressure), internal antecedents (green capabilities), and CLSC adoption and the two underpinning theories. The research framework also introduced seven hypotheses, as explained in the further subtopics. Each line illustrates a direct connection between an independent variable and the dependent variable, whereas a dotted line illustrates a connection between a dependent variable, the independent variable, and the mediator.

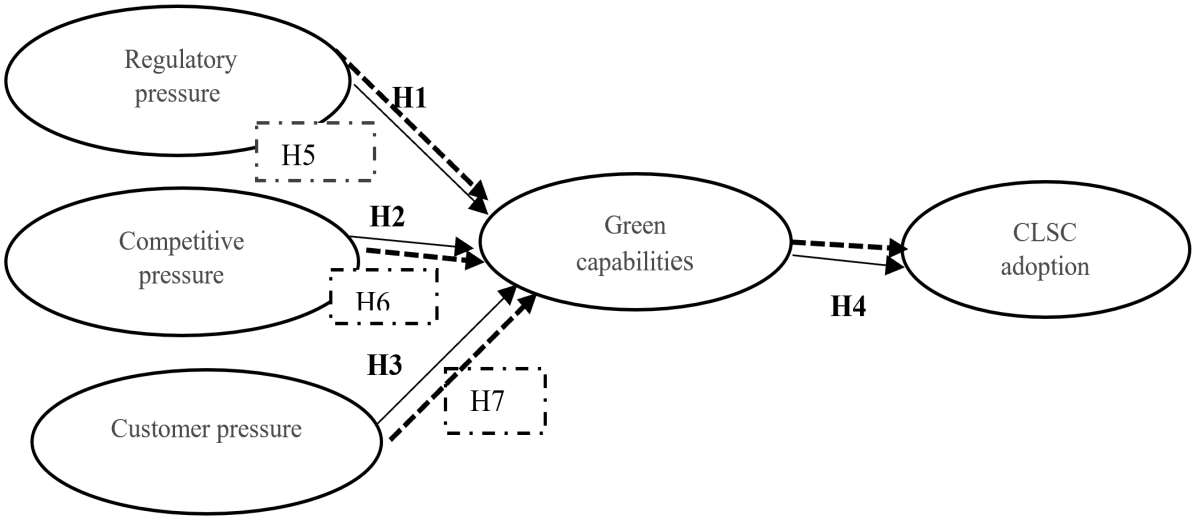

Figure 1 Research Framework

HYPOTHESIS DEVELOPMENT

Regulatory Pressure and Green Capabilities

Regulatory pressure or coercive pressure originates from government initiatives imposing new regulations and policies for the industry, such as competitive necessity within an industry and market segment (Ciftci et al., 2019; Demirbag et al., 2010; DiMaggio & Powell, 1983; Liang et al., 2007). The process from a conservative or traditional approach to an environmentally friendly approach requires massive investment and a proper time frame. Therefore, internal capabilities are the primary concern as a proactive organization focuses on enhancing and reorganising all procedures and practices to accommodate a green transformation in the organization (De Sousa Jabbour, 2015; Zhu et al., 2013a). Businesses that are serious about being green will begin by showcasing their internal resources and demonstrating how they may be used to enhance and streamline every aspect of the company's operations (De Sousa Jabbour, 2015; Zhu et al., 2013a). Hence, the study proposes the following hypothesis:

H1: Regulatory pressure positively affects green capabilities in CLSC adoption.

Customer Pressure and Green Capabilities

In Institutional Theory, firms' tendency to mimic others creates mimetic pressure (MP) or customer pressure. Past research has discovered that customer pressure is detrimental in certain circumstances (Benton & Maloni, 2005), while other customer pressures have a more positive impact (Zhu et al., 2013b). Based on NRBV, dynamic capabilities in efficiently managing and controlling resources have improved firm innovation (Hart & Dowell, 2011). Due to customer pressure, firms should realize that green innovation is part of establishing green capabilities (Huang et al., 2015). Hence, the study presents that:

H2: Customer pressure positively affects green capabilities in CLSC adoption.

Competitive Pressure and Green Capabilities

Pressures on focal organizations emerging from professionalization are known as normative pressure (NP) or competitive pressure (Zheng et al., 2012). Generally, a group of almost identical employees is formed in every industry through formal education and professional networks (DiMaggio & Powell, 1983; Liang et al., 2007; Zheng et al., 2012). In addition, Liu et al. (2010) stated that in order for businesses to avoid being severed from cooperative relationships and to ensure access to organizational resources, businesses will regulate with NP and adopt innovative technologies if NP materializes. This will allow businesses to avoid being severed from cooperative relationships and to ensure access to organizational resources. Accordingly, green management reduces stress by increasing performance and a competitive advantage by developing and optimizing the human, business and technological resources in forming green capabilities (Gable et al., 2015). Hence, competitive pressure might have a significant influence on green capabilities:

H3: Competitive pressure positively affects green capabilities in CLSC adoption.

Green Capabilities and Closed-loop Adoption

In CLSC, leveraging green capabilities as a unique resource and adding extra value in performing tasks enables firms to reduce costs and increase productivity (Shaharudin et al., 2019). Moreover, Hart (1995) stated that the NRBV extends the RBV by considering environmental elements. Therefore, the NRBV theory is considered in implementing the sustainable life cycle environment and forming product stewardship that prevents pollution; this is an excellent strategy for future earnings (Shaharudin et al., 2019). An organisation's green resources could also

form strategic processes for handling environmental issues (Judge and Douglas, 1998). Growing green capabilities as part of the CLSC adoption process can have an impact on recovery, integration, and manufacturing capabilities in order to deal with uncertainties in product return flows. In the end, managing returns through CLSC adoption brings about a reduction in the cost of the product's life cycle, an improvement in the value chain system, and a repositioning of the market to produce product stewardship (Hart and Dowell, 2011, Miemczyk et al., 2016). Hence, the proposed hypothesis is as follows:

H4: Green capabilities positively affect CLSC adoption.

Internal Antecedents (Green Capabilities) as a Mediator Between External Antecedents and a Closed-Loop Supply Chain

Größler & Grübner (2006) claimed a company's resources can be either material possessions or intangible advantages. Examples of tangible resources include physical structures, while intangible resources include the free exchange of information and expertise. Researchers of RBV studies have discussed organizational capabilities as a higher-order concept, while significance varied with the combination of available resources (Wu, 2006). Grant (1991b) further stated that capabilities are formed when resources are incorporated and utilized together.

According to Institutional Theory, institutional constraints from the government, customers, and competitors, in the form of coercive, normative, and culturally-cognitive Isomorphism shape the impact of green capabilities on CLSC adoption (DiMaggio & Powell, 1983; Scott, 2015). It is mandatory to comply with the conditions imposed by authorities such as ISO 14001 as a form of coercive isomorphic. The same can be said of the desire to satisfy customers while obtaining sales, remaining up-to-date with the current fads, and protecting the environment. Pressure from different directions motivates businesses to optimize returns processes to address environmental concerns, generating a profit and lowering expenses, particularly via CLSC adoption (Shi et al., 2012). Consequently, Institutional Theory proposes the substantial effects of external forces such as international competitiveness, rapid technological change, and rising environmental pressure. Hence, given the above discussion, the following hypotheses are proposed:

H5: Green capabilities positively mediate the relationship between regulatory pressure and CLSC.

H6: Green capabilities positively mediate the relationship between customer pressure and CLSC.

H7: Green capabilities positively mediate the relationship between competitive pressure and CLSC.

METHODOLOGY

Measurement Instrument

In order to quantify each construct, a survey questionnaire was developed for this study. All measurements were derived from prior studies. To assess regulatory pressure, the sixth item was adopted from Chu et al. (2018), Abdullah & Yaakub (2014), Ninlawan et al. (2010), and Eltayeb et al. (2011). Meanwhile, the measurements for customer pressure were adapted from Carter & Ellram (1998) and Eltayeb et al. (2011), while for the source of competitive pressure the measurement was taken from Liu et al. (2010) and Liang at al. (2007). The measurement for green capabilities was adapted from Eltayeb et al. (2011) and Montabon et al. (2007). Global items were also added to this variable, as adopted from Cheah et al. (2018). Last but not least, to assess the adoption of a close loop supply chain, the associated measurement items were taken from Carter and Ellram (1998), Eltayeb et al. (2011), and Rogers & Tibben-Lembke (2001). The details of the numbers of items and scale are as stated in the Table 1.

Table 1 The Numbers of Items and Scale of Measurements

No	Variable	Number of items	Scale
1	Regulatory pressure	6	Five-Point Likert Scale
2	Customer pressure	7	Five-Point Likert Scale
3	Competitive pressure	5	Five-Point Likert Scale
4	Green Capability	5	Five-Point Likert Scale
5	CLSC Adoption	7	Six-Point Likert Scale

For research using a questionnaire survey, pretesting the instrument is essential to ensure the questions are well understood and the words used have no second meaning (Sekaran & Bougie, 2013). As such, a pre-test was carried out before the main survey. Two logistics managers, manufacturing engineers from manufacturing companies, and three academics were randomly sampled to participate in this pre-test during a personal one-on-one interview. Participants were asked to fill out a questionnaire and make comments on its clarity, completeness, usefulness, and relevance.

Study Sites and Data Collection

This study looked into individual firms with the population being all Green label manufacturing sectors in Malaysia that had received the Myhijau Mark registration. The government introduced the MyHijau Mark & Directory as a drive to advocate for sourcing and procuring green products and services in Malaysia, helping firms by allowing them to maintain an eco-label for their products. This study investigates the association between an environmental issue (green issues) and business aspect (supply chain). Therefore, the appropriate person from whom to acquire the required data should ideally know both elements. Thus, the proper respondents to answer the questionnaire were determined to be company owners, general managers, logistic officers, or engineers who handle manufacturing. Data collection occurred from November 2021 until April 2022, via an online-based data collection technique which was used throughout this study as the collection time was during the Malaysian Movement Control Order. Ultimately, a sample of 109 data sets were obtained from 441 Myhijau Marks companies. The minimum sample size was determined using G*Power software (Erdfelder et al., 2009). The G*Power analysis has been set for multiple regression (Cunningham & McCrum-Gardner, 2007), comprising three predictors to determine the accurate sample size. The test used the alpha of 0.05, a power of 0.80, and a medium effect size of ($f2 = 0.15$). As 80 per cent is considered the minimum acceptable power in most social sciences studies (Gefen et al., 2011), the desired sample size was set to 77 companies. Therefore, based on the calculation results, a sample size of 109 was deemed adequate for data analysis of data from this population.

Common Method Variance

Data collection from a single source may lead to common method variance (CMV), even if some preventative measures are adopted beforehand. This research takes a two-pronged approach, implementing both pre- and post-data-collection procedures to lower the CMV. Partial least squares structural equation modelling (PLSSEM) in statistical treatments was proposed as one of two ways to evaluate CMV. Full collinearity assessments using variance inflation factors (VIFs) (Kock, 2015) and the marker variable technique were utilized to test the CMV. As a first step, a comprehensive collinearity test was run to identify any constructions that had VIF values of 3.3 or more due to high levels of collinearity (Kock & Lynn, 2012). The results imply that VIFs for all constructs range from 1.371 to 1.808 (Refer to table 2), verifying that CMV was not a severe concern in this study. The second statistical approach

performed was the marker variable technique. Marker variable is a statistical technique that assesses the expected cause of method variance as a covariate (Podsakoff et al., 2003). In this study, the procedures recommended by Rönkkö & Ylitalo (2011) were used, while the designated marker variable was adopted from (L. Huang et al., 2015) consisting of three items that are unrelated to the study. As depicted in Table 3 and Table 4, there was no significant difference in either the Beta (β) value (differences between -0.001 to 0.01) or R2 changes with the addition of the marker variables (difference between 0.00 to 0.001). This result indicates that CMV is not a significant issue in this study.

Sample Profile

Table 5 shows the sample profile of the hundred and nine companies in the sample. Thirty-nine per cent of the hundred and nine respondents were managers, while thirty-one per cent were from the production department. About fifty per cent of the respondents had ten years of experience, and almost seventy per cent were from the building and energy sector. Sixty-eight per cent of the respondents were from companies aged more than 15 years. Forty-two per cent had between five and seventy-five employees; the majority (seventy per cent) were Malaysian companies.

Table 2 The Full Collinearity Result

	Competitive Pressure	Customer pressure	CLSC adoption	Green capabilities	Regulatory pressure
VIF	1.808	1.485	1.306	1.371	1.514

Table 3: Path Coefficients

Relationship	Without Marker Variable	With Marker Variable
Regulatory pressure → Green capabilities	0.459	0.46
Competitive pressure → Green capabilities	-0.187	-0.186
Customer pressure → Green capabilities	0.24	0.239
Green capabilities → CLSC adoption	0.315	0.323

Table 4: R Square

Relationship	Without	With Marker Variable
CLSC adoption	0.1	0.099
Green capabilities	0.234	0.234

Table 5 Sample Profile

Demographic Factors	Categories	Frequency	Percentage
Designation	Managing Director	13	12
	Senior manager	9	8
	Manager	43	39
	Deputy Manager	2	2
	Assistant Manager	12	11
	Others	30	28
Department	Production	34	31
	Quality	16	15

Table 5 (Continued)

Demographic Factors	Categories	Frequency	Percentage
	Supply Chain	4	4
	Procurement	9	8
	Others	46	42
Job Experience (Years)	Less than 1 year	5	5
	1 to 5 years	14	13
	6 to 10 years	37	34
	Above 10 years	53	49
Green Product Certification	ISO 14024 Type I Eco-labels	53	49
	ISO 14025 Type III Eco Labels	4	4
	other Type I-like Voluntary Sustainable Scheme; VSS)	24	22
	Performance Standard Compliance	28	26
Sector	Building	40	37
	Water	2	2
	Waste	10	9
	Energy	39	36
	Transport	8	7
	Others	10	9
Age of organisation	Less than 5 years	8	7
	5 years to 10 years	8	7
	10 years to 15 years	19	17
	More than 15 years	74	68
No. of employees	Less than 5 employees	8	7
	5 to 75 employees	46	42
	76 to 200 employees	29	27
	More than 200	26	24
Ownership	Malaysian	77	71
	Joint ventures	7	6
	Foreign	25	23

RESULTS AND FINDINGS

Evaluating the Measurement Model

The measurement model consisted of two stages. Composite reliability (CR), loading indicators, and average variance extracted (AVE) should be above 0.7, above 0.5, and above 0.5, respectively, for the reliability and convergent validity analyses to be successful (Hair & Alamer, 2022; Hair et al., 2019). All AVE values were greater than 0.5, while CR values were greater than 0.7, as shown in Table 6. All loading indicators were over 0.5. The sample therefore met the criteria for reliability and convergent validity. The discriminant validity was then assessed. According to Henseler et al. (2015), ideal heterotrait-monotrait (HTMT) values ought to be less than 0.85 or 0.9; this study used the stricter limit of 0.85. The statistics in Table 7 indicate that discriminant validity was satisfactory as it confirms no discriminant validity issues for any variables. All factor loading, AVE, CR, and HTMT, values of the items were highly adequate to their respective subscales (see Tables 6 and 7).

Table 6: Measurement Model

Construct	Items	Loading	CR	AVE
CLSC adoption	CLSC1	0.751	0.937	0.714
	CLSC2	0.793		
	CLSC3	0.906		
	CLSC4	0.901		
	CLSC5	0.94		
	CLSC6	0.757	0.904	0.654
Customer pressure	CP1	0.832		
	CP2	0.852		
	CP3	0.859		
	CP4	0.707		
	CP5	0.784		
Competitive pressure	ComP1	0.95	0.979	0.903
	ComP2	0.96		
	ComP3	0.949		
	ComP4	0.968		
	ComP5	0.923		
Green capabilities	FC	0.768	0.896	0.592
	GlobalC	0.716		
	IC	0.841		
	InnC	0.813		
	MC	0.678		
	RC	0.788		
Regulatory pressure	RP2	0.662	0.818	0.534
	RP3	0.619		
	RP5	0.878		
	RP6	0.737		

Note: R1, R4 were deleted due to low factor loading; CR = composite reliability; AVE = average variance extracted.

Table 7 Discriminant Validity (HTMT Ratios)

	Competitive pressure	Customer pressure	CLSC adoption	Green capabilities	Regulatory pressure
Competitive pressure					
Customer pressure	0.597				
CLSC adoption	0.439	0.235			
Green capabilities	0.174	0.34	0.341		
Regulatory pressure	0.511	0.319	0.533	0.483	

Evaluating The Structural Model

After establishing the measurement model, the investigation continued with structural model evaluation. A multivariate skewness and kurtosis assessment has been suggested by Hair et al. (2017) and Cain et al. (2017) to evaluate structural models' capacities to predict one or more target constructs. Both Mardia's multivariate skewness (β = 18.10, $p < 0.01$) and Mardia's multivariate kurtosis ($\beta = 50.19$, $p < 0.01$) indicated that the data did not follow the assumptions of multivariate normality. A resampling bootstrapping process was then used to produce a sample of 5,000 to present the structural model's path coefficients, standard errors, t-values, and p-values (Ramayah et al., 2017). In addition, using a mix of criteria, including p-values, confidence intervals, and effect sizes, was recommended by Hahn & Ang (2017), who argued that p-values are not a good criterion for testing a hypothesis's significance. A summary of the criteria used to assess the developed hypotheses is shown in Table 8.

Following the advice of Preacher & Hayes (2004, 2008), bootstrapping was used to examine the indirect effect and thereby evaluate the mediation hypotheses. The t-value for the indirect effect of H6 β=0.145 (0.315x0459) was 2.161, as determined by the bootstrapping technique. Furthermore, the indirect impact 0.145, 95% Boot CI; [LL= 0.005, UL=0.236] did not cross over into either direction of 0 (as shown by Preacher and Hayes, 2008), showing mediation. As a result, it can be said that H6's mediation impact is significant. Boot CI [LL= -0.269, UL=0.039], which does straddle 0, indicates that neither hypothesis 5 nor 7 have any indirect effect (see Table 9).

DISCUSSION

This study empirically examined the relationship between regulations, customers, and competitors (external factors), towards green capabilities and the relationship between green capabilities and CLSC. Further, this research external factors and CLSC. Wang et al. (2014) stressed that a fast-

Table 8: The Summary of the Criteria

Hypo-thesis	Relationship	Std Beta	Std Error	T-value	P-Value	BCI LL	BCI UL	f2	Effect size
H1	Regulatory pressure → Green capabilities	0.459	0.144	3.192	**p<.001**	**0.1**	**0.619**	0.226	Medium
H2	Customer pressure → Green capabilities	0.24	0.206	1.165	0.122	-0.216	0.53	0.053	No effect
H3	Competitive pressure → Green capabilities	-0.187	0.198	0.947	0.172	-0.525	0.083	0.028	No effect
H4	Green capabilities → CLSC adoption	0.315	0.105	3.014	**p<.001**	**0.11**	**0.398**	0.111	Small

Table 9: Bootstrapping of the Indirect Effect

Hypo-thesis	Relationship	β	T-value	BCI LL	BCI UL	Result
H5	Competitive pressure → green capabilities → closed loop supply chain adoption	-0.059	0.627	-0.269	0.039	Not supported
H6	regulatory pressure → green capabilities → closed loop supply chain adoption	**0.145**	2.161	**0.005**	**0.236**	**Supported**
H7	Customer pressure → green capabilities → closed loop supply chain adoption	0.076	0.711	-0.041	0.239	Not Supported

growing economy encourages manufacturers to shorten the product life cycle, thus, excessively speeding up the upgrading process which generates new versions of the products. Significantly, many products are not used until their EOL cycle due to the release of new products in the market. Furthermore, the increasing concern of depleting natural resources has alarmed stakeholders, pushing for more government regulations regarding emissions and ethical sourcing for manufacturing. Consequently, a resource-saving and environment-friendly society has been implemented by many countries through recycling and reusing materials post-consumption and creating a CLSC system with a forward supply chain. Specifically, a CLSC fully utilizes materials, reduces the impact of economic activities on the natural environment, and provides companies with a new source of profit through recycling, remanufacturing, and reselling. Thus, this study tested the Institutional Theory and NRBV using data from 109 MyHijau companies. These 109 companies have practised green processes due to the requirement of the MyHijau mark in sourcing and production and anything related to green product certification.

The results of this study indicate a significant relationship between antecedents as external factors and green capabilities as internal factors. This has revealed that the direct relationship between external factors and internal capabilities (green capabilities) in adopting CLSC in Malaysia among MyHijau mark companies is triggered by regulations from the authorities, which come from Coercive Isomorphism in the Institutional Theory. Competition among companies and consumers' roles in demanding green products were found not to be significant in adopting CLSC. This contradicts the findings from previous studies by Liu et al. (2010) and Huang et al. (2015), which highlighted that competition pressure and customer pressure both played a part in encouraging companies to practise CLSC adoption and other green activities. According to the findings, it can be concluded that in Malaysia, the government has more power to enforce the practise of CLSC compared to customers and competitors.

Green capabilities have been shown to have a positive relationship toward CLSC adoption, consistent with the earlier study of Shaharudin et al. (2019). As emphasised in CLSC, leveraging green capabilities as a unique resource and adding extra value in performing tasks enables firms to reduce costs and increase productivity (Shaharudin et al., 2019). This also parallels the results of Liu and Chen (2010) which indicated that innovation capability is a standard capability of a successful organisation. Similarly, the results are consistent with what has been shown in Taiwan, where the green capabilities of Taiwanese electronics firms, such as environmental participation, manufacturing and packaging, marketing, supply, inventory and eco-design were examined (Shang et al., 2010).

Based on insights from institutional theory and the natural resources-based view, the three mediation hypotheses of green capabilities between the external factors and CLSC. The findings show that H6 is supported, while H5 and H7 are not. H6 describes that green capabilities positively mediate the relationship between customer pressure and CLSC. This is also similar to the result of Größler and Grübner (2006), who explained that a "fit" between internal capabilities and external requirements from competitors and the environment is required for an organization to succeed.

IMPLICATIONS AND FUTURE RESEARCH

The implementation of CLSC in Malaysia is still relatively young; as a result, the adoption of extended producer responsibility is still relatively low because the majority of enterprises accept returns through their own motivation (Agamuthu & Victor, 2011). Hence, the study benefits practitioners involved in the supply chain and production. Supply chain executives should be aware that a CLSC could increase profits and

sustainability as companies plan to produce the products and dispose of them profitably. Practically, the findings provide in-depth information for governments or policymakers on antecedent factors or the competent ability of each green-labelled manufacturing firm on their challenge to comply with a CLSC. Additionally, the study helps companies to understand how CLSC works to indirectly provide a competitive advantage over competitors within the supply chain.

Webster & Mitra, (2007) mentioned that a collective implementation means that the specific industry branch is responsible for transforming the industrial structure, forming an environment with profitable remanufacturing without a take-back law. Conversely, if similar rules were applied solely to individual businesses, where each entity would be solely responsible for its products, such entities would have more say over their remanufacturing operations.

More studies should investigate the two theoretical areas discussed above using quantitative methods in order to have managerial relevance. Additionally, the CLSC concept is new and requires further development and extensive empirical research. Environmental sustainability and the effect of environmental variables on the development and implementation of supply chain strategies within businesses should also be studied. Further research is required on developing closed-loop strategies and the impact of these environmental factors on developing a firm's CLSC. Generally, a quantitative research design is applied via a questionnaire to answer the research questions and confirm the hypothesis. A study can be exploratory, descriptive, or causal, in terms of conducting hypothesis testing. Exploratory studies are suited in this study as the initial research clarifies the nature of the problem. The study considers exploratory studies due to the initial objective: examining and describing the correlation among the variables. Therefore, the strength and direction of the associations in the research model may be quantitatively tested in following studies. Different industries, company types, strategic approaches, and geographical regions, will likely adopt CLSCs at different rates, therefore future research should focus on elucidating the factors that contribute to these variations.

LIMITATIONS AND FUTURE RESEARCH

Due to some limitations in the study, there are gaps that can be highlighted for future research proceedings. First, the sample mainly focused on only the MyHijau mark-certified companies. MyHijau mark companies (*green accreditation companies*) consist of only 441 companies. In contrast, Malaysia has more than two hundred thousand SMEs, which indirectly practice reverse logistics, especially in clothing, furniture, baby products, skincare and cosmetics, and home appliance industries, yet are not categorised as green companies. Most companies have a program for return of products. Future research should also include other accredited companies that may practice CLSC, such as ISO14001.

The second limitation for this study is that data were collected during the Movement Control Order (MCO) when covid hit Malaysia in 2020 until 2022. During that time, Malaysia practised strict MCO where civilians, except for front liners such as health staff, could not leave the house. Nevertheless, the response rate was only 25% when it took around nine months to get a response. A series of friendly reminders were sent to potential participants. Between the months of November 2021 and July 2022, electronic mail was sent out to recipients. A total of 441 businesses were contacted about this opportunity. Those who were the focus of the study were given multiple opportunities to participate in the study, such as getting a prenotification outlining the aims of the research, a tailored survey packet, and the option to send the survey back via electronic mail or over the phone. A series of cordial reminders were emailed out to anybody who might be interested in participating. This led to a challenging data collection process, yet

the companies also struggled to survive during the MCO in the covid time.

Hence, researchers of future studies are encouraged to explore CLSC adoption among SMEs (Small Medium Enterprises) and other green accredited companies that might consider other factors such as types of products and location of the company such as urban or non-urban. Future undertakings may think to use AMOS or GSCA as this broadens the data, fulfilling the requirement of CB-SEM; such a large sample size and normality assumptions must be met, yet PLS-SEM can work without them (Hair et al., 2011; Hair et al., 2012). Through CB-SEM, it is helpful to recognise that the PLS estimator, which is used for estimating factor models, might unknowingly induce bias. When estimating factor models within the composite paradigm, it is proposed that future studies investigate the possibility of adopting PLSc or GSCAm to avoid this limitation (Manosuthi et al., 2021) or employing PLSc or IGSCA when the model contains mixed constructs (Fakfare et al., 2021; Fakfare et al., 2023). Additionally, it is essential to note that the discriminant validity of factor models can be formally and statistically tested using the CI-CFA method (Chuchuen, & Chanvarasuth, 2022). Consideration of the CI-CFA methodology proposed by Rönkkö and Cho (2022) is also recommended for future studies in order to prevent breaching the parallel assumptions underlying the HTMT method. Numerous empirical examples use such methodologies (Manosuthi et al., 2022)

CONCLUSION

As CLSC continues to be embedded in manufacturing practices in developing countries, companies have slowly realised CLSC management benefits. With no outlay for fresh materials, businesses may increase their margins even as they cut their pricing thanks to these more cost-effective options. Consequently, raw material consumption is less, less energy is used, and the waste does not end up in landfills. The situation is better for the planet and the company's public image. Furthermore, the situation creates more jobs than waste processing and landfill. Therefore, this study could help firms to increase the company's awareness and capability in practising CLSC in Malaysia.

CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare absence of conflicting interests with the funders.

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