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Network Building Capabilities for a Sustainable and Circular Economy

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Abstract
This research introduces a novel integrated model that affiliates the innovative capacity of circular start-ups, as seen through their network-building capabilities, with the influential attribute of top management support as outlined in the T-O-E theory. The investigation employs a quantitative research methodology based on a random sampling technique for the entire research population. The structural equation model, utilizing SMARTPLS, is used on a dataset comprising 231 manufacturing-based circular start-ups and their franchises in India. The findings reveal significant direct and indirect relationships between network-building capabilities and the innovation function of circular start-ups. The study highlights the pivotal role of top management support, following the T-O-E framework, as a complete mediator between network-building capabilities and organizational innovativeness. This inquiry establishes that effective networking and other factors confer a competitive edge upon firms. Furthermore, it contributes to the literature on the circular economy within emerging markets, offering insights applicable across various sectors like IT, hospitality, aviation, pharmaceuticals, and more. The study's implications extend to future researchers and policymakers, advocating for adopting a multi-level perspective to foster and ensure the innovativeness of circular start-ups in diverse industries.

Keywords- Network building capabilities, Organizational enablers, Circular start-ups, Circular start-up innovativeness.

1. Introduction

The linear economies (take-make-waste) are trying hard to imbibe circular practices in their vicinity by adopting recuperative and regenerative production and consumption approaches to successfully mitigate the environmental footprints (Fernhaber and Stark, 2019; Freeman, 2017; Geissdoerfer et al., 2017;

Moreau et al., 2017; Schreurs, 2008). On the other hand, circular economies are continuously striving to compress, slow, and close down on energy and resource loops by picking up on the take-make-reutilize models (Balsas, 2019; MacArthur, 2015; Genovese et al., 2017; Han, 2017; Jones & Comfort, 2017; Maltz et al., 2018). Given the current state-of-art of emerging economies espousing circularity and its principles, it is highly recommended that they should exhaustively concentrate on their resource splurge and waste management action plans for more significant results (Balsara et al., 2019; Nathaniel & Bekun, 2020). To address critical socio-environmental issues, circular start-ups must step in with novel business model designs (Henry et al., 2020; Jones & Comfort, 2018; Wurster & Hagemann, 2020). The successfully running Circular Start-Ups (CSU), supported by the MacArthur Foundation in the emerging world, has been cited in the scholarly work of researchers till now. However, practical circular business models, fully functional in emerging markets, are limited and few in the count (Urbinati et al., 2017; Zucchella & Urban, 2019).

It is no secret that the circular economy concept is in a primitive stage, demanding fundamental changes. The focus on actors of the circular value chain, value propositions, and network building with multiple stakeholders (internal as well as external stakeholders) requires the immediate attention of policymakers, practitioners, entrepreneurs, academicians, and researchers (Lüdeke-Freund et al., 2018; Ünal & Shao, 2019). The adoption of CE practices (reuse, recycle, redesign, reuse, reproduce, remanufacture, reduce) by all the actors at all levels is needed for successful waste management, employment creation, and business growth (Ghisellini et al., 2016; Lewandowski, 2016). However, no direct positive impact on the environment of circular business models is assessed because of the complexities involved in referring value chains and product life cycles (Ada et al., 2023; Pesoa & Becker, 2017). At the same time, measuring the effect created on the environment is challenging; still, our research article offers value propositions concerning circular business models (Ali et al., 2023).

Innovative practices in adopting circularity principles are few to find and adopt. The upstream (supplier-end) and downstream (consumer-end) value chain actors can contribute immensely to achieving circular innovativeness concerning new products, processes, marketing, and managerial procedures. Stakeholder mapping is necessary for productive and efficient value chain operative ness (Bozhanova et al., 2022; Lokesh et al., 2018). The building of social networking worth, valuable supply chains, a resilient workforce, long-lasting business partnerships, and shared socio-ecological goals are all examples of extraneous factors. That is crucial to strategic capabilities (Huikkola & Kohtamäki, 2017; Busca & Bertrandias, 2020).

Circular practices like collaborative consumption (Schallehn et al., 2019), servitization (Spring & Araujo, 2017), platform sharing, assets tracking, and technology building (Zhou et al., 2018) much more lead to the growth of circular start-ups in economies (Stewart & Niero, 2018; Tunn et al., 2019; Veleva & Bodkin, 2018). Even the Indian economy is optimistic about the potential of a circular economy and expects 1.4 crores of jobs in the next 5 to 7 years (Gaurav et al., 2019; Goyal et al., 2018).

The developed world economies theorize the concept that directly focuses on the strategic capabilities of circular business models. The above-mentioned literature work highlighted the need for more empirical studies in the same context. A wide gap exists with immense potential to link theory and practical worlds in developed and developing economies, opting for circular loops. Research questions are formulated based on the gap that needs to be bridged by the scholarly work.

The strategic capacity of any organization that adheres to its architectural structure and strengthens its operating value by successfully beating its competitors is known as ability currency. The famous strategic

capability currency is and has always been networking. In our research investigation, network-building capability (NBC) is primarily used to study the capability currency of an organization. The top management teams are the ones that reinforce the fundamental values, goals, and beliefs. The strategy and support that boldens the organizational policies and goals are labeled enablers. The catalyzing factors are responsible for the organizational success, mainly of a circular start-up that plays on its innovation value. The circular start-up innovation function is used as CSIF in the text.

Based on the above discussion and motivation from the prior studies, we shall address the following research questions:

***RQ*1** "How do the network-building capabilities affect the innovativeness of circular start-ups in the manufacturing industry?"

***RQ*2** "How do the network-building capabilities of manufacturing-based circular start-ups impact organizational enablers like top management support?"

***RQ*3** "How does the role of top management impact the circular start-up innovation function?"

In addressing the research questions, we used structural equation modeling by applying SMARTPLS software to establish our contributions to circular innovativeness. Two main findings are explored in the current research - first, a significant positive relationship is determined between NBC and circular start-ups. Second, top management effectively mediates between both factors (NBC and CSIF). The layout of article is structured as follows: section 1 presents the introductory part of the conceptual description of the circular economy; section 2 showcases the theoretical framework and hypothesis development; sections 3 and 4 demonstrate the research methodology applied in the study along with the data analysis section; section 5 discusses the findings, implications, limitations, and scope for future research, along with the conclusion under section 7 mentioned in the last research article segments.

2. Theoretical Framework and Hypotheses Development

2.1 Network Building Capability and Firm's Innovativeness

In the transition process of linear economies (open-loop) into circular economies (closed-loop), the integral 'pro-circular behavior' of multiple stakeholders demands thorough investigation (Ertz et al., 2019; Muranko et al., 2018). That includes- internal stakeholders, stakeholders in the supply chain, and the extended supply chain, including the downstream actors of the value chain, i.e., consumers, upstream actors, i.e., vendors/suppliers, networking partners, employees, potential partnering organizations, and such, the essential enablers of circular economies (Henry et al., 2020; Tukker, 2015). The topic still needs research (Manninen et al., 2018). The value propositions offered from the circular business models - for instance, a product having greater PLE (Product lifetime Extension), product multiple lives practices, eco-designs, reverse logistics facilities, and many more, are the merit of circular spin-offs. In short, it creates system effectiveness that reduces external footprints (MacArthur et al., 2015; Zarbakhshnia et al., 2019).

This study seeks to fill the research gap by taking the building capability of circular spin-offs into the picture. That includes internal dynamics, human-centeredness, and cultural aspects. Circular spin-offs focus on the value network-building capabilities built with the stakeholders aiming to narrow down or close the loop (reuse, repair, and recycling of the product) (Hussain & Malik, 2020; von Kolpinski et al., 2023). Organizations efficiently communicate with suppliers at the pre-use or pre-customer stage to adopt circular innovations or eco-innovations (Urbinati et al., 2017).

The communication channel with the customers is established while implementing take-back/buy-back programs, rebuy/e-commerce systems, reconditioned product designing, and many more. (Nussholz, 2017; Borms et al., 2023). Focal or source organizations must constantly contact the customers, suppliers, and partners. The relationship among multiple stakeholders ensures a great revenue model and reduces environmental footprints (Pieroni et al., 2019). Organizations should build a strong partnership with potential stakeholders to develop new circular strategies and have more incredible value propositions. The objective of becoming a fuller, circular organization from the downstream or upstream circular organization is possible because of robust networking with potential stakeholders (Urbinati et al., 2017). The knowledge about the partner's domain can help enhance circular strategies and create economic-environmental value. Nature-based solutions do involve all the actors of the value chain; anyone missing can disrupt the whole process of achieving the goal of closing the loop (circular economies) (Maes & Jacobs, 2017; Nußholz, 2018). Inter-organizational networking stems from the quality of social capital (Ballet et al., 2007; Ali et al., 2018), the feeling of shared ownership (sharing of assets), and cooperation (Schallehn et al., 2019; Geissdoerfer et al., 2023).

However, the empirical research carried out is in sync with the theoretical work of the above European authors. The researchers join the narrative of European counterparts that are ahead in theorizing the circular spin-offs' value addition advantages. The efficient decision-making process of circular start-ups has a strong foundation of collaborative practices. The undercurrent of inter-organizational networking is the knowledge of consumer preference, sharing of technological and trading platforms, tracking assets, and acquisitions of novel alternatives by the focal or source organization (Konietzko et al., 2020).

However, measuring the impact of technology-enabled circular products released in the market is demanding. Moreover, though the topic is in a primitive stage and no study exists in the manufacturing industry of circular economies, the study was conducted in the context of circular manufacturing spin-offs and franchises. Thus, based on the above discussion, the hypotheses are formulated:

***H*1:** Network-building capability positively influences the Firm's innovativeness in a sample of circular start-ups and their franchises in India.

2.2 Network Building Capability and Firm's Organizational Function (Top Management Support)

The organizational enablers are responsible for material management, information management, capital flow, knowledge sharing, and such (Langenbach et al., 2020; Malik et al., 2019) and are successful only if top management support is rendered. We borrowed organizational factors from the decision-making TOE (Technology-Organizational and Environmental) theory rather than from Resource-Based View (RBV) or Natural Resource-Based View theory. So that stakeholder perspectives can be conceptualized using organizational enablers significant for addressing economic and environmental issues (Awa et al., 2017). The circular spin-offs focusing on supplier training and development, particularly in the franchise model, should be more emphasized. The inner motivation of the focal organization to encash the stakeholder's perspective to minimize waste is witnessed in circular economies. However, European policymakers have laid down the CEPS (for Stakeholders) framework, focusing on extensive stakeholder interaction but lacking empirical evidence (Taranic et al., 2016). The inadequate regulatory measures at the national, regional, and organizational levels in circular economy transitions are disappointing. The lack of policies and procedural framework can be pointed out.

In contrast, only a few motivated circular spin-offs and their distributors have framed and followed their regulatory system without much governmental support (Kirchherr et al., 2017). The lack of circular inputs

and the available raw material are matters of concern requiring immediate attention. Obstructing rules and regulations in circular economies poses a hurdle for future start-ups. The cost of technologies and circular designs is a crucial organizational factor but only affects people's willingness to operate there. Staff incentives, as per their contribution of time and efforts, are not synced with organizations' policies. Market, cultural, technological, and regulatory barriers exist, but the impact on circular innovativeness must be observed more. Regular R&D in circular designs improved managerial and marketing practices, and releasing the latest products in the market is starting to show on the surface, thus enabling us to incorporate the theme in the study.

The empirical research pieces of evidence are few in the theoretical European author's framework. We join the line of researchers who have applied practical narratives in figuring out the gap between the academic and realistic world. Picking sides is difficult due to the primitive availability of scholarly work. Here, the role of organizational factors in circular start-ups' innovative function is researched. Therefore, hypotheses *H*2 and *H*3 are framed and mentioned below:

***H*2:** Network-building capability positively influences the Firm's organizational function in a sample of circular start-ups and their franchises in India.

***H*3:** The Firm's organizational function positively influences its innovativeness in a sample of circular start-ups and their franchises in India.

3. Research Methodology

The research objective is to study the impact of circular-start-up network-building capabilities on their innovation function through the mediating role of organizational factors within the Indian manufacturing circular start-ups and their franchises. For this purpose, deductive and quantitative approaches have been used to collect data and test the proposed research hypothesis. The sample size of the study is determined using simple random sampling. In the manufacturing industry, a few circular start-ups and their franchises (more than 500) (Rawat, 2019; Shelote et al., 2019) spread country-wide demarcated for the survey. To comprehend better the network-building capabilities of multiple value chain actors, a questionnaire (Johnson & Clark, 2006) comprising three constructs - Network building capabilities (12 items) (Parida et al., 2017); organizational factors (5 items) (Awa et al., 2017; Wang et al., 2012; Rawat & Singh, 2022) and Circular start-up innovation function (5 items) (Soto-Acosta et al., 2016) circulated personally and via WhatsApp. Around 97 questionnaires were completed by visiting the franchise holder's office in the Delhi NCR region. A total of 500 circularity-practicing organizations were targeted irrespective of the founder's gender, and 231 responses were finalized containing complete information asked for. Two hundred sixty-nine questionnaires from the franchise holders are mostly incomplete with no significant inputs, which made us omit from further processing. Instead, two hundred thirty-one responses were collected after achieving a minimum of 0.70 Cronbach alpha values during the pilot testing phase. To further comprehend the respondents' characteristics, it is evident from the pie chart below that the maximum responses are collected from the central (Madhya Pradesh) and northern regions (Haryana). The eastern part (Kolkata) is split into two comprising north-eastern areas. The most extensive participation from the western region is from Maharashtra and Gujarat states- the title holders of early respondents also. All over the country, 88 percent of male participation is witnessed in our response collection, whereas just 12 percent is represented by females.

4. Data Analysis

Most business research has recently been tested using structural equation modeling (SEM) analysis (Hair et al., 2012). SMART PLS software is widely used for variance-based partial least squares data analysis.

Using a goodness-of-fit index, the researchers study two significant elements in modeling structural equations. One equation assesses the fit of a model to data that ranges in possible value between zero and unity, with zero indicating a complete lack of fit and unity indicating a perfect fit. Users are provided with multiple facilities to conduct CFA, impact performance matrix analysis, non-linear effects, moderating and mediating effects, etc. Most business research has recently been tested using structural equation modeling (SEM) analysis. SEM models are of two types: inner (structural) and outer models (latent variables-items), and are measured using two indicators, i.e., formative and reflective (Sarstedt et al., 2014). In reflective models, the indicators are affected by the latent variable, whereas in formative models the indicators define the latent variable. SMARTPLS software is widely used for variance-based partial least squares data analysis.

4.1 Evaluation of Measurement Model

Construct validity is the measure of how well the obtained results from using measures fit the theories on which the model is based. Table 1 shows the factor loadings of individual items (refer to Appendix A for the entire item list). Factor loading of the items can be used to assess the content validity of the measurement model (Hair et al., 2012). All items used to measure construct should load highly on that construct. If some items are found loading on other constructs than the respective construct, they are entitled to deletion (Hair et al., 2012). It is clear from Table 1 that all items load significantly to the construct that they belong to, thereby confirming the content validity. Three constructs (NCB4, NCB10, and NCB12) were omitted from the structure because of the poor factor loading (less than 0.7) to garner better results from the structural equation model representing circular start-up innovation functions. However, the factor loading for the rest of the items was more significant than 0.7, indicating a good fit between the item and the construct. Thus, content validity is confirmed.

Table 1. Factor loading of items.

Items	Network Capability	Organizational Function	Circular-start-ups Innovation Function
NCB1	0.7986		
NCB11	0.8914		
NCB2	0.7623		
NCB3	0.8116		
NCB5	0.740		
NCB6	0.7387		
NCB7	0.7367		
NCB8	0.7491		
NCB8	0.7491		
OF1		0.831	
OF2		0.9646	
OF3		0.8898	
OF4		0.9054	
OF5		0.7906	
CSIF1			0.8462
CSIF2			0.805
CSIF3			0.8275
CSIF4			0.7341
CSIF5			0.8438

Source: Author Calculation

The average variance extracted (AVE) ranges from 0.571 to 0.769. The recommended value is more than 0.5. The AVE values for Network capability building, Organizational function and CSIF innovation function are 0.0517, 0.769 and 0.640, respectively. The composite reliability and Cronbach alpha values

are close to the recommended value of more than 0.7. CR and Cronbach alpha values greater than 0.7 are considered good (Hair et al., 2016). All values are close to 0.9, indicating high consistency among the three constructs' items. Both reliability measures are satisfactory and in line with recommended values.

Discriminant Validity tests how distinct they are constructed from each other and should not correlate with each other (Hair et al., 2014). It is tested using cross-loadings and (Fornell & Larcker, 1981) criteria. The outer loading of the individual item with its construction should be higher than that of items with other constructs (Cross loading). Discriminant validity is confirmed by Table 2, which exhibits cross loading matrix.

Table 2. Fornell –Larcker discriminant validity.

Constructs	Network Capability Building	Organizational Functions	Circular Start Innovation Function
NCB	0.7887		
OF	0.5634	0.8784	
CSF	0.7091	0.6090	0.8124

Source: Author Calculation

Discriminant validity is also confirmed in Table 2. The square root of the AVE of each construct is more significant than their correlation coefficient with other constructs. Discriminant validity is verified as values of the square root of AVE are more significant than the bivariate correlation coefficient (Ringle et al., 2012). For example, the square root value of AVE for network capability building is 0.7887, more significant than its correlation with organizational function (0.5634) and CSIF innovation (0.7091).

Table 3. Reliability and AVE.

Constructs	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Network Capability Building	0.9364	0.9386	0.9365	0.6221
Organizational Function	0.9435	0.9475	0.9438	0.7716
Circular-Start-Ups Innovation Function	0.9067	0.9082	0.9064	0.6599

Source: Author Calculation

These two measures have been considered insufficient measures to capture discriminant validity. Before proceeding with the HTMT method, the Average Variance Extracted and constructed reliability values are mentioned in Table 3 for the journal's audience. Therefore, the Heterotrait-Monotrait Ratio of Correlations (HTMT) has been introduced (Henseler et al., 2015). This criterion also estimates the correlation between constructs and is an improved measure of discriminant validity. According to HTMT, if any two variables have correlation values of less than 1, it indicates distinctiveness between these two variables. The HTMT ratio between Network capability building and Organizational function (Table 4) is 0.5363 and is less than 1, which confirms that these two variables are different.

Table 4. Heterotrait-Monotrait ratio (HTMT).

Constructs	Network Capacity Building	Organizational Function	CSIF Innovation Function
Network Capacity Building	-	-	-
Organizational Function	0.5367	-	-
Circular-Start-ups Innovation Function	0.7065	0.6064	-

Source: Author calculation

4.2 Evaluation of Structural Model

Table 5 summarizes the result of the structural model using PLS-SEM analysis. The structural model is shown in Figure 1. The R square value is 0.31, which means the model explains 31 percent variance in the dependent variable. Baron & Kenny's approach was used to establish mediation. According to Muller et al. (2005), mediation must satisfy four conditions. The first condition says the relationship between dependent and independent variables must be significant without mediating variables (Refer to Figure 2). Second, the predictor variable (NCB) must significantly affect the mediating variable (OF). Third, the mediating variable (OF) must affect the outcome variable (CSIF) significantly, controlling the effect of the predictor (NCB), and the last indirect effect via a mediating variable (CB→ OF → CSIF) must be significant. Satisfaction of these four conditions confirms the presence of mediation in the relationship.

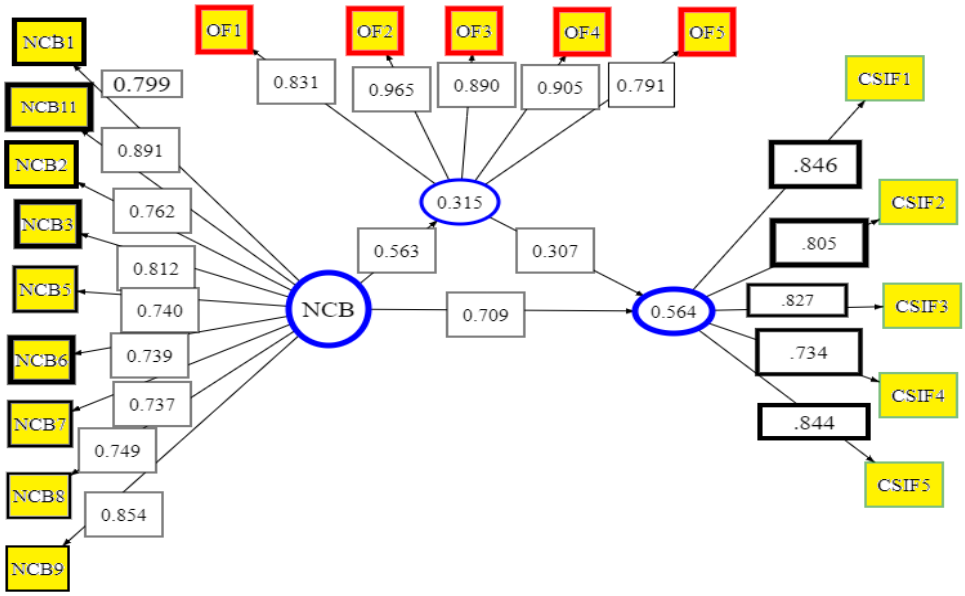

Figure 1. Structural equation modeling.

4.3 Mediation Analysis

The path theory assumed two structural paths in this model. One is NCB→CSIF, and the second one is NCB→OF→CSIF. Mediation is confirmed as the path NCB→ OF→CSIF has been found significant.

Test of Total Effect

The impact of network capability building on CSIF Innovation function in the absence of mediating variables (NCB→CSIF) is significant (β=0.56: p<0.001). This supports hypothesis 1 (Refer to Table 6).

Test of Direct Effect

A mediating variable (Organizational function) has been included in the model to assess the direct effect. The standardized path coefficient has come down (β=0.56 - 0.49) and is statistically significant. The drop in path coefficient from 0.56 to 0.49 confirms partial mediation in the analysis (Baron & Kenny, 1986). Hypothesis 1a stating the impact of network capability building on CSIF innovation function, has been supported.

Test of an Indirect Effect

The indirect effect via path NCB → OF → CSIF has been found statistically significant. This confirms hypothesis 1b, which states that the effect of hypothesis H1 will be mediated by Organizational function. Further, Hypothesis 2, that Network capability building leads to organizational function, is significant (β=0.53: $p<0.001$). In addition, the path OF → CSIF is significant, confirming hypothesis 3 that organizational function leads to CSIF function.

Table 5. Summary of hypothesis testing.

Hypotheses	Structural Relationships	β Standard	T Values	P Values	Decision
Hypothesis 1 (Total effect)	NCB → CSIF	0.57	13.03	0.0000	Supported
Hypothesis 1a (Direct effect)	NCB → CSIF	0.49	9.16	0.000	Supported
Hypothesis 1b (Indirect effect)	NCB →OF→ CSIF	0.17	5.07	0.000	Supported
Hypothesis 2	NCB → OF	0.53	11.71	0.000	Supported
Hypothesis 3	OF→ CSIF	0.30	5.82	0.000	Supported

Significant at 0.05 Source: Author calculation

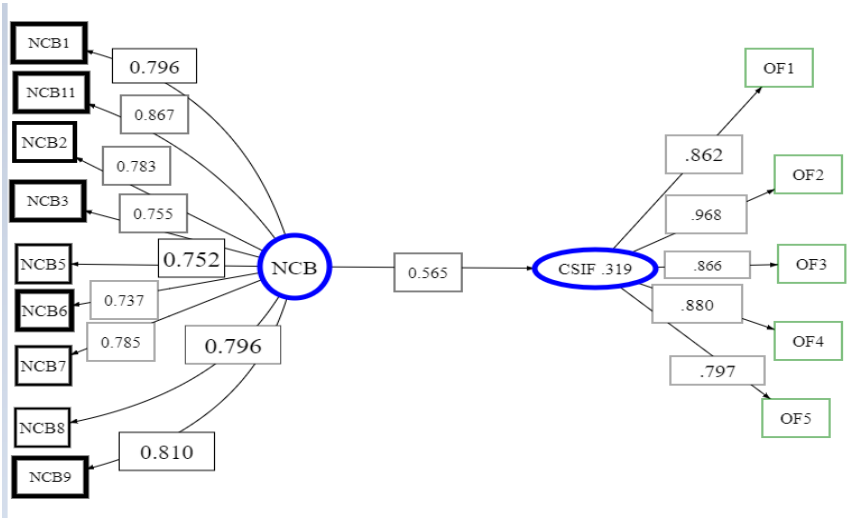

Figure 2. Structural model in the absence of mediating variable.

Table 6. Test of direct impact of NCB on CSIF.

Constructs	Path Coefficient)	Standard Error	t- value	P value	Decision
NCB → CSIF	0.565	0.043	13.028	0.000	Supported

Significant at 0.05 Source: Author Calculation

***Effect Size (F2)*:** The size of the effects (0.02; small, 0.15; mean and 0.35; large) can be defined as follows: The effect of this analysis was 0.139, which was measured for network building capabilities of circular start-ups, which was appropriate.

***Predictive Relevance (Q2)*:** The value of *Q*2, which estimates the model, should adequately estimate the indicators of each latent endogenous construct. The blindfolding test results show that NCB and CSIF are more significant than zero at 0.038, and the path model has strong predictive validity.

***The SRMR Test*:** The recommended value of SRMR should be less than 0.08. This model has reported an SRMR value of 0.07, less than the recommended value indicating a good model fit.

5. Results & Discussion

Study findings have revealed that a positive relationship exists between dimensions of network-building capabilities and the innovation function of circular startups and their franchises (*H*1) both in direct (*H*1a) and indirect effect (*H*1b). Statistically, it is supported that the Firm's networking building capabilities with the multiple stakeholders stimulate organizational innovativeness (Path Coefficient: 0.709, Sig. at 0. 000). Where new resource combinations and the role of internal stakeholders mainly impacted the innovation function of circular startups.

Organization enablers/factors fully mediate the relationship between networking and innovation function. The second hypothesis (*H*2) depicts that organizational factors do get directly affected by network building capabilities of circular startups (Path Coefficient: 0.563, Sig. at. 0.000). And even organizational factors positively impact the organizational innovativeness (*H*3) (Path Coefficient: 0.307, Sig. at 0.000). The relationship between network-building capabilities and organizational factors is more reliable than the relation between organizational factors and the Firm's innovation function (*H*2>*H*3).

Manninen et al. (2018), in their research, have emphasized the CE business model framework enabling value propositions to a circular economy. The contemporary topic of circular spin-offs still needs to be empirically investigated in the context of the manufacturing sector (Despeisse et al., 2017; Gurtu et al., 2016; Mathews et al., 2018; Prendeville et al., 2016). The relationship between the network-building capabilities of circular startups and their franchises lacks empirical investigation (Lafuente et al., 2017). The call for integrating both domains exists in theoretical studies, requiring immediate attention for practical examination. The stakeholders and organizational factors retrieved from the decision-making TOE (Technological, Organizational, and Environmental) theory need more comprehensive exploration (Orji et al., 2020) (refer to Figure 3). Studies on CE business models are available, but evidence on internal communications, relationship building, coordination, and partners' knowledge of manufacturing circular spin-offs are now recognized. Therefore, adding organizational factors to top management support significantly mediates the relationship between network-building capabilities and organizational innovation function (improved products, processes, R&D, and management practices). This work presents added empirical evidence from an emerging economy. Overall, this study's findings revealed that most of the direct relationships between dimensions of network-building capabilities and organizational innovation function were statistically supported. It is also aligned with arguments that manufacturing-based circular startups, and their franchises are related to the network building and organizational enablers of TOE theory.

Delving into the results of *H*1- it is evident that the stakeholder's perspective of building relationships and communication is vital to the Firm's advanced managerial and marketing practices (Gupta et al., 2019). Moreover, the mediation element, i.e., top management's commitment towards the stakeholders and organizational innovativeness (R&D, new product development) (Latan et al., 2018), are also statistically proven in the study. Finally, our work adds value to the contemporary domain of circular start-ups' network-building capabilities in the manufacturing sector. To date, a similar contribution has yet to be made in the manufacturing industry of emerging economies. Other developing countries can consider the sample of Indian circular start-ups and their franchises, too. India faces environmental and waste management challenges as a developing country today due to its population size and industrialization. Natural capital is depleting, and more needs to be done about it. Though young minds have come up with

circular start-ups for proper environmental management, serving the goal of achieving a successful transition of circular economies from linear ones.

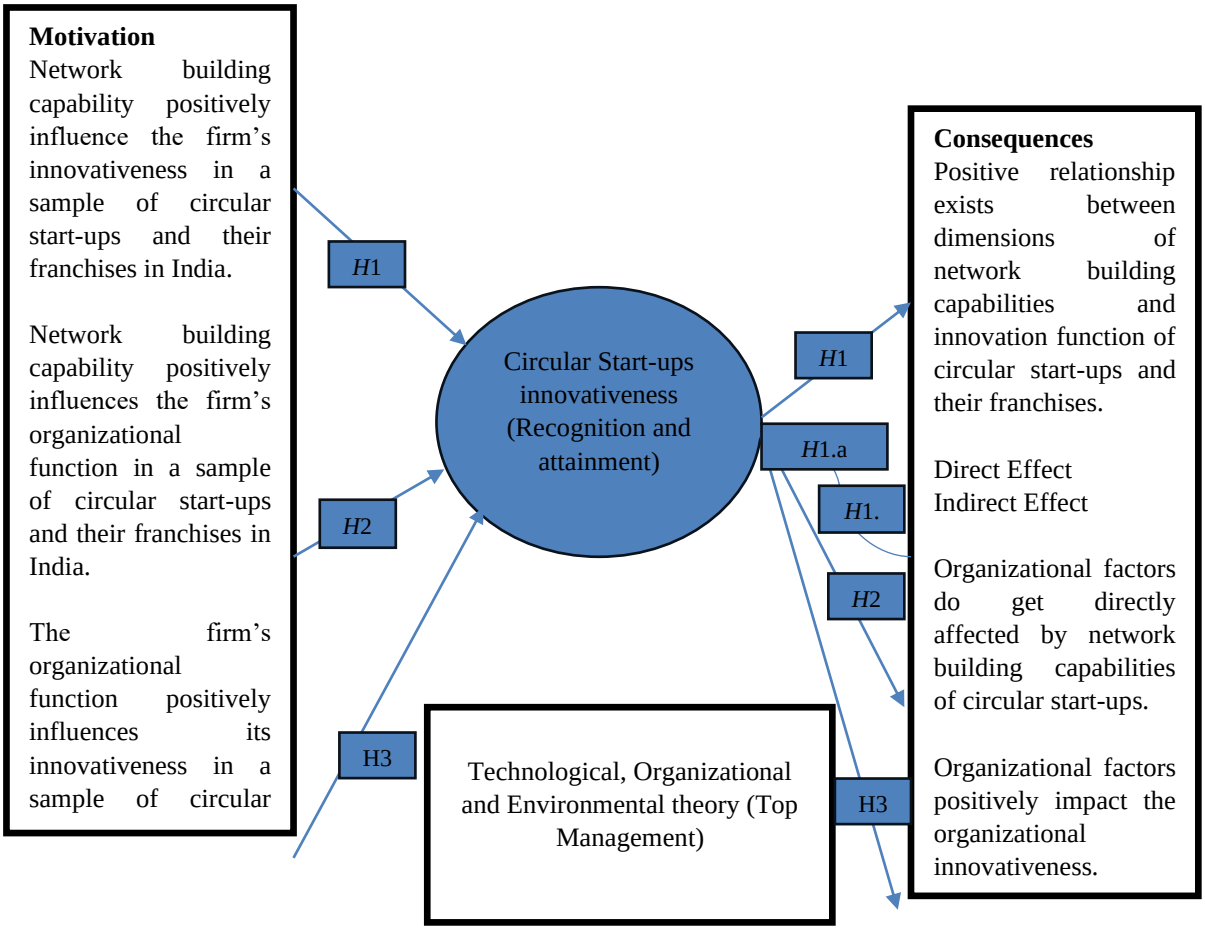

Figure 3. Conceptual framework of circular start-ups innovation function.

In the circular economy literature, Henry et al. (2020) have revealed that strong collaborations and engagement with the stakeholders yield limited economic value but significantly influence innovations and circular strategies. Our contributions accentuate the relevance of strategic thinking behind achieving innovative processes and procedural techniques. Our work partially attains the direct and indirect value offered to target developing economies' zero waste (carbon neutralization) programs. Similar to our outcomes, sustainability-oriented innovations in existing models and supply chains are discovered in the current research on circular start-ups. Another notable research finding of new resource combinations (extending material's life cycle) is in sync with the work of researchers of developed economies (Vuorio, 2020). However, only a few successful instances are seen in the case of developing economies' circular start-ups. The recent study is unique in that multi-perspective responsible enablers are established with the circular innovation function, unlike the other studies, which have more of a qualitative approach to analyzing the circular start-ups' innovation functions and strategies. Therefore, efforts are made to narrow the wide research gap in the literature on circular start-ups with actual quantitative results instead of vague conceptual theories and abstractions leading to no concrete results.

5.1 Managerial Implications

Organizations' strategic planning addressing environmental challenges has become integral to their functioning today (Raut et al., 2017). The circular business models have two Hard (organizational enablers) and soft factors (personnel resources) to balance the green external environmental issues with the power of capitalizing the operational models. Manufacturing-based circular startups have demonstrated immense practical and managerial implications: Circular entrepreneurs and managers handling waste and resource management of an organization should work on stakeholder-building capabilities. Managers can start implementing training and development programs for stakeholders, empower them with environmental knowledge, create knowledge-sharing platforms, build efficient communication channels, and create new relations with them because they are a crucial part of the new value chain system of circular economies. The clarity of content coverage in environmental training sessions and focus on environmental policy-making should be at the top of the priority list for managers. Managers should cooperate and support franchise development so that the reach of circular strategies is not just confined to the focal organizations. For environmental-conscious stakeholders, different reward systems, financial or non-financial, should be incorporated into the organization's policies. Thus, lifting their morale should be regularly exercised.

5.2 Implications for Researchers

The present study has implications for academicians, environmentalists, and waste and resource management researchers also working in the field of circular economies. Organizational innovativeness can be achieved by focusing on circular principles in the context of value chain actors. The academic world should also examine the networking capabilities of circular stakeholders and organizational factors responsible for addressing waste management issues. The theoretical and empirical findings can further contribute to the circular economy's state of the art.

The policymakers (policies/procedures/Laws), educationists (training and syllabus module), practitioners (circular strategies), Millennials (inspiration/motivation), and potential circular entrepreneurs (novel venture creation) all can imbibe the circular practices (Jones & Comfort, 2020) and strategies in their course of work. Thus, both directly and indirectly participate in the transition process of economies (linear to circular).

6. Limitations and Future Research Recommendations

The study provides various contributions to the circular economy, particularly of emerging economies. However, a few limitations exist in the paper, too. Other researchers can cover that in the future. Follow-up is not just of manufacturing sectors but other industry subsectors that still need to be included in the present paper. The literature on other factors of TOE theory (technology and environment) must be identified and studied in the context of circular start-ups. We have included only one aspect of organizational enabler in the study. Though the literature on circular economies mainly represents emerging markets, domestic literature still needs to be developed. To better comprehend circular economies, materials, and concepts of local and national regions need to be identified in the future. Next, we used circular entrepreneurs as the sample representing the Indian continent. Generalizing the results for other emerging economies would not be correct on our part because of several emerging economies' different demographic, geographic, and political backgrounds. Extending the study by focusing on multi-country and cross-country research is necessary to comprehend the concept better. Also, the present paper needs to conduct qualitative, in-depth interviews of the owners/managers running circular start-ups. The idea is naïve for the emerging world, and an accurate picture of these entrepreneurial firms is still incomplete. The multi-case study method can be of great help to researchers. The multiple moderators and mediators, like the role of women, organizational size, age, education, income status, and many

others, can be applied in the manufacturing sub-sectors plus other industries like hospitality, IT, pharmaceuticals, and Agro-based industries. The cases and empirical study can widely lay the stone for building Grounded theory, an essential part of qualitative methodology. Gioia's methodological implications based on a detailed cover of the case studies is one prominent example.

7. Conclusion

This study concludes that sustainable startups are based on three pillars that fit the T-O-E business management theory: circular innovativeness, top management support, and network-building capabilities.

All the identified factors and subfactors and their relation are well-organized and weighted per the statistical yardstick. The positive outlook of the circular startup innovation function will foster climate mitigation procedures and processes. Further, they play a role in emulating similar prototypes, thus creating global synergy among circular establishments supporting environmental concerns. Our empirical study strengthens the theoretical framework-based implications, enhancing the model's suitability in developing economies. The developing world's (global south) practical narrative backing tactical approaches at the micro level is more inclined toward the developed world's mainly European circularity studies, drawing the attention of stakeholders, which other researchers neglect in their body of work.

Conflict of Interest

The authors confirm that there is no conflict of interest to declare for this publication.

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Appendix A

Team Codes	Network building capabilities
	Internal Communications
NCB1	Your company has regular meetings for all small issues
NCB2	Your employees develop informal contacts among themselves
NCB3	Your managers and employees often give feedback to each other
	Coordination
NCB4	You coordinate with your partners in decision-making
NCB5	You review and analyze your expectations with partners
NCB6	You develop relations with each partner based on their strength
	Relationship Skills
NCB7	You can build good interpersonal relationships with your partners
NCB8	You deal flexibly with your partners
NCB9	You solve your problems constructively with your partners
	Building New Relationships
NCB10	You seek new relationships proactively
NCB11	You have a wide range of access to knowledge resources
NCB12	You create a space for new resource combinations
	Organizational Enabler Function (Top Management Support)
OF1	Training and development on innovation

OF2	Goods disposition to innovation
OF3	Policies and Procedures of encouragement
OF4	Staff incentives for innovation
OF5	Updating enterprise technologies
	Circular Start-up Innovation Function
CSIF1	New or improved products launched in the market significantly (in last 3 years)
CSIF2	New or improved processes evolved significantly.
CSIF3	Top management encourages Research and development outputs.
CSIF4	Company focuses on improving marketing practices consistently.
CSIF5	Company focuses on improving managerial practices consistently

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