Product Innovation and Network Management as Formalization Mechanisms in Creative Ventures: Evidence from Structural Equation Modeling

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Abstract*-- This study examines the sequential chain through which creative capabilities relate to the formalization of creative entrepreneurship, mediated by product innovation and network management. Using a cross-sectional, quantitative, explanatory design, a self-administered questionnaire was applied to 92 creative entrepreneurs in San Pedro Sula, Honduras, through non-probabilistic convenience sampling. The model was estimated using structural equation modeling (SEM) with robust maximum likelihood estimation (n = 90). The measurement model showed adequate standardized loadings (λ = .597-.869), satisfactory internal consistency (α = .757-.822; ω = .740-.814), and acceptable convergent and discriminant validity (AVE = .488-.598; HTMT < .85). The structural model showed adequate fit (CFI = .944; TLI = .928; RMSEA = .072; SRMR = .070). Results supported all three hypothesized paths: creative capabilities were positively associated with product innovation (β = .677, p = .002), which in turn was positively associated with network management (β = .781, p < .001), and network management was positively associated with the degree of formalization (β = .846, p < .001). Serial indirect effects were also significant. The model explained 45.8%, 60.9%, and 71.5% of the variance in innovation, networks, and formalization, respectively. Interpreted through dynamic capabilities theory, these findings suggest that the formalization of creative ventures may depend largely on the indirect strengthening of creative capabilities and collaborative networks, rather than on direct incentives toward legal registration.

Keywords*-- creative capabilities, product innovation, network management, business formalization, creative entrepreneurship, dynamic capabilities.

I. Introduction

Creative industries have become a strategic sector for economic development, articulating the production of goods and services with high symbolic content through market-oriented innovation processes [1]. These industries are characterized by the exploitation of opportunities anchored in artistic freedom and peer recognition [1], as well as by the integration of a substantive creative component into their products or services, combined with market objectives and knowledge-intensive activities [1]. In this context, creative ventures face the challenge of translating their creative capital into sustainable innovation processes, which requires moving beyond the mere interpretation of technological schemes toward knowledge management grounded in continuous learning [1].

The relationship between creativity and innovation has been documented as a pairing that drives business growth, improves production, and strengthens organizations' competitive position amid the accelerated changes of globalization [2]. Empirical evidence on entrepreneurial performance in creative industries confirms that entrepreneurs' individual capabilities translate into innovation outcomes within these organizations [3], a relationship that can also be interpreted through human capital theory, which conceives creative capabilities as a form of individual capital acquired through education, experience, and practice, whose productive exploitation generates economic and organizational returns [4]. Along the same lines, qualitative studies with creative-industry entrepreneurs have identified that perceived innovation is explained by individual traits (internal drive, passion, and creativity), by external contexts that stimulate an innovative mindset, and by the dynamics of serendipity and experimentation inherent to creative practice [5].

Once generated, product innovation does not operate in isolation: its consolidation depends largely on the venture's ability to embed itself within collaborative networks. Evidence shows that recognition of networking efforts and the contributions of other ecosystem actors are decisive for cultural ventures to change their performance and integrate into international markets [6]. Complementarily, in the case of newly created firms, cooperation with other small businesses, universities, research centers, and financial institutions significantly predicts the attainment of product innovations, unlike what occurs in already-established firms [7].

Collaborative networks, in turn, have been empirically linked to business formalization processes. The operational partners that firms rely on —commercial actors, tax advisors, and funding organizations— play a significant role in the decision to legalize their activities, confirming the relevance of a relational approach in analyzing formalization factors [8]. In solidarity entrepreneurship contexts, formalization has emerged precisely as the result of collective negotiation processes and the consolidation of roles and responsibilities among network actors [9]. At the ecosystem level, it has been documented that the formalization or informality of micro and small ventures depends largely on the type of relationship their members maintain with corporate and institutional actors [10], and that universities and other exchange platforms act as key facilitators of the co-creation and cooperation processes that sustain such formalization [11].

The interplay among these variables finds its most solid theoretical grounding in dynamic capabilities theory. From this perspective, dynamic capabilities allow organizations to innovate through the creation and development of new products and processes in response to environmental changes

[12], insofar as they determine the speed and extent to which a firm's particular resources can be aligned and realigned to fit the requirements and opportunities of the business environment [12]. Teece [13], in his seminal formulation, argues that firms with robust dynamic capabilities not only adapt to their business ecosystems but actively shape them through innovation and collaboration with other firms, entities, and institutions, directly linking the development of internal capabilities with network-based action as a mechanism for sustained superior performance. This logic has been corroborated in subsequent studies: dynamic knowledge management capabilities —particularly knowledge application— have a robust positive effect on innovation performance [14].

Empirical literature also supports the mediating role of innovation and networks within this chain. In service-sector firms, innovation capabilities drive the generation of new and improved products, which in turn impacts and enables better organizational performance [15], a relationship confirmed by findings showing a significantly positive impact of innovation performance on organizational performance [15]. In software organizations, innovation fully or partially mediates the relationship between entrepreneurial capabilities —communication, strategic capability, and industry knowledge— and firm performance [16]. Similarly, social capital influences the performance of micro and small firms both directly and indirectly through innovation, evidencing a generalized pattern of partial mediation across different types of innovation [17]. Networks, for their part, have also shown a mediating role of their own: access to entrepreneurial resources explains how an entrepreneur's formal and informal networks indirectly influence firm performance [18].

Finally, formalization is not a neutral endpoint but a variable with substantive consequences for the sustainability and competitiveness of the venture. Meta-analytic evidence indicates that formalization brings advantages to firms, although these take time to materialize and are more pronounced when formalization is induced by public policies accompanied by training processes, as opposed to self-induced formalization [19]. In the creative industries sector specifically, collaboration and network-building —favored by market access and appropriate regulatory frameworks— increase competitiveness through greater market share, export of creative products, and more competitive selling prices [20]. Nevertheless, other studies qualify this relationship: although entrepreneurial orientation and collaborative networks significantly influence innovation capability and competitive advantage, the direct effect of collaborative networks on performance is not always significant [21], underscoring the importance of explicitly modeling the mediating mechanisms —innovation and networks— rather than assuming direct relationships between capabilities and formal outcomes.

Despite this accumulated evidence, no identified study has simultaneously and sequentially tested the full chain linking creative capabilities, product innovation, network management, and the degree of formalization in the specific context of Latin American, and particularly Honduran, creative ventures. Most prior studies examine pairs of variables in isolation (creativity-innovation, innovation-networks, or networks-formalization), without offering an integrative test of the sequential mediation process that dynamic capabilities theory implicitly suggests. This research seeks to close that gap through a structural equation model that simultaneously assesses the three direct relationships and their indirect effects, contributing robust quantitative evidence to a field so far dominated by qualitative or descriptive studies.

Accordingly, the present study proposes the following hypotheses:

H1. Creative capabilities exert a positive and significant effect on product innovation in creative ventures.

H2. Product innovation exerts a positive and significant effect on network management in creative ventures.

H3. Network management exerts a positive and significant effect on the degree of formalization of creative ventures.

II. Method

A. Design and Study Context

A cross-sectional, quantitative, non-experimental, explanatory design was employed, using structural equation modeling (SEM), following the STROBE guidelines for cross-sectional observational studies [22]. The study was conducted with creative entrepreneurs in the city of San Pedro Sula, Honduras, between February and May 2026.

B. Participants

Eligibility criteria required participants to be owners or founders of an active creative venture. Recruitment was carried out through the Chamber of Commerce and the research team's contact networks, using non-probabilistic convenience sampling. The sample size (n = 92) was determined by the availability of accessible entrepreneurs during the data collection period, without a prior statistical power calculation.

C. Variables and Instrument

The structural model assessed four latent constructs organized in a sequential chain: Creative Capabilities, Product Innovation, Network Management, and Degree of Formalization, the latter serving as the final outcome variable. Each construct was measured using 5-point Likert-type items (Creative Capabilities: P2-P4; Product Innovation: P5-P7; Network Management: P12-P14; Degree of Formalization: P8-P10), developed by the research team specifically for this study. The instrument underwent a content validation process through expert judgment prior to its application; subsequent psychometric evidence (standardized factor loadings, Cronbach's alpha, McDonald's omega, AVE, and HTMT) is reported in the Results section. Additionally, five sociodemographic variables were collected: gender, age range, academic background, hierarchical position, and industry category.

D. Procedure

Data were collected through a self-administered online questionnaire distributed via Google Forms. All items required a response, which prevented item-level missing data.

Anonymity and confidentiality were guaranteed for all participants; consent to participate was obtained implicitly through the voluntary completion and submission of the form.

E. Data Analysis

Likert items were treated as continuous variables (reflective indicators). The measurement model was first assessed through confirmatory factor analysis (CFA), followed by the structural model, estimated through structural equation modeling (SEM) using maximum likelihood (ML) estimation with robust standard errors, complemented by the Yuan-Bentler scaled test statistic. Missing data were handled through listwise deletion. Due to the listwise deletion of 2 cases with missing data, the final analytic sample used in model estimation was n = 90. Analyses were conducted in Jamovi 2.7, using the SEMLj module (based on the R package lavaan). The reported model corresponds to the single, final model; no additional sensitivity analyses or comparisons with alternative estimators were performed.

F. Ethical Considerations

The study was approved by an internal institutional ethics committee at Universidad Tecnológica de Honduras. Informed consent was implicit, granted through voluntary completion of the questionnaire.

III. RESULTS

A. Sample Characterization

The final sample consisted of 92 creative entrepreneurs. Regarding gender distribution, 60.9% of participants were women and 39.1% were men. In terms of age, the largest proportion of participants fell within the 18-25 age range (31.5%), followed by 26-35 (29.3%), 36-45 (19.6%), and the 46-55 and 56-or-older ranges (9.8% each). Regarding academic background, most participants held undergraduate degrees (54.3%), followed by graduate degrees (28.3%) and technical training (17.4%). In terms of hierarchical position, participants worked mainly in administrative roles (38.0%), followed by supervisory positions (25.0%), strategic planning (19.6%), and management (17.4%). Participants were also distributed across eight industry categories, with the highest concentration in advertising and creative marketing (26.1%) and design (15.2%), and the lowest in performing arts (4.3%).

TABLE I
Sociodemographic Characteristics

Variable	Category	f	%
Gender	Female	56	60.9
	Male	36	39.1
Age range	18-25 years	29	31.5
	26-35 years	27	29.3
	36-45 years	18	19.6
	46-55 years	9	9.8
	56 years or older	9	9.8
Academic background	Technical	16	17.4
	Undergraduate	50	54.3
	Graduate	26	28.3
Hierarchical position	Administration	35	38.0
	Management	16	17.4
	Supervisory	23	25.0
	Strategic planning	18	19.6
Industry category	Performing arts	4	4.3
	Visual and plastic arts	8	8.7
	Crafts and cultural products	13	14.1
	Design	14	15.2
	Personal care and hygiene	10	10.9
	Jewelry and accessories	7	7.6
	Advertising and creative marketing	24	26.1
	Apparel and footwear	12	13.0

B. Measurement Model Assessment

Prior to evaluating the structural relationships, the measurement model was assessed through confirmatory factor analysis (CFA). All standardized factor loadings exceeded conventional thresholds, ranging from .597 to .869, supporting the convergent validity of the four latent constructs: Creative Capabilities, Product Innovation, Network Management, and Degree of Formalization. Internal consistency was adequate across all constructs, with Cronbach's alpha values between .757 and .822, and McDonald's omega values between .740 and .814. Average variance extracted (AVE) ranged from .488 to .598, providing general support for convergent validity. Discriminant validity was assessed using the heterotrait-monotrait ratio (HTMT), with all values below the conservative threshold of .85, ranging from .438 to .754.

TABLE II
Measurement Model

Factor	Item	λ (stand.)	α	ω	AVE
Creative Capabilities	P2	0.597	.757	.762	.520
	P3	0.820			
	P4	0.744			
Product Innovation	P5	0.869	.822	.814	.598
	P6	0.724			
	P7	0.705			
Network Management	P12	0.606	.776	.740	.488
	P13	0.686			
	P14	0.822			
Degree of Formalization	P8	0.633	.767	.768	.527
	P9	0.769			
	P10	0.770			

C. Structural Model Fit

The structural model showed an adequate fit to the data.

TABLE III
Fit Indices

χ^2	df	CFI	TLI	RMSEA	SRMR
72.6	51	.944	.928	.072	.070

D. Structural Relationships

The structural model indicated a positive and significant relationship between creative capabilities and product innovation. Product innovation, in turn, showed a positive and significant relationship with network management. Network management showed a positive and significant relationship with the degree of formalization of creative ventures.

TABLE IV
Structural Relationships

Hypothesis	β	95% CI	p	Result
H1: Cpc_C → Inn_P	.677	[0.360, 1.573]	.002	Supported
H2: Inn_P → Gst_R	.781	[0.302, 0.760]	< .001	Supported
H3: Gst_R → Grd_F	.846	[0.441, 1.379]	< .001	Supported

Note. Cpc_C = Creative Capabilities; Inn_P = Product Innovation; Gst_R = Network Management; Grd_F = Degree of Formalization. The 95% CI corresponds to the unstandardized parameter estimate.

E. Indirect Effects

The serial indirect effect of creative capabilities on the degree of formalization, through product innovation and network management, was significant. The indirect effect of product innovation on the degree of formalization, through network management, was also significant.

TABLE V
Indirect Effects

Path	Indirect β	95% CI	p
Cpc_C → Inn_P → Gst_R → Grd_F	.447	[0.101, 0.833]	.012
Inn_P → Gst_R → Grd_F	.660	[0.276, 0.690]	< .001

F. Explained Variance

The structural model explained a substantial proportion of the variance in the endogenous constructs. Product innovation was explained by creative capabilities at 45.8%. Network management was explained by product innovation at 60.9%. The degree of formalization was explained by network management at 71.5%, reflecting a progressively stronger explanatory chain along the proposed sequence.

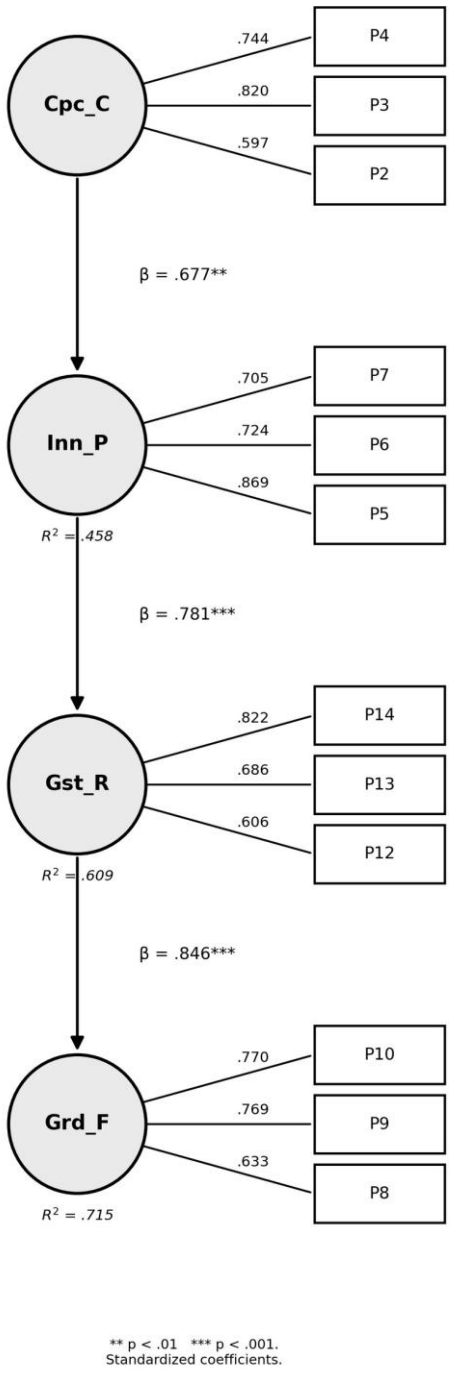


Fig. 1. Final structural model.

IV. Discussion

The results obtained consistently support the three proposed hypotheses, providing empirical support for the sequential chain of creative capabilities → product innovation → network management → degree of formalization in a sample of Honduran creative entrepreneurs.

First, the positive and significant association between creative capabilities and product innovation (β = .677, p = .002; H1 supported) is consistent with evidence on

entrepreneurial performance in creative industries, which documents that entrepreneurs' individual capabilities —their repertoire of creative skills, knowledge, and dispositions— translate directly into innovation outcomes within this type of organization [3]. This finding can also be interpreted through human capital theory, which conceives creative capabilities as a form of individual capital acquired through education, experience, and practice, whose productive exploitation generates economic and organizational returns [4]. It is equally consistent with findings attributing perceived innovation to individual traits such as internal drive and passion for creative work [5]. This result further reinforces the notion that the interpretation of creative capabilities and schemas is a necessary, though not sufficient, condition for scaling toward innovative products [1], and is consistent with the logic of dynamic capabilities theory, according to which organizations innovate by identifying processes that allow them to align their particular resources with environmental opportunities [12].

Second, product innovation showed a positive, significant, and larger-magnitude relationship with network management ($\beta = .781$, $p < .001$; H2 supported). This result aligns with evidence that networking and integration into broader markets are closely associated with changes in the performance of cultural ventures [6], and with findings showing that, particularly among newly created firms, cooperation with external actors significantly predicts product innovation [7]. The direction of the relationship specified and supported in this model —from innovation toward networks, rather than the reverse— suggests that, in the context of Honduran creative ventures, the capacity to generate innovative products may enable and strengthen access to collaborative networks, and not solely the other way around, a relevant nuance for a literature that has tended to treat both directions interchangeably.

Third, network management showed the strongest standardized association within the model with the degree of formalization ($\beta = .846$, $p < .001$; H3 supported), the most robust finding of the study. This result is consistent with evidence that operational partners —commercial actors, tax advisors, and funding organizations— play a determining role in the decision to formalize business activities [8], as well as with cases in which formalization emerges directly from negotiation processes and the consolidation of roles within a collaborative network [9]. It is also consistent with evidence that the formalization of micro and small ventures depends on the type of relationship their members maintain with corporate and institutional actors [10], and with the facilitating role played by platforms such as universities in the co-creation processes that sustain formalization [11].

The indirect effects further support the sequential mediating role of innovation and network management. The full indirect effect of creative capabilities on formalization, serially mediated by innovation and networks ($\beta = .447$, $p = .012$), and the indirect effect of innovation on formalization through networks ($\beta = .660$, $p < .001$), are consistent with prior evidence on the partial and complete mediation of innovation in the relationship between organizational capabilities and performance [16], [17], as well as with the mediating role of resource access —enabled by networks— in the relationship between networks and entrepreneurial performance [18]. These results extend that literature by suggesting that mediation may not occur at a single link alone, but along a sequential three-step chain, a finding that had not previously been jointly tested.

The proportion of explained variance, increasing along the sequence ($R^2 = .458$ for innovation, .609 for networks, and .715 for formalization), suggests that the proposed model captures the mechanisms associated with formalization in a cumulative and incremental manner, in line with the notion that firms with robust dynamic capabilities not only adapt to their ecosystems but actively shape them through innovation and collaboration [13]. However, this finding should be qualified in light of evidence that has found non-significant effects of collaborative networks on performance in other contexts [21], which suggests that the strength of the chain documented here may be conditioned by characteristics specific to the Honduran entrepreneurial ecosystem —of relatively lower institutional formality— rather than constituting a universal pattern.

These findings can also be interpreted in light of the distinctive economic traits that characterize creative industries. Caves [23] argues that creative production is governed by particular properties —demand uncertainty ("nobody knows"), near-infinite product variety, and the collaborative, heterogeneous nature of the teams involved ("motley crew")— which give contractual and relational coordination greater weight than in conventional sectors. This logic helps explain why, in the present study, network management emerged as the link with the strongest standardized association in the entire chain: in contexts of high creative uncertainty, relationships with external actors may function not merely as a diffusion channel but as a mechanism that reduces perceived risk and facilitates the transition toward formalization. Complementarily, creative class theory [24] suggests that the geographic and social concentration of creative talent generates agglomeration externalities that feed back into innovation and collaboration among entrepreneurs; this is consistent with the central role that the Chamber of Commerce and local contact networks played in recruitment and, presumably, in the collaborative dynamics of the San Pedro Sula creative entrepreneurs analyzed in this study.

Finally, these findings carry relevant practical implications: given that formalization yields benefits that materialize over time and are more pronounced when induced by policies accompanied by training processes [19], and that the competitiveness of the creative industry depends largely on strengthening collaboration and networks [20], the results suggest that public policies and support programs for creative entrepreneurship in Honduras should prioritize strengthening creative capabilities and product innovation as an indirect —yet statistically robust— gateway to business formalization, rather than focusing exclusively on direct incentives toward legalization. This recommendation is consistent with recent

policy guidance for the development of cultural and creative industries, which emphasizes integrated approaches combining capability-building, network access, and institutional facilitation, rather than isolated interventions centered solely on legal registration [25]. Evidence from comparable Central American contexts, such as the Panamanian case, reinforces the regional relevance of this integrated approach for strengthening creative and cultural industries [26].

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