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Influence of internal social capital and external social capital on product innovation

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Abstract: Product innovation plays an important role in enhancing the competitiveness of enterprises, creating new products and services, and better meeting the needs of customers and the market, thereby increasing market share and revenue. Product innovation helps firms maintain market appeal, meet customer needs, and create a competitive advantage. The purpose of this study is to determine whether internal social capital and external social capital have a positive impact on product innovation. This study uses a quantitative research design supported by SPSS software. The population in this study consisted of respondents from plastic and packaging firms in Vietnam, while the sample was obtained from 275 respondents, including office staff, sales staff, accountants, etc., from plastic and packaging firms. The sampling technique used was purposive sampling. The data analysis techniques included reliability analysis of scales through Cronbach's alpha coefficient, exploratory factor analysis (EFA), correlation analysis, and regression models. The overall research results show that internal social capital and external social capital positively impact product innovation. These results are also supported by the consistency of the responses to each question item for the independent and dependent variables. Based on the research findings, we propose some recommendations to enhance product innovation in plastic and packaging enterprises, thereby contributing to improved business performance.

Keywords: *Business administration, Economics, External social capital, Internal social capital, Plastic and packaging firms, Product innovation.*

1. Introduction

Manufacturers can maintain a competitive edge in their product portfolio by implementing innovative products [1]. However, given the poor success rates and the fact that many initiatives fail in the middle of the product development cycle, product innovation is still dangerous and expensive [2].

They can overcome the risks associated with product innovation by exchanging a range of complementary information and knowledge with buyers, suppliers, strategic partners, joint ventures, and stakeholders [3]. This allows them to create new goods at affordable costs.

A company's capacity to reinvent its products is crucial nowadays since it provides SMEs, in particular, with a competitive advantage [4]. Product innovation creates a favorable environment for growth and competitiveness, giving the economy new momentum to reach new heights [5].

Social capital, according to Fukuyama [6] is made up of members' interactions with one another, their level of compassion, and a relatively robust social network.

Social capital is thought to be a factor that promotes knowledge generation by sharing and learning from stakeholders, claim [7]. Social capital facilitates business-to-business learning by making

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information and other resources readily available [8, 9]. Through its network of partner relationships, social capital increases the accessibility of the company's expertise [9].

Currently, there are around 4,000 plastics companies in Vietnam, with 90% of them being small and medium-sized businesses, according to Ho Duc Lam, chairman of the Vietnam Plastics Association. With the help of several sizable supply factories, including Hyosung, Thailand's SCG Group, Nghi Son Refinery, and Petrochemical Plant, the industry's capacity to produce plastic materials is also expected to significantly increase and soon be able to meet roughly 50% of domestic demand.

The chairman of the Vietnam Packaging Association, Nguyen, et al. [10] asserts that the packaging sector is becoming more and more valued. However, the digital transformation and the circular economy will provide significant challenges for the packaging industry in 2023, just like they will for other industries. This is a legal requirement in addition to an objective one.

Plastic is a widely utilized material with various benefits that is used to make many things in daily life. With an average annual growth rate of 10–12%, the plastics industry has experienced significant expansion throughout the years. According to Hoang and Chu [11] of the Vietnam Plastics Association, industry revenue in 2022 also surpassed 25 billion USD, a 5.7% increase over the same period in 2021. However, given the global economic downturn in general and the ongoing effects of the COVID-19 pandemic in particular, Vietnam's plastics industry's development rate appears to be slowing down from the beginning of 2023 to the present [12].

The plastics industry in Vietnam is also compared to a processing sector due to its long-standing reliance on imported raw materials (70–80%); nearly all of its machinery and equipment come from major markets like China, Taiwan, Korea, Japan, Germany, Italy, and so on [12]. In order to help plastic and packaging companies make timely decisions that will improve business performance, it is vital and significant to evaluate, analyze, and measure the impact of both internal and external social capital on product innovation.

2. Literature Review

2.1. External Social Capital

Resources that individual members of a collectivity may be able to acquire or actually mobilize through external interactions are referred to as external social capital [13]. External social capital is the quality of an organization's network of relationships with external partners [14].

An evaluation of the quality of external networks shows how businesses must keep their word, build, maintain, and foster trust; share expertise; and provide reciprocal support to friends, family, distributors, and suppliers [15, 16].

Furthermore, companies need to keep tight relationships with their business partners by doing things like keeping their word, providing new ideas, avoiding conflicts of interest, and maintaining personal friendships [14].

Additionally, it has long been recognized that external social capital has a major impact on investment for new enterprises [17, 18].

2.2. Internal Social Capital

Internal social capital builds a positive work environment based on employee trust and understanding [19].

The web of relationships between an organization's internal departments, divisions, and employees is known as its internal network structure [14]. The relationship network is presented both vertically and horizontally.

The quality of internal interactions shows how important it is for all members of the company to share knowledge, trust, and goals and visions [15, 20]. By regularly keeping agreements, maintaining strong relationships, and exchanging knowledge and information, each department tries to avoid adversely influencing the interests of other departments Mikovic, et al. [21].

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Nguyen, et al. [22] investigate, assess, and measure the internal social capital of plastic and packaging enterprises in Hanoi and the surrounding areas using both qualitative and quantitative research approaches. Based on a review of previous research and expert interviews, the study identified and investigated six scales (component qualities) of internal social capital in plastic and packaging industries.

2.3. Product Innovation

The Organization for Economic Cooperation and Development (OECD, 2005) defines innovation in a business as introducing a new product or service, enhancing an existing process or creating a new one, developing marketing campaigns, or implementing a new strategy across the board. The OECD (2005) classified organizational innovation into four categories: (i) innovation in marketing activities; (ii) innovation in operational processes; (iii) innovation in management systems; and (iv) innovation in products.

The main goal of product innovation in a company is to increase the value that a product provides and boost business performance [23]. Additionally, product innovation can be achieved through the application of new information and technologies as well as creative combinations of knowledge and technology that currently exist [24].

Variables that reflect a company's efforts to enhance products, lead the way in launching new items onto the market, establish distinctions, and proactively improve product quality in comparison to rivals are used to measure the product innovation scale [25].

2.4. External Social Capital and Product Innovation

While searching for new business opportunities, a company's external networks help it access resources from its surrounds. Organizational financial results Lins, et al. [26] product innovation results Sanchez-Famoso, et al. [27] and business results [28, 29] are all positively impacted by having a wide network of links.

Acording to social capital theory, a company can obtain resources from its surroundings in pursuit of new chances thanks to its external networks [3]. Because both parties are dedicated to contributing a substantial portion of their resources, a better outcome will be facilitated by external relationships that are more cohesive and show mutual trust, assistance, and support [16]. They can overcome the risks associated with product innovation by exchanging a range of complementary information and knowledge with buyers, suppliers, strategic partners, joint ventures, and stakeholders [3]. This allows them to create new goods at affordable costs.

2.5. Internal Social Capital and Product Innovation

In a study of 142 companies in Spain's manufacturing, information technology software services, and mechanical industries, Cuevas-Rodríguez, et al. [3] found that internal social capital has a greater influence on product innovation than external social capital.

Through mutual understanding and trust, internal social capital fosters a positive work atmosphere [19]. Additionally, strong internal cohesion is fostered by internal social capital [30] which makes it easier for employees and various divisions inside the company to collaborate [31]. Employee trust and understanding enable regular informal talks to share expertise or information, which improves the efficiency of product invention [3]. Employees and units collaborate and coordinate closely through internal social capital, exchanging information and knowledge in many areas of business operations generally, particularly in the fields of research and product introduction or product innovation and improvement [14].

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3. Methodology

3.1. Scale and Design of Questionnaires

In this study, a 5-point Likert scale with a range of 1 to 5 was employed. I completely disagree with number five. I completely agree (for dependent variables) and completely disagree (for independent variables). Based on the findings of expert interviews and group discussions, the statements in each scale are modified to fit the current context of plastic and packaging companies in Hanoi and surrounding provinces, Vietnam, after being corrected in their wording by expert opinions and earlier research.

3.2. Research Models

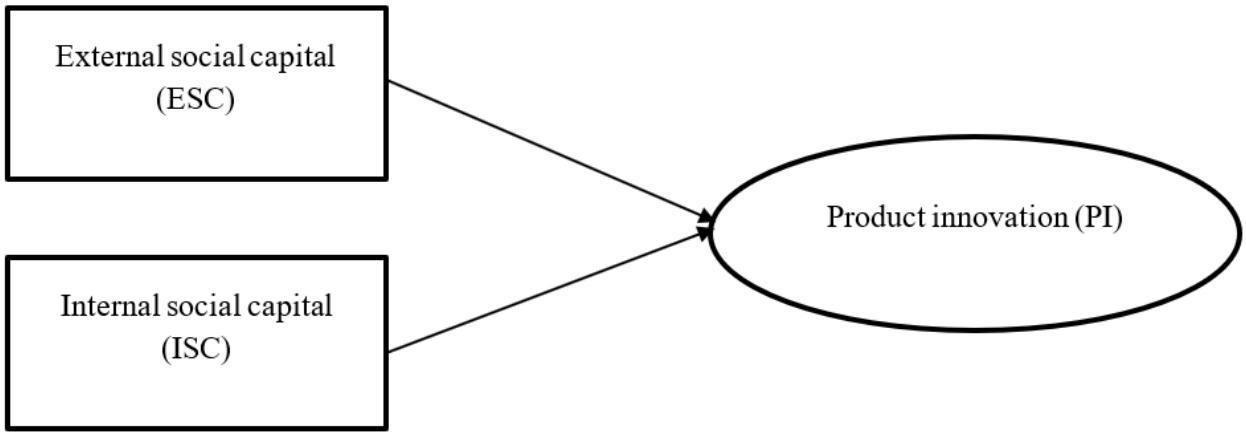

Figure 1.
Research model.

External social capital (ESC): Includes 5 observed variables (ESC1, ESC2, ESC3, ESC4, ESC5) inherited from the research results of Nguyen, et al. [22].

Internal social capital (ISC): Includes 6 observed variables (ISC1, ISC2, ISC3, ISC4, ISC5, and ISC6) inherited from the research results of Nguyen, et al. [22].

Product innovation (PI): Includes 4 observed variables (PI1, PI2, PI3, and PI4) inherited from the research results of Dai, et al. [14].

3.3. Samples and Data Collection

The convenience approach was used to choose the study sample. After creating the questionnaire, we administered it both in-person and online using Google Docs. After being cleaned, 275 of the gathered questionnaires were left for analysis. The following are the features of the sample: Of the 275 responders, 185 are men (67.3%) and 90 are women (32.7%). Additionally, 72 of them have fewer than five years of career seniority (26.2%), 134 have between five and ten years of career seniority (48.7%), and the remaining 25.1 percent have ten years or more of career seniority.

3.4. Data Processing

Quantitative research methods provided by SPSS software include regression models, correlation analysis, EFA analysis, and scale reliability analysis utilizing Cronbach's alpha coefficient.

4. Results

4.1. Cronbach Alpha

The internal reliability of the scales is evaluated using the Cronbach alpha coefficient. The statistical results in Table 1 show that Cronbach alpha values between 0.736 and 0.894 are higher than the

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significance level of 0.7, confirming the reliability of the scale utilized in the study. Every observable variable on the scales has an item-total correlation greater than 0.3. Because they meet the requirements, all of the scales can be used for exploratory factor analysis [11, 32-34].

Table 1.
Results of Cronbach's alpha testing of attributes and item-total statistics.

PI				
Cronbach's Alpha			**N of Items**	
0.899			4	
	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
PI1	9.447	3.525	0.748	0.879
PI2	9.375	3.593	0.768	0.873
PI3	9.396	3.474	0.782	0.867
PI4	9.451	3.124	0.811	0.858
ESC				
Cronbach's Alpha			**N of Items**	
0.816			5	
	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
ESC1	13.415	6.813	0.514	0.805
ESC2	13.407	6.658	0.502	0.810
ESC3	13.240	5.709	0.728	0.741
ESC4	13.745	6.563	0.555	0.794
ESC5	13.247	5.552	0.738	0.736
ISC				
Cronbach's Alpha			**N of Items**	
0.902			6	
	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
ISC1	17.993	12.971	0.662	0.894
ISC2	17.945	12.358	0.772	0.878
ISC3	18.160	12.128	0.773	0.878
ISC4	18.102	12.661	0.699	0.889
ISC5	18.265	12.407	0.758	0.880
ESC6	18.062	12.664	0.725	0.885

4.2. EFA analysis

Component analysis and variance were then used to perform exploratory factor analysis (EFA), as shown in Tables 2, 3, and 4.

The findings of Bartlett's test, which was used to look into the likelihood of correlation between the observed data, show that the KMO index is 0.813 and 0.869, respectively, more than 0.5 (>0.5). These four and eleven observable factors explain 76.906% and 63.038% of the variation in the data, respectively (>50%), according to the extracted variance. Bartlett's test is considered statistically significant if Sig. < 0.05. It can be concluded, therefore, that the study's indicators meet the requirements of the EFA analysis [11, 33, 34].

These numbers demonstrate the suitability of factor discovery research data analysis. Through the quality assurance of the scale and the test of the EFA model, we have identified four components of product innovation, five components of external social capital, and six components of internal social capital of plastic and packaging companies [11, 34].

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Table 2.
KMO and Bartlett's Test.

PI	**KMO and Bartlett's Test**	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.813
Bartlett's Test of Sphericity	Approx. Chi-Square	684.148
	Df	6
	Sig.	.000
ESC & ISC	**KMO and Bartlett's Test**	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.869
Bartlett's Test of Sphericity	Approx. Chi-Square	1,407.945
	Df	55
	Sig.	.000

Table 3.
Total Variance Explained.

	Initial Eigenvalues			**Extraction Sums of Squared Loadings**		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
PI						
1	3.076	76.906	76.906	3.076	76.906	76.906
2	.411	10.275	87.181			
3	.300	7.496	94.677			
4	.213	5.323	100.000			
ESC & ISC						
1	4.073	37.031	37.031	4.073	37.031	37.031
2	2.861	26.006	63.038	2.861	26.006	63.038
3	.698	6.347	69.385			
4	.644	5.856	75.241			
5	.537	4.878	80.118			
6	.509	4.626	84.745			
7	.456	4.143	88.888			
8	.391	3.554	92.442			
9	.304	2.764	95.206			
10	.272	2.469	97.675			
11	.256	2.325	100.000			

Note: Extraction Method: Principal Component Analysis.

Table 4.
Component Matrix[a].

	Component
PI	1
PI4	0.898
PI3	0.881
PI2	0.873
PI1	0.856

ESC&ISC	**Component**	
	1	**2**
ISC2	0.847	-0.090
ISC3	0.839	-0.148
ISC5	0.829	-0.127
ISC6	0.811	-0.091
ISC4	0.788	-0.091
ISC1	0.738	-0.216
ESC5	0.177	0.843
ESC3	0.159	0.839
ESC4	0.125	0.708
ESC1	0.208	0.648
ESC2	0.163	0.645

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4.3. Correlation Analysis

Table 5 displays the correlation matrix's findings. Both the internal and external social capital correlation coefficients with product innovation in plastic and packaging companies are more than 0.0, indicating a positive trend. Furthermore, all variables are connected if the sig. values are less than 0.05, indicating a linear relationship between the independent factors and the dependent variable ([33]. Furthermore, there is virtually no chance of collinearity between the two independent variables because they are not correlated (sig = 0.287, greater than 0.05) [35].

Table 5.
Correlations.

		Product innovation	External social capital	Internal social capital
Product innovation	Pearson Correlation	1	0.262**	0.153*
	Sig. (2-tailed)		0.000	0.011
	N	275	275	275
External social capital	Pearson Correlation	0.262**	1	0.064
	Sig. (2-tailed)	0.000		0.287
	N	275	275	275
Internal social capital	Pearson Correlation	0.153*	0.064	1
	Sig. (2-tailed)	0.011	0.287	
	N	275	275	275

As a result, conclusions may be drawn on how internal and external social capital affect the ability of plastic and packaging industries to create innovative goods. However, further research should be done on the other independent factors that influence the product innovation of plastic and packaging companies besides internal and external social capital. To improve the credibility of the research findings, more investigations with larger sample sizes and wider geographic scopes should be carried out in the future.

4.4. Regression Model

Multiple regression analysis is used to determine the study's findings, which include two independent variables and one dependent variable. Product innovation (PI) will be the sole variable in this study's regression phase.

Utilizing model regression, investigate how plastic and packaging companies' product innovation (PI) is impacted by external and internal social capital (ESC and ISC) (see Fig. 1). The model's validity and the connections between the dependent and independent variables are demonstrated in Table 6. Two factors account for 8.7% of the variance in product innovation (PI) in plastic and packaging companies, according to this model's R-square value of 0.087 [11, 36]. The p-value (sig. value) of the ANOVA test is 0.000 with a 95% CI, meeting the requirement that it be less than 0.05 (table 7). In other words, the ANOVA analysis shows that the linear model is relevant [11, 36].

Because the Durbin-Watson value falls between 1 and 3 (DW = 1.411), Durbin-Watson statistics, which are used to confirm the autocorrelation of residuals, demonstrate that the model is not violated when employing the multiple regression approach. Stated otherwise, the model does not contain residual autocorrelation [11, 36].

The p-values (sig. values) in the coefficients result displayed in Table 8 are less than 0.05, indicating that two independent variables are significant predictors of the dependent variable. Additionally, both predictors' VIF values are less than 2, indicating the absence of multicollinearity [11, 36]. The regression equation can then be determined as follows based on the outcome:

PI = 0.253*ESC + 0.137*ISC

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Table 6.
Model Summary[b].

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.296[a]	0.087	0.081	0.58212	1.411

Note: a. Predictors (Constant): ISC, ESC
b. Dependent Variable: PI.

Table 7.
Anova[a].

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	8.823	2	5.036	17.343	0.000[b]
Residual	92.170	242	0.290		
Total	100.992	244			

Note: a. Dependent Variable: PI
b. Predictors: (Constant): ISC, ESC

Table 8.
Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.687	0.259		7.208	0.000		
ESC	0.251	0.058	0.253	4.363	0.000	0.996	1.004
ISC	0.119	0.050	0.137	2.360	0.019	0.996	1.004

Note: a. Dependent Variable: PI.

5. Discussion and Implications

Employees will help a company enhance product innovation if they share the same vision and goals, consistently fulfill their commitments, maintain relationships, and communicate with one another when doing tasks [14]. More product innovation will also be encouraged by plastic and packaging companies that concentrate on establishing tight coordination mechanisms between departments or units to complete duties.

Businesses are more likely to innovate their products when they maintain their word, establish positive rules with partners, and refrain from jeopardizing mutual benefits. Additionally, businesses frequently fulfill their commitments, establishing guidelines to preserve collaboration with business partners and frequently getting referrals to new business prospects from them [14].

Significant engagement with suppliers and consumers, as well as within the company, is necessary for firm product innovation [24]. As a result, product innovation must set the product apart from rivals, which is crucial in the packaging and plastics industries.

Customers frequently evaluate product quality across companies before choosing to purchase goods or services [37]. Therefore, while introducing new products to the market, plastic and packaging companies should evaluate the quality of their new products against those of their rivals in order to succeed in product innovation.

Businesses in the plastic and packaging sectors need to perform better still given the pressure from the competition, the impact of Industrial Revolution 4.0, the digital transformation of plastic and packaging companies, and the growing risk of being bought out by foreign investors.

The government of Vietnam will implement a strategy to encourage collecting, recycling, and reuse in the near future in order to reduce resource consumption, in line with the global trend toward the creation of a circular economy. natural resources, lowering the amount of plastic trash released into the environment in accordance with the 2020 Law on Environmental Protection. In order to meet market demand, that will help boost investment in new technology and machinery, opening doors for future providers of new materials and machinery [12].

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Vietnam has developed into a plastic product manufacturing hub that serves major import markets. In order to foster technological innovation and aid in business development, it seeks to unite prominent industries from the printing, packaging, and plastics sectors [12].

The packaging sector is growing at a good and steady pace in Vietnam. The average annual growth rate from 2015 to 2020 was 13.4%, with plastic packaging growing at the quickest pace, at almost 25%. Approximately one million tons of plastic are utilized annually [38]

The vice president of the Vietnam Chamber of Commerce and Industry (VCCI), Hoang and Chu [11] stated that the printing, packaging, and plastic industries have all seen growth and are expanding quickly in tandem with the growth of the local manufacturing sector. They are regarded as a promising supporting industry that, in order to become more competitive in the market, demands items with advanced technology, contemporary production techniques, and management.

Companies that specialize in plastic and packaging are industry leaders in offering services and solutions related to these materials. We consistently provide our clients with improved plastic and packaging options in addition to investment, innovation, and a spirit of challenge. Becoming the market leader in plastic and packaging is the company's aim. Prior to that, we always work to make sure that our products have the best quality and technology, the lowest prices, and the highest level of customer happiness.

The goal of plastic and packaging companies is to meet all consumer needs while producing the greatest plastic products and packaging. We are confident in our ability to provide our clients with high-quality publications, guaranteeing the utmost satisfaction for picky clients, thanks to a staff of knowledgeable human resources and a system of contemporary, expert machinery.

Additionally, companies that deal with plastic and packaging have a staff that helps consumers with free consultations, product design, and packaging. They are prepared to offer guidance on strategy implementation and brand promotion via printed packaging and merchandise. Consequently, companies are able to validate their brand with consumers.

Vietnam's plastics sector continues to face some obstacles and expand unevenly. Petroleum products supplied from overseas are the primary raw resources used in this sector. As a result, Vietnam still has far higher plastic product prices than many other nations in the region.

To enhance business performance, plastic and packaging companies must proactively implement solutions, such as figuring out how to boost sales, save expenses, and lower product costs. The price of imported raw materials affects the plastics industry's production costs. To be self-sufficient in raw materials, the plastics industry must aggressively invest in the manufacture of input materials, concentrating on the creation of materials that local businesses have a high need for, like plastic beads.

Packaging companies currently face challenges in gathering, classifying, and recycling plastic trash. In order to help members understand and implement the policy effectively, the Vietnam Packaging Association should update it on a regular basis. Additionally, integrating packaging businesses with the market entails helping them comprehend and identify the processes in the digital transformation process as well as enhancing their endogenous capacity.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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