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A Study on Product Innovation in Furniture Firms

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Abstract
Digital technology is using technology such as AI, the Internet, websites, etc. to apply to the field of design and development. Therefore, the furniture field in the context of digital technology will face many opportunities and challenges. The purpose of the study was to discuss product innovation among furniture firms. The study aimed to show the evaluation of the differences in product innovation among furniture firms with participants of different marital statuses, work locations, job positions, and ages. The study relied on a data collection tool. The questionnaire was designed based on the opinions of experts and the results of previous studies. A group of employees in furniture firms in Vietnam represented the population of the study. 300 questionnaires were distributed, and 220 were retrieved, representing a 73.33% response rate. SPSS was utilized for a comparative evaluation of product innovation among furniture firms between respondents. Multiple statistical techniques were employed for data analysis, including SPSS via the independent t-test and ANOVA. The study's results indicate that there is difference in assessing product innovation among furniture firms between different subjects in terms of marital statuses, work locations, job positions, and ages. This study offers theoretical and practical implications for improving product innovation among furniture firms, thereby improving business performance. Based on this result, the study proposes some recommendations for furniture firms.

Keywords: Product Innovation, Furniture Firms, Economics, Business Administration, Business Performance

JEL code: M10, O31, D22, M00

1. Introduction
In the craft sector, most craft businesses are SMEs; product innovation plays a key role and is an indispensable requirement for craft businesses to survive and develop (Harel *et al*., 2019) [7].
Through relationships with buyers, suppliers, strategic partners, joint ventures, and stakeholders, they are able to exchange a variety of complementary information and knowledge to create new products with low costs, overcoming risks related to product innovation (Cuevas-Rodríguez *et al*., 2014) [2].
During the interior design process, choosing the right style will help improve people's mood, health, and work efficiency. Therefore, furniture firms always try to bring customers modern, convenient, and creative space solutions.
Digital technology is using technology such as AI, the Internet, websites, etc. to apply to the field of design and development. Therefore, the furniture field in the context of digital technology will face many opportunities and challenges. Firms that can proactively adapt, absorb, and apply digital and high-tech technologies will gain a competitive advantage and develop sustainably. On the contrary, firms left behind will have difficulty maintaining their position and survival.

2. Literature Review
According to the Organization for Economic Cooperation and Development (OECD, 2005) [9], innovation in a firm is the implementation of a new product or service, improving an existing process or building a new process, innovating marketing activities, or deploying a new method throughout the entire organization. According to the OECD (2005) [9] classification, organizational innovation is divided into 4 types as follows: (i) product innovation; (ii) operational process innovation; (iii) management system innovation; and (iv) innovation in marketing activities.
Several studies have asserted that social capital facilitates knowledge development, which, in turn, provides the foundation for generating corporate innovation and competitive advantage (Sanchez-Famoso *et al*., 2017; Wang *et al*., 2016) [10, 11]. Additionally, social capital facilitates innovation by promoting cooperation and coordination among members inside and

outside the firm (Adler & Kwon, 2002; Dai *et al*., 2015) [1, 3]. Furthermore, empirical research by Cuevas-Rodríguez *et al*. (2014) [2] also shows that internal social capital has a stronger impact on product innovation than external social capital when studying 142 firms in the mechanical industry, manufacturing, and information technology software services in Spain.

3. Methodology

The study followed two approaches: (i) the descriptive approach and (ii) the analytical approach (questionnaire).

Participations: The study population consists of 400 employees in furniture firms in Vietnam until the midyear of the year 2023, and a random sample of 300 employees was selected; the questionnaires were distributed through Google Drive and e-mail, and the questionnaires retrieved were 220 by the ratio (73.33%) of the sample size (see Table 1).

Study variable: The study relied on a variable product innovation among furniture firms (PI1–PI4).

The statistical analysis program (SPSS) was used, and the following tests were performed: independent T-test and ANOVA analysis.

Table 1: Respondents by marital status, work location, job positions and ages

	Frequency	Percent	Cumulative Percent
Marital status			
Married	166	75.5	75.5
Single	54	24.5	100.0
Job positions			
Business staffs	77	35.0	35.0
Accountants	66	30.0	65.0
Production department	36	16.4	81.4
Other positions	41	18.6	100.0
Ages			
From 22 to 30 years old	64	29.1	29.1
From 30 to 35 years old	58	26.4	55.5
From 35 to 45 years old	51	23.2	78.6
45 years old or older	47	21.4	100.0
Work location			
City	82	37.3	37.3
Contryside	138	62.7	100.0
Total	220	100.0	

Information on the data collected is shown in Table 1. It shows that among the respondents, 35.0% were business staff, 30% were accountants, 16.4% were in the production department, and other positions accounted for 18.6%. Of these, 64 participants are from 22 to 30 years old, accounting for 29.1%; 58 participants are from 30 to 35 years old, accounting for 26.4%; 51 participants are from 35 to 45 years old, accounting for 23.2%; and the remaining respondents are 45 years old or older, accounting for 21.4%. Among the respondents, 37.3% of the participants work in furniture firms in the city, and 62.7% of the participants work in furniture firms in the countryside. There were 166 participants who were married; the remaining were single.

4. Results

4.1 Independent T-Test: Different Marital Status

A comparison of the results of the evaluation of the differences in product innovation among furniture firms with participants of different marital status (married and single) can be seen in Table 2.

According to the results shown in Table 2, sig Levene's test is 0.003, which is less than 0.05. The variance between married and single is different. Moreover, the sig value t-test is 0.025, which is less than 0.05, which means that there is statistically significant difference in product innovation among furniture firms between these different marital status (Hoang & Chu, 2008, Hair *et al*., 2009; Hair *et al*., 2014) [8, 5, 6].

4.2 Independent T-Test: Work Location

A comparison of the results of the evaluation of the differences in product innovation among furniture firms with participants of different work location (countryside and city) can be seen in Table 3. According to the results shown in Table 3, sig Levene's test is 0.039, which is less than 0.05. The variance between countryside and city is different. Moreover, the sig value t-test is 0.043, which is less than 0.05, which means that there is statistically significant difference in product innovation among furniture firms between these different work location (Hoang & Chu, 2008; Hair *et al*., 2009; Hair *et al*., 2014) [8, 5, 6].

Table 2: Differences in product innovation among furniture firms with participants of different marital status-Independent Test

		Levene's Test for Equality of Variances		T-Test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
PI	Equal variances assumed	8.907	0.003	1.909	218	0.058	0.22886	0.11988	-0.00740	0.46512
	Equal variances not assumed			2.268	127.185	0.025	0.22886	0.10091	0.02919	0.42853

Table 3: Differences in product innovation among furniture firms with participants of different work location - Independent Test

		Levene's Test for Equality of Variances		T-Test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
PI	Equal variances assumed	4.296	0.039	-1.955	218	0.052	-0.20851	0.10665	-0.41871	0.00169
	Equal variances not assumed			-2.038	192.280	0.043	-0.20851	0.10232	-0.41033	-0.00669

4.3 ANOVA-Job Positions

An ANOVA test was needed to make a comparison of the results of the evaluation of the differences in product innovation among furniture firms between the four subjects, including participants who are business staff, participants who are accountants, participants who are in the production department, and participants in other positions. Table 4 shows that the sig Levene statistic is 0.438, which is more than 0.05, which means that the hypothesis of homogeneity of variance among the variable value groups (different job positions) has not been violated. Table 7 shows that sig. is 0.724, which is more than 0.05, which indicates that there is no statistically significant difference in product innovation among furniture firms between the mentioned four groups of job positions (Hoang & Chu, 2008, Hair *et al*., 2009; Hair *et al*., 2014) [8, 5, 6].

Table 4: Test of Homogeneity of Variances

Descriptions	Levene Statistic	df1	df2	Sig.
PI				
Based on Mean	0.909	3	216	0.438
Based on Median	0.708	3	216	0.548
Based on Median and with adjusted df	0.708	3	209.051	0.548
Based on trimmed mean	0.712	3	216	0.546

Table 5: ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
PI					
Between Groups	0.789	3	0.263	0.440	0.724
Within Groups	128.989	216	0.597		
Total	129.778	219			

4.4 ANOVA-Ages

An ANOVA test was needed to make a comparison of the results of the evaluation of the differences in product innovation among furniture firms between the four subjects, including participants who are from 22 to 30 years old, participants who are from 30 to 35 years old, participants who are from 35 to 45 years old, and participants who are 45 years old or older. Table 6 shows that the sig Levene statistic of 0.369 is greater than 0.05, which means that the hypothesis of homogeneity of variance among the variable value groups (different ages) has not been violated. Table 7 shows that sig. is 0.203, which is more than 0.05, which indicates that there is no statistically significant difference in product innovation among furniture firms between the mentioned four groups of ages (Hoang & Chu, 2008; Hair *et al*., 2009; Hair *et al*., 2014) [8, 5, 6].

Table 6: Test of Homogeneity of Variances

Descriptions	Levene Statistic	df1	df2	Sig.
PI				
Based on Mean	1.056	3	216	0.369
Based on Median	0.670	3	216	0.571
Based on Median and with adjusted df	0.670	3	212.669	0.571
Based on trimmed mean	1.084	3	216	0.357

Table 7: ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
PI					
Between Groups	2.732	3	0.911	1.548	0.203
Within Groups	127.046	216	0.588		
Total	129.778	219			

4.5 The Relationship between Product Innovation among Furniture Firms

4.5.1 Job Positions

Next, the line graph shows the relationship between product innovation among furniture firms and each respondent's job position (Fig 1). Fig 1 shows that this line tends downward when the respondents' job positions are other positions. But this line tends to go up when the respondents' job positions are business staff, accountants, and production departments.

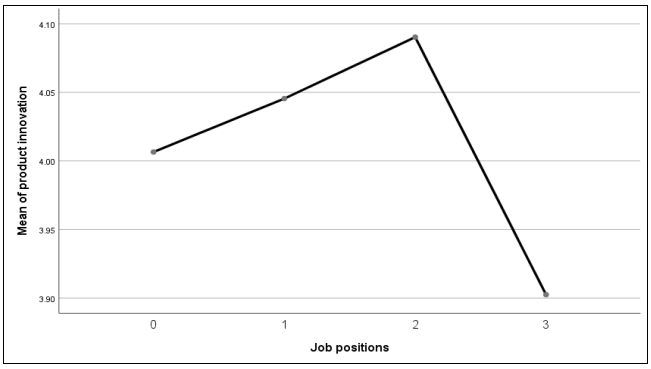

Fig 1: The line graph shows the relationship between product innovation among furniture firms and each respondent's job positions

4.5.2 Ages

Next, the line graph shows the relationship between product innovation among furniture firms and each respondent's age (Fig 2). Fig 2 shows that this line tends to go down when the respondents' ages range from 22 to 30 years old, from 30 to 35 years old, and from 35 to 45 years old. But this line tends to slope up when the respondents' ages are 45 years old or older.

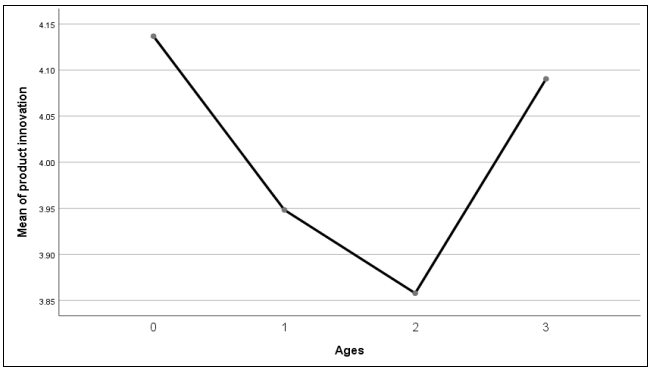

Fig 2: The line graph shows the relationship between product innovation among furniture firms and each respondent's ages

5. Discussion and Implications

Many furniture factories lack high-quality human resources, especially creative and unique designers. Besides, there is a lack of cooperation between firms, between firms and schools, and between firms and the state. Policies to support, encourage, and protect the Vietnamese furniture industry still have limitations.

Consumer needs are not only for functional, smart, and personalized furniture products but also for reasonable prices and quick delivery. This is a significant challenge for carpenters and even large furniture manufacturers.

In recent times, some furniture businesses have invested heavily in digitizing all accessories in CAD/CAM format so that furniture production software can read product information. Thereby, firms can help traditional carpenters upgrade their production lines into digital factories.

Furniture firms plan to become one of the leading interior design brands not only in Vietnam but also in Southeast Asia. That plan will promote furniture firms, creating both an opportunity and a challenge for the furniture industry. Furniture firms expect to bring Vietnamese architectural style globally, contributing to promoting Vietnamese culture and creativity. At the same time, furniture firms also want to contribute to the sustainable development of society by using recycled, energy-saving, and environmentally friendly materials.

According to some experts, the consumer market has changed its perspective on demanding sustainability in interior products. More than just a trend, sustainability today has become a mandatory requirement for firms wanting to enter the consumer market. This puts great pressure and challenges on Vietnamese furniture firms.

It can be said that in the past year, the Vietnamese furniture industry in general and the wooden furniture industry in particular have had impressive growth in the international market. Vietnam is currently one of the world's leading exporters of wooden furniture. In addition to meeting domestic demand, Vietnamese wooden furniture is also exported to more than 120 countries around the world, especially large regions such as North America, Europe, and Asia (consosukien.vn, 2021) [12].

Furniture firms also have major changes in designs, marketing trends, and export standards to gradually better meet the requirements of consumers around the world. However, behind that, firms have been facing many challenges and certain difficulties. First of all, raw material sources are being interrupted, making it difficult for supply to meet the increase in customer demand. In particular, the traceability of each product part is also becoming stricter, so if just one product part does not meet the process, it will block the entire export shipment. In addition to facing new regulations in import markets, Vietnam's wood processing and export industry is also facing a common problem in the world economy. There is a shortage of empty containers to export goods through international ports before being delivered to customers around the world (consosukien.vn, 2021) [12].

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