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Research Article

Thriving in Constraints: Exploring the Interplay of Human Capital, Social Capital, and Financial Constraints in Frugal Innovation within Family Businesses

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ABSTRACT

This study aims to learn the impact of human capital, social capital, and financial constraints on frugal innovation as perceived by family businesses in the Philippines. Quantitative research was performed using data collected from 93 family businesses, which were analyzed using simple linear regression and structural equation modeling. The results showed that human capital, social capital, and financial constraints, individually and collectively, have a significant impact on frugal innovation. The results also indicated that all measures used for human capital and financial constraints are acceptable, while some measures of social capital and frugal innovation were deemed unfit and were removed from the model. The academe should expand or improve its discussion and curriculum on frugal innovation and continue to look at this through the lenses of its theoretical and practical aspects. Moreover, professors and students should study the relationship further and ultimately expand knowledge and understanding. Family businesses should prioritize improving their human capital to enhance their frugal innovation capabilities. Implementing efficient financial procedures, investigating alternative funding sources, and actively seeking external finance opportunities are crucial. Moreover, family businesses should develop robust social networks. Lastly, the Philippine government should actively encourage continuous learning through mentorship programs and networks.

Keywords: *Financial constraints*, *Frugal innovation, Human capital, Social capital*

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Introduction

Business innovations are emphasized in the 21st century as a means of adjusting to technological advancements and market dynamics. Focusing on innovation is essential for businesses to maintain competitiveness and long-term sustainability (Dagan et al., 2021). Despite the advantages, research indicates that family businesses frequently demonstrate a disinclination towards embracing innovation, primarily attributed to their conservative nature and risk aversion (Heider et al., 2022). Additionally, studies suggest that family businesses exhibit lower levels of innovation due to their cautious approach toward financial risks (Duran et al., 2015). Under the influence of their cultural values, family enterprises might give higher importance to conventional techniques rather than innovative approaches (Miller & Le Bretton-Miller, 2021).

Heider et al. (2020) ascertain that human, social, and financial capital significantly fosters creativity within family businesses. Recognizing financial constraints, this study investigates the relationship between these variables and their impact on innovation, mainly focusing on frugal innovations in family-owned organizations.

Frugal innovation, a strategy catering to low-income consumers with limited resources, aligns with the needs of family businesses (Hossain, 2016). It benefits social and economic sustainability and taps into an untapped market, potentially increasing sales (Clausen and Fichter, 2019, as cited in Lopez-Sanchez & Santos-Vijande, 2022). Frugal innovation is a practical strategy in a developing country like the Philippines, which has a rapidly expanding economy and a skilled workforce, to effectively cater to low-income consumers' needs (United Nations Industrial Development Organization, n.d.).

Considering family businesses' traditional nature and limited resources, investigating frugal innovation provides a new and insightful viewpoint. This study seeks to address the existing research gap by examining frugal innovation within family businesses instead of the broader focus on innovation in general. Exploration is crucial for the sustained growth of family enterprises, as innovation is necessary for expanding their possibilities (Olexova & Gogolova, 2021). An exploration of frugal innovation in family businesses has the potential to enable these enterprises to capitalize on their advantages fully.

Conceptual background and hypothesis

Human capital and frugal innovation

Human capital is often linked to knowledge and skills; however, attitude and motivation could also be associated with it (Dawson, 2012). Sun et al. (2020) determine the firm's human capital by the general managers' education and tenure and the management team's average schooling and age. On the other hand, Danquah & Amankwah-Amoah (2017) associate human capital with knowledge, training, and education. Felicio et al. (2012) defined human capital using 5 dimensions, which are knowledge, experience, professional proficiency, cognitive ability, and proactivity. Therefore, human capital can be defined and measured in many different ways.

Therefore, Thrassou et al. (2018) discussed how human capital is crucial for family firms as it could be used as a competitive advantage. Therefore, family firms are usually associated with being superior in professional experience, education, training, level of knowledge of the market and industry, abilities for working within the context of global marketplaces, and care for their constituents as compared to non-family firms (Kidwell et al., 2019). Therefore, human capital is often evident in family firms, and it plays a crucial role in the operation of these firms.

Thus, in the context of frugal innovation, Jayabalan et al. (2022) determined the potential of frugal innovation using human capital as a component in doing so through their use of intellectual capital in the study. A research review was conducted, but unfortunately, the results have shown that few studies have been conducted on the relationship of frugal innovation with intellectual capital and information technology capability. On the other hand, the research of Lei et al. (2021) has learned that human capital has a positive effect on frugal innovation in the context of manufacturing and service businesses, wherein it was determined that leadership and knowledge reasons are key

drivers of innovation. Therefore, this research proved that human capital has an impact on frugal innovation.

H1. Human capital greatly affects frugal innovation as perceived by family businesses.

Social capital and frugal innovation

Social capital, as defined by Bhandari & Yasunobu (2009), is the "collective asset in the form of shared norms, values, beliefs, trust, networks, social relations, and institutions that facilitate cooperative and collective action for mutual benefits." It plays a vital role in integrating innovation in firms as numerous literatures link the concepts together (Pucci et al., 2017). Studies show that R&D is highly correlated with relationships developed by firms, which may affect their ability to innovate. This is supported by the study conducted by Gu et al. (2013), wherein it emphasized social capital's key involvement in promoting R&D innovation.

Mengesha et al. (2021) explain how crucial social capital is, most especially when implementing the "frugal knowledge" needed for frugal innovation. The research discussed that by facilitating communication and lowering the cost of information exchange, social capital boosts efficiency, which is a form of frugal thinking. With this, Felicio et al. (2012) identified six dimensions that measure social capital: social relations, personal relations, family support, complicity, interlinking, and status.

H2. Social capital greatly affects frugal innovation as perceived by family businesses.

Financial constraints and frugal innovation

Trachuk & Linder (2021) emphasized the importance of financial resources in fostering innovation, noting that constraints can impede innovation in business operations. This was supported by Sica (2018), who emphasized the dependence of start-ups on financial resources for eco-innovation (frugal innovation).

Financial resources are crucial for implementing innovations as they provide the necessary funds. However, various research articles contend that this is not universally true. Financial constraints may also lead businesses to explore alternative methods of innovation. Abbas and Liu (2021) studied the challenges faced by Pakistan- and Bangladesh-based frugal eco-innovative startups. The authors found that startups have more trouble getting loans from banks than larger firms because financial institutions have higher start-up requirements. These enabled startups to apply a cost-efficient innovation with a low environmental impact.

The relationship between financial resources and innovation varies across different types of businesses and innovation categories. While financial constraints may hinder certain aspects, frugal eco-innovative startups demonstrate the possibility of integrating innovation without excessive financial resources, emphasizing the role of business models in achieving sustainable outcomes.

H3. Financial constraints greatly affect frugal innovation as perceived by family businesses.

Human capital, social capital, financial constraints, and frugal innovation

In family businesses, Heider et al. (2020) identified that higher investment in human capital, social capital, and patient financial capital affects the innovation of these firms. Previous researchers also separately showed the impact of human capital, social capital, and financial constraints on frugal innovation (Jayabalan et al., 2022; Mengesha et al., 2021; Abbas & Liu., 2021).

Sun et al. (2020) identified that firms with strong human capital are more likely to contribute to competitive advantage. Social capital is also involved in innovation capability (Sanchez-Famoso et al., 2019). Sica (2018) also explained that firms with financial constraints seek alternative innovations that are within the limitations, which evokes frugal innovation. Research shows that family firms are more innovative with human and financial resource constraints (De Massis et al., 2017; Matzler et al., 2014).

In exploring the impact of frugal innovation on family businesses, the concept is analyzed by considering human, social, and financial capital. This approach is grounded in the research conducted by Heider et al. (2022).

H4. Human capital, social capital, and financial constraints, collectively, have a significant impact on frugal innovation as perceived by family businesses.

Methodology

Framework

The study adopted a quantitative approach for its research. Specifically, descriptive-causal research was conducted to test and determine the relationships of the tested variables. With this, a survey was conducted and disseminated to over 100 family business owners or managers in the Greater Metro Manila area, wherein a clustered sampling method was administered. The survey questions utilized were derived from the three sources used in the study's conceptual and operational framework, which are Felicio et al. (2012), Rosetto et al. (2023), and Shaikh & Khoso (2019).

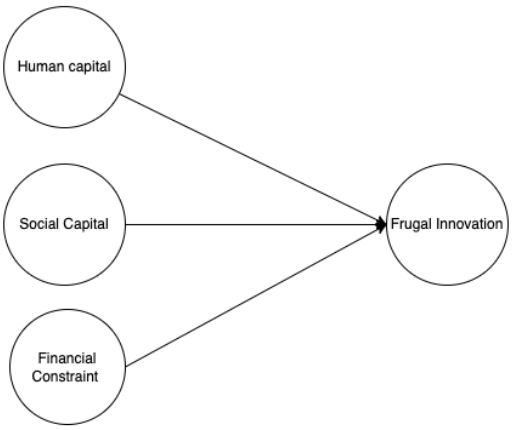

Figure 1. Conceptual Framework

Construct measurement

Human capital is a second-order construct and is measured through five dimensions adapted from the study by Felicio et al. (2012), which includes knowledge, experience, professional proficiency, cognitive ability, and proactivity. It has a total of 18 questions, and a 5-point Likert scale was used ranging from 1 = very low to 5 = very high, 1 = novice to 5 = expert, 1 = poor to 5 = excellent, and 1 = never to 5 = always, accordingly. The questions are asked based on managers/owners as a representation of the business's current human capital.

Following social capital, also a second-order construct uses the six dimensions by Felicio et al. (2012), which include social relations, personal relations, family support, complicity, interlinking, and status. Similarly, a 5-point Likert scale was employed, ranging from 1 = not at all to 5 = very, 1 = very weak to 5 = very strong, 1 = lower to 5 = upper, depending on the question type. There are 23 questions, and they are asked based on "The company representative" for social capital.

Third, financial constraints are a first-order construct of which questions were adapted from Shaikh & Khoso (2019). There are seven questions focusing on internal financing obstructions, external financing, stringent collaterals, inadequate facilities, financial institutions' constraints, cost of borrowing, and procedure of obtaining loans. A five-point Likert scale ranged from 1 = strongly disagree to 5 = strongly agree. The questions are based on the family business's current financial constraints and capital.

Lastly, frugal innovation is a second-order construct and is measured through the dimensions by Rosetto et al. (2023). The dimensions are core functionalities, cost reduction, and shared sustainable engagement. Having ten questions and a five-point Likert was applied, ranging from 1 = strongly disagree to 5 = strongly agree regarding the importance of the company with frugal innovation in the last three years.

Demographics of family businesses were also classified and should be owner or manager, in the manufacturing or merchandising

type, have at least three years of operations, at least 11 employees, and be in the Greater Metro Manila (Metro Manila, Bulacan, Laguna, Cavite, and Rizal) area.

To test the validity of the adapted questionnaires, a pilot testing was done with 30 respondents. Cronbach's alpha resulted in a score of 0.849, which is a good reliability level for the survey instrument (George & Mallery, 2003).

Results

Sample characteristics

The researchers extracted the sample from family businesses within the Greater Metro Manila Area, which consists of Metro Manila, Bulacan, Laguna, Cavite, and Rizal, that are within the manufacturing and merchandising industries. The researchers focused their survey on catering to top managers and owners as key informants. With this, 103 responses were gathered. The majority of respondents were family business owners (52.4%) from the manufacturing industry (57.3%) that have been operating for more than ten years (69.9%) and have more than 30 employees (37.9%), with a relatively proportionate distribution within the areas under GMMA. This is within the minimum required number of respondents of 80 derived from the 20:1 parameter of Kline (2015).

In this study, the researchers utilized the structural equation modeling (SEM) method and the statistical software JASP. Through SEM, the researchers determined and quantified the connection between the latent variables with the use of their measures. Only 93 responses were utilized in the SEM analysis, eliminating incomplete responses due to inapplicability to their business.

Regression results - relationship analysis

Table 1. Simple Linear Regression Model of Human Capital and Frugal Innovation

	Unstandardized	Standard Error	p
Intercept	2.007	0.383	<.001
Human Capital	0.490	0.091	<.001

Results of the analysis showed that human capital has a direct and moderate correlation with frugal innovation. A unit increase in the mean score of human capital would result in an expected increase of 0.490 units for frugal innovation. The standard error also shows that the data is close to the true population. With a 0.05 significance level, the null hypothesis is rejected. Human capital greatly affects frugal innovation as perceived by family businesses.

Table 2. Simple Linear Regression Model of Social Capital and Frugal Innovation

	Unstandardized	Standard Error	p
Intercept	2.044	0.389	<.001
Human Capital	0.518	0.099	<.001

The results also show that a positive/direct moderate correlation exists between social capital and frugal innovation. Therefore, for every unit increase in social capital, there is an expected increase of 0.518 units for frugal innovation. Furthermore, using the 0.05 significance level, the results have shown sufficient evidence to reject the null hypothesis. Thus indicating that social capital significantly impacts frugal innovation.

Table 3. Simple Linear Regression Model of Financial Constraints and Frugal Innovation

	Unstandardized	Standard Error	p
Intercept	3.358	0.179	<.001
FC	0.209	0.052	<.001

The results show that a positive/direct moderate correlation exists between financial constraints and frugal innovation. Therefore, for every unit increase in financial constraints, there is an expected increase of 0.209 units for frugal innovation. Furthermore, using the 0.05 significance level, the results have shown sufficient evidence to reject the null hypothesis. Thus indicating that financial constraints have a significant impact on frugal innovation.

Measurement model

Table 4. Standardized Loadings for Each Parameter in the Final Reduced SEM

Parameter Estimate	**Loading**
Loadings	
HC → Knowledge	0.67
HC → Experience	0.71
HC → Professional Proficiency	0.70
HC → Cognitive Ability	0.82
HC → Proactivity	0.78
SC → Social Relations	0.74
SC → Personal Relations	0.98
SC → Interlinking	0.56
FC → Internal Financing	0.75
FC→ Limited access to external financing	0.84
FC → Stringent collateral	0.77
FC → Inadequate facilities	0.79
FC → Financial institutions constraints	0.82
FC → Cost of borrowing	0.75
FC→ Procedures of Obtaining Loans	0.85
FI → Cost Reduction	0.75
FI → Shared Sustainable Engagement	0.73

In the preceding SEM analysis of this study, the indicators Family Support, Status, Complicity, and Core Functionalities, were removed as they are not acceptable indicators and has a R^2 that is less than the threshold of 0.20 (Hooper et al., 2008). Table 4 shows the remaining acceptable to good indicators for each latent variable. Values equal or greater than 0.5 are considered acceptable, while equal or greater than 0.7 are deemed good (Hair et al., 2010). As such, there is also no outlier and multicollinearity in the data.

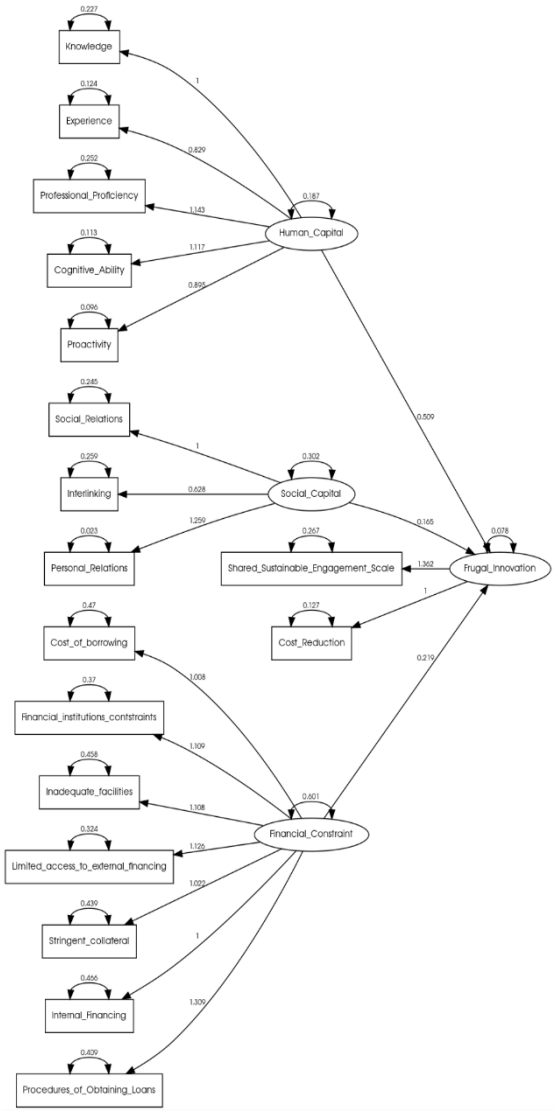

Figure 1. Node Diagram for the Final Reduced SEM

Figure 1 shows the node diagram for the SEM analysis. The indicators for each latent variable are shown with its unstandardized errors and unstandardized loadings. The one-point end arrow directed to the dependent variable indicates the hypothesis of human capital, social capital, and financial constraints affecting frugal innovation. The impact of all three independent variables affecting the dependent variable was also collectively studied.

Fit Indices for the Final Reduced SEM

Table 5. Fit Indices

NFI	TLI	CFI	RMSEA	SRMR
0.81	0.90	0.92	0.08	0.09

The fit indices in Table 5 present the degree of fit between the theoretical model being proposed and the actual data that has been observed.

The fit indices presented in Table 5 evaluate the congruence between the hypothesized theoretical model and the collected empirical data. The normed fit index (NFI), Tucker-

Lewis index (TLI), comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) were assessed, resulting in the following findings indicated above.

Upon analysis of these indices, it is evident that the NFI, TLI, and CFI values failed to meet the recommended threshold of 0.95, suggesting a poor or unsatisfactory fit for the model (Hu and Bentler, 1999, as cited in Hooper et al., 2008). More precisely, the NFI indicates that the model does not accurately correspond with the data that has been observed. This highlights the importance of enhancing the model's ability to explain the relationships between variables. The TLI and CFI values also indicate inadequate fits, underscoring the need for a more precise model.

While the RMSEA value is within the range indicating moderate fit, concerns arise regarding the model's ability to elucidate relationships adequately (Steiger, 2007, as cited in Hooper et al., 2008). The fact that the SRMR value is higher than the critical threshold of 0.08 suggests a significant difference between the observed and predicted data, highlighting the necessity to improve the model.

Structural model results - relationship analysis

Table 6. Unstandardized Loadings (Standard Errors), Standardized Loadings, and Significance Levels for Regression in Final Reduced SEM

Parameter Estimate	Unstandardized	p
HC → FI	0.51 (0.13)	<0.001
SC → FI	0.16 (0.08)	0.036
FC → FI	0.22 (0.06)	<0.001

The results of the regression analysis conducted for human capital and frugal innovation in SEM shows that a direct relationship exists between them. Therefore, for every unit increase in human capital, there is an expected increase of 0.51 for frugal innovation. Furthermore, using the 0.05 significance level, sufficient evidence exists to reject the null hypothesis. Thus, showing that human capital has a significant impact on frugal innovation.

On the other hand, the results of the regression analysis conducted for social capital and frugal innovation in SEM show that a direct relationship exists between them. Therefore, for every unit increase in social capital, there is an expected increase of 0.16 for frugal innovation. Furthermore, using the 0.05 significance level, sufficient evidence exists to reject the null hypothesis. Thus, proving that a significant relationship exists between social capital and frugal innovation.

Lastly, the results of the regression analysis conducted for financial constraints and frugal innovation show that a significant relationship exists between them. Therefore, for every unit increase in financial constraints, there is an expected increase of 0.22 units for frugal innovation. Furthermore, using the 0.05 significance level, sufficient evidence exists to reject the null hypothesis. Thus, this indicates that financial constraints have a significant impact on frugal innovation.

Discussion

Theoretical implications

The results have shown that each latent variable possesses a significant relationship with frugal innovation, which supports all the hypotheses of the study as well. Therefore, it is recommended that the academe use these results to expand or improve their discussions and curriculum for frugal innovation. By showing that all these latent variables have a significant impact on frugal innovation, the members of the academe must continue to look at this topic through the lenses of its theoretical and practical aspects. Therefore, for professors or instructors, there's a need to encourage or conduct more research regarding the relationship that these latent variables have on frugal innovation to learn more about this and utilize these better for the betterment of businesses in general. On the other hand, it is recommended that the students continue to learn more about the

relationship that these latent variables have with frugal innovation by experiencing them firsthand as they embark on their On-The-Job training or work in the business world. By doing so, they may gain a better appreciation of this relationship while also gaining more ideas to enhance further or expand their knowledge regarding this. Therefore, the members of the academe could use the results to expand further the knowledge and understanding that they currently have about frugal innovation and these latent variables.

Practical implications

First, results showed that human capital has the highest impact on frugal innovation; it is recommended that family businesses prioritize improving their human capital more to strengthen their ability to enhance frugal innovation capabilities. Investing resources in training programs and initiatives that enhance employees' knowledge, experience, and cognitive abilities promotes a skilled and creative workforce capable of driving cost-effective innovation.

Furthermore, results also showed that it is imperative to consider and tackle financial constraints. To mitigate the difficulties caused by financial limitations, it is crucial to implement efficient financial management procedures, investigate alternative funding sources, and actively seek external finance opportunities. This fosters a favorable atmosphere for nurturing a culture that encourages cost-effective innovation, thereby improving the business's competitive edge.

Although there is a weaker correlation between social capital and frugal innovation, it is still crucial for family businesses to develop robust social networks. Fostering interpersonal connections, fostering mutual trust, and establishing common principles among employees, partners, and stakeholders is essential for creating a collaborative atmosphere that forms the basis for cost-efficient innovation.

In the context of the Philippine economy, the government can have a crucial impact by actively encouraging continuous learning through mentorship programs and networks for sharing knowledge. It is recommended to provide incentives for research and development (R&D) in family-owned businesses, make funding more accessible through inclusive financial strategies, and offer specialized grants and subsidies for frugal innovation initiatives. The government should optimize bureaucratic procedures, guaranteeing transparency and equitable access to opportunities. Finally, the promotion of industry-specific groups, business clusters, and the facilitation of trade fairs can enhance a dynamic business ecosystem that fosters frugal innovation and sustainable growth. In summary, proactive government intervention is crucial for the holistic economic development of the Philippines through frugal innovation.

Conclusion

In relation to the research objective, it can be concluded that family businesses perceive frugal innovation as of fairly good importance. This means that family businesses value and focus on the core functionality of their products, cost reduction of their operational processes, and sustainable engagement with customer needs, environment, and community. Moreover, family businesses perceive their human and social capitals as good, while their financial constraints as moderate. Additionally, it is concluded that human capital significantly impacts frugal innovation, indicating that family businesses that increase their professional knowledge and skills are more susceptible to implementing frugal innovation for their long-term sustainability. Furthermore, social capital also significantly affects frugal innovation, implying that family businesses use their relationships, support, interpersonal, linking, and status well to improve frugal innovation. Financial constraints also significantly affect frugal innovation, implicating that they may focus on core functions, cost reduction, and shared engagement. Lastly, human capital, social capital, and financial constraints collectively have a significant effect on frugal innovation. With these present, family businesses should invest first in human capital, followed by identifying financial constraints, and then social capital to implement frugal innovation successfully.

Limitations and Future Studies

There are limitations to the study. The results showed a poor fit with regard to the model, which can be attributed to the small sample size and the chosen indicators for the latent variables. Additionally, the study was conducted in the Greater Metro Manila areas, focusing on manufacturing and merchandising business types only. Thus, it is recommended that future researchers explore other measures or indicators for the same latent variables, increase the sample size, and expand the research locale. It is also recommended to explore frugal innovation in service businesses, which were not covered in this study. Furthermore, the study focuses on the family businesses perspective, and future researchers can apply the same framework for different businesses about frugal innovation.

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