International Journal of Innovative Research and Scientific Studies, 8(2) 2025, pages: 3833-3856

IJIRSS International Journal of Innovative Research & Scientific Studies

ISSN: 2617-6548

URL: www.ijirss.com

Continuing series of innovations by entrepreneurship to perform competitive resilience in airline business

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Abstract

The unprecedented pandemic has impacted the airline industry, thus requiring strategic entrepreneurship to facilitate competitive resilience and long-term performance. This study investigated the value chain of an airline by exploring the relationships between entrepreneurship, innovation capability, organizational innovation, digital collaboration, and business model innovation, to build competitiveness and become resilient. The research study employed a quantitative and cross-sectional design while collecting data through structured questionnaires from top executives of an airline, with success eventually affecting all senior executives in the country. The principal results of hypothesis analysis were obtained using "Smart Partial Least Square Structure Equation Model" (SPLS SEM) software. It was found that entrepreneurship capability has an accepted indirect effect on competitive resilience within the research model. The results showed that triple series innovation serves as an important mediator that connects entrepreneurship capability to building competitive resilience. Specifically, dimensions of variables like self-efficacy, industry dynamics, and risk-taking portrayed significant levels of validity and reliability. Entrepreneurship capability and competitive resilience act as measures of a robust industry in its ability to weather the storms of volatility caused by the pandemic. These findings highlight the need for aligning entrepreneurship capability with technology and the value chain to stay competitive in a dynamic market. The study intended to add empirical evidence to entrepreneurship capability in the aviation domain by uncovering interdependencies between triple series innovation dimensions to foster competitive resilience.

Keywords: Competitive Resilience, Digital Collaboration, Business Model, Entrepreneurial Capability, Organizational Innovation, Triple Series Innovation.

DOI: 10.53894/ijirss.v8i2.6112
Funding: This study received no specific financial support.
History: Received: 26 February 2025 / **Revised:** 31 March 2025 / **Accepted:** 2 April 2025 / **Published:** 11 April 2025

Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.
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.
Publisher: Innovative Research Publishing

1. Introduction

This study went about examining how entrepreneurship capabilities relate to competitive performance in Indonesia's various airlines by using triple-series innovations to achieve resilience. To address an airline company's challenges due to the pandemic, this research suggests focusing on the process theory of strategic management [1]. Strategic management is a rational process that organizations follow in order to create competitiveness and earn above-average returns [2]. Strategic Entrepreneurship is defined as the willingness to identify and exploit external opportunities through innovative practices.

Managing existing company resources that effectively provide innovative actions to solve difficulties and achieve strong competitiveness to increase the current market share [3]. The study analyzed airline sequel value chain activities, which include aircraft, entrepreneurial capabilities, organizational processes, systems for distribution, product portfolios, and market competitiveness, as illustrated in Figure 1. Innovation covers many areas of inquiry, including business, economics, public administration, and engineering at various disciplinary levels of research, such as economy, industry, group, and individual. It is pointed out that entrepreneurship can be described as individuals who lead innovation and introduce new products or services by overcoming challenges [4].

Organizations manage innovation, which alters the value chain and enhances competitiveness [5, 6]. Competitive performance is largely dependent on innovation and entrepreneurship. Creativity and market-oriented innovation are connected in the modern economy, acting as fundamental economic drivers [7].

According combines strategic formulation and implementation with entrepreneurial actions and innovation strategies to promote competitive performance. In the airline sector, this means coupling airline entrepreneurship to the step of the airline value chain as the respective company. This process fosters resilience by allowing organization members to pursue opportunities despite resource limitations [8, 9]. Identify three key entrepreneurial capabilities for airlines to innovate: (a) organization-oriented, (b) distribution systems and networking, and (c) product from the business model.

Airline entrepreneurship, as corporate entrepreneurship, tends to be more inclined towards the innovative airline company's value chain organization, distribution, and products or services as a business model [10, 11]. When it comes to entrepreneurship capability, it's not just about finding the right balance between exploring and exploiting resources. It's also about coming up with new ideas as novelty from three distinctly different areas of the value chain, namely: a business-oriented organization, digital collaboration as a distribution system, and flight routes as the product of an airline business model, composing a competitive resilience before entering the market dynamics [12-14].

Though offering valuable insights, this research acknowledges inherent limitations, as the sample of 250 senior executives from seventeen Indonesian airlines may limit the wider applicability of the findings of this study. As J. and Wahyuni [15] Jonker and Wahyuni [16] also stated how critical it is to focus largely on relevant insights when dealing with high-level managers, as the participants of any study. Yet, according to [17, 18]. As well as HAIR JUNIOR et al. [19], the size of the sample may also limit the generalizability of the paper outside a certain geographical territory (as in the present case, the region is Indonesia and broadly South-East Asia). Using Smart PLS SEM with bootstrapping enhanced the statistical robustness of this paper's findings [20]. This method aims to generate relevant insights even within sample size limitations.

The study aimed to understand how strategic entrepreneurship manages turbulence, drives innovative transformations, and strengthens market positioning [21]. This research underscores the significance of dynamic entrepreneurship capability, achieved through a series of triple innovations, to ensure the long-term sustainability and resilience of public air service carriers [22].

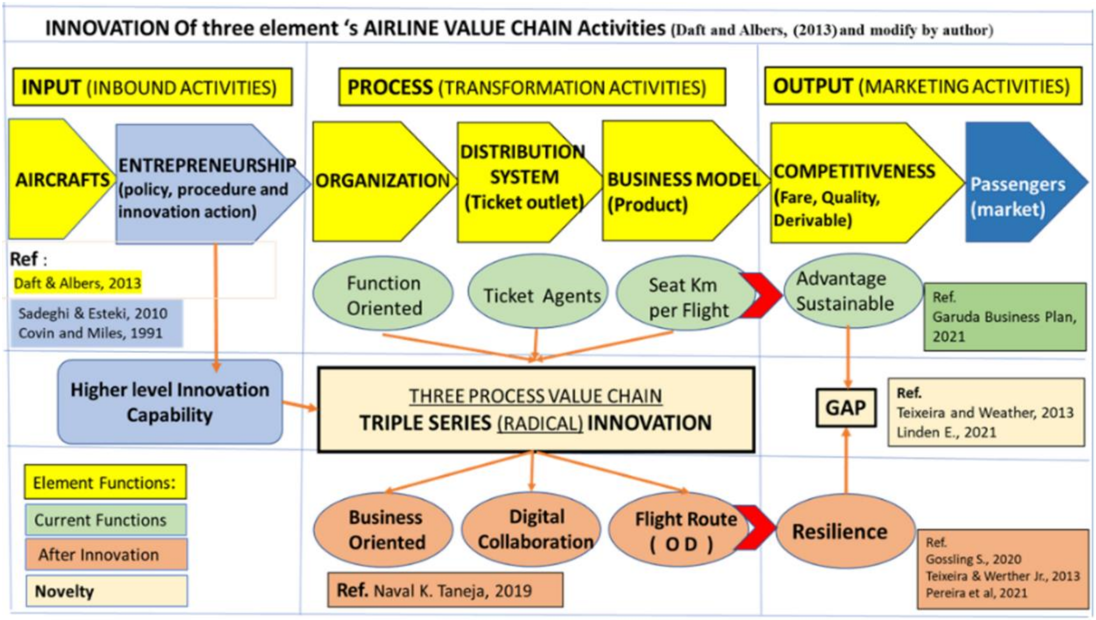


Figure 1.
Airline Value Chain.
Source: TANEJA [23]; DAFT AND ALBERS [24]; SADEGHI AND ESTEKI [25]; COVIN AND MILES [26]; Linden [27]; TEIXEIRA, ET AL. [28]; HARARI, ET AL. [29] **and** Pereira, et al. [14]

2. Research Methods

This research is an explanatory study with a quantitative approach, which aims to understand the relationship between various variables in the context of entrepreneurship capability and organizational innovation in the Indonesian Airline Business. This research design employs quantitative methods with a cross-sectional approach. Data is collected at one specific point in time to examine the relationship between predetermined variables [30]. This design provided valuable insights into industry trends and entrepreneurship behaviors, allowing for an objective analysis of study constructs [15].

The paper centered on Indonesia's employees from various airlines having the Air Operator Certificate, consists of approximately. 26,673 total workforce and around 670 people fill up the middle to upper management roles in the companies, as Association of Airline Indonesia January 2022 [31, 32]. The paper focuses on managerial-level employees with influence over innovation and organizational agility, as strategic decision-making is crucial for airline sector resilience [33]. The data was collected using non-probability sampling, specifically quota sampling. This involved selecting respondents who met certain criteria, specifically middle to upper management in airline companies in Indonesia. This technique was used to collect information from respondents who accurately represented the target population [15].

From the total population of 26,673 airline employees, the number of potential samples that meet the criteria is 659 people (2.477% of the population). From this potential sample, collected from 250 respondents (37.93%) of the potential sample to ensure the validity of the results.

The data collection instrument in this study was a Google Form-based questionnaire distributed to 285 respondents at the upper management level and all managerial functions. The paper selected 150 of these respondents to complete the questionnaire. The questionnaire used a six-point Likert scale to measure respondents' agreement with the statements. The scale ranged from (1) strongly disagree, (2) disagree, (3) somewhat disagree, (4) somewhat agree, (5) agree, and (6) strongly agree [34]. The study utilized a six-point scale to incentivize respondents to provide more definitive answers, avoiding neutral options [35]. This study used the following dimensions and indicators to measure the mutual relationship between the variables. Operationalization helps make abstract ideas easier to understand by describing clear and observable traits. This approach allows us to evaluate each variable more objectively [34].

Table 1.
Variable and Dimension.

Variables	Definition	Dimensions	Reference
Entrepreneur's Capability	Firm's capacity to sense, select, and shape opportunities, and synchronize their strategic moves and resources in pursuit of these opportunities.	Self-Renewal Industry Dynamic Risk Taking Innovativeness	Ireland, et al. [13]; Luke [36] and Zahra, et al. [37]
Organization Innovation	Organizational innovation is the implementation of a new organizational method in a firm's business practices, workplace organization, or external relations.	Propose Oriented Structure Flexibility Level Decision Relationship Orientation	Drucker [38]; Finkelstein and D'aveni [39]; Curado and Bontis [40]; Grant [41] and Aryanto, et al. [42]
Digital Collaboration Innovation	The ongoing revolution of Industry 4.0 is enabling quicker and more efficient processes that create a variety of products for higher quality at lower costs in the digital marketplace.	Access to Market Collaboration Innovation Personalize Product	Kulichenko and Boichenko [43]; Snow, et al. [44]; Ireland, et al. [13]; Steiner [45]; Lee and Lee [46]; Wenger and Snyder [47] and Link, et al. [48]
Business Model Innovation	The nature of the firm, together with the roles of entrepreneurs and economic aspects, should benefit from better business model innovation and has been affected by new business models and performance.	Sharpening Foresight Renewal Profit Oriented	Gambardella and McGahan [49]; Lecocq, et al. [50]; George and Bock [51]; Zott, et al. [52] and Teece [53]
Competitive Resilience	Market-place competitiveness can be self-sufficiency and collaboration within the two most prominent aspects: self-reliance and active networks, which are touted as models and contributions to competitive advantage and an ascendant of competitive resilience.	Self-sufficient Organizational Competitiveness Strategic orientation	Teicher [54]; Levy and Spicer [55]; Teixeira, et al. [28]; Sheffi and Rice Jr [56]; Sharma and Sharma [57]

After collection, the data underwent three stages of analysis. Once the data was collected and analyzed in three stages. First, descriptive analysis was conducted. Second, confirmatory factor analysis (CFA), and then Structural Equation Modeling (SEM) was conducted. This study utilized the aforementioned three steps. The research hypotheses were designed to ascertain both direct and indirect correlations between entrepreneurial capabilities and organizational innovations, specifically with regards to competitive resilience within Indonesia's airline industry [58]. Concretely, for the direct analysis, the study proposed a hypothesis that EC (entrepreneurship capabilities) affects OI (organizational innovation) (H1), digital collaboration (DC) innovation (H2), and business model (BM) innovation (H3). Also, in H4 and H5, the paper hypothesized that OI influences the DC and BM innovation, respectively. H6 furthermore posits that DC affects BM innovation, and lastly that BM innovation is key to CR (competitive resilience) (H7).

Regarding the indirect analysis, the study examined how innovation variables mediate the relationship between EC and CR. H8 posited that EC affects CR with OI, DC innovation, and BM innovation. Furthermore, the model hypothesized that EC affects CR via OI and BM (H9), through OI as a sole factor (H10), and through DC and BM (H11). The hypotheses of the analysis are inspired by credible theoretical frameworks, reviews of past literature, and the operationalization of the variables. The result of the model structure provides a broad overview of how EC, when implicated by various innovation types, would be able to increase the competitive resilience of firms in the airline industry.

2.1. Research Model and Dimension

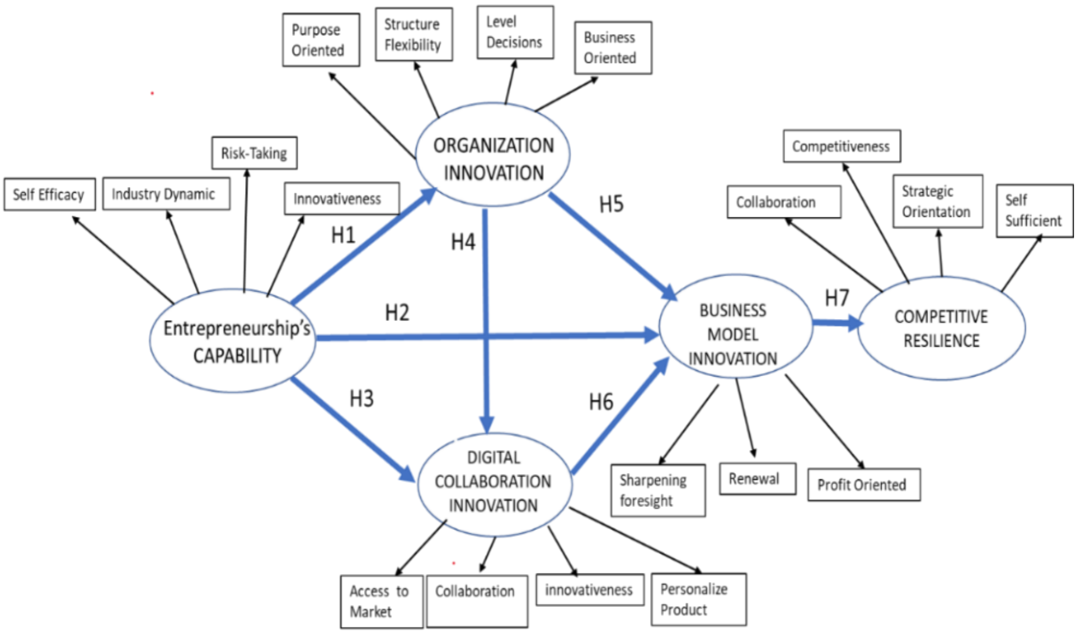


Figure 2.
The Structural Model.

3. Results

Middle to top-level managers as an entrepreneurship within various airline organizations were selected as the individual units for analysis because they are frequently classified as representatives of Entrepreneurship Capability (EC) in these organizations. Middle to top-level managers often have cross-functional responsibilities, as well as the pertinent experience, authorities, and perspectives needed to offer insights into the organizational dynamics. So, the total number of sampled participants (from middle to top management) was 659 from the airline industry in Indonesia. The team used Google Forms to distribute questionnaires via WhatsApp and email among the 250 respondents. Responses received from 217 of them, giving a response rate of 86.17 percent. Such a high rate of response is indicative of a high level of engagement and a robust dataset, which enabled later analysis.

3.1. Descriptive Data

3.1.1. Respondents' Demography

The demographic features of the final dataset included gender, age, education level, job title, tenure (length of service), and the number of subordinates. There was a substantial gender difference evident in the sample, with 89 percent of the respondents being male. By age distribution, 67 percent of the respondents were over 55 years of age, and 13 percent below the age of thirty-five. As for educational level, those having a doctoral degree (S3) were found to be 5% (11 respondents), and those with a master's degree (S2) were 40% (87 respondents). Most respondents, accounting for 44% or 95 individuals, identified as holders of a bachelor's degree (S1). Fifty-four percent (118 respondents) had served more than twenty years, 15 percent (32 respondents) had served between ten and fifteen years, and 10 percent (21 respondents) had served less than five years. The above analysis of the organizational hierarchy indicates that 36 percent of the participants were top-level executives (e.g., Vice Presidents and Directors) and that 48 percent of them managed more than forty subordinates, and just 10 percent had fewer than ten team members. These demographic details highlighted the sample's representativeness and ability to offer valuable insights about the capabilities of entrepreneurship in aviation.

Figure 3 explains the respondents' demographic characteristics.

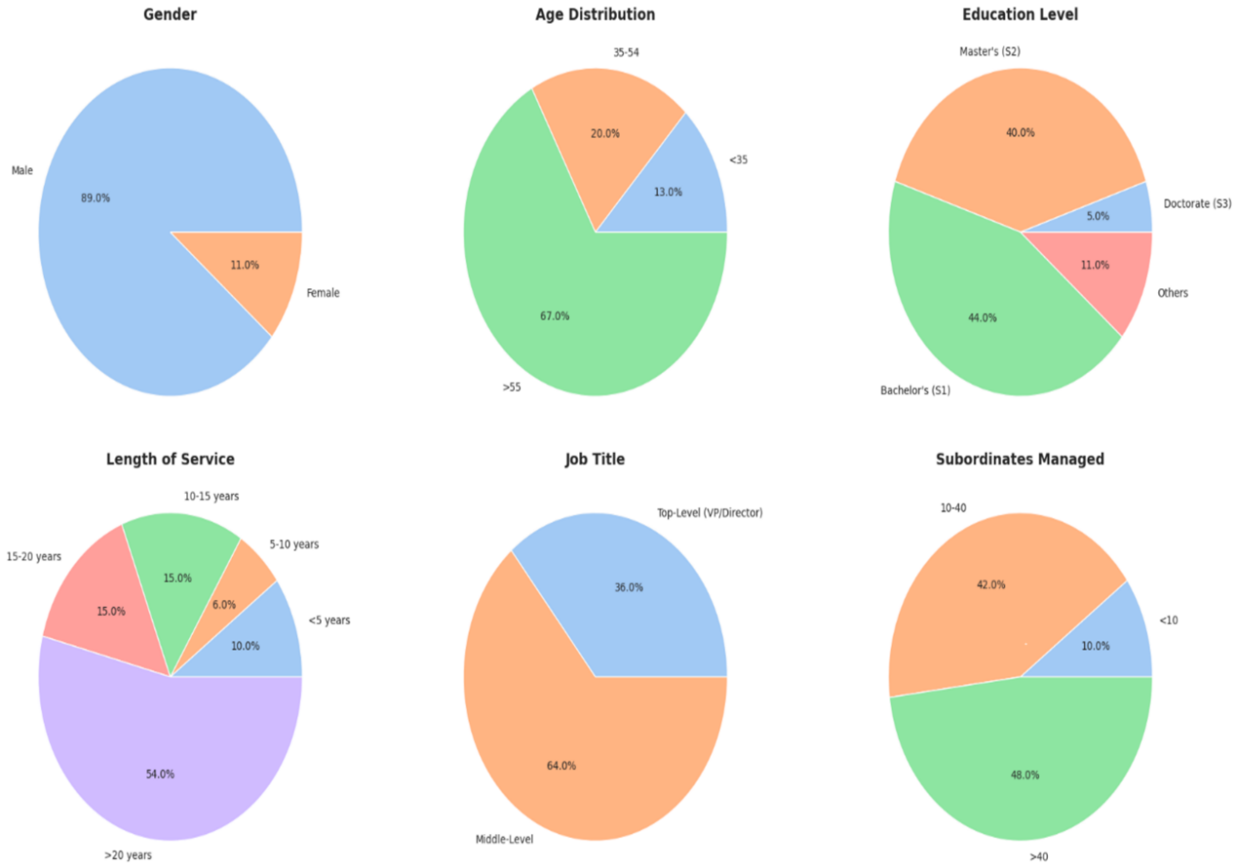


Figure 3.
Demographic Characteristics of the Respondents.

3.2. Descriptive Statistics

The paper performed descriptive statistical analysis to summarize the main characteristics of the data (minimum values, maximum values, mean, and standard deviation). The analysis was performed using SPLS and Excel statistical packages. The questionnaire utilized a five-point Likert scale with the following anchor points: 1 = "strongly disagree"; 2 = "disagree"; 3 = "neutral"; 4 = "agree"; and 5 = "strongly agree." Overall, the mean values ranged from 4.65 to 5.52, reflecting a positive perception of the measured constructs. The standard deviation ranged between 0.38 and 0.71, indicating medium variability of responses.

3.3. Research Model Analysis (Outer Model and Inner Model)
3.3.1. Evaluation of the Outer Model

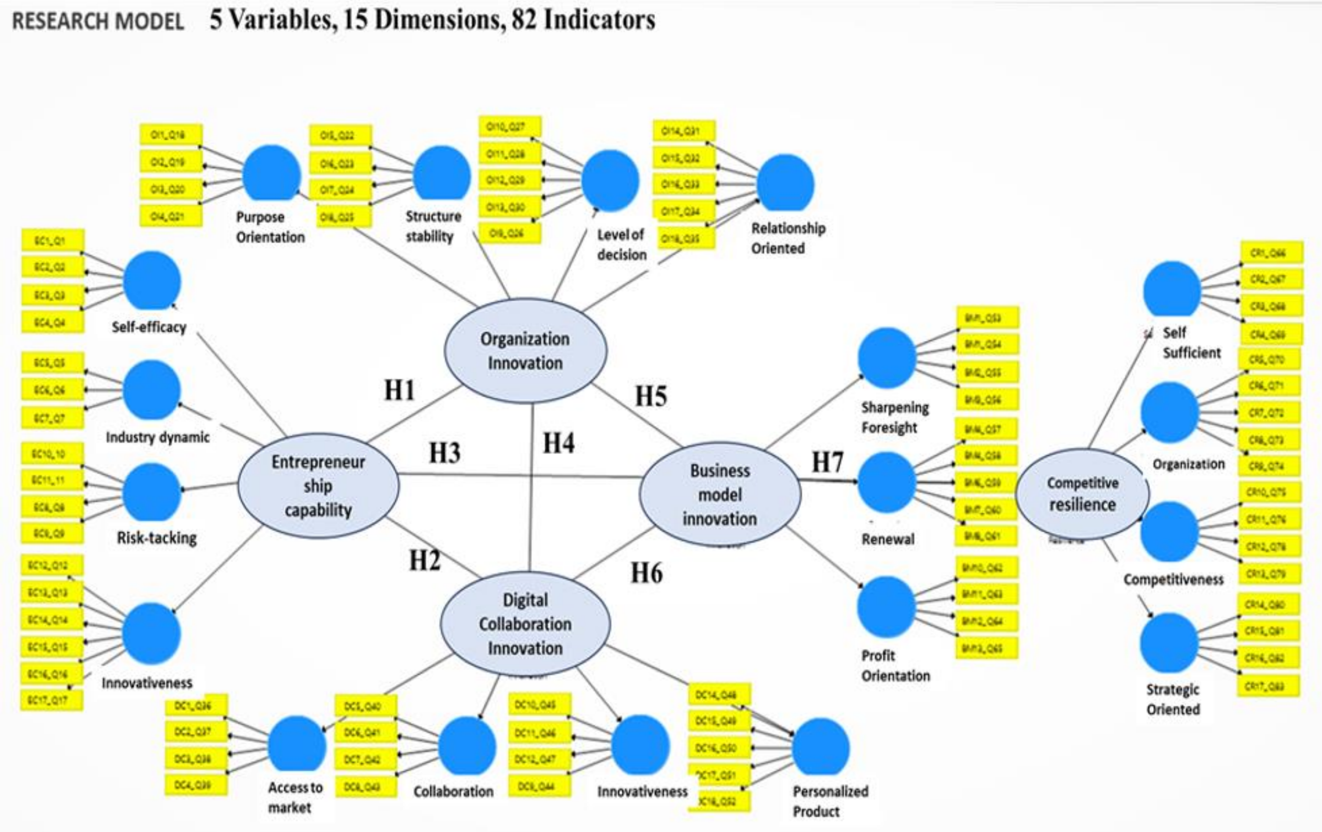


Figure 4.
Research Model (5 variables, 19 Dimensions, 82 indicators).

Moreover, the first research model was composed of 5 variables, 19 dimensions, and 82 indicators (Figure 4). However, some indicators were dropped as they did not exceed the factor loading threshold of ≥ 0.60. Table 2 shows the list of indicators that were excluded.

Table 2.
List of dropped indicators.

Latent Variables	Dimension	Indicators	F/L < 0.60
Entrepreneurship Capability	Risk Taking	EC-11_Q11	0.552
	Innovativeness	EC-13_Q13	0.487
		EC-14_Q14	0.490
		EC-17_Q17	0.564
Organization Innovation	Structure Flexibility	OI-5_Q22	0.597
	Level of Decision	OI-9_Q26	0.439
	Relationship Orientation	OI16_Q33	0.381
		OI-17_Q34	0.293
Digital Collaboration Innovation (DC)	Access to Market	DC4_Q39	0.450
	Collaboration	DC7_Q42	0.505
	Personalized Product	DC16_Q50	0.322
Business Model Innovation	Renewal	BM4_Q57	0.539
		BM5_Q58	0.544
	Profit Orientation	BM13_Q65	0.575
Competitive Resilience (CR)	Organization	CR7_Q72	0.514
	Competitiveness	CR11_Q76	0.554

Figure 5 illustrates the explanation of the cutoff value for the loading factor as referenced in Table 2.

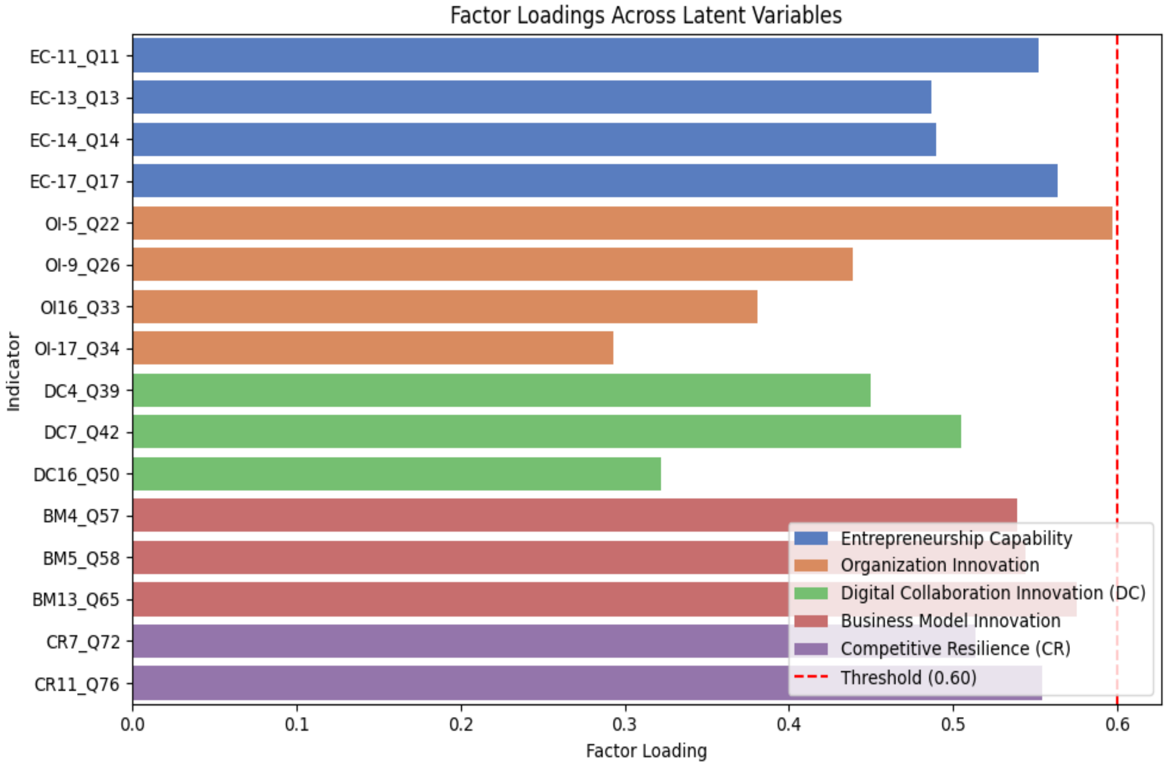


Figure 5.
Factor Loadings Across Latent Variables.

After eliminating these indicators, the model was recalculated. The revised model retained five variables and nineteen dimensions, along with sixty-six indicators, as illustrated in Figure 6.
Recalculated after dropping the indicator is loading factor below 0.60.

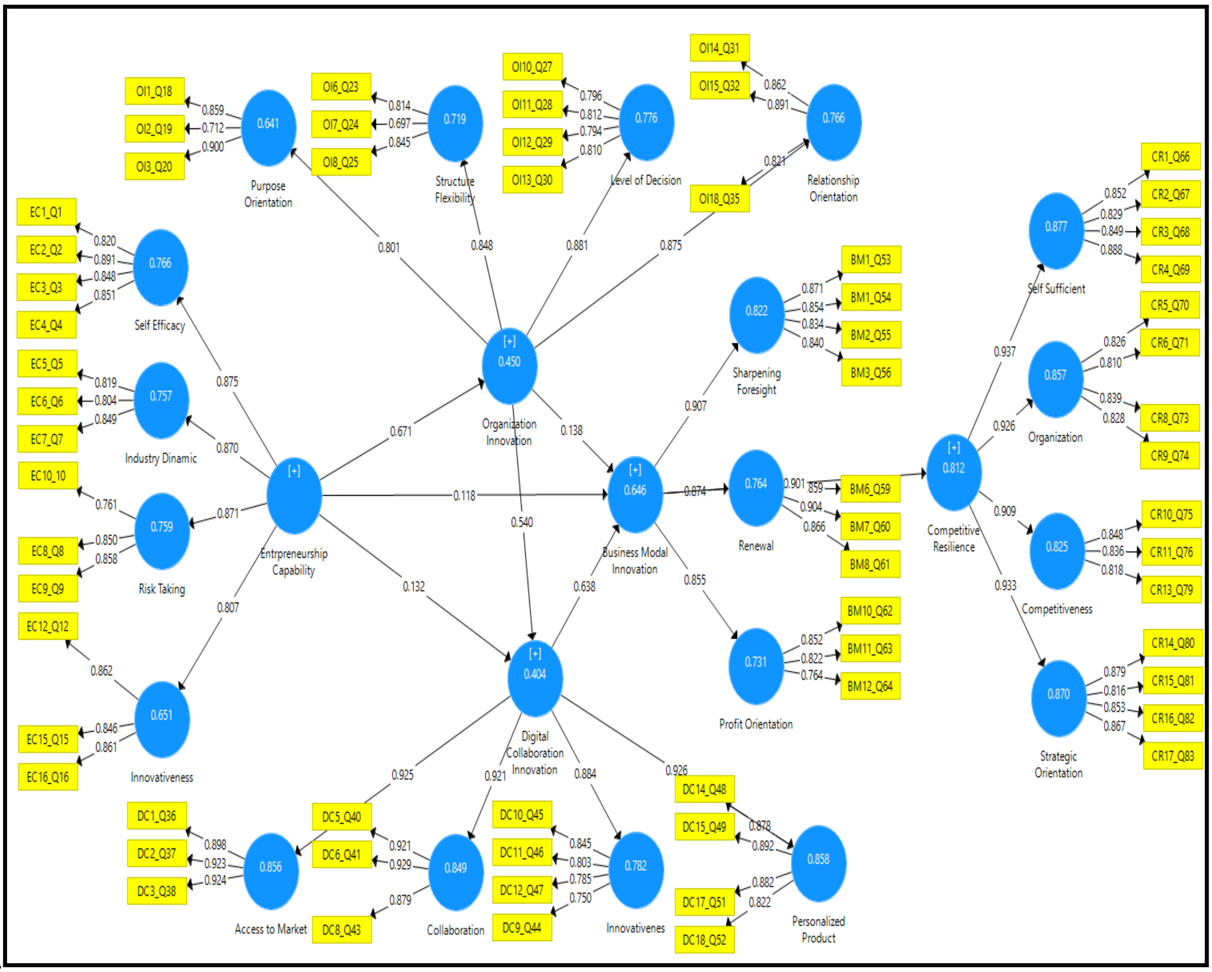


Figure 6.
Revamp Model.

As a result of removing those indicators, this study has 5 variables, 19 dimensions, and 66 indicators, as shown in Figure 6. Therefore, we reassessed the validity of the outer measurement model, as explained in the following paragraphs.

3.4. Entrepreneurship Capability (EC)

Factor loadings from all entrepreneurship capability indicators exceeded the threshold of 0.70, confirming their validity. The obtained Cronbach's alpha values were all found to be above the 0.50 threshold, while composite reliability ranged from 0.864 to 0.914. Convergent validity was sufficient since the AVE (average variance extracted) for each of the dimensions surpassed 0.50. Results of the Fornell-Larcker criterion further established adequate discriminant validity between the constructs. The results indicated that all indicators, dimensions, and the latent variable "EC" were valid and reliable [59].

Table 3.
Variable Latent Validity Measurement: Entrepreneurship capability.

Variable	Code	FL≥ 0.70	Validity	Cronbach's Alpha ≥ 0.50	CR ≥ 0.70	AVE ≥ 0.50	Reliability
Entrepreneurship Capability	EC			0.921	0.933	0.517	Reliable
Self Efficacy	EC1_Q1	0.820	valid	0.875	0.914	0.727	Reliable
	EC2_Q2	0.891	valid				
	EC3_Q3	0.848	valid				
	EC4_Q4	0.851	valid				
Industry Dynamic	EC5_Q5	0.819	valid	0.765	0.864	0.679	Reliable
	EC6_Q6	0.804	valid				
	EC7_Q7	0.849	valid				
Risk-Taking	EC8_Q8	0.850	valid	0.701	0.811	0.622	Reliable
	EC9_Q9	0.858	valid				
	EC10_Q10	0.761	valid				
Innovativeness	EC12_Q12	0.862	valid	0.819	0.892	0.734	Reliable
	EC15_Q15	0.846	valid				

	EC16_Q16	0.861	valid				

Figure 7 illustrates the explanation of the cutoff value for the loading factor, and Figure 8 provides the explanation of dimension reliability as referenced in Table 3.

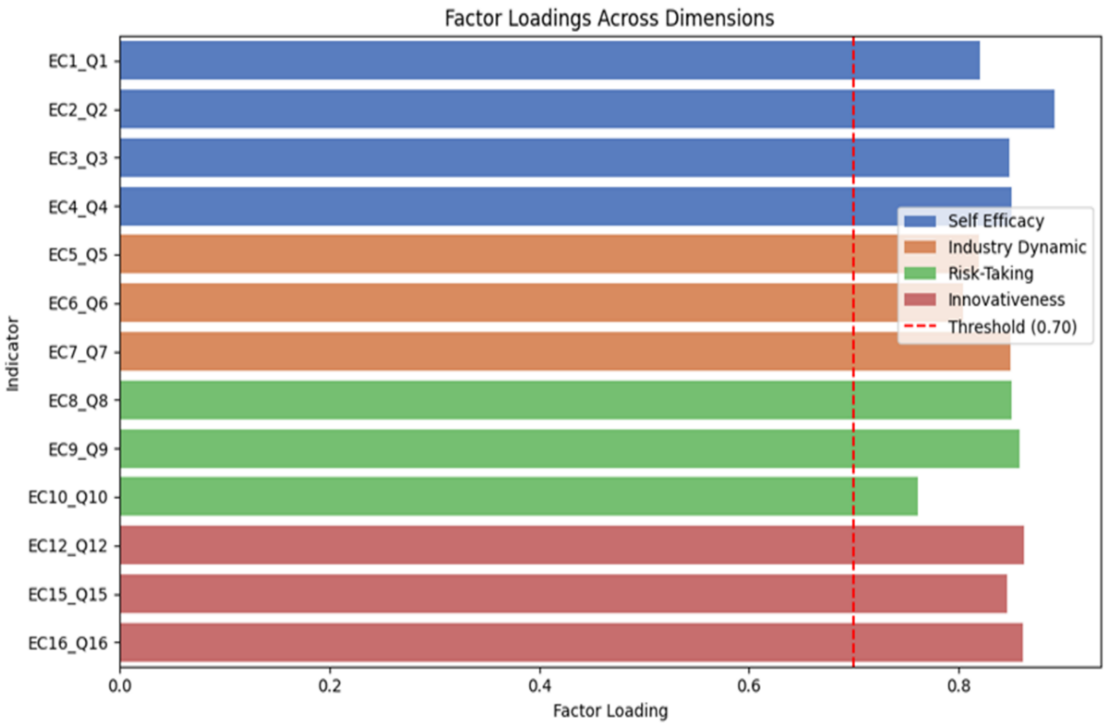


Figure 7.
Factor loadings across dimensions.

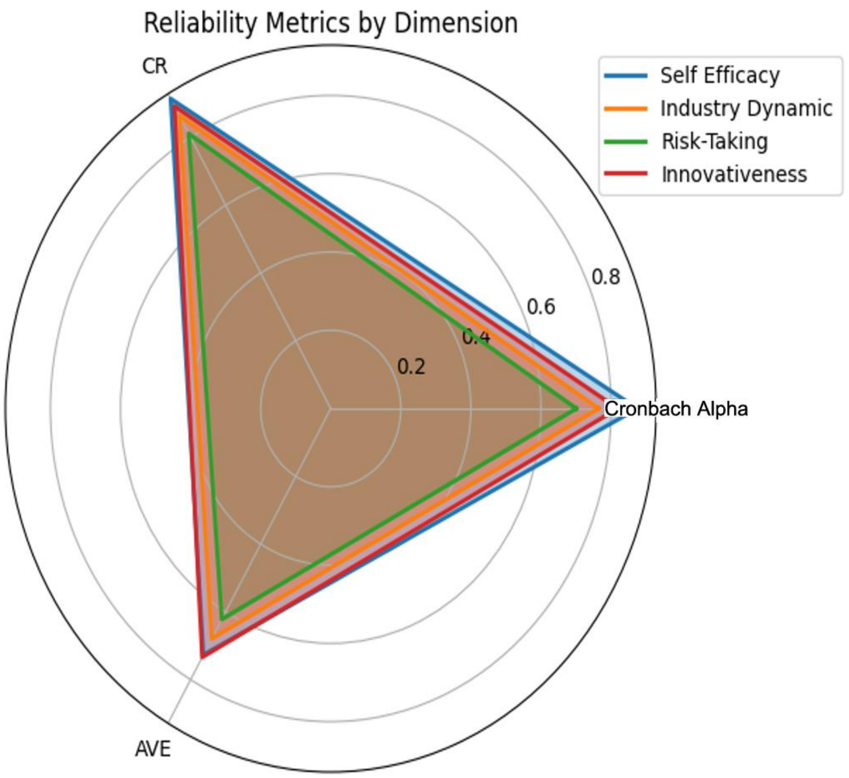


Figure 8.
Reliability metric by dimension.

3.5. Organization Innovation (IO)

The factor loadings of constructs of organizational innovation ranged from 0.697 to 0.900, which met the requirements of validity of ≥ 0.70. Cronbach's alpha and composite reliability values found over 0.50 and 0.70, respectively, confirming internal consistency. Convergent validity was confirmed by the AVE values, and the discriminant properties were validated by the Fornell-Larcker criterion. The results present frequencies calculated for each dimension are shown in Table 4 below. All indicators for organizational innovation had good reliability and acceptable alpha values, making them suitable for analysis [60].

Table 4.
Validity and Reliability of Organization Innovation.

Variable	Code	FL≥ 0.70	Validity	Cronbach's Alpha≥ 0.50	CR ≥ 0.70	AVE ≥ 0.50	Reliability
Organization Innovation	OI			0.912	0.926	0.532	Reliable
Purpose Orientation	OI1_Q18	0.859	valid	0.768	0.866	0.685	Reliable
	OI2_Q19	0.712	valid				
	OI3_Q20	0.900	valid				
Structure Flexibility	OI6_Q23	0.871	valid	0.695	0.830	0.621	Reliable
	OI7_Q24	0.697	valid				
	OI8_Q25	0.845	valid				
Level of Decision	OI10_Q27	0.796	valid	0.817	0.879	0.645	Reliable
	OI11_Q28	0.812	valid				
	OI12_Q29	0.795	valid				
	OI13_Q30	0.811	valid				
Relationship Orientation	OI14_Q31	0.863	valid	0.821	0.894	0.737	Reliable
	OI15_Q32	0.891	valid				
	OI18_Q35	0.820	Valid				

Figure 9 explains the cutoff value for the loading factor, while Figures 10 and 11 detail the dimensions' reliability as mentioned in Table 4.

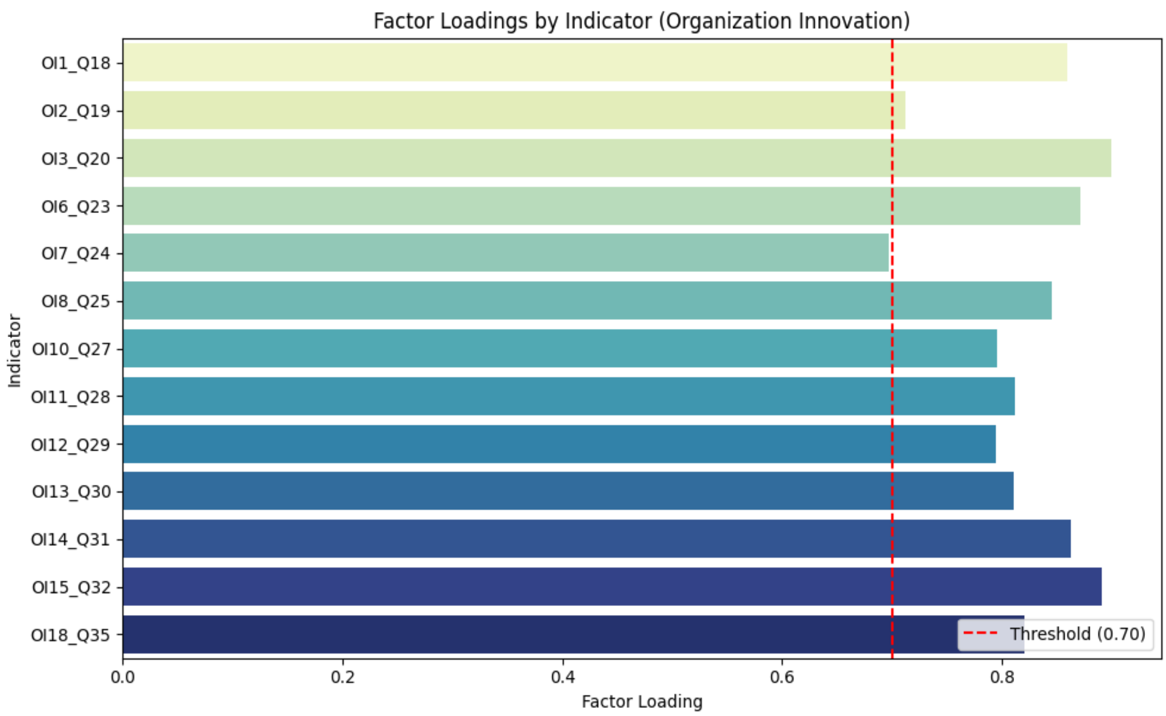


Figure 9.
Factor loadings by indicator (Organization innovation).

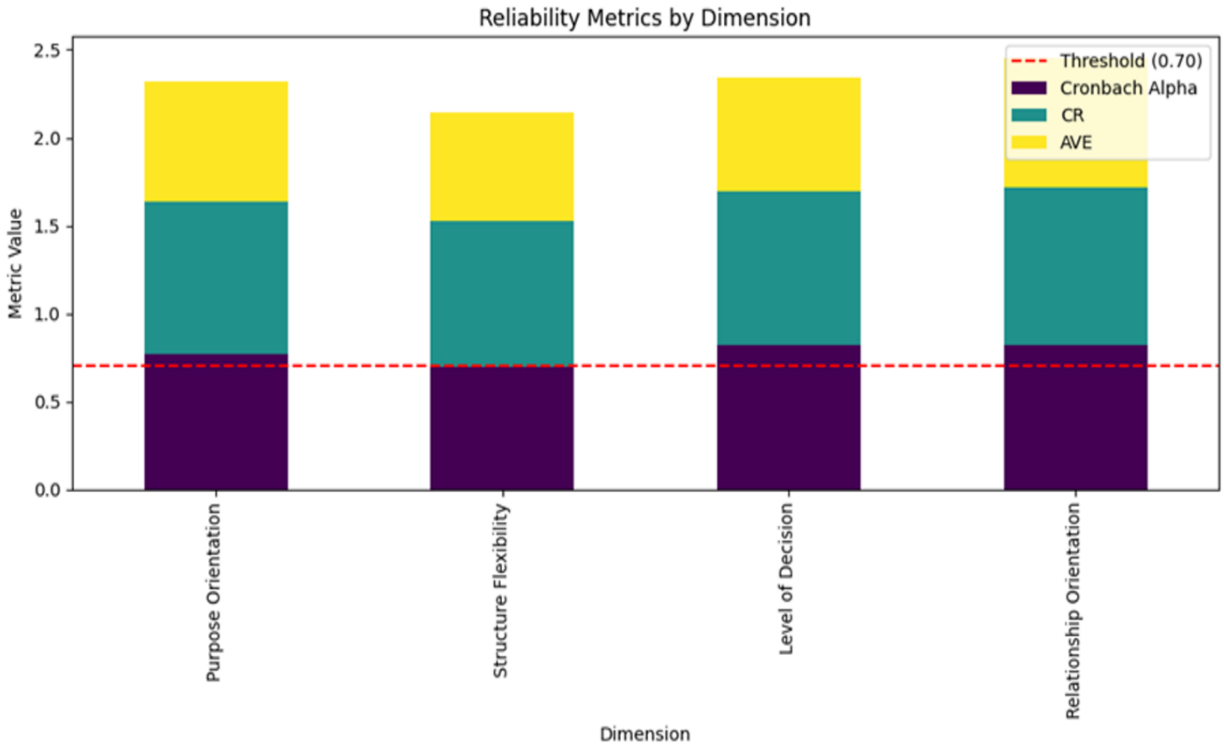


Figure 10.
Reliability metrics by dimension.

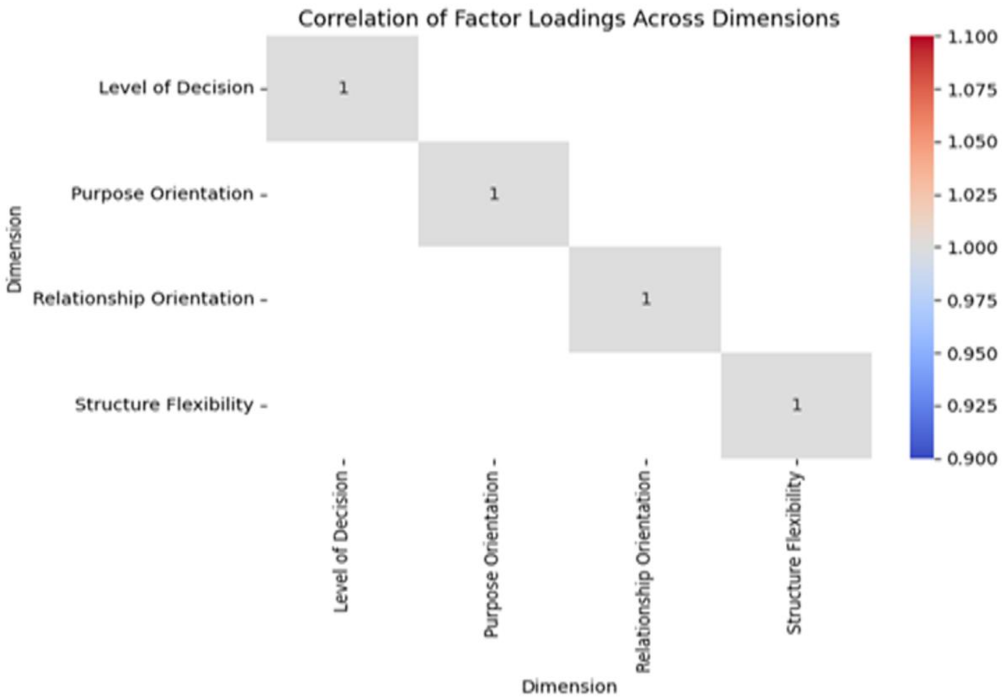


Figure 11.
Correlation factors loadings across dimensions.

3.6. Digital Collaboration Innovation (DC)

Factor loadings of all indicators of innovation in digital collaboration ranged from 0.750 to 0.929. Cronbach's alpha and composite reliability metrics fell along the respective minimal thresholds of 0.50 and 0.70. The AVE values demonstrated the validity of the construct's convergence, and the Fornell-Larcker criterion revealed that the digital collaboration innovation variable was distinct. The results confirmed the validity and reliability of the DC construct and its dimensions [61].

Table 5.
Validity and Reliability of Digital Collaboration Innovation.

Variable	Code	FL ≥ 0.70	Validity	Cronbach's Alpha≥ 0.50	CR ≥ .70	AVE ≥ 0.50	Reliability
Digital Collaboration Innovation	DC			0.954	0.960	0.631	Reliable
Access to Market	DC1_Q36	0.898	valid	0.903	0.939	0.838	Reliable
	DC2_Q37	0.923	valid				
	DC3_Q38	0.924	valid				
Collaboration	DC5_Q40	0.921	valid	0.896	0.935	0.828	Reliable
	DC6_Q41	0.929	valid				
	DC8_Q43	0.879	valid				
Innovativeness	DC9_Q44	0.750	valid	0.819	0.892	0.734	Reliable
	DC10_Q45	0.845	valid				
	DC11_Q46	0.803	valid				
	DC12_Q47	0.785	valid				
Personalized Product	DC14_Q48	0.878	valid	0.892	0.925	0.755	Reliable
	DC15_Q49	0.892	valid				
	DC17_Q51	0.882	valid				
	DC18_Q52	0.822	valid				

Figure 12 explains the cutoff value for the loading factor, while Figures 13 and 14 detail the dimensions' reliability as mentioned in Table 5.

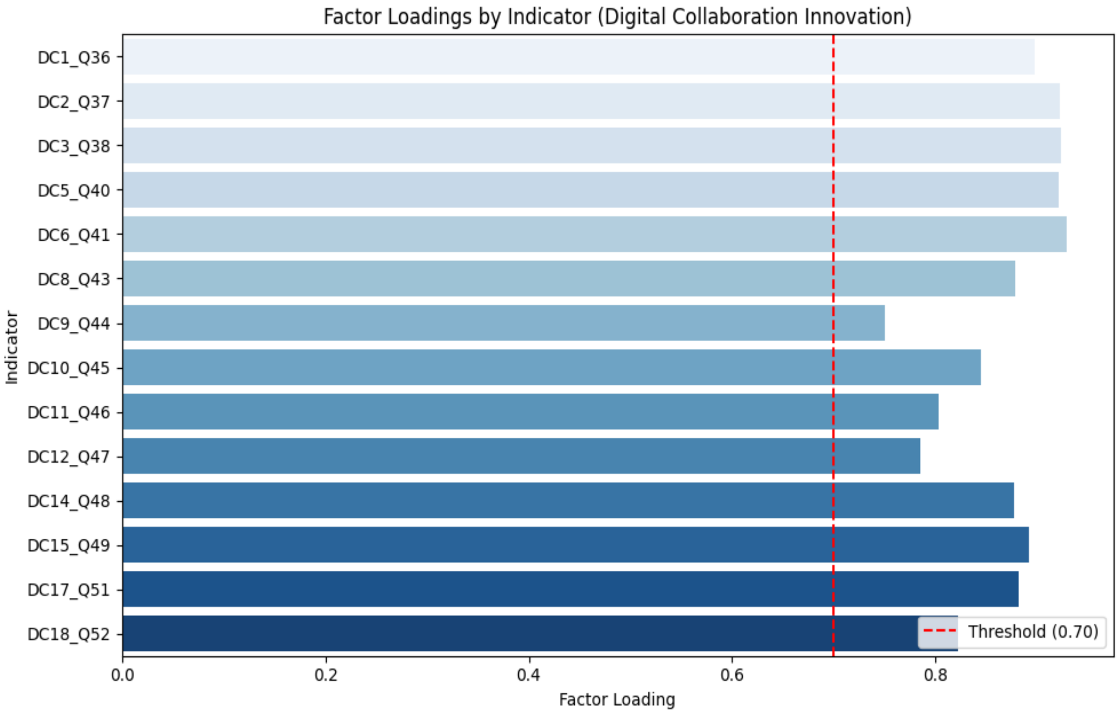


Figure 12.
Factor loadings by indicator (DC innovation).

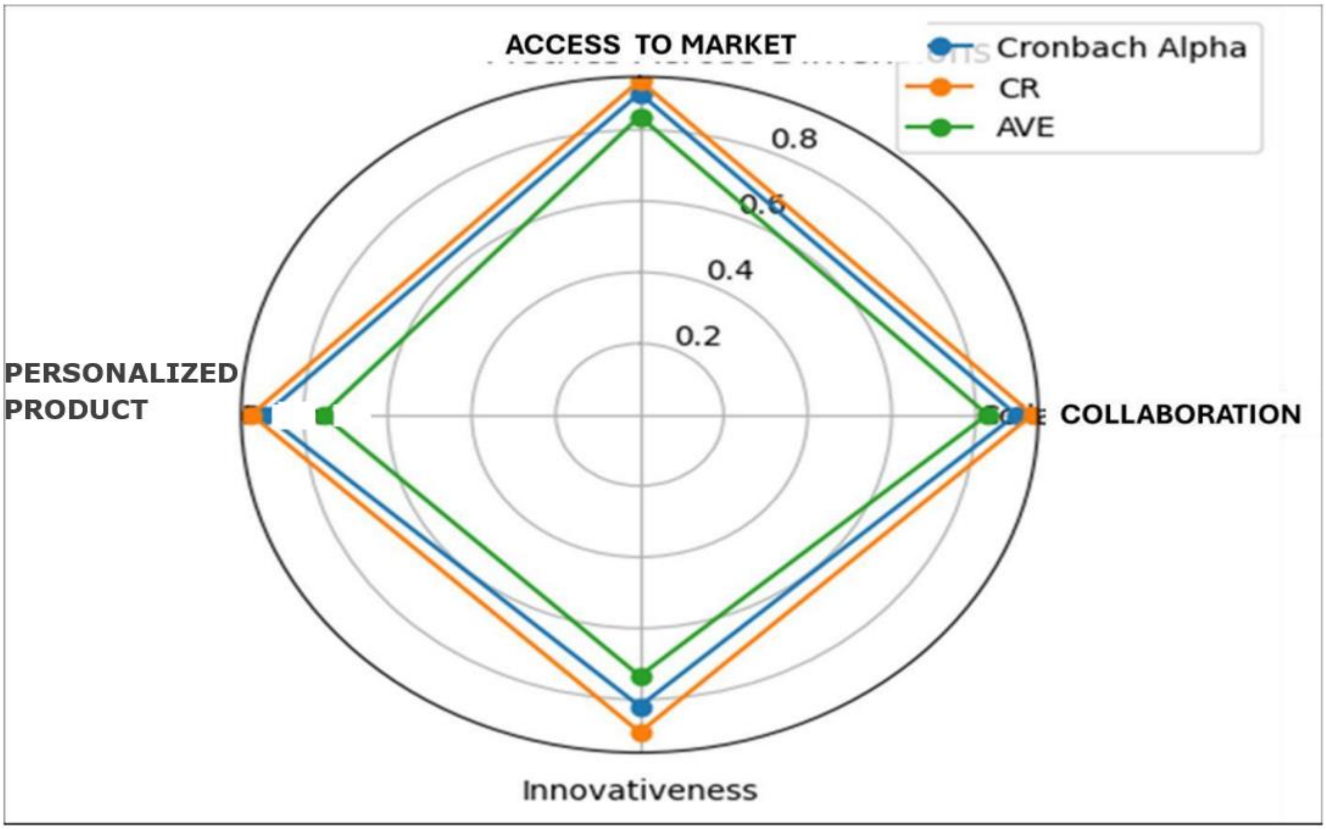


Figure 13.
Reliability metrics across dimensions.

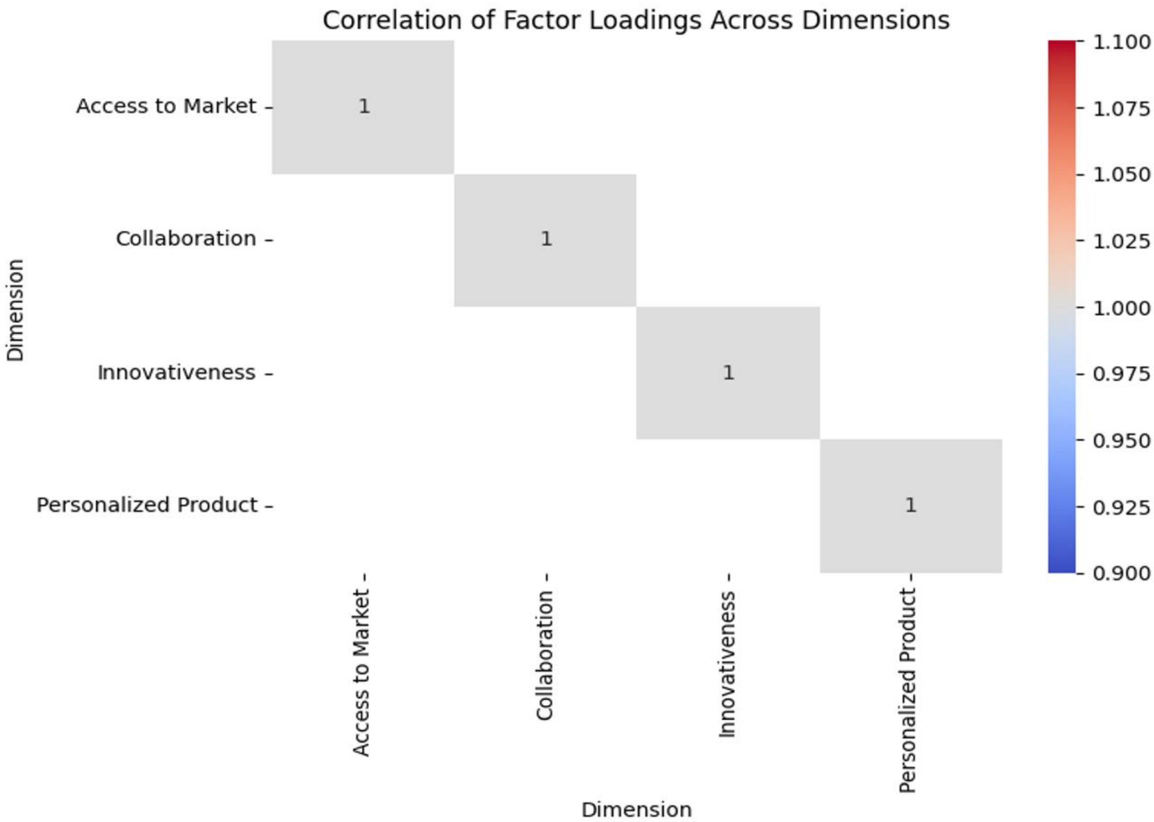


Figure 14.
Correlation of factor loadings across dimensions.

3.7. Business Model Innovation (BM)

Statistics show that the BM variable, along with its dimensions and indicators, is valid and reliable. All indicators have factor loadings above the minimum limit of ≥ 0.70. In addition, the Cronbach's alpha and composite reliability values ensure the reliability of the variables, with Cronbach's alpha exceeding the minimum threshold of ≥ 0.50 and ranging from 0.744 to

0.926. The composite reliability values were also above the ≥ 0.70 threshold, ranging between 0.854 and 0.926. The Fornell-Larcker results further confirmed the discriminant validity of the variables. Details of the validity and reliability tests are presented in the table below, while the next Table 6 displays the Fornell-Larcker results.

Table 6.
Validity and Reliability of Business Model Innovation (BM).

Variable	Code	Factor Loadings	Validity FL ≥ 0.70	Cronbach's Alpha ≥ 0.50	CR ≥ 0.70	AVE ≥ 0.50	Reliability
Business Model Innovation	BM			0.911	0.926	0.558	Reliable
Sharpening Foresight	BM1_Q53	0.871	valid	0.872	0.912	0.722	Reliable
	BM1_Q54	0.854	valid				
	BM2_Q55	0.834	valid				
	BM3_Q56	0.840	valid				
Renewal	BM6_Q59	0.859	valid	0.849	0.909	0.768	Reliable
	BM7_Q60	0.904	valid				
	BM8_Q61	0.866	valid				
Profit Orientation	BM10_Q62	0.852	valid	0.744	0.854	0.662	Reliable
	BM11_Q63	0.822	valid				
	BM12_Q64	0.764	valid				

Figure 15 illustrates the explanation of the cutoff value for the loading factor, and Figure 16 provides the explanation of the dimension reliability as referenced in Table 6.

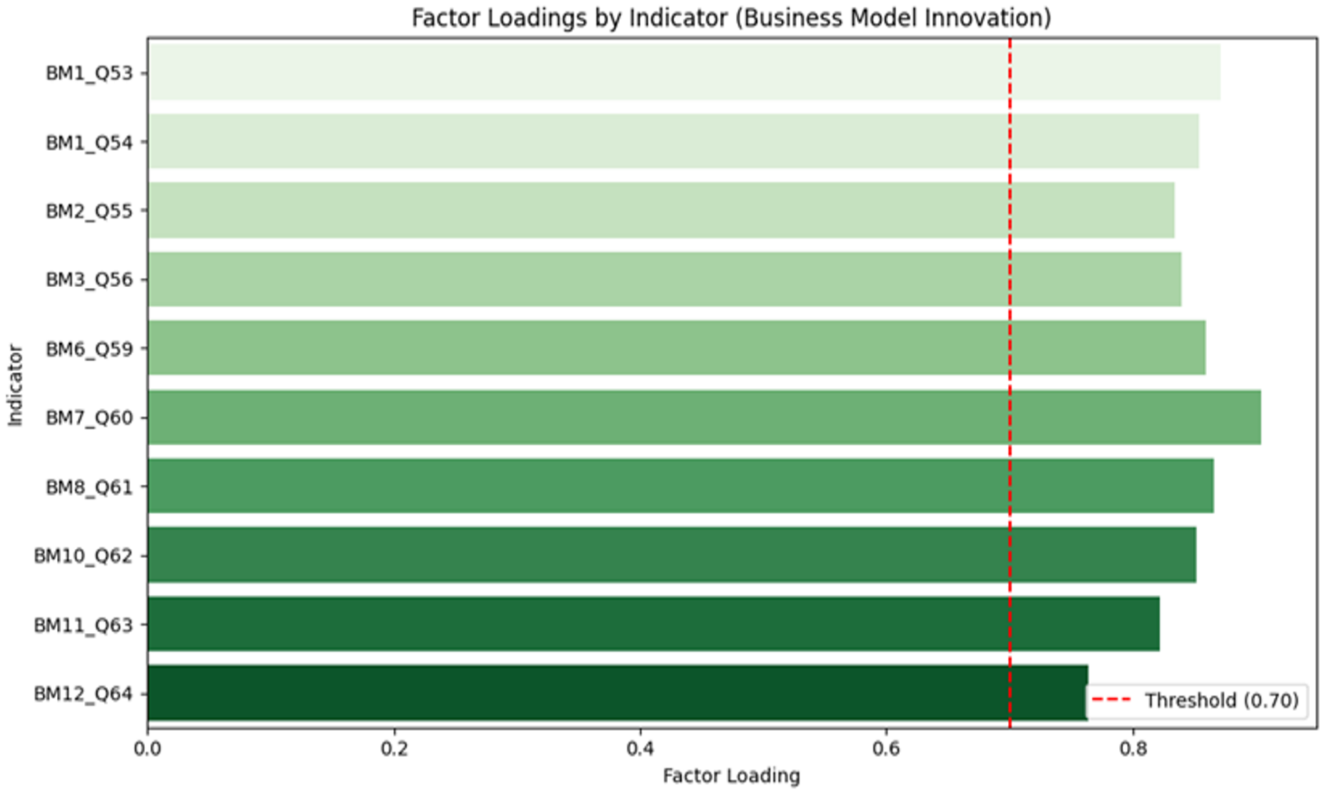


Figure 15.
Factor loadings by indicator (BM innovation).

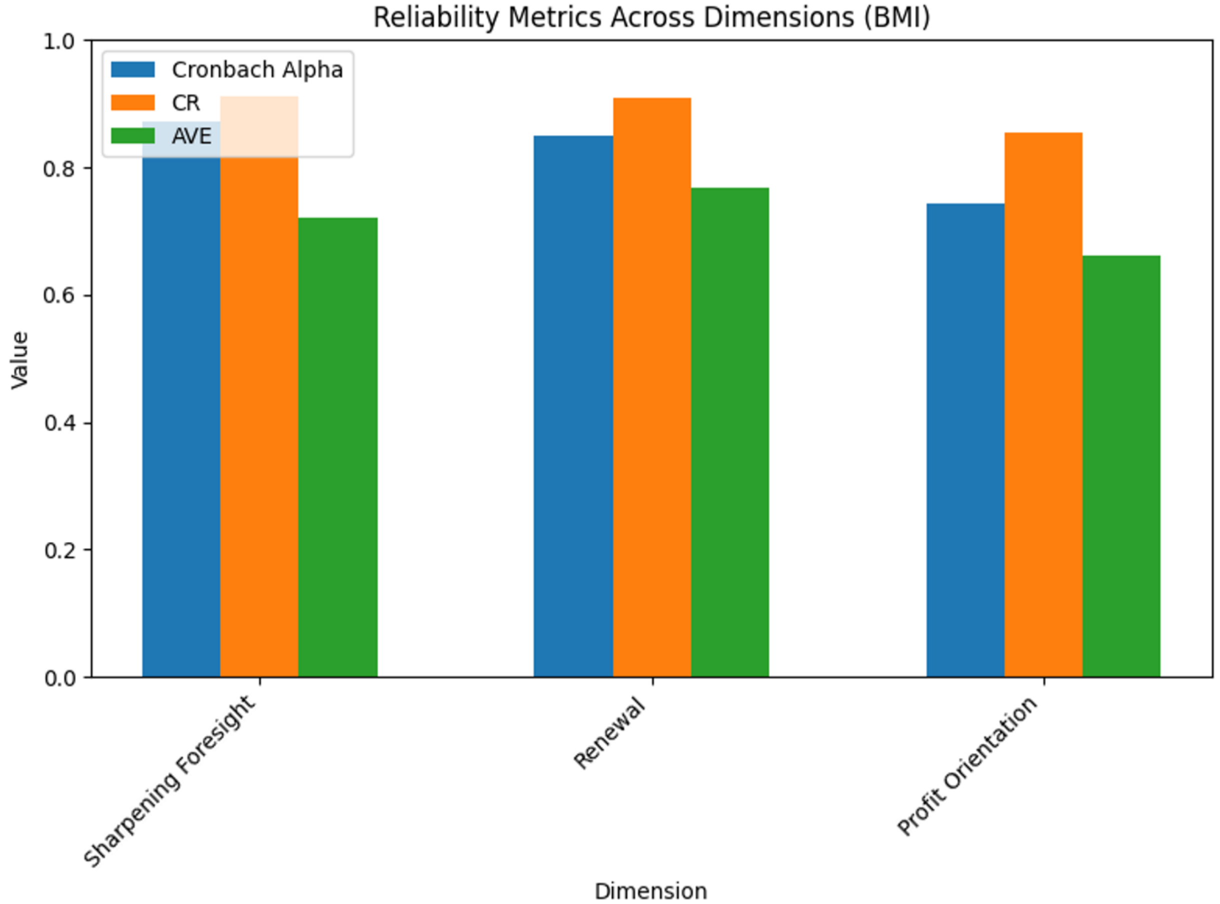


Figure 16.
Reliability metrics across dimensions (BM innovation).

3.8. Competitive Resilience (CR)

The statistical results show that the indicators have factor loadings between 0.810 and 0.889, which are above the threshold. In addition, Cronbach's alpha values for dimensions and latent variables are above the ≥ 0.50 threshold, with a range of values from 0.782 to 0.957. The composite reliability value also exceeded the threshold of ≥ 0.70. In summary, the competitive resilience variable, including its dimensions and indicators, was declared valid and reliable. Convergent validity was checked using the AVE (average variance extracted) value, which was above 0.50. This confirms the convergent validity of the variable._Discriminant validity was assessed by comparing the square root of the AVE with the correlation between constructs; the square root value of the AVE was higher than the correlation between constructs.. The Fornell-Larcker results can be seen in the following table:

Table 7.
Validity and Reliability of Competitive Resilience (CR)

Variable	Code	Factor Loadings	Validity FL ≥ 0.70	Cronbach's Alpha ≥ 0.50	CR ≥ 0.70	AVE ≥ 0.50	Reliability
Competitive Resilience	CR			0.952	0.957	0.616	Reliable
Self Sufficient	CR1_Q66	0.852	valid	0.877	0.916	0.731	Reliable
	CR2_Q67	0.829	valid				
	CR3_Q68	0.849	valid				
	CR4_Q69	0.888	valid				
Organization	CR5_Q70	0.826	valid	0.845	0.896	0.682	Reliable
	CR6_Q71	0.810	valid				
	CR8_Q73	0.840	valid				
	CR9_Q74	0.828	valid				
Competitiveness	CR10_Q75	0.889	valid	0.782	0.873	0.696	Reliable
	CR11_Q76	0.836	valid				
	CR13_Q79	0.862	valid				
Strategic Orientation	CR14_Q80	0.878	valid	0.876	0.915	0.729	Reliable
	CR15_Q81	0.816	valid				
	CR16_Q82	0.853	valid				
	CR17_Q83	0.866	valid				

Figure 17 explains the cutoff value for the loading factor, while Figure 18 details the dimensions' reliability as mentioned in Table 7.

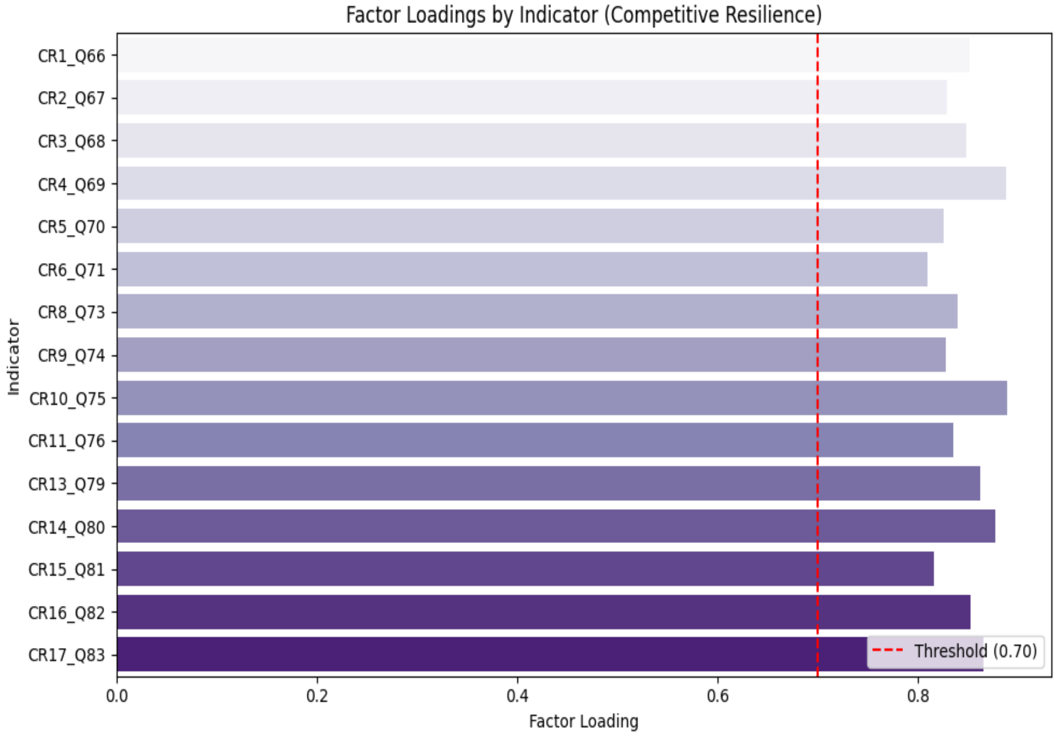


Figure 17.
Factor loading by indicator (CR).

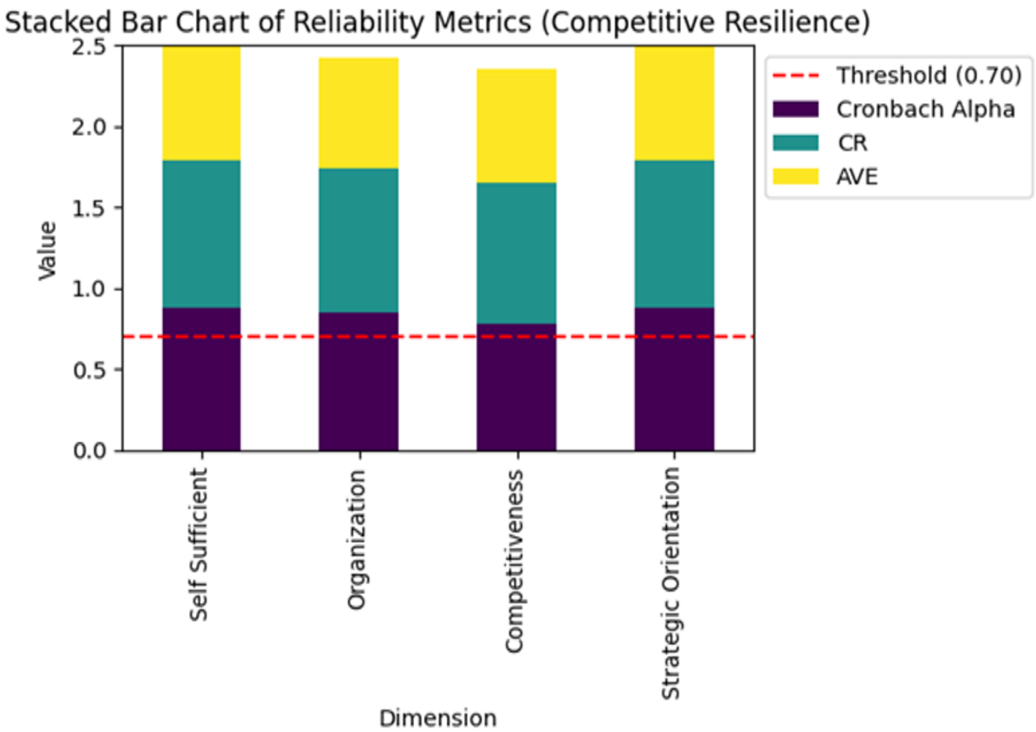


Figure 18.
Reliability metrics (CR).

3.9. Inner Model Analysis: Goodness of Fit and Path Coefficient
3.9.1. Determinant Coefficient: R-Square

Table 8.
R-Square Value.

	R Square	Percentage (%)	Interpretation
Competitive Resilience	0.825	82%	Strong
Organization Innovation	0.450	45%	Moderate
Digital Collaboration Innovation	0.404	40%	Moderate
Business Model Innovation	0.646	64%	Moderate

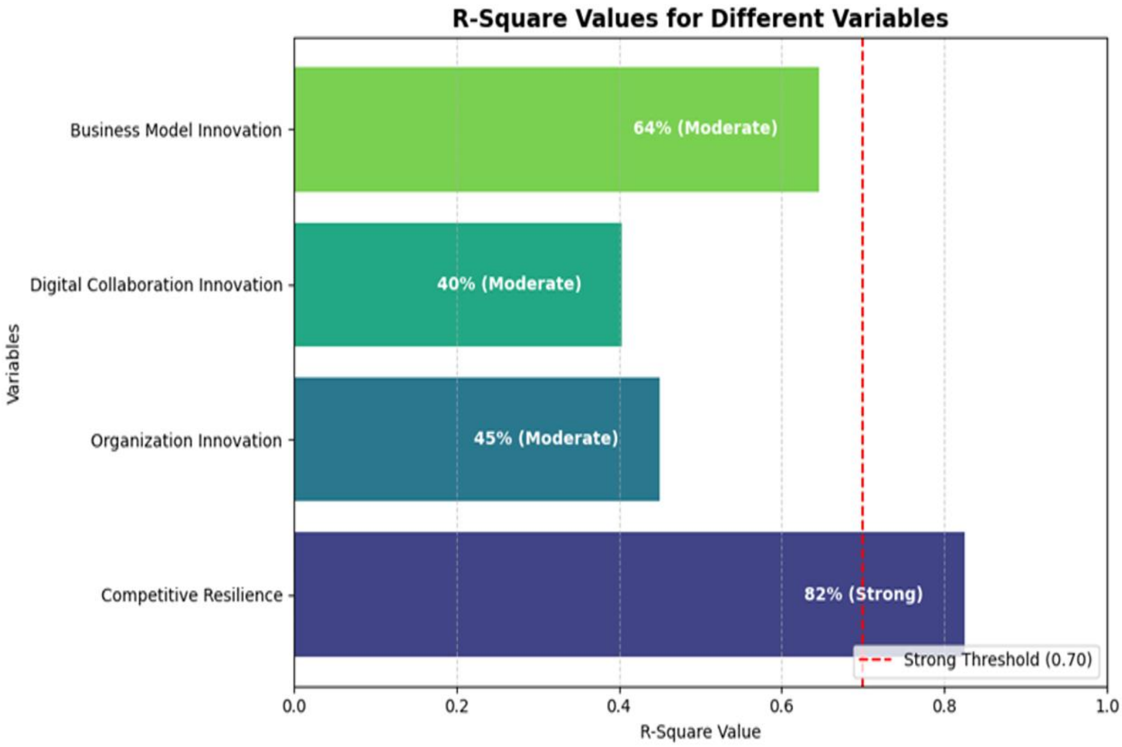


Figure 19.
R-Square values.

Table 8 and Figure 19 show that the R² value for the competitiveness variable is 0.825. This means that 82.5% of the competitiveness can be explained by entrepreneurship capability, organization innovation, digital collaboration innovation, and business model innovation working together. The remaining 17.5% is explained by other factors outside this research model. With a value of 82.5%, this indicates that the influence of all independent variables on the dependent variable is in the strong category. Then it also means that the regression model used has a good fit level of the data.

3.10. Significance of the Path Coefficient Analysis: Bootstrapping

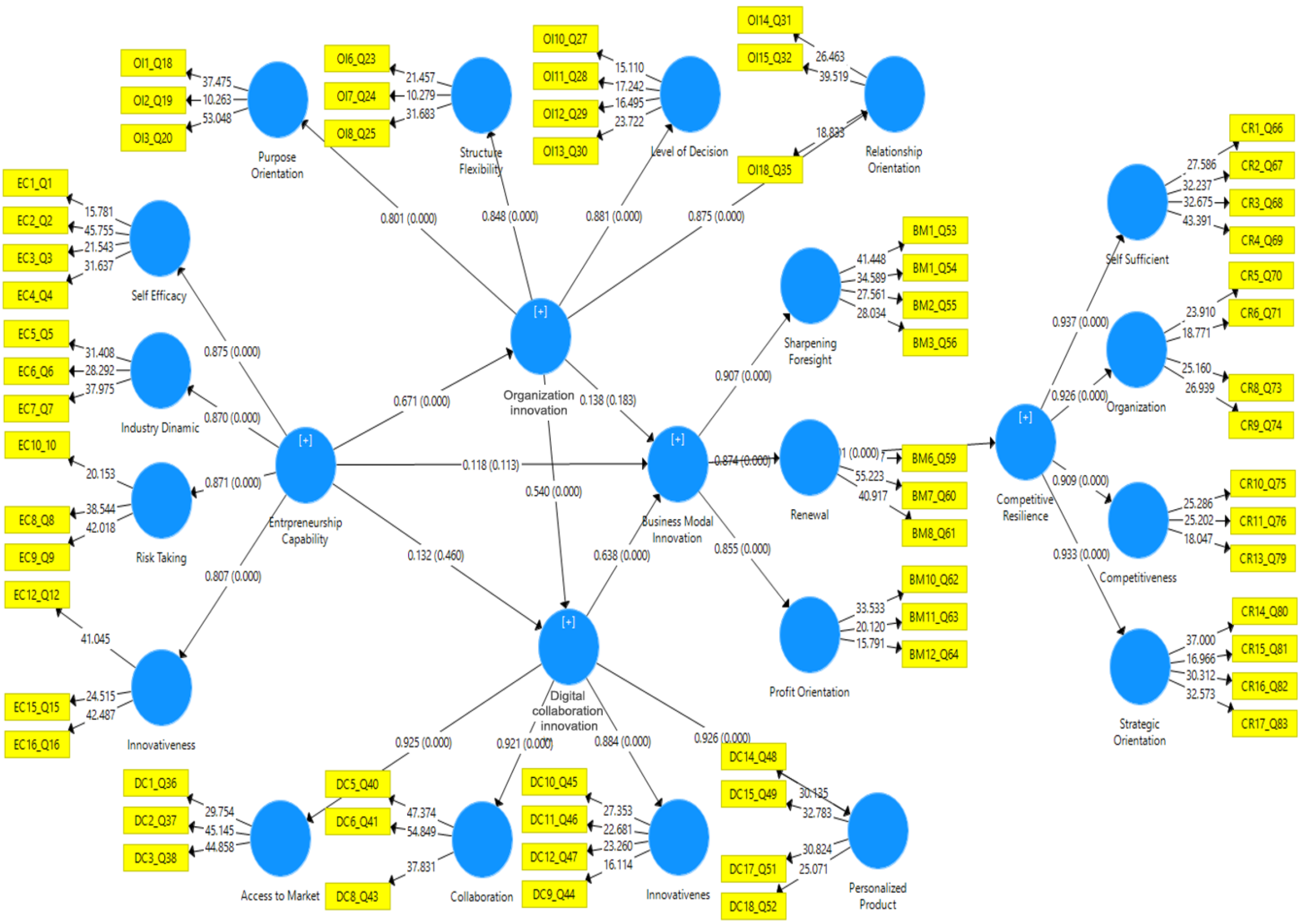


Figure 20.
Path Coefficient Analysis: Bootstrapping Smart PLS-SEM.

Inner model analysis also proved useful for predicting the cause-and-effect relationship between latent variables, which are the variables that cannot be measured directly. The paper analyzed the relationship between two latent variables by calculating the P-value and T-test through bootstrapping techniques by using the Smart PLS-SEM application. In Figure 20

According to the Inner Model output presented in Table 9, the hypothesis was analyzed by examining the Path Coefficient value, which ranged from -1 to +1. A value closer to +1 indicates a stronger relationship between the two constructs. Conversely, a value close to -1 indicated a negative relationship between the two variables. The study used the P-value to assess the hypothesis. If the P-value is below 0.05 and the T-statistics exceed 1.96, the independent variable likely affects the dependent variable significantly. The hypothesis is accepted if the T-statistics are greater than 1.96 and the P-value is less than 0.05.

Table 9.
Result Hypothesis Analysis.

Hypothesis (Path Analysis)		Path Coefficients	T Statistics ≥1.96	P Values <0.05	Conclusion
	Direct Effect				
H1	Entrepreneurship Capability -> Organization Innovation	0.671	12.757	0.000	Significant
H2	Entrepreneurship Capability -> Digital Collaboration Innovation	0.132	0.740	0.460	Not Significant
H3	Entrepreneurship Capability -> Business Model Innovation	0.118	1.587	0.113	Not Significant
H4	Organization Innovation -> Digital Collaboration Innovation	0.540	3.852	0.000	Significant
H5	Organization Innovation -> Business Model Innovation	0.138	1.334	0.183	Not Significant
H6	Digital Collaboration Innovation -> Business Model Innovation	0.638	4.783	0.000	Significant
H7	Business Model Innovation -> Competitive Resilience	0.901	39.682	0.000	Significant
Indirect Effect					
H8	Entrepreneurship Capability -> Organization Innovation -> Digital Collaboration Innovation -> Business Model Innovation -> Competitive Resilience	0.208	3.455	0.001	Significant
H9	Entrepreneurship Capability -> Organization Innovation -> Business Model Innovation -> Competitive Resilience	0.083	1.353	0.177	Not Significant
H10	Entrepreneurship Capability -> Business Model Innovation -> Competitive Resilience	0.106	1.610	0.108	Not Significant
H11	Entrepreneurship Capability -> Digital Collaboration Innovation -> Business Model Innovation -> Competitive Resilience	0.076	0.726	0.468	Not Significant

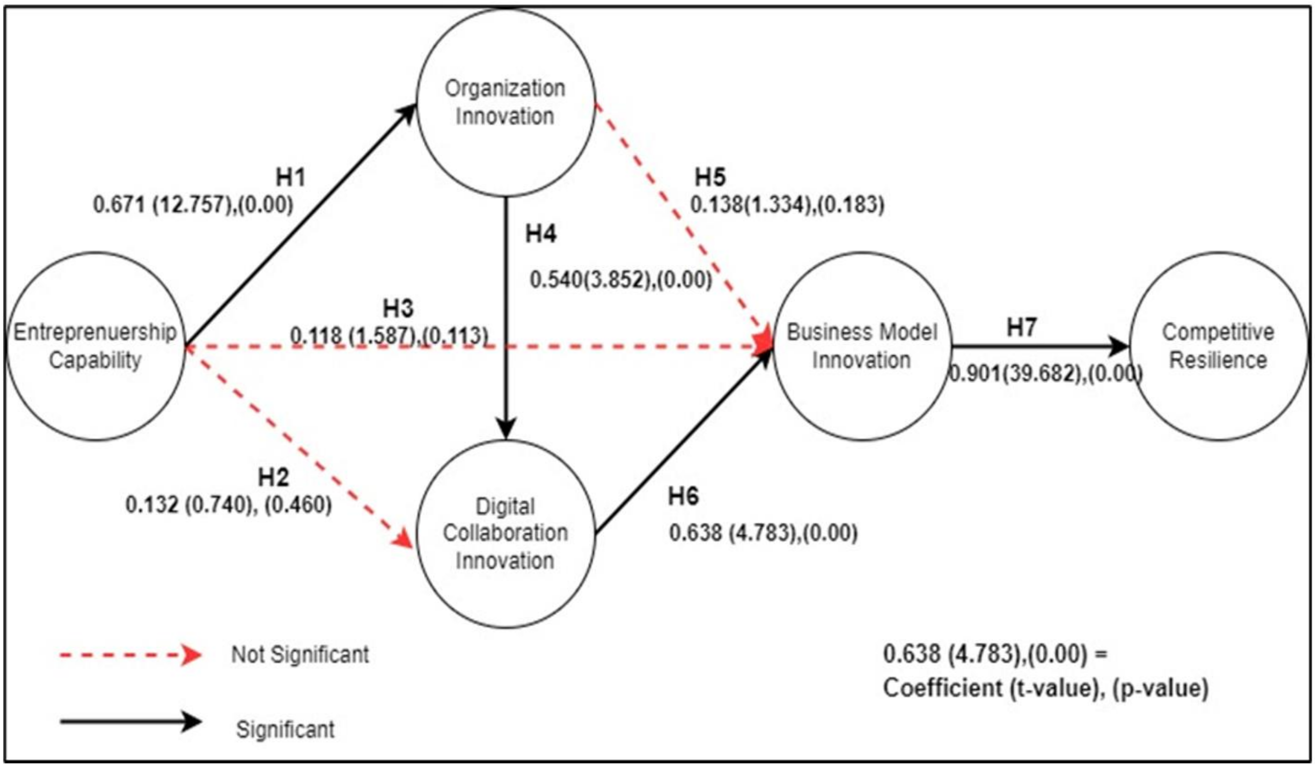
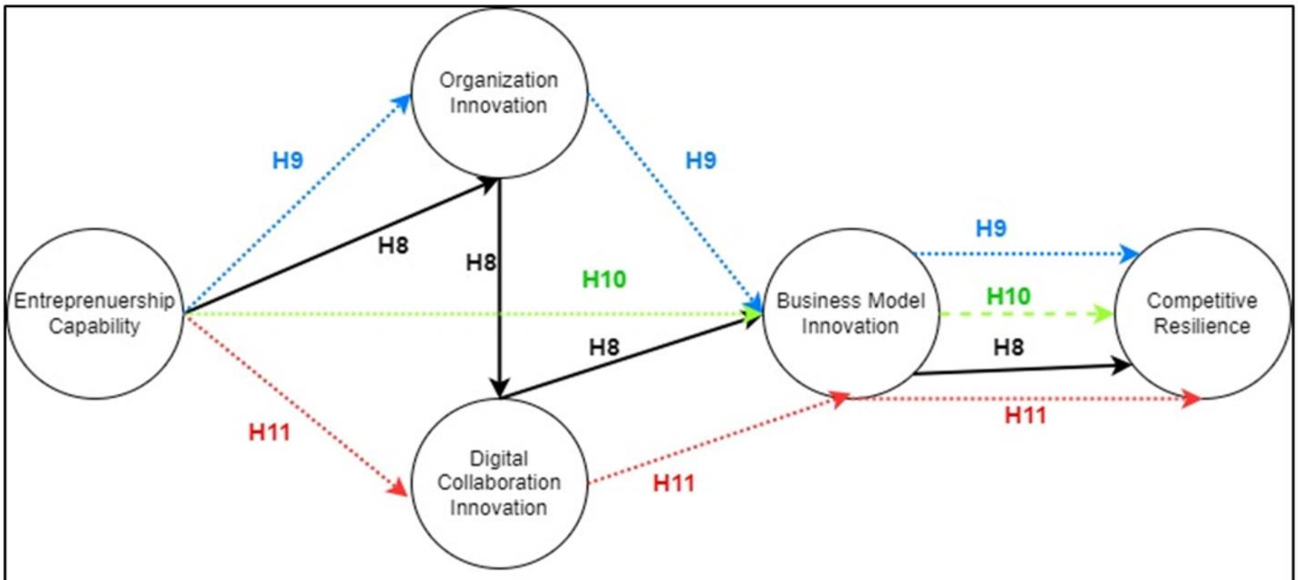


Figure 21.
Direct Path Coefficient Analysis.



	Path Coefficients	T Statistic ≥ 1.96	P-value ≤ 0.05	
H8	0.208	3.455	0.001	Significant
H9	0.83	1.353	0.177	Not Significant
H10	0.106	1.61	0.108	Not Significant
H11	0.076	0.726	0.468	Not Significant

Figure 22.
Indirect Path Coefficient Analysis.

Based on the results listed in Table 9, Figure 21 and Figure 22, this study can conclude that entrepreneurship capability (CE) plays a role in driving innovation through three types of innovation: organization innovation (OI), digital collaboration innovation (DC), and business model innovation (BM), which in turn can increase competitive resilience (CR), off the seven hypotheses proposed in this study, four were found to be valid, namely H1, H4, H6, and H7.

In particular, the indirect effect in hypothesis H8 shows in Figure 22 that having strong entrepreneurship capability can enhance a company's capability to stay competitive and resilience by triple series innovation. The analysis shows that there isn't enough evidence to support the direct effects of hypotheses H2, H3, and H5. This means the study did not confirm a direct relationship between these variables. Similarly, the study did not receive sufficient evidence to accept hypotheses H9, H10, and H11, which test for indirect effects.. The next chapter will provide a more detailed explanation of these results.

The result showed a strong positive association between EC and OI, which concluded that H1 was accepted as the path coefficient (PC) was 0.671, T-statistics were at 12.757 with a p-value of 0.000. The strongest EC dimension was self-efficacy (0.875), suggesting that entrepreneurship capabilities contributed to organizational innovations and helped organizations achieve their respective performance goals [62]. Innovation helps organizations tackle digitalization challenges and enhance competitiveness [63]. For DC and BM, the results indicated a non-significant influence on the relation of EC (H2 rejected) and (H3 rejected). These factors likely stem from low factor loadings for risk-taking and innovation Khouroh et al. [64] and limited entrepreneur involvement in digital operations. Likewise, OI did not affect BM either (H5 rejected), highlighting the need for innovation with a company's value chain activities to facilitate transformation towards a new business model.

On the other hand, OI was found to have a significant relationship with DC (H4 accepted), with a PC of 0.540, a T-statistic of 3.852, and a p-value of 0.000. Guo and Chen [65] posited that open innovation facilitates digital collaboration, which in turn improves information interoperability and agile processes within the digital economy. H6 was supported as DC strongly positively impacted BM (PC of 0.638), contributing to innovation through real-time collaborations [46]. H7 accepted and proved that BM innovation positively influenced CR (competitive resilience) (β = 0.901; T-statistic = 39.682), thus further asserting its validity as a factor related to the performance and the market positioning. These results indicate an indirect and significant relationship (H8 accepted), where EC positively influenced CR through the mediation of OI, DC, and BM, emphasizing a stepwise innovation process[66]. Yet, EC only indirectly affected CR via OI and BM (H9 rejected), or directly via BM alone (H10 rejected), suggesting that EC's effect on resilience is mediated by intermediate innovations instead of direct interactions.

4. Conclusion

The results of this paper highlight the importance of the influence of triple series innovation, following steps of the value chain in the airline business, such as organizational innovation, digital collaboration innovation, and business model innovation, to compose competitive resilience driven by entrepreneurship capability on the strategic adaptability of continuing action on innovativeness. Based on the responses collected from mid- to top-level managers, the analysis showed that the diversity of this demographic profile added nuance to the intersectionality of entrepreneurship capability through triple series innovation and composed operational resilience. Using SPLS software, the research model analyzed five variables, nineteen dimensions, and sixty-six indicators, post-dropping sixteen indicators. The results of the quantitative analyses validated reliability. The EC (entrepreneurship capability) emerged as a significant factor, particularly with high reliability indicators above Cronbach's alpha cutoff value, covering dimensions like self-efficacy, dynamics of the industry, and risk-taking aspects. Likewise, through indirect analysis, innovations showed strong internal consistency, where structural flexibility and relationship orientation were effective in passing through the three-value chain, ultimately becoming statistically significant contributors to competitive resilience. As an entrepreneur, one needs to focus on the most radical level of innovation by performing innovation activities gradually or in a triple series order, depending on the airline's value chain. The model structure finds a path correlation through indirect analysis that has a long-lasting impact on competitive resilience, starting with the capability to be an entrepreneur and continuing through three levels of innovation in the airline value chain. The step-by-step innovation process, known as Triple Series Innovation, contributes to filling a gap in this research, leading to novelty. This triple series development involves a shift from competitive advantage, as noted by Porter [67], to competitive sustainability and ultimately to competitive resilience.

Table 10.
Summary of theoretical results on innovation and competitiveness strength.

Market Condition De Groot, et al. [68]	**Innovation Level Al-Hakim and Hassan [69]**	**Organization Leih, et al. [70]**	**Airline Distribution OVACI [71]**	**Airline Business Model Doz and Kosonen [72]**	**Strength Of Competitiveness Teixeira, et al. [28]**
Calm	Normal	Function Orientation	Travel Agent & Channel	SEAT per Km Flight	Advantage
Dynamic	Incremental	Product Orientation	Partnership	Low cost (One ticket price/seat)	Sustainable
Turbulence	Radical	Business Orientation	Digital Collaboration	Route/OD Flight	Resilience

Access to markets. Linden [27] personalized offerings and products provided by the airline, Ovaci and Yldirim [73], and innovative approaches, Al-Hakim and Hassan [74] to emerging needs in the expanding digital domain of aviation were all evidenced as high factor loadings. Business model innovation Doz and Kosonen [75], characterized by foresight and profit focus Leih et al. [76], was clearly related to organizational adaptability Leih et al. [76] while competitive resilience reflected the industry's capability to manage market disruptions from turbulence [77].

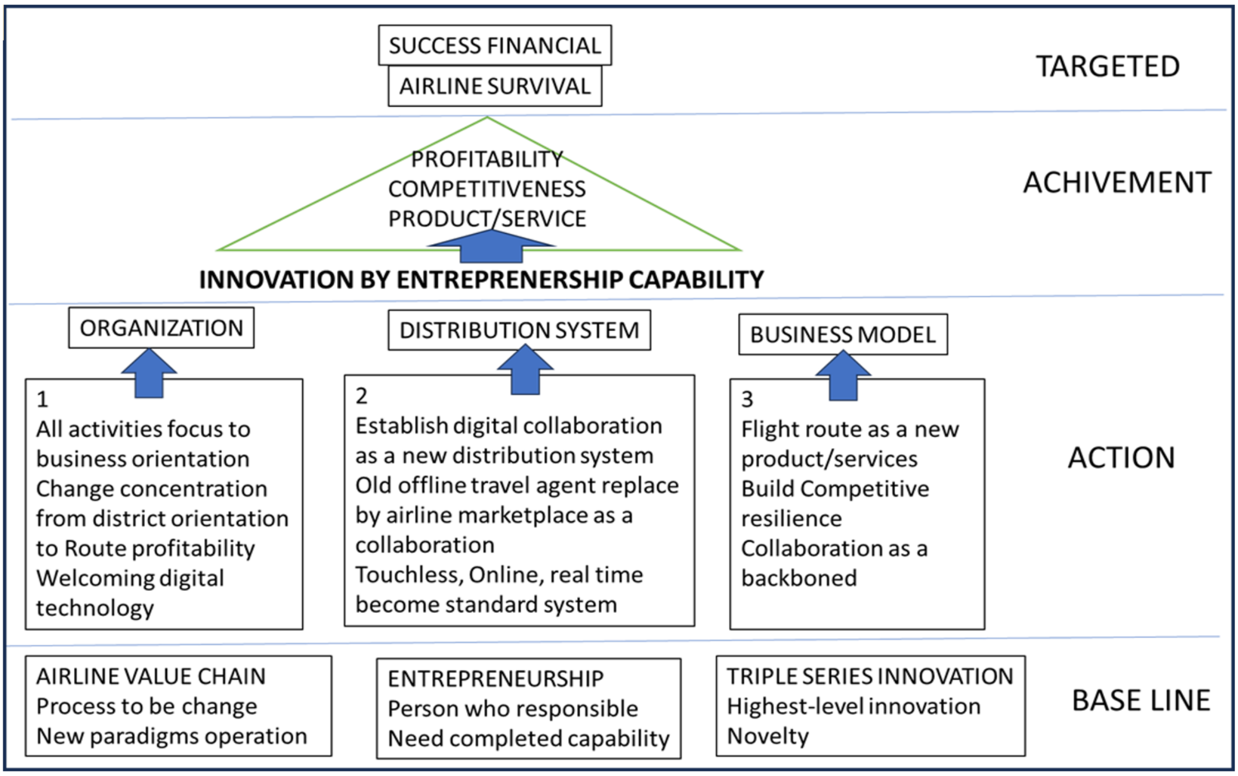


Figure 23.
The innovation activities for the airline's value chain by entreprenership capability.

These results reaffirm that innovation-centered structures, amplified by cross-functional digital networks and agile business models, remain pivotal to competitive resilience within the airline industry. The study results are positioned in line with the theoretical readings of the past, in which market turbulence highlights the importance of entrepreneurial capabilities in continuing innovation in dynamic environments.

Future studies may also combine these relations across the global aviation landscape in the context of changing digital transformations and the demands of the market.

The role of entrepreneurship in the capability of innovation in tough situations is enhanced by adding to what is known about successful serial innovation testing in terms of three key factors: collaboration, organization, and business models. It can improve theoretical entrepreneurship by innovating through three stages in a series to elevate competitiveness to a level of resilience that allows firms to escape market turbulence.

Abbreviation

BBA Bachelor of Business Administration
MMIS Master of Management in Information System
MSIS Master of Science in Information system
DR (C) Doctoral Degree (Candidate)
S.I.P. Bachelor of Political Science
MSc. Master of Science
Ph.D. Doctor of Philosophy
MA Master of Arts
SE Bachelor of Economy

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