JOURNAL OF INTERDISCIPLINARY PERSPECTIVES

ISSN Print: 2984-8288, ISSN Online: 2984-8385
Vol. 2, No. 12, pp. 554-569, December 2024

Innovation Strategies Among Medium and Large Enterprises in Dumaguete City, Negros Oriental

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Date received: October 16, 2024
Date revised: November 11, 2024
Date accepted: November 30, 2024

Originality: 98%
Grammarly Score: 99%
Similarity: 2%

Recommended citation:
Merto, A.C., Ybañez, R. (2024). Innovation strategies among medium and large enterprises in Dumaguete City, Negros Oriental. *Journal of Interdisciplinary Perspectives*, 2(12), 554-569. https://doi.org/10.69569/jip.2024.0578

Abstract. This study investigated the ever-changing domain of innovation strategies and obstacles encountered by medium and large enterprises in Dumaguete City, Negros Oriental. Additionally, it put forth practical suggestions for higher education institutions (HEIs) to better align graduate education with the market's requirements. Surveys and interviews were used to meticulously collect data from 150 establishments using a comprehensive mixed-methods approach. Important insights were extracted through statistical analyses, such as frequency distribution and Pearson's correlation coefficient. The results indicated that the business environment was complex and varied, with organizations placing a high value on technological progress and product innovation while facing significant obstacles, including employee opposition, insufficient support from leadership, competitive forces, and regulatory intricacies. In order to tackle these challenges, the study proposed the implementation of capacity-building initiatives for decision-makers, targeted innovation support, the promotion of synergistic collaborations between academia and industry, and advocacy for policy frameworks that are conducive to progress. A comprehensive remedial strategy outlines pragmatic measures that local enterprises can undertake to strengthen their innovative capabilities; it emphasizes collaborative support networks, advocacy endeavors, and robust monitoring systems. This study made a substantial scholarly contribution to innovation management and business strategies, with significant implications for economic progress and the improvement of graduate education. When viewed through the lens of NOCCI, innovation becomes a critical factor in promoting entrepreneurial development and stimulating economic vitality in Negros Oriental. The proactive efforts undertaken by NOCCI to foster an innovative ecosystem via service provision, investment facilitation, collaborative ventures, and advocacy campaigns underscore the organization's dedication to promoting sustainable business growth and prosperity within the local community.

Keywords: Challenges; Innovation; Large establishments; Medium establishments; Strategies.

1.0 Introduction

As noted by Drucker (1985), innovation acts as a catalyst for entrepreneurship, transforming resources into drivers of wealth creation. This study explores innovation strategies in medium and large enterprises in Dumaguete City, drawing on prior research examining innovation's complexities within organizational contexts. Chesbrough's (2003) concept of open innovation shifted traditional views by emphasizing the importance of external collaboration and knowledge-sharing, a practice increasingly adopted by medium and large enterprises. Barney's (1991) resource-based view highlights how sustainable competitive advantage stems from strategically allocating valuable resources. This framework stresses the role of internal capabilities and external networks in fostering continuous improvement—critical for enterprises facing a fast-evolving business environment.

Empirical studies by Laursen and Salter (2006) underscore the importance of aligning research and development (R&D) with broader business objectives to drive innovation. These findings suggest that medium and large enterprises should prioritize innovation investments that yield measurable returns and long-term competitive advantages. Inspired by the Negros Oriental Chamber of Commerce (NOCCI), which recognizes innovation's role in driving local entrepreneurial success, this research examines the strategies employed by Dumaguete's enterprises. NOCCI supports businesses by promoting collaboration, resource allocation, and the alignment of R&D with business goals, echoing themes in scholarly research.

While much has been studied on innovation, there remains a gap in understanding the specific strategies and challenges faced by medium and large enterprises in Dumaguete City. This study seeks to bridge that gap, combining theoretical insights with empirical evidence to offer actionable recommendations to enhance local economic growth and competitiveness. This study's research question is: "What are the innovation strategies and challenges employed by medium and large enterprises in Dumaguete City, and how can HEIs improve graduate quality in response to market needs?"

2.0 Methodology

2.1 Research Design

This research utilized a mixed-methods approach, combining qualitative and quantitative methodologies to investigate the innovation practices of medium and large establishments in Dumaguete City. The study population included a diverse range of establishments, with a sample size of 150 carefully selected through stratified random sampling. This rigorous sampling method ensured representation across various sectors and sizes, enhancing the study's robustness and validity.

2.2 Research Locale

The City of Dumaguete in Negros Oriental is its provincial capital and is classified as a coastal component city. It has a land area of 33.62 sq. km. with a population of 134,103 based on the 2020 Census, registering a population density of 3,989 persons per square kilometer. Thirty barangays in the city embrace different demographic make-ups and population characteristics. Economically, the city of Dumaguete is growing consistently and has an annual regular revenue of ₱988.7 million in 2020. Real property tax, business tax, and other fees generate a large share of this revenue. The city has been witnessing steady population growth since 1903 when it hosted just 14,894; by 2020, the population had swelled to 134,103, with a median age of 27.21. The household population 2020 was 134,103 persons, and the total number of households was 32,726. The population structure indicates a considerable share of the youth population, with a youth dependency ratio of 35.84 and an old age dependency ratio of 8.62. Moreover, the city stands in proximity to other urban centers within Negros Oriental and neighboring provinces that function as strategic drivers for development and connectivity.

2.3 Research Participants

The research respondents for this study comprise managers and owners of medium and large establishments in Dumaguete City, Negros Oriental. Five hundred five potential respondents were identified, representing a diverse range of industries and sectors within the city's business landscape. These establishments were selected based on specific size criteria to ensure a comprehensive understanding of innovation strategies in medium and large businesses. The selection process was guided by the objective of advancing knowledge in innovation management and business strategies within the local context of Dumaguete City.

2.4 Research Instrument

The survey questionnaire served as the means for data gathering. It was a self-made instrument based on the general principles of survey design, the research objective of the study, and the best practices in questionnaire construction. Before the actual survey, the questionnaire underwent pilot testing. The first set of questionnaires determined the profile of the medium and large establishments in Dumaguete City and their innovations, challenges, and recommendations to HEIs. The Cronbach's alpha coefficient was employed to assess the internal consistency and reliability of the data sampling in this research. The result of Cronbach's alpha analysis yielded a value of 0.745806, indicating an acceptable level of internal consistency reliability for the measures used in the study. This suggests that the items included in the measurement instrument are sufficiently correlated with each other, demonstrating a reliable measure of the underlying construct. The second type of instrument used was the unstructured interview, which solicited qualitative answers from the selected prominent industry experts in Dumaguete City.

2.5 Data Gathering Procedure
In the first stage of the study, the researcher sought relevant data about the medium and enormous establishments in Dumaguete City at the Mayor's Office through the office of the City Admin. The researcher obtained permission from the dean of the graduate school, who agreed to administer the questionnaire and thus set a definite day and time to present the objectives and importance of the study to the respondents before the administration of the questionnaire. The informed consent was obtained from all the respondents, which involved the purpose of the study, the voluntary character of participation, the measures taken to ensure the anonymity and confidentiality of the results, and the right to withdraw from the study at any time without penalties.

The researcher personally distributed the instrument itself to control the number of non-responses. While answering the questionnaire, respondents were assisted by the researcher himself, who also conducted an unstructured interview. The second instrument was answered through structured interviews among pre-selected key business executives in Dumaguete City. The questions were predefined and guided the interview process. The researcher accommodated his time and efforts by holding the sessions in any of these people's offices within a convenient frame for the respondents and the researcher himself. The questionnaire was the leading guide in eliciting key insights and views on the subject matter.

2.6 Ethical Considerations
The study observes high ethical standards throughout the research process to ensure that the rights and well-being of the respondents are not compromised. The information is kept in such a way as to ensure the confidentiality and anonymity of the respondents, including the safe storage of data and control over access to it. Possible conflicts of interest are declared openly, and precautions are taken to minimize bias or undue influence on the findings. Moreover, relevant data protection regulations are adhered to when conducting the research, ensuring that the respondents' personal information is kept confidential. By upholding these ethical standards, the study ensures its findings can be trusted and are free from bias, with the primary goal of ensuring the ethical treatment of all individuals involved. Upon data collection, the researcher tabulated and examined the raw data and prepared tables for the various statistical analyses, interpretations, and implications.

2.7 Data Analysis Procedure
The statistical tools utilized include frequency, distribution, weighted mean, percentile, range, and Pearson's correlation coefficient (r).

Frequency Distribution
This tool arranges the values of one or more variables taken in a sample. Each entry in the table represents the frequency or count of occurrences within particular groups or intervals, summarizing the distribution of values in the sample.

Weighted Mean
This type of mean is where individual data values contribute variably to the mean. The weighted mean was used to determine the alignment of the establishment's vision for innovation, measure the significance of innovation efforts, and identify challenges in implementing innovation.

Percentage
This tool calculates the proportion of a particular data set relative to the whole. It was used to establish the profile of medium and large establishments in Dumaguete City, the type of innovation these establishments focus on, the measurement of innovation initiatives, methods to determine the success of innovation initiatives, performance indicators measuring innovation success, frequent challenges across sectors, the impact size of innovation, allocation of annual revenue, and recommendations for HEIs.

Range

The range, the difference between the highest and lowest values in a dataset, provides a measure of data dispersion or spread, indicating variability within the dataset. In this study, the range was used informally to describe overall variability or the extent of values within the dataset in qualitative terms rather than numerical ones. After calculating the weighted mean to determine the average value, the researcher examined data spread using the range to gain insights into the alignment of the establishment's vision for innovation, measure the significance of innovation efforts, and identify challenges in implementing innovation.

Pearson's Correlation Coefficient (r)

This measure indicates the strength and direction of the linear relationship between two continuous variables. The study used it to assess the relationship between innovation measures and challenges faced by medium and large establishments in Dumaguete City.

3.0 Results and Discussion

3.1 Business Profile

Table 1 presents a snapshot of the business landscape in Dumaguete City based on data from 150 establishments. A significant 69.33% of these businesses are corporations, aligning with the study's focus on medium and large-scale enterprises. This dominance reflects broader corporate growth trends in urban areas (Smith et al., 2023).

Table 1. Business Profile

Forms of Business Ownership	Frequency	Percentage (%)
Sole Proprietorship	41	27.34
Partnership	2	1.33
Corporation	104	69.33
Cooperative	3	2
Scope of Business		
1. Local	25	16.67
2. Regional	30	20
3. National	55	36.67
4. International	40	26.66
Years of Operation		
Less than 1 year	1	0.67
1-5 years	1	0.67
6-10 years	5	3.33
11-20 years	15	10
More than 20 years	128	85.33
Sector		
Manufacturing/ Production	15	10
Services/ Technology	51	34
Construction	8	5.33
Retail	37	24.67
Healthcare	34	22.67
Others	5	3.33
Annual Revenue		
Less than 1 Million	0	0
1 Million - `10 Million	10	6.67
11 Million - 50 Million	0	0
51 Million - 100 Million	0	0
More than 100 Million	22	14.67
Others	118	78.66

Sole proprietorships, constituting 27.34%, underscore the entrepreneurial spirit prevalent among small and medium-sized enterprises (SMEs) (Chowdhury & De, 2022). Cooperatives and partnerships, while less common, represent alternative business models that emphasize collaboration and shared ownership (Johnson & Smith, 2021; Brown & Green, 2020). The prevalence of corporate structures suggests a need for strategies tailored to the specific needs of large-scale businesses. As research on business dynamics and innovation indicates (Garcia et al., 2023), corporations must continually adapt and innovate to maintain their competitive edge.

The scope of business operations in Dumaguete City reflects broader global trends**.** A significant portion (36.67%) of businesses operate nationally, aligning with the increasing globalization of markets (Johnson & Smith, 2021). Additionally, 26.66% of businesses have an international focus, emphasizing the importance of a global outlook for competitiveness and innovation (Kumar & Kundu, 2022; Hitt et al., 2016). The presence of regional (20%) and local businesses (16.67%) highlights the importance of catering to both broader regional markets and local needs. This aligns with the literature on the role of businesses in regional economic development (Smith & Johnson, 2021) and localized economic development (Brown & Green, 2022). The diverse range of business scopes underscores the need for context-specific innovation strategies. Businesses operating on different scales, from local to international, face unique challenges and opportunities. Therefore, strategies must be tailored to each business's specific needs, considering factors such as market size, competition, and regulatory environment (Garcia & Martinez, 2020).

The data reveals that most establishments (85.33%) have been operating for over 20 years. This longevity suggests strong market positioning, customer loyalty, and a proven track record (Li & Liu, 2020; Li et al., 2022). Businesses in the 11-20-year range (10.00%) also demonstrate stability and adaptability, highlighting the importance of organizational learning (Li & Chen, 2021). The presence of businesses in the 6-10-year category (3.33%) indicates a dynamic business landscape with ongoing growth and evolution. These businesses may be expanding and diversifying, as suggested by the literature on business life cycles (Kim & Park, 2023). While newer businesses (1-5 years and less than 1 year) represent a smaller proportion, they contribute to the city's economic vitality and innovation. These startups face unique challenges, such as building a customer base and securing funding (Johnson & Smith, 2022). The sectoral distribution of establishments in Dumaguete City aligns with broader economic trends. The services/technology sector (34%) reflects the increasing importance of knowledge-based industries, mirroring global shifts towards digital economies (Smith & Johnson, 2021; Kumar & Kundu, 2022).

The retail sector (24.67%) plays a crucial role in the local economy, aligning with the literature on the importance of consumer-facing businesses (Thangavelu, 2019). The healthcare sector (22.67%) is also well-represented, reflecting the growing demand for healthcare services and opportunities for innovation in this field (Garcia & Martinez, 2020; West et al., 2021). While manufacturing and production (10%) still have a presence, the city's economy is increasingly shifting towards service-oriented sectors. This trend reflects the global shift from manufacturing-based economies to service-based economies (Smith, 2019). The presence of the construction sector (5.33%) aligns with the literature's recognition of its importance in urban development (Doe, 2020). The "other unspecified sectors" category (3.33%) highlights the diversity of businesses in the city, which may include niche industries or emerging sectors. Annual revenue distribution indicates a predominance of smaller businesses, likely SMEs, which are crucial for local economic development (Chowdhury & De, 2022; Brown & Green, 2022). The absence of mid-sized businesses may suggest challenges related to financing and infrastructure (Reyes et al., 2021). However, the presence of larger businesses indicates a more diversified economic landscape. Higher education institutions must provide tailored education and training programs to support the growth and innovation of businesses of all sizes (Tijssen et al., 2023; Brown et al., 2022). Additionally, fostering a culture of innovation and adaptability is crucial for businesses to thrive in an ever-changing economic environment (Kim & Park, 2023; Smith et al., 2023).

3.2 Vision and Strategic Innovations

Contemporary literature on innovation management and organizational behavior strongly resonates with the findings regarding the alignment of establishments' vision for innovation, the effectiveness of strategic initiatives, and the importance placed on innovation, among other related aspects. As shown in Table 2, the weighted mean scores indicate a commitment to innovation among establishments in Dumaguete City, Negros Oriental, which is consistent with recent studies in the field. The weighted mean of 4.26 for aligning the establishment's vision for innovation suggests a shared understanding of innovation's role in organizational goals, echoing findings in recent research emphasizing the importance of a clear and coherent vision for innovation (Brown & Anthony, 2021). Similarly, the weighted mean of 4.26 for the effectiveness of strategic initiatives aligns with the literature, highlighting the crucial role of effective strategies in fostering innovation within organizations (Chesbrough, 2020). Effective strategic initiatives are essential for guiding innovation efforts toward desired outcomes and ensuring organizational success.

Table 2. Vision and strategic innovations

Vision and Strategic Innovation	Mean	Interpretation
Alignment of Establishment's Vision for Innovation	4.26	Very High
Effectivity of Establishment's Strategic Initiative on Innovation	4.26	Very High
The Level of Importance of Innovation	4.31	Very High
Update on Vision for Innovation	3.36	Moderate
Conduct Assessments for Innovation and Strategies	3.33	Moderate
Employees' Involvement in the Innovation Process	3.82	High
Dedicated Budget or Funding for Innovation Projects	4.09	High
Satisfaction Level on Innovation	4.31	Very High
Cumulative Weighted Mean	**3.97**	**High**

Ranges: 5.00 - 4.20 = Very High (VH); 4.19 - 3.52 = High (H); 3.51 - 2.52 = Moderate (M); 2.51 - 1.76 = Low (L); 1.75 - 1.00 = Very Low (VL)

Recent studies have highlighted the pivotal role of innovation in fostering organizational growth and competitiveness, and Damanpour's (2020) findings corroborate the weighted mean of 4.31 for this level of importance. A weighted mean score of 4.31 for the level of satisfaction with innovation efforts aligns with previous research that links successful innovation with overall organizational success and satisfaction (Garcia & Martinez, 2020). A high level of satisfaction indicates a positive perception of innovation efforts and their contribution to organizational well-being. While the cumulative weighted mean of 3.97 indicates a strong commitment to innovation, areas for improvement, such as updating the innovation vision and conducting regular assessments, highlight opportunities for further enhancement. Recent studies emphasize the importance of continuous learning and adaptation in innovation management (Brown & Eisenhardt, 2018; Salter et al., 2021). With these findings, Participant B stated that traditional businesses, predominantly owned by Filipino Chinese, often face challenges in transitioning to modern systems. This can lead to stagnation in growth when their existing systems fail to keep up with increasing demands. Therefore, innovation is needed, especially in sectors beyond tourism, such as trading.

As shown in Table 3, the predominant focus among establishments in Dumaguete City, Negros Oriental, is on product innovation, revealing a concerted effort to create or enhance products in response to dynamic market demands or to gain a competitive edge through novel offerings. The significant emphasis on technological innovation indicates a strategic acknowledgment of technology's role in driving competitiveness and operational efficiency, with establishments likely investing in the adoption or advancement of technologies to stay abreast of industry trends. Many establishments emphasize organizational innovation, suggesting a commitment to improving overall effectiveness and adaptability through changes in structures, processes, or culture. This multifaceted approach aligns with the Resource-Based View (RBV) theory, emphasizing the significance of internal resources and capabilities in fostering innovation and sustaining a competitive edge.

Table 3. Type of innovation the establishment focus

Innovation Type	Frequency	Percentage (%)
Product Innovation	143	95.33
Technological Innovation	113	75.33
Organizational Innovation	111	74.00
Process Innovation	100	66.67
Marketing Innovation	98	65.34

Including process innovation as a key focus reflects a commitment to refining and optimizing internal operations, potentially for heightened efficiency and cost-effectiveness. This aligns with the literature discussing the importance of dynamic capabilities, where adaptability and learning contribute to sustained innovation. Moreover, recognizing marketing innovation among establishments signifies understanding the need for inventive approaches to reaching and engaging customers within competitive markets. Chesbrough (2003) championed the Open Innovation concept, advocating for collaboration and external knowledge to enhance innovation outcomes.

With these findings, Participant F stated that the current trend revolves around digitization and digital technology, facilitating borderless money transactions and user-centric flows, especially in online banking, e-transfers, and similar platforms. However, ensuring the security of ownership remains paramount amidst these changes. While many individuals are embracing the digital shift, a significant portion is still accustomed to traditional physical spaces due to past scams and concerns. Balancing the old-school and new-school approaches poses a challenge, yet online banking platforms, transfer banks, and digital loan applications offer convenience and security to industry stakeholders, ensuring timely payments and peace of mind.

Digitalization extends beyond financial sectors, infiltrating various aspects such as online communities within the UN and social media platforms like Twitter and TikTok, which recognize my expertise and research. However, challenges persist, particularly in data backup and database management. In Dumaguete, the focus is on the food industry, with coffee shops, shoe stores, and appliance retailers competing for market share. As businesses adapt to the digital landscape, innovation remains key to navigating these challenges and seizing opportunities for growth and development.

The analysis of establishments in Dumaguete City highlights a comprehensive approach to measuring the impact of innovation initiatives, reflecting an understanding of innovation's multifaceted contributions to organizational performance (see Table 4). All establishments uniformly prioritize revenue increase as a primary metric, showcasing a widespread acknowledgment of innovation's central role in driving financial growth and sustainability. This aligns seamlessly with the Resource-Based View (RBV) theory, emphasizing the pivotal role of internal resources and capabilities, including innovation, in sculpting competitive advantage (Barney, 1991).

Table 4. Measurement of innovation initiatives

Measurement Type	Frequency	Percentage (%)
Increase in Revenue	150	100
Customer Feedback and Satisfaction	133	88.67
Improved Operational Efficiency	113	75.33
Market Share Growth	108	72.00
Number of New Products/ Services introduced	100	66.67
Others (Not Specified)	5	3.33

Many establishments also emphasize customer feedback and satisfaction as metrics, underscoring the paramount importance of customer-centric innovation. This aligns with contemporary literature highlighting the significance of customer-focused strategies in ensuring the success and longevity of innovative initiatives (Brown & Anthony, 2021). Many establishments measure innovation by focusing on improved operational efficiency, signaling a deliberate effort to optimize internal processes for increased productivity and cost-effectiveness. Recent studies have shown that dynamic capabilities are very important. For example, Smith (2019) and Jones et al. (2020) show that learning and adaptability are two main factors that make innovation last and operations run smoothly.

Market share growth emerges as another important metric for many establishments, demonstrating an understanding of innovation as a catalyst for expanding market presence and bolstering competitiveness. This aligns with the open innovation concept, which champions collaboration and external partnerships to enhance innovation outcomes and competitive advantage (Chesbrough, 2003). A significant percentage of establishments track the introduction of new products or services, emphasizing a commitment to continuous product development and expansion of offerings. This multifaceted measurement strategy, encompassing financial indicators, customer satisfaction, operational efficiency, market share, and product/service expansion, aligns cohesively with the diverse dimensions of innovation outlined in the literature (Johnson et al., 2020).

Table 5 provides insights into the diverse methodologies establishments employ to evaluate the efficacy of their innovation initiatives. Customer feedback and satisfaction surveys emerge as pervasive tools, with a substantial 89.33% of establishments utilizing this method. This aligns seamlessly with contemporary literature emphasizing the centrality of customer-centric approaches in gauging the success of innovation (Brown & Anthony, 2021).

Table 5. Methods used to determine the success of innovation initiatives

Types of Methods	Frequency	Percentage (%)
Customer Feedback and Satisfaction Survey	134	89.33
Key Performance Indicators and Metrics Tracking	125	83.33
Market Share Growth	110	73.33
Increase in Sales Revenue	99	66
Customer Adoption and Usage rates of new products/ services	99	66
Return on Investment (ROI) Analysis	90	60
Number of new products and services launched	81	54
Time to Market for New Innovations	74	49.33
Employee feedback and engagement surveys	70	46.67
Competitive Analysis and Benchmarking	60	40
External Recognition or awards for innovation	54	36
Reduction in Production Cost	54	36
Innovation Performance Assessments by third-party organizations	54	36
Number of patents or intellectual property generated	54	36

Following closely at 83.33%, establishments employ key performance indicators (KPIs) and metrics tracking. This approach resonates with the Resource-Based View (RBV) theory, which underscores the importance of internal resources, capabilities, and metrics in shaping competitive advantage and firm performance (Barney, 1991). The array of methods extends to market share growth, an increase in sales revenue, customer adoption rates, and return on investment (ROI) analysis. This diversity underscores the multifaceted nature of innovation and its impact on various dimensions of organizational performance. The emphasis on market-related metrics aligns with the Open Innovation concept, which recognizes the importance of external collaboration and market-oriented outcomes (Chesbrough, 2003). According to these findings, hundreds of intellectual property rights have been filed since the opening of the IPOPHL Satellite Office in Dumaguete City in 2018, and more than 80 have already been registered (DTI Dgte).

As shown in Table 6, the majority of establishments (87%) rate the significance of innovation in their overall success as very high (VH), indicating a strong acknowledgment of innovation's pivotal role in contributing to businesses' overall success and sustainability. The mean score of 4.18 supports this, indicating a high level of consensus on the importance of innovation (Brown & Anthony, 2021).

Table 6. Measuring the significance of innovation efforts

Indicators	Mean	Verbal
Significance of Innovation in Overall Success	4.18	Very Significant
Significance of Internal Evaluations to Assess Impact of Innovation	4..25	Very Significant
Significance of Innovations Against Competitors	4.21	Very Significant
Significance of Measuring and Evaluation in Innovation	4.21	Very Significant
Satisfaction with the Measurement and Evaluation Process in Innovation	4.18	Very Significant
Cumulative Weighted Mean	**3.36**	**Moderately Significant**

The establishments exhibit a high regard for internal evaluations in assessing the impact of innovation, with a weighted mean of 4.25. This suggests that organizations recognize the value of internal assessments to gauge the effectiveness and outcomes of their innovation initiatives. The absence of low ratings (L or VL) emphasizes a consensus on the high importance of internal evaluations (Smith & Jones, 2020). Furthermore, the establishments place high importance on evaluating their innovations against competitors, with 87% giving a very high (VH) rating. This indicates a keen awareness of the competitive landscape and the need to benchmark innovations against industry standards. The dimension holds high significance, as supported by the mean score of 4.21 (Johnson & Smith, 2020). 87% of respondents give high ratings to measuring and evaluating the innovation process, indicating their significance. The moderate rating (M) in 5% of responses suggests some variation in opinions, possibly indicating diverse perspectives on the methodologies or tools used for measurement. The overall weighted mean of 4.21 confirms that measuring and evaluating innovation is important (Chesbrough, 2003).

Satisfaction with the measurement and evaluation process in innovation is generally high, with 87% providing high (H) or very high (VH) ratings. The presence of 10% moderate (M) ratings may indicate areas for improvement or varying expectations regarding satisfaction with the evaluation process. The weighted mean of 4.18 aligns with the overall positive sentiment regarding satisfaction (Johnson et al., 2020). According to these findings, establishments show a significant effort in measuring innovation, just as Participant C stated,

"*In the past, installing a point system, also known as a point of sale or POS system, would typically cost between 80 to 100 thousand pesos. You can now download an app and pay a yearly subscription for about 1,500 to 2,000 pesos. So small and medium enterprises can now register and issue a thermal paper receipt for a much lower cost than before. So, number one, for me, is the cost of adopting innovative systems. The innovation that could help the local government, I think, is also another factor because I have yet to see and hear them creating programs for these small and medium enterprises. The DTI is trying to do its best. They're trying to come up with an initiative, but it's not enough. So it's not only DTI that should help these MSMEs, but also other departments, like perhaps the DOST, should turn these ideas into realistic and tangible systems that our business people and entrepreneurs can take advantage of.*"

Table 7 delineates the performance indicators utilized to gauge the success of innovation efforts. "Increase in revenue" is the most frequently occurring indicator, accounting for 100.00% (Brown & Anthony, 2021). Other noteworthy metrics encompass "Customer Satisfaction Ratings" (81.33%) (Brown & Eisenhardt, 2018), "Market Share Growth" (75.33%) (Barney, 1991), and "Number of New Products/Services Launched" (66.00%) (Chesbrough, 2003). Collectively, these indicators offer a well-rounded perspective on innovation success, spanning financial, customer satisfaction, and operational dimensions.

Table 7. Performance indicators that measures success of innovation effects

Performance Indicators	**Frequency**	**Percentage (%)**
Increase in Revenue	150	100
Customer Satisfaction Ratings	122	81.33
Market Share Growth	113	75.33
Number of New Products/ Services launched	99	66
Employees Satisfaction Engagement	97	64.67
Cost Reduction or Efficiency gains	94	62.67
Time to Market for new products/ services	69	46
Rate of Successful Innovation Projects	67	44.67

Several scholarly works have examined the challenges inherent in implementing innovation within organizational settings, yielding notable insights. The literature review meticulously categorizes and weights these challenges to provide a comprehensive perspective of the landscape. Table 8 systematically outlines challenges spanning diverse dimensions, encompassing financial constraints and regulatory impediments. Notably, it acknowledges the relatively minor nature of challenges such as the lack of dedicated financial resources for innovation and limited accessibility to technological advancements or research facilities. Although we acknowledge these hurdles, we do not consider them as critically severe in comparison to other obstacles.

Table 8. Challenges in implementing innovation

Challenges	Mean	Interpretation
Lack of Financial Resources Dedicated to Innovation	1.87	Slightly Challenging
Limited Access to Technological Advancements or Research Facilities	1.97	Slightly Challenging
Resistance to Change from Employees and Management	2.63	Moderately Challenging
Insufficient Support from Top Management or Leadership	2.11	Slightly Challenging
Difficulty in Identifying Variable Innovation Opportunities	2.38	Slightly Challenging
Long Product Development Cycles or Time to Market	2.58	Moderately Challenging
Inadequate Collaboration Between Different Departments or Teams	1.95	Slightly Challenging
Competition from Established Players or Market Incumbents	4.16	Very Challenging
Regulatory or Legal Constraints Hindering Innovation	2.23	Slightly Challenging
Overcoming Challenges Related to Innovation	3.95	Very Challenging
Cumulative Weighted Mean	**2.58**	**Moderately Challenging**

Ranges: 5.00 - 4.26 = Extremely Challenging (EC); 4.25 - 3.52 = Very Challenging (VC); 3.51 - 2.52 = Moderately Challenging (MC); 2.51 - 1.76 = Slightly Challenging (SC); 1.75 - 1.00 = Not a Challenge at All (NC)

However, the literature also highlights challenges that have a moderate impact, such as resistance to change from employees and management and inadequate support from top leadership. Such challenges highlight the indispensable role of fostering a conducive organizational culture and securing leadership buy-in to facilitate innovation effectively. Moreover, the literature identifies relatively low to moderate challenges in identifying variable innovation opportunities and surmounting long product development cycles or time-to-market hurdles. These obstacles may somewhat hinder innovation processes but are deemed manageable with appropriate strategies and resource allocations. In contrast, the literature accentuates the highly challenging nature of competition from entrenched market players or incumbents. This underscores the intense competitive landscape organizations must navigate to innovate successfully and carve out market positions.

Furthermore, we acknowledge regulatory or legal constraints as challenges, albeit not as formidable as competition or resistance to change. Addressing these constraints necessitates meticulous attention to compliance and legal frameworks, which can significantly influence the trajectory of innovation efforts. The literature review encapsulates a comprehensive category labeled "Overcoming Challenges Related to Innovation," which signifies the multifaceted nature of organizations' hurdles. This category is highly significant, underscoring the imperative for comprehensive strategies and concerted efforts to overcome these challenges effectively. The literature review's cumulative weighted mean suggests that implementing innovation initiatives presents a moderate challenge. While organizations confront notable obstacles, they also possess opportunities to navigate these challenges and propel innovation forward through strategic planning, resource allocation, and organizational commitment.

These findings are insights shared by industry practitioners on the aspect of innovation challenges. Participant A stated that in terms of innovation, the internet connection serves as a key driver. Yet, many businesses in Dumaguete have not fully utilized this tool, particularly in adopting cloud-based systems. Despite my office being equipped with such systems, the challenge lies in the capability of third-party suppliers and customers to handle a paperless system effectively. The availability of these systems is crucial, and reliable support is paramount. Purchasing from reputable companies ensures that support is readily available in case of system failures, preventing disruptions to business operations. While costly, the investment in a reliable system with support outweighs the risks of system failures. Traditional businesses, predominantly owned by Filipino Chinese, often face challenges in transitioning to modern systems. This can lead to stagnation in growth when their existing systems fail to keep up with increasing demands. Therefore, innovation is needed, especially in sectors beyond tourism, such as trading. Participant D also stated that the challenges hindering the transition to technology-driven approaches in traditional businesses primarily revolve around financial constraints. Capital investment in innovation remains a significant hurdle, deterring businesses from embracing more modern methods.

3.2 Challenges

As shown in Table 9, most respondents (54.67%) express the view that challenges exhibit slight differences between sectors, suggesting the presence of sector-specific innovation challenges. Additionally, a significant portion (34.67%) highlights substantial variability between sectors, underscoring the necessity for tailored strategies to address innovation challenges in each sector.

Table 9. Frequent challenges across different sectors

Type of Challenges	Frequency	Percentage (%)
Challenges are similar across all sectors	16	10.66
Challenges vary slightly between sectors	82	54.67
Challenges vary significantly between sectors	52	34.67

This aligns with the literature emphasizing the contextual nature of challenges in innovation management, where sector-specific dynamics play a crucial role (Chesbrough, 2003). The findings underscore the importance of sector-focused approaches in devising effective innovation strategies. Consistent with these findings, Participant B also stated that within Dumaguete City, there is a prevalent adherence to traditional business practices, reflecting a slower pace of technological adoption compared to neighboring major cities like Bacolod, Cebu, Davao, and Metro Manila. While the city has made strides in embracing delivery services, there remains a considerable gap, particularly in sectors like construction and manufacturing, where traditional methods and machinery persist. Agricultural practices also lag, with manual labor still prevalent despite the potential for innovative technologies like drones and cultivator machines to enhance efficiency.

Table 10. Size of impact in the level of challenge faced in implementing innovation

Size of Impact	Frequency	Percentage (%)
Challenges are consistent regardless of the company size	68	45.33
Large establishments face more challenges than smaller ones	46	30.67
Smaller establishments face more challenges than larger ones	36	24

This Table delineates the perceived impact size of the challenges encountered in implementing innovation relative to the company's size. A substantial portion (45.33%) of respondents indicate that challenges remain consistent across companies of different sizes. This finding resonates with the idea that some challenges in innovation management may be independent of company size and are more related to other factors, such as industry dynamics or market conditions. In contrast, 30.67% believe that larger establishments experience more challenges, while 24.00% contend that smaller establishments encounter greater challenges in implementing innovation. This variability in perception could stem from factors such as resource availability, organizational structure, or market positioning, which may differ between large and small companies. These findings align with the literature, which acknowledges the variability in innovation challenges based on the scale and resources of enterprises (Chesbrough, 2003). The diverse perceptions underscore the complex interplay between company size and the challenges inherent in fostering innovation, emphasizing the need for tailored strategies for different-sized establishments.

3.3 The Innovation Measures

The analysis of innovation measures within the establishment reveals a consistent effort to prioritize and invest in innovation. While the establishment conducts periodic analyses to identify patterns between innovation investment and business growth, positive outcomes from innovation initiatives are reported every few years (see Table 11). This data underscores the establishment's commitment to innovation and suggests a need for a more frequent and comprehensive evaluation of its strategies. For instance, Brown and Wilson (2019) offer insights into best practices for assessing innovation metrics, aiding organizations in refining their measurement approaches. Jones and Patel (2020) also delve into the challenges and opportunities of measuring innovation impact, providing strategies for organizations to enhance their innovation measurement practices. These studies collectively contribute to a deeper understanding of innovation measurement and offer recommendations for optimizing organizational innovation practices.

Table 11. Innovation measures

Innovation Measures	Mean	Interpretation
The establishment prioritizes and invests in innovation.	2.82	Annually
The establishment measures the impact of innovation on its income and overall financial performance.	2.82	Annually
The establishment conducts analyses or reviews to identify patterns or trends between innovation investment and business growth.	1.82	Every Few Years
The establishment experienced a positive outcome due to innovation investment and income growth in the past years.	1.81	Every Few Years

Ranges: 5.00 - 4.26 = Continuously as Needed (CN); 4.25 - 3.52 = Every Few Months (EFM); 3.51 - 2.52 = Annually (A); 2.51 - 1.76 = Every Few Years (EFY); 1.75 - 1.00 = Rarely or Never (R/N)

Table 12 shows the relationship between innovation measures and challenges, with a correlation coefficient (r) of 0.66 and a p-value of 0.05. The interpretation suggests rejecting the null hypothesis due to the significant correlation at the 0.05 level. Furthermore, the correlation coefficient falls within the range of 0.60 to 0.799, which suggests a strong positive correlation between innovation measures and challenges. This means that as the level of innovation strategy increases, the challenges faced also tend to increase significantly. The findings suggest that there is indeed a significant relationship between the level of innovation strategy and the challenges encountered. It aligns with the literature review, emphasizing the importance of innovation strategies such as product innovation, process innovation, organizational innovation, and marketing innovation for business success. The role of Higher Education Institutions (HEIs) in preparing graduates to meet industry demands and foster innovation is highlighted (Smith, 2020).

Table 12. Correlation between innovation measures and challenges

Variable Tested	r	P-Value	Interpretation	Decision
Innovation Measures Vs. Challenges	0.66	0.05	Reject the Null Hypothesis	Significant

Table 13 provides information on the allocation of establishments' annual revenue. However, the presented data consisted of only one data point—three establishments allocating 1% of their annual revenue. Other establishments did not share information about allocating annual revenue for research and development or innovation activities. Future research efforts may benefit from gathering more detailed data on revenue allocation among establishments. This would provide a better understanding of the investment patterns and priorities related to innovation within the studied establishments. Such insights are crucial for formulating effective strategies to promote innovation and drive economic growth in the studied context.

Table 13. Establishment's allocation for annual revenue

Allocation for Annual Revenue in Percentage	Frequency	Percentage (%)
1%	3	0.02

The recommendations for Higher Education Institutions (HEIs) underscore a holistic approach to education, reflecting the diverse skill set required for students to thrive in a dynamic and interconnected world (Smith & Johnson, 2022). The unanimous emphasis on communication skills highlights their pivotal role in education and professional success (Brown & Martinez, 2021). It suggests an understanding that effective communication is a foundational skill applicable across disciplines. The strong endorsement of critical thinking aligns with the need for students to navigate complexities, analyze information, and make informed decisions (Garcia & Lee, 2020). It reflects a commitment to nurturing students' analytical abilities. The significant recommendation for technical skills underscores their ongoing importance (Chen et al., 2023). This aligns with the demand for specialized expertise in various fields, emphasizing the practical application of knowledge. The recognition of digital literacy signals an acknowledgment of the evolving technological landscape (Robinson & Wang, 2020). HEIs are urged to equip students with the skills to thrive in an increasingly digital world. The emphasis on soft skills, including interpersonal and communication skills, suggests an awareness of the need for well-rounded individuals capable of collaborating and adapting in diverse settings (Lee & Garcia, 2023).

Table 14. Specific skills or knowledge for hei's to prepare students in the workplace

Recommendations for HEI's Skills for Students	Frequency	Percentage (%)
Communication Skills	150	100
Critical thinking and problem solving	122	81.33
Technical skills	119	79.33
Digital literacy	114	76
Soft skills	102	68
Perspective	76	50.67
Adaptability to rapid change	73	48.67
Self-Reflective learning	61	40.67
Data and analytics skills	59	39.33
Industry-relevant knowledge	44	29.33
Ethical and cultural awareness	39	26
Entrepreneurial mindset	36	24
Research and information literacy	35	23.33
Environmental and sustainability awareness	26	17.33
Financial literacy	23	15.33
Self-management and career planning	23	15.33
Networking and professional development	21	14
Cross-cultural competence	14	9.33
Mental health and well-being	2	1.33

Perspective and Adaptability to Rapid Change: These recommendations focus on a global perspective and the ability to navigate rapid changes (Johnson & Brown, 2022). HEIs recognize the importance of preparing students for a dynamic and interconnected world. The recommendation for self-reflective learning reflects a commitment to fostering self-awareness and metacognition among students, encouraging them to engage in their educational journey actively (Martinez & Robinson, 2021). The acknowledgment of data and analytics skills aligns with the increasing reliance on data-driven decision-making in various industries (Wang & Chen, 2023). HEIs are encouraged to equip students with the ability to analyze and interpret data.

While important, the recommendation for industry-relevant knowledge suggests a balanced approach, recognizing the need for knowledge that aligns with current industry demands (Lee et al., 2021). The emphasis on ethical and cultural awareness signifies a commitment to cultivating academic knowledge, ethical behavior, and cultural sensitivity among students (Garcia et al., 2020). The recommendation for an entrepreneurial mindset aligns with a growing recognition of the value of innovation, creativity, and an enterprising spirit in today's competitive landscape (Brown et al., 2022).

The focus on research and information literacy suggests a desire for students to develop critical thinking skills and the ability to navigate and evaluate vast amounts of information (Johnson et al., 2023). The recommendation for environmental and sustainability awareness aligns with a growing emphasis on responsible and sustainable practices (Robinson et al., 2021). HEIs are urged to instill an understanding of environmental challenges. While less frequent, the acknowledgment of financial literacy indicates a recognition of the importance of financial knowledge for students' personal and professional lives (Chen & Wang, 2020).

Self-Management, Career Planning, Networking, and Professional Development: These recommendations underline the importance of preparing students not just academically but also for their professional journey, including self-management, career planning, networking, and ongoing professional development (Martinez et al., 2022). While lower in frequency, cross-cultural competence and mental health and well-being highlight the evolving understanding of education. There's a recognition of the importance of cross-cultural competence and the growing awareness of mental health issues among students (Wang et al., 2023).

In line with these findings, Participant C shared that skill acquisition is essential and practical application is key to learning. Discipline and character are valued traits, as they are crucial for long-term success. While proficiency in English can be advantageous, particularly in call centers, for clerical roles, dedication and mindset ultimately drive skill acquisition and success. With determination and focus, individuals can learn new skill sets relatively quickly, making ongoing learning and adaptation integral to professional development in Dumaguete.

Table 15. HEI's collaboration with businesses

Recommendations for HEI's Collaboration with Businesses	Frequency	Percentage (%)
Tailored Programs	132	88.00
Identify Key Industry Needs	130	86.67
Industry Advisory Boards	104	69.33
Internship and Coop Programs	47	31.33
Research Collaborations	42	28.00
Diversity and Inclusion	42	28.00
Marketing and Visibility	40	26.67
Marketing and Visibility	39	26.00
Professional Development Workshops	36	24.00
Long-Term Partnerships	35	23.33
Cultural Understanding	28	18.67
Flexible Curriculum	27	18.00
Continuous Improvement	23	15.33
Networking Events	22	14.67
Innovation Hubs	19	12.67
Lifelong Learning Partnerships	18	12.00
Technology Transfer Offices	16	10.67
Industry-Affiliated Centers and Labs	12	8.00
Dual Degree Programs	11	7.33
Collaborative Projects	11	7.33
Cross-Disciplinary Initiatives	4	2.67
Intellectual Property Agreements	4	2.67
Guest Lecturers and Speakers	0	0.00
Evaluate and Adjust	0	0.00

The collaboration between Higher Education Institutions (HEIs) and businesses is crucial for meeting industry needs and driving innovation. Tailored programs, as emphasized by Jones and Iredale (2020), emerge as the predominant recommendation, with the highest frequency (132) and percentage (88.00%), indicating a proactive approach to customizing educational offerings to address specific industry demands. This aligns with Gibb's (2019) findings, highlighting the significance of HEIs identifying and responding to key industry needs to equip graduates with relevant skills for workforce integration. Additionally, as noted by Bertrand et al. (2021), industry advisory boards play a crucial role in providing industry insights and informing curriculum development, with a relatively common presence among HEIs (104; 69.33%). However, while internship and co-op programs are valued, their relatively lower frequency (47; 31.33%) suggests potential challenges in implementation and scaling, as discussed by Ding and Han (2022). Nevertheless, research collaborations (42; 28.00%) are recognized as vital for advancing scientific knowledge and technology transfer between academia and businesses, as Belderbos et al. (2019) emphasized. Furthermore, initiatives focusing on diversity and inclusion (42; 28.00%) underscore HEIs' commitment to fostering inclusive environments within collaborative efforts, aligning with Nakanishi et al.'s (2020) findings on the importance of diversity in enhancing creativity and problem-solving. Moreover, acknowledging the importance of marketing and visibility (40; 26.67%) reflects HEIs' recognition of the need to promote collaboration opportunities and showcase their value to businesses. Finally, the commitment to professional development workshops (36; 24.00%) underscores HEIs' dedication to enhancing the skills and capabilities of students and professionals through collaborative endeavors. These findings highlight the importance of collaborative approaches between HEIs and businesses in addressing industry needs and driving innovation.

With these findings, Participant D stated that there's a call to instill entrepreneurship among students within higher education institutions (HEIs). Entrepreneurial skills are vital catalysts for economic progress, with entrepreneurs playing a pivotal role in driving innovation and economic development. While not all students may pursue entrepreneurship, fostering an entrepreneurial mindset equips them for various roles within the workforce. Moreover, there's a need to align skills development with market demand, ensuring the workforce is equipped with relevant skills that meet industry needs. Collaboration between the education sector and the business community is essential to addressing skill gaps and fostering economic growth. Ultimately, the integration of entrepreneurship education, along with the alignment of skills development with market demand, can create a conducive environment for innovation and economic progress within Dumaguete City. By nurturing entrepreneurial talent and fostering stakeholder collaboration, the city can bridge the gap between traditional practices and modern innovation, driving sustainable economic growth and development.

4.0 Conclusions

The research highlights the diverse range of medium and large enterprises in Dumaguete City, focusing on the technology and services sectors. These businesses have been operational for over two decades, indicating their stability and strategic planning. These companies show a strong commitment to innovation, especially in product and technology advancements, but need improvements in updating innovation vision and regular assessments. Innovation challenges include resistance from employees and management, limited top leadership support, competition, and sector-specific regulatory constraints.

Although businesses recognize the importance of innovation, the study must establish a clear link between the degree of innovation strategy implemented and the difficulties faced, suggesting other factors influence innovation implementation. Further investigation is needed to uncover these factors for more effective innovation strategies. The study emphasizes that NOCCI acknowledges these enterprises' strategic advantage and resilience. Despite commendable innovation efforts, the identified challenges align with NOCCI's observations. To promote innovation-driven development in Negros Oriental, businesses and higher education institutions must collaborate and develop customized strategies in line with NOCCI's dedication to bolstering the local economy.

5.0 Contributions of Authors

The first author was responsible for conceptualizing the research, designing the methodology, collecting and analyzing the data, and drafting the initial manuscript. The second author, the advisor, provided invaluable guidance throughout the research process, offering expertise in research design, data processing, data interpretation, and manuscript revision. Their collaborative efforts were instrumental in the successful completion of this research.

6.0 Funding

This work received no specific grant from any funding agency.

7.0 Conflict of Interests

None

8.0 Acknowledgment

The researcher would like to thank the Almighty Father, the source of everything and who made this study possible. The researcher would like to express her sincere gratitude to her adviser, Dr. Romario P. Ybañez, for sharing his expertise, guidance, and valuable suggestions throughout all stages of the work, which have contributed greatly to the improvement of her study. She is especially indebted to Dr. Ligaya Mae T. Concepcion, who has supported her professional goals and worked actively to provide her with the information and additional help. To her esteemed and extraordinary panelists, their expertise and guidance have greatly contributed to the improvements of the study. The researcher would also like to thank Dr. Techie Ann Baena, Dean of the Graduate School, who contributed much to the development and success of her study. She is also grateful to all those with whom she has enjoyed working throughout this journey and other related projects. She is thankful to her parents, whose love and guidance are with her in whatever she dreams. They are her ultimate inspiration. Most importantly, she wished to thank her supportive husband and wonderful children, who inspired her.

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