

# The Influence of Open Innovation and Digital Literacy on Business Sustainability with New Product Development as an Intervening Variable in Leading UMKM in Buleleng District

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## ABSTRACT

The aim of this research is to assist UMKM (Micro, Small, and Medium Enterprises) in gaining a competitive advantage by focusing on key factors such as Open Innovation, New Product Development (NPD), and Digital Literacy in their marketing strategies. This study was conducted in Buleleng Regency, Bali, with a sample of 60 UMKM businesses. The research used questionnaires as the primary data collection technique, and the data was analyzed using Structural Equation Modeling (SEM) to assess the relationships between the variables. The results of the study indicate that Open Innovation, Digital Literacy, and New Product Development significantly influence the sustainability of UMKM businesses in the region. Open innovation, which involves utilizing both internal and external ideas, helps businesses enhance their product offerings and adapt to changing market conditions. Digital literacy enables UMKM to leverage digital platforms for marketing and customer engagement, while new product development ensures that businesses can meet evolving customer needs and stay competitive. The findings have critical implications for Marketing Management, suggesting that UMKM should prioritize innovation and digital capabilities to improve their marketing strategies. By doing so, they can enhance their market position, improve customer satisfaction, and ultimately achieve long-term business sustainability. This research provides valuable insights for UMKM to adapt to the modern market landscape and create more effective strategies to thrive in a competitive environment.

## 1. INTRODUCTION

Business competition is currently increasingly fierce and difficult to predict because it is full of uncertainty and every company is always required to develop following current trends. Very high business competition requires business actors to further increase productivity. The success of a business is not only about productivity but also about business sustainability. Business continuity is a form of consistency in the condition of a business. Sustainability is the ongoing process of a business, including growth, development, strategies to maintain business continuity and development, all of which aims at the existence (resilience) of the business.

All types of businesses try various ways to survive in competition so as to create business continuity. Business sustainability is an important thing that business actors need to pay attention to (Christoper & Kristianti, 2020). Business sustainability is an issue that is still very interesting to study and develop in all business units. Ferlito & Faraci (2022) stated that to create business sustainability, the business must be able to create more value than competitors. One of them is innovation because innovation tends to involve new ideas, novelty, experimentation and creative processes that can produce products, services or technological processes (Wang et al., 2019).

Companies that consistently promote innovation will be able to become leaders in the market and become a challenge that is difficult for competitors to follow in their efforts to imitate them. The findings from the research confirm that innovation has a positive impact on the continuity of UMKM businesses. (Ekasari & Sularsih, 2023). On the other hand, not all innovations introduced by a company are well received and have a positive impact on business continuity. Hamka et al. (2021) stated that many innovative products failed in the market because they did not meet consumer needs or the products offered did not meet consumer expectations. This condition is what encourages a business to implement open innovation.

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Open innovation is an approach that not only involves internal companies, but also external parties in developing and integrating new ideas optimally for the benefit of the company (Fadhilah & KS, 2018). Research by Behnam et al. (2018) stated that businesses that implement open innovation will be able to survive longer in competition. Open innovation can have a significant positive effect on business sustainability. Open innovation has an important role in business development and sustainability, but currently there are very few studies on open innovation (Apriza, 2021). This research was conducted to fill the research gap by conducting an empirical study on open innovation. The open innovation strategy places greater emphasis on receiving input from internal and external parties in developing and integrating new ideas for business progress (Sangadah, 2023). Businesses that implement open innovation are able to create innovative thinking, especially in developing new products to maintain business continuity (Badawi & Nugroho, 2022). Open innovation carried out by a business will get many ideas about developing new products and by developing new products it will be able to create business sustainability. Carrasco-Carvajal et al (2021) states that to create successful new products, business actors can adopt open innovation to gain a lot of knowledge so as to create value and improve performance. The topic of open innovation is increasingly becoming a major focus in theoretical studies and empirical research. Therefore, companies choose to adopt the concept of open innovation as a strategy to maintain sustainable competitive advantage, especially in facing uncertain business environments and rapid technological changes (Valdez & Castillo, 2021).

Creating business sustainability not only requires open innovation, but technological capabilities are also something that is important for business actors to have. The rapid advancement of technology was followed by changes in business strategy from initially using conventional methods, then switching to digital (Nurfitriya et al., 2022). Farhan et al. (2022) stated that digital literacy can influence the sustainability of UMKM. Lack of understanding regarding digitalization from business actors is a problem for all types of businesses. Digital literacy is the ability to understand and use information from various digital sources. Digital literacy is the knowledge and skills to use digital media (Hanik, 2020). Business actors who have digital literacy skills can effectively respond to rapid changes in innovative technology and focus on long-term goals. Digital literacy skills play a crucial role in influencing the business continuity of business people. In the world of entrepreneurship, knowledge of digital aspects, content evaluation, and internet search skills are very necessary to support marketing activities and maintain business account security (Aulia et al., 2021). Oluwakemi (2019) stated that digital literacy creates entrepreneurial innovation capabilities so that it has an impact on product development. Digital literacy can also help business actors develop new ideas and accelerate business innovation (Widayanto et al., 2023).

Adopting open innovation and having digital literacy can strengthen a business's position in competition and maintain its continuity. Business individuals who integrate open innovation and digital literacy can expand the knowledge horizons of business actors, generating various ideas for developing new products. All business actors compete to not only survive in a competitive environment, but also to achieve success, and business sustainability is a significant measure of this achievement. The resilience of a business reflects its capabilities and potential. If a business cannot maintain its continuity, business people risk being displaced by competition in the business world. Business sustainability is the main hope of every UMKM actor, including UMKM in Bali. UMKM in Bali tend to create products that reflect rich culture and local wisdom. Each region in Bali has different characteristics of UMKM, as is the case with UMKM in North Bali (Buleleng Regency). Buleleng Regency has various types of UMKM businesses, but this type of business cannot be separated from the production of handicrafts and local products that reflect the local wisdom and culture of the Buleleng people. The resulting handicrafts often display traditional techniques and designs passed down from generation to generation.

Seeing the potential contained in each UMKM, the Buleleng Regency Government is actively trying to support the progress of UMKM through various policies. In 2022, the Buleleng Regency government formed a Regional Financial Access Acceleration Team (TPAKD) to facilitate financial access for UMKM. TPAKD functions as a coordination forum between agencies and stakeholders with the aim of increasing the acceleration of financial access in the regions. In 2023, TPAKD determined 60 UMKM to be included in the superior UMKM category. Leading UMKM are businesses that have product quality, production consistency, social impact and developed innovation. The types of businesses that are classified as Leading UMKM are handicrafts, food, drink, incense, VCO and health businesses.

Based on the results of field observations, leading UMKM entrepreneurs in Buleleng Regency have diverse career patterns, some of them inherited family businesses, while others started their businesses from scratch. The products produced by superior UMKM are directed to keep up with current developments and be able to compete in national and international markets. Leading UMKM entrepreneurs need open innovation to increase ideas for new products, in accordance with the results of research by Hartono & Singapurwoko (2020) which states that open innovation has a positive influence on product development.

Product development carried out by a business will be able to create business sustainability (Badawi & Nugroho, 2022). Open innovation is the key to ensuring that the products produced remain relevant, competitive and able to attract consumer interest amidst changing needs and market trends. Technological developments are shifting current business patterns, including leading UMKM in Buleleng Regency. Leading UMKM in Buleleng Regency are directed to learn about digital literacy by providing training on digital literacy, especially in product marketing and digitalization of payments. Leading UMKM entrepreneurs in Buleleng Regency, most of whom are the younger generation, generally have a good understanding of digital literacy because they actively interact with social media as a platform to promote their products.

Digital literacy possessed by business actors is valued as a crucial aspect in creating product innovation and improving marketing strategies. This skill becomes more relevant because many leading UMKM business actors in Buleleng Regency tend to use social media as a means to display their products. It is hoped that the combination of open innovation and digital literacy among leading UMKM entrepreneurs in Buleleng Regency can lead to the development of new products (New Product Development). The research results of Handayani (2023) and Oluwakemi (2019) convey the same results, namely that business actors who have digital literacy are able to create entrepreneurial innovation capabilities so that they have an impact on product development. This is expected to provide encouragement for the growth and success of UMKM in competing, so that they can achieve the desired business sustainability. Digital literacy of business actors is an important focus in research. There has been no in-depth research regarding how open innovation, digital literacy, and New Product Development simultaneously influence the sustainability of leading UMKM craftsman businesses in Buleleng Regency. Therefore, this research will fill this knowledge gap by investigating the relationship between open innovation and digital literacy, as well as its impact on the sustainability of leading UMKM craftsman businesses by considering the role of New Product Development as a mediating variable.

## 2. METHODS

This research was conducted at leading UMKM in Buleleng Regency. The research population is all leading UMKM in Buleleng Regency. Based on data from the Department of Trade, Industry and Cooperatives, Buleleng Regency Small and Medium Enterprises recorded 60 leading UMKM. The research population can still be reached by researchers and all populations are used as research samples so that the sampling technique in this research uses a saturated sampling technique. The data obtained in this research was obtained by distributing questionnaires, that is, researchers went directly to obtain data from the parties concerned. Questionnaires were given directly to 60 respondents who were owners of leading UMKM businesses in Buleleng Regency and were selected as research samples. In the questionnaire given to respondents using the Likert scale measurement method to measure attitudes, opinions and perceptions of a person or group of people regarding social phenomena or variables studied such as open innovation, digital literacy, new product development and business sustainability, each of which consists of five statements.

The questionnaire given to respondents consisted of several statements that had to be answered by respondents with the aim of obtaining data about the perceptions of leading UMKM business actors in Buleleng Regency regarding open innovation, digital literacy, new product development and business sustainability. The initial stage will be to test the research instrument by distributing questionnaires to leading UMKM entrepreneurs in the district. This test is carried out to assess the accuracy of measurement items or research instruments for all variables using validity and reliability testing. In measuring the outer model, convergent validity and discriminant validity tests were carried out. Hypothesis testing in SEM-PLS is carried out using the p value with significance value.

## 3. RESULTS AND DISCUSSIONS

### Results

To test the hypothesis in this research, the Structural Equation Modeling Partial Least Square (SEM PLS) method was used. Before going to the stages of the Partial Least Square (PLS) based SEM method, the following will explain the structural model in the research

#### *Evaluation of the Measurement Model (Outer Model)*

The measurement model with reflexive indicators is evaluated with convergent validity and discriminant validity. The results of the convergent validity and discriminant validity tests are as follows.

**Table 1. Convergent Validity of Factor Loading Values**

Matrix	Business Continuity	Digital Literacy	New Product Development	Open Innovation
BC1	0.939			
BC2	0.930			
BC3	0.961			
BC4	0.972			
BC5	0.940			
LD1		0.976		
LD2		0.924		
LD3		0.966		
LD4		0.958		
LD5		0.939		
NPD1			0.948	
NPD2			0.918	
NPD3			0.947	
NPD4			0.911	
NPD5			0.934	
OP1				0.804
OP2				0.897
OP3				0.935
OP4				0.892
OP5				0.877

From table 1 it can be seen that all factor loading values are above 0.7, this shows that all these indicators have met convergent validity.

**Table 2. Discriminant Validity**

	Business Continuity	Digital Literacy	New Product Development	Open Innovation
Business continuity	0.948			
Digital Literacy	0.856	0.953		
New Product Development	0.840	0.860	0.881	
Open Innovation	0.803	0.768	0.810	0.846

It can be seen in table 2 that all constructs have AVE root values greater than the correlation values between constructs, which means that all variable constructs have met discriminant validity.

#### *Structural Model Evaluation*

The structural model shows the strength of estimates between latent variables or constructs. In assessing the structural model with PLS structural, it can be seen from the R-Squares value for each endogenous latent variable as the predictive power of the structural model. The following is a picture of the Structural model.

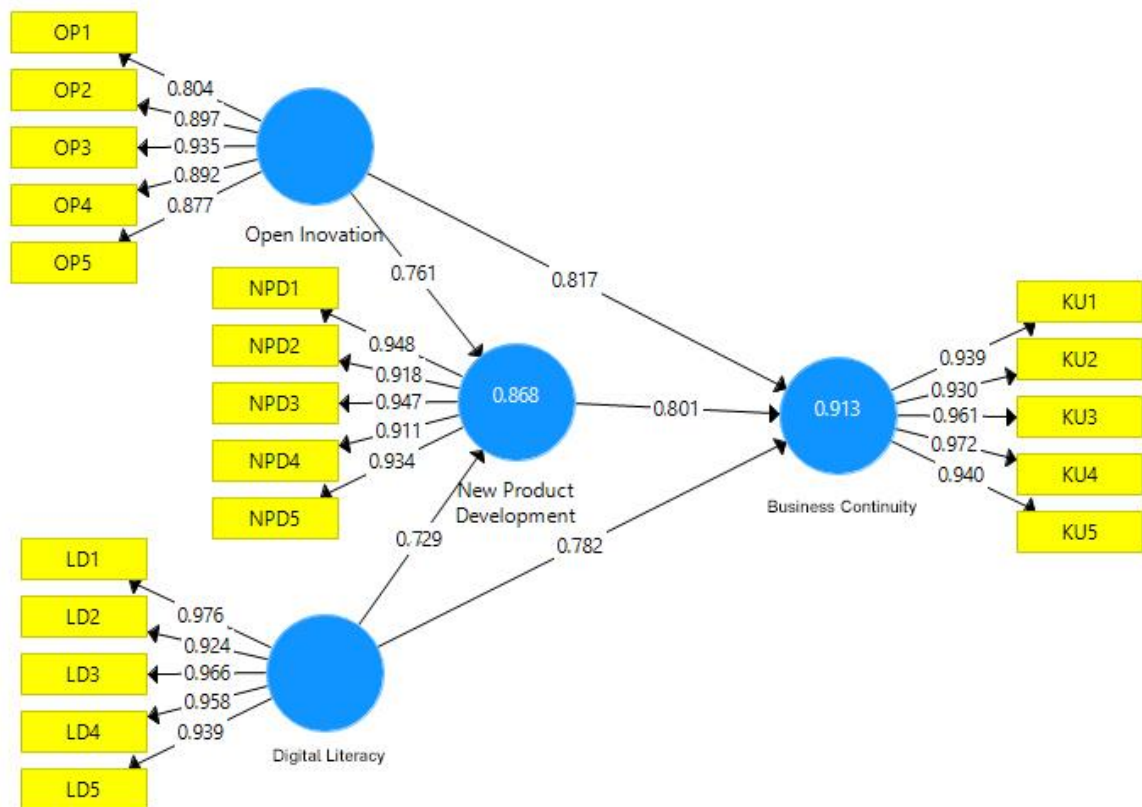


Figure 1. The Structural Model

**Hypothesis Testing**

The significance of the estimated parameters provides very useful information about the relationship between the research variables. The basis used in testing the relationship is the value contained in the output result inner weight. In PLS, statistical testing of each relationship is carried out using simulation. In this case, bootstrapping is carried out on the sample. Testing with bootstrap is also intended to minimize the problem of non-normality of research data. The bootstrapping test results from PLS analysis are as follows:

Table 3. Path Coefficients

Variable	T Statistic	P Values
Digital Literacy --> Business Continuity	4.781	0.000
Digital Literacy --> New Product Development	6.203	0.000
New Product Development --> Business Continuity	6.446	0.000
Open Innovation --> Business Continuity	4.444	0.000
Open Innovation --> New Product Development	7.430	0.000

**Discussion**

Based on the results of the analysis, the analysis related to the research results will be discussed below: 1. The influence of digital literacy on the sustainability of leading UMKM businesses in the district is influential with a probability value (p value) = 0.000, which is smaller than the error level of 0.05 (5%). Digital literacy can help business owners to utilize technology and digital opportunities more effectively, increase their competitiveness, and ensure the sustainability of their business in the ever-growing digital era. 2. The influence of digital literacy on new product development of leading UMKM in the district is influential with a probability value (p value) = 0.000 which is smaller than the error level of 0.05 (5%). Deep



digital literacy in New Product Development can speed up and increase the efficiency of the new product development process, enable companies to respond more quickly to market changes, and increase the success of new products in increasingly competitive markets.3. New Product Development on the sustainability of leading UMKM businesses in the district is influential with a probability value (p value) = 0.000 which is smaller than the error level of 0.05 (5%). Innovative and quality new products can help companies maintain or improve their position in the market. By presenting attractive new products, companies can attract the attention of new consumers, expand market share, or even create new markets. 4. Open Innovation on the sustainability of leading UMKM businesses in the district is influential with a probability value (p value) = 0.000 which is smaller than the error level of 0.05 (5%). Open innovation allows companies to share risks with their partners. By sharing research and development costs with external parties, companies can reduce the financial burden associated with developing new products, thereby increasing their financial sustainability.5. Open Innovation towards New Product Development of Leading UMKM in the Regency is influential with a probability value (p value) = 0.000 which is smaller than the error level of 0.05 (5%). By involving external parties in the innovation process, companies can accelerate the development of new products or services. They can take advantage of research and development that has been carried out by other parties, thereby saving time and costs associated with internal research and development.

#### 4. CONCLUSION

Based on the results of the research that has been carried out, it can be concluded that digital literacy allows business owners to understand online platforms and digital marketing techniques such as SEO (Search Engine Optimization), social media, and online advertising campaigns. By understanding these methods, businesses can expand their reach, reach a wider target market, and increase sales. Additionally, digital literacy allows business owners to use financial software and applications to manage their finances more efficiently. They can use tools such as online accounting software and digital payment applications to monitor cash flow, manage invoices and conduct financial transactions securely online. New Product Development is an important element in business growth and sustainability strategies. Companies that are able to develop new products regularly, follow market trends, and understand consumer needs have a greater chance of surviving and growing in the long term. open innovation can be a strong strategy to increase innovation and business sustainability. By leveraging additional resources and knowledge from outside the company, companies can create significant added value and strengthen their position in a competitive market.

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