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Pharmapreneur: An Empirical of Entrepreneurship Model for University Student of Pharmacy in Makassar, South Sulawesi

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ABSTRACT

This study aims to conceptualize an empirical model of pharmapreneur for university student of pharmacy in Makassar, South Sulawesi, considering the role of management pharmaceutical literacy and entrepreneurial motivation with the exploration of business innovation as moderating variable to produce pharmacist entrepreneur. This is an explanatory study with quantitative approach and survey method to address research questions, deliberating 380 university students of pharmacy in Makassar, South Sulawesi as the sample of research. The data is collected at certain time intervals for one-shot approach, indicating cross-sectional data when it viewed over a certain time horizon. Moderating Regression Analysis (MRA) is used to analyze the data and the relationship of each variable with Smart-PLS program. Empirically, the result discovers that pharmaceutical literacy significantly impacts on the implementation of pharmapreneur for university student of pharmacy in Makassar, South Sulawesi directly. However, entrepreneurial and business innovation cannot directly influence the implementation of pharmapreneur. Rely on the result, this study contributes to create a framework that can be implemented to create pharmacist entrepreneur, as in this dynamic landscape, pharmaceutical industry experiences a paradigm shift from drug-oriented to patient-oriented that transcends traditional career trajectory.
Keywords: Pharmacy Industry, Entrepreneur, Business Innovation

INTRODUCTION

The pharmaceutical industry emerges as the fourth largest non-oil and gas manufacturing sector that contributes to the Indonesia National economic growth. As a strategic industry, the pharmaceutical sector has been designed as one of the top 10 priority industries in the Master Plan for the Development of the National Industry (Rencana Induk Pengembangan Industri Nasional (RIPIN)) for the period 2015-2035. Despite a decade havig elapsed, since the initiation of the RIPIN, the pharmaceutical industry continuous to grapple with intricate dynamic, where the government should conduct a comprehensive evaluation of the persisting dynamics within the pharmaceutical industry framework outlined in RIPIN 2015-2035. In this regard, such urgent efforts are imperative to propel the pharmaceutical industry towards independence from potential threats posed by reliance on imported raw materials (Christianingrum & Mujiburrahman, 2021).

In the era of Industry 4.0, new challenges have emerged across various professions, including the field of pharmacy, where pharmacists are obligated to provide pharmaceutical services, which in the current era of global competition, have undergone a paradigm shift from drug-oriented to a patient-oriented approach. This situation means that as the previous era, pharmaceutical service activities are originally centered on drug management as a commodity, have now reoriented towards comprehensive services aimed at enhancing the quality of patients' lives. In this regard pharmacists are required to enhance their competencies, encompassing horizons, skills, and behaviors to effectively engage in direct interactions with patients. Nevertheless, studies which are focusing on how pharmacists are prepared to fulfill their roles while responding to social and systematic challenges, as well leveraging new opportunities remains significantly limited.

Whereas, in the past decades, there has been a phenomenon of the burgeoning of entrepreneurs within the pharmaceutical sector, where the pharmaceutical products such as vitamins, supplements, cosmetics, and herbal items are now considered essential needs in society during this era. This situation highlights the remarkably high markets share of pharmaceutical products. However, an analysis of the performance of the pharmaceutical industry in the first quarter of 2023 revealed a decline in the terms of performance of chemical, pharmaceutical, and traditional medicines sector's Gross Domestic Product (GDP). This decline is attributed to a reduction in retail sales at pharmacies due to the ongoing impact of the COVID-19 pandemic, resulting in a mode 3,52% correction in its performance (Pratama, 2023).

To response the existing phenomenon, there is currently concerted effort to promote the "pharmapreneur" program, which has been introduced in the pharmaceutical circumstances, particularly among pharmacy students. According to the Director of the Indonesian Academy of Pharmacy (AFI) in Jogjakarta, the pharmapreneur program has seen an increase from 3% to 5% by 2020 (Sri, 2021). Introducing this program to pharmacy students is regarded as a strategy to accelerate sustainable development of pharmaceutical literacy and possess strong motivation to transform them into competitive aspiring pharmacists. Their focus extends beyond production, as they can also venture into distribution and service sectors within the pharmaceutical industry. Additionally, pharmacy literacy serves as a primary asset for generating business odeas/ products in the pharmaceutical sector (Adunlin & Pan, 2022; Berg & Meyers, 2023; Scahill & D'Souza, 2022a), while motivation acts as the driving force to initiate entrepreneurial activities in the alignment with their aspirations (Ayesh et al., 2023).

Therefore, this study aims to conceptualize an empirical model of pharmapreneur among pharmacy students in the city of Makassar, South Sulawesi. This conceptualization takes into consideration the roles of pharmaceutical management literacy and entrepreneurial motivation, while also exploring the moderating role of business innovation as a variable to yield pharmaceutical entrepreneurs.

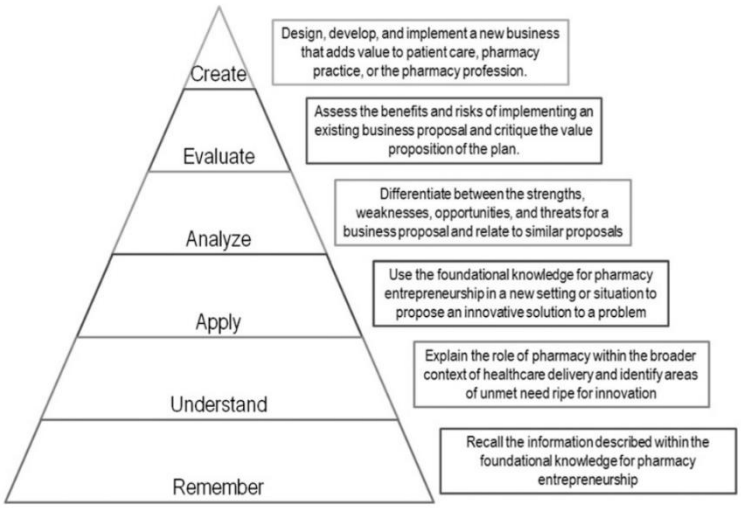
LITERATURE REVIEW

The Emerges of Pharmapreneurs in the Circumstance of Pharmacists

Resources-based theory is utilized to elucidate the relationship between resources and business strategy. According to (Habbershon et al., 2003), and (Ravichandran et al., 2005), this theory fundamentally involves groups of resources with specific qualification, where both conditions mutually play crucial roles in determining strategy formulation and performance achievements. (Dewi et al., 2020) assume that a company will attain and sustain its competitive advantage when it can effectively and efficiently leverage and transform its resources. These resources encompass tangible and intangible assets, making it a potential strategy for enhancing performance.

In this regard, refers to the function of the theory, to enhance the success of pharmapreneursip, a strategy collaboration between universities and pharmacy faculties to incorporate an entrepreneurial curriculum that can be integrated with a pharmaceutical focus. According to Mattingly, et all (2019) there are several taxonomis that should be applied to entrepreneurial education for pharmacists (Figure 1).

Figure 1. Bloom's Taxonomy Applied to Enterpreneurship Education for Pharmacist



Mattingly, et all (2019)

Thus, in the concept of ‘pharmapreneur’ we can observe the relevance of entrepreneurship theory as an appropriate approach to revealed this issue. This is because, this theory provides valuable insights and frameworks for understanding the dynamic and evolving landscape of the pharmaceutical industry to understand the behavior and the characteristic of entrepreneurship both individual and groups, functioning as entrepreneur in the pharmaceutical industry. Moreover, it also helps the pharmapreneurs to navigate the challenges and opportunities associated with developing innovative drugs, identifying market gaps, and establishing competitive advantage. This theory also sheds light on the importance of strategic partnerships, effective resource allocation, and productive risk management in the pharmaceutical sector. By leveraging the entrepreneur theory, pharmapreneurs can not only drive economic growth, but also improve patient outcomes by fostering the discovery and development pharmaceutical products and solutions. Therefore, it is evidence that understanding the principle of entrepreneurship can shape the pharmacists’ behavior into pharmapreneur that can better comprehended the importance of market research, customer behavior, and trend analysis in developing the pharmaceutical products that truly meet the needs of patients and healthcare providers.

Management Pharmaceutical Literacy, Entrepreneurial Motivation, and Business Innovation

According to the American Heritage Dictionary, literacy is defined as 'the ability to read and write'. In addition, The National Center for Education Statistic (NCES) is also expanded upon this definition, conceptualizing functional literacy as the capability to 'use printed and written information to function in society, achieve personal goals, and develop potential knowledge. The NCES further categorizes literacy into three specific levels: 1)prose literacy, which involves the knowledge and skills required for tasks such as searching, comprehending, and utilizing information from continuous texts; 2) document literacy, encompassing the knowledge and skills needed for tasks involving noncontinuous texts in various formats; 3) quantitative literacy, which involves the knowledge and skills necessary for performing tasks such as identifying and executing computations, either independently or sequentially, using numbers embedded in printed materials (King et al., 2011).

In the realm of pharmacist, it is frequently referred to the ability of people to comprehend written health information such as that found on medicine bottles is an important component of any health care experience (Mattingly et al., 2019). This is considered prominent to highly literate in health care particularly pharmaceutical, remembering that majority patients are lack of knowledge regarding the pharmaceutical products. Thus, it is important for pharmacists to understand patients' health literacy status to provide the best possible care to these patients. Developing communication skills to effectively work with a broad range of people and recognize social determination of health are required by to achieve the standard of the pharmacists (Newsome et al., 2018). To broaden horizon in this field universities with pharmacy faculties is important to support it, universities and pharmacy faculties, considering how pharmacy curriculums can include training in health literacy and effective strategy for working with how health literacy patients(Scahill & D'Souza, 2022b). Thus, strategies that have been shown effectively include utilizing open-ended question to patients, use metaphor when explaining concepts, and creative technology tools.

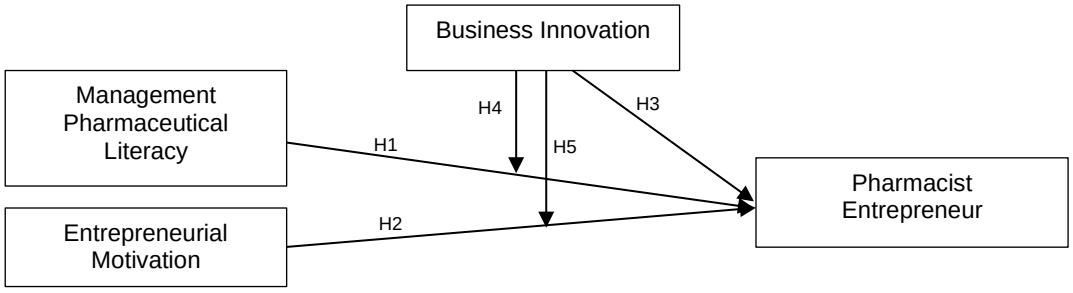
Furthermore, as in this dynamic landscape, pharmaceutical industry experiences a paradigm shift from drug-oriented to patient-oriented that transcends traditional career trajectory, the pharmapreneur emerges as a new concept to accommodate this issue in the field of pharmaceutical industry. This phenomenon occurred to address the obstacles and possibilities linked with creating groundbreaking pharmaceutical, recognizing market segments, and establishing a competitive advantage in this field to shed lights collaboration and prudent risk management in the pharmaceutical industry (Scahill & D'Souza, 2022b). Therefore, to address this challenge, pharmacists are also should master the entrepreneurial skills to achieving outcomes beyond his or her personal gain (Frenzel, 2020).

One of strategies to achieve the goal of the pharmacists as entrepreneurs, it absolutely needs their motivation to do it. The role of motivation in entrepreneurship is pivotal and multifaceted, influencing various aspects of an entrepreneurs' journey and the success of their ventures (Jan & Maulida, 2022). This is because, motivation serves as the driving force behind the decision to embark on an entrepreneurial journey. It inspires individuals to identify opportunities, explore new ideas, and take the initial steps toward starting a venture (Chhabra et al., 2020). In addition, motivation is also closely tied to the formulation of clear vision and goals. Entrepreneurs with high level of motivation are more likely to set ambitious yet achievable objects, providing direction and purpose to their entrepreneurial pursuit (Jan & Maulida, 2022; Saoula et al., 2023). Therefore, the pharmapreneur should possess the entrepreneurial motivation to adapt to changing circumstances ad a commitment to continuous learning to stay relevant in dynamic markets and acquire the knowledge needed for successful business in pharmaceutical industry. It is because, motivation is a fundamental for entrepreneur to persists creativity, adaptability, and overall success of entrepreneurs and their ventures.

In addition, the pharmapreneur should also have to think creatively and innovatively to develop their pharmaceutical business, broadening the relationship with stakeholders, customers, and other parties to conduct innovation in R&D process, accelerating drug discovery and development (Riswanto, 2016; Sari et al., 2023). This is because, business innovation in the pharmaceutical industry spans various domains from specific and technological advancements to strategic collaborations and patient-centered approaches. These innovations contribute not only to the growth and competitive business of pharmaceutical, but also to the improvement of healthcare outcomes and the overall well-being of patients (Mattingly et al., 2019).

Therefore, based on the remarked discussion this research presents the framework, depicting the relationship between pharmaceutical literacy and entrepreneurial motivation with the exploration of business innovation as moderating variable to produce pharmacist entrepreneur.

Figure 2. Research Framework and Hypothesis



H1: Management pharmaceutical literacy shapes pharmacist entrepreneur
H2: Entrepreneurial motivation shapes pharmacist entrepreneur
H3: Business innovation shapes pharmacist entrepreneur
H4: Business innovation moderated the influence of management pharmaceutical literacy to shape pharmacist entrepreneur
H5: Business innovation moderated the influence of entrepreneurial motivation to shape pharmacist entrepreneur

RESEARCH METHOD

This is an explanatory study with quantitative approach and survey method to address research questions. This research deliberats 380 university students of pharmacy in Makassar, South Sulawesi as the sample of research, referring to the Krejcie and Morgan (1970) method. The data is collected at certain time intervals for one-shot approach, indicating cross-sectional data when it viewed over a certain time horizon. Moderating Regression Analysis (MRA) tool is used to analyze the data and the relationship of each variable with Smart-PLS program. Thus, the mathematical model of this research is presented bellows, and to measure each variable, this research uses several indicators adopting from numerous scholars as presented by Table 1:

$$PE = \beta_0 + \beta_1 PL + \beta_2 EM + \varepsilon_1 \quad (1)$$

$$PE = \beta_0 + \beta_1 MSI + \beta_2 HA + \beta_3 PL*BI + \varepsilon_2 \quad (2)$$

$$PE = \beta_0 + \beta_1 MSI + \beta_2 HA + \beta_3 EM*BI + \varepsilon_3 \quad (3)$$

Table 1. Research Instrument

Variable	Indicators	Source
Management Pharmaceutical Literacy (MPL)	leverages existing pharmacy knowledge, skills, and resources	(Mattingly et al., 2019)

	Ability to responsive to changes in healthcare or other aspects of practice comprehend written health information trained in the core concepts of pharmacy (ie, basic sciences, therapeutics, patients care services)	
Entrepreneurial Motivation (EM)	High self-confidence innovative and creative have a good leadership willing to take risks	(Saoula et al., 2023; Uli Wildan Nuryanto et al., 2019)
Pharmacist Entrepreneur (PE)	Willing to make sacrifices (i.e. personal, financial) Able to implement a new idea into practice in pharmaceutical industry Able to pursues new opportunities pharmaceutical industry Goes beyond traditional roles in pharmacy practice to entrepreneur	(Mattingly et al., 2019)
Business Innovation (BI)	Able to creates new value through innovation of business Able to create new products/patents for the marketplace. Adaptable in new and more effective forms business	(Songkajorn et al., 2020)

RESULTS AND DISCUSSION

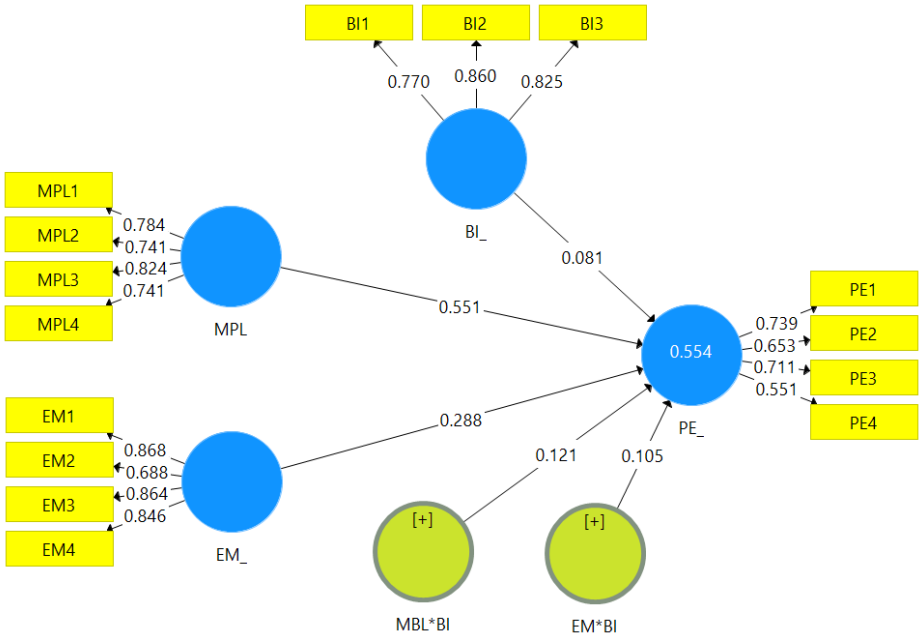
To validate the model, this research uses two-step approach, which involves evaluating both the outliner (measurement) and inner of structural model. Initially, this research involves the validity and reliability measurements. The outcomes are depicted in Figure 3, revealing that all the indicators of this research exhibit a loading score exceeding 0.7. This minimum score for each item is essential for meeting reliability standards, conforming the reliability of all the items measurement in the process.

The second step is through the loading factor value, the reliability is indicated by the composite reliability value, which should surpass 0.7. based on the result, the composite reliability for all the constructs in this model exceeds 0.7, as detailed in the table 2. This situation signifies the model's reliability. Furthermore, the analysis of the convergent validity is also crucial, considering the average variance extracted value. The result (Table 2) revels that all the constructs surpass 0.5, confirming that the attainment of convergent validity, which is consequently signifies that the model is deemed valid.

Table 2. The Result of Descriminant Validity

Variable	Composite Reliability	Result	Average Variance Extracted	Result
MPL	0.779	0.779 > 0.7: Reliable	0.598	0.598 > 0.5: Valid
EM	0.890	0.890 > 0.7: Reliable	0.672	0.672 > 0.5: Valid
PE	0.764	0.764 > 0.7: Reliable	0.645	0.645 > 0.5: Valid
MPL*BI	0.882	0.882 > 0.7: Reliable	0.583	0.583 > 0.5: Valid
EM*BI	0.774	0.774 > 0.7: Reliable	0.562	0.562 > 0.5: Valid

Figure 3. The measurement and structural model



In assessing hypothesis, the p-values has to be under 0.05 for a hypothesis to be accepted. The table 3 shows the results of the first to the fifth hypothesis. The p-value for management pharmaceutical literacy to shape pharmapreneur in a student university of pharmacy in the city of Makassar, South Sulawesi is 0.000, which is lower than 0.05 means a positive and significant relationship between the two constructs. Based on this result, the H1 is accepted. Therefore, it can be clearly seen that that great management pharmaceutical literacy (MPL) leads to shape pharmacy entrepreneur (PE) mentality.

Pharmaceutical literacy plays a crucial role in shaping the pharmacy entrepreneur mentality among university students. By developing a strong understanding of medications, their uses, and their effects on patients, students can better identify opportunities for innovation and entrepreneurship within the pharmaceutical industry (Afeli & Adunlin, 2022; Shahiwala, 2017). Furthermore, pharmaceutical literacy equips students with the knowledge and skills needed to identify gaps in the market, develop innovative solutions, and effectively communicate their ideas to investors, stakeholders, and potential customers (Kosasih et al., 2020). This is also important for pharmacists to understand patients' health status to provide the best possible care to these patients, as well as developing communication skills to effectively work with a broad range of people and recognize social determination of health are required by to achieve the standard of the pharmacists (Newsome et al., 2018). This knowledge also helps students navigate regulatory requirements and understand the legal and ethical considerations involved in starting a pharmaceutical business.

The integration of pharmaceutical literacy with business management into pharmacy education not only provides students with knowledge of medications but also cultivates a deeper understanding of the complexities of the pharmaceutical industry (Nouri et al., 2020). With this comprehensive understanding, students can delve into the intricacies of drug development, manufacturing processes, regulatory compliance, and market dynamics. This multifaceted knowledge equips students with a holistic view of the industry, enabling them to identify unmet needs and areas for improvement (Ali et al., 2016), encouraging students to think critically about the clinical and economic impact of pharmaceutical products. It prompts them to consider the potential societal benefits and market viability of new drugs or healthcare innovations, fostering an entrepreneurial mindset centered around social responsibility and strategic innovation. Thus, by gaining

proficiency in pharmaceutical literacy and business management, university students are better prepared to analyze market trends, assess competitive landscapes, and formulate informed business strategies, leading them to create their own ventures and drive forward advancements in pharmaceutical science. In conclusion, pharmaceutical literacy is an essential component in shaping the pharmacy entrepreneur mentality for university students.

The contribution from this model is that the proposed relationship between the quality of management pharmaceutical literacy and entrepreneurial motivation is validated to shape the pharmapreneurs in the circumstance of university student of pharmacy in the city of Makassar, South Sulawesi. It can strengthen the management and business literature by showing that the quality of management pharmaceutical literacy can significantly shapes the pharmacy entrepreneur.

Table 3. The result of Parh Coefficients for Hypotheses

	Original Sample (O)	Sample Mean (M)	Standar Deviation (STEDEV)	Standar Deviation (|O/STEDEV|)	P-Values	Result
MPL--> PE	0.551	0.550	0.094	5.829	0.000	Accepted
EM --> PE	0.288	0.241	0.185	1.555	0.121	Rejected
BI --> PE	0.081	0.085	0.076	1.057	0.291	Rejected
MPL*BI --> PE	0.121	0.119	0.060	2.022	0.044	Accepted
EM*BI --> PE	0.105	0.032	0.101	1.039	0.299	Rejected

Meanwhile entrepreneurial motivation (EM) and business innovation (BI) variables could not shape the pharmapreneur of student university of pharmacy in the city of Makassar, South Sulawesi, reaching p-values 0.121 and 0.291 respectively, which are higher than 0.05. The finding does not support the formulated hypotheses and theory that has been developed in this research. Thus, the H2 and H3 are rejected. As entrepreneurial motivation generally becomes beneficial for fostering an entrepreneurial mindset, but in this case, it cannot effectively shape the pharmacy entrepreneur mentality in university student of pharmacy in the city of Makassar, South Sulawesi. There are various factors behind this scenario, such as insufficient understanding of healthcare dynamic. It is because, entrepreneurial motivation may not compensate for a lack of understanding of the complex dynamics in the healthcare and pharmaceutical sectors. Without a solid foundation in pharmaceutical literacy, students may overlook critical factors in their entrepreneurial pursuit. Moreover, entrepreneurial motivation may not be effective if students fail to accurately identify genuine unmet needs in the pharmaceutical market. Therefore, without a keen awareness of the healthcare landscape, entrepreneurial endeavors may lack of relevance and impact to shape the pharmacy entrepreneur mentality.

This situation is also occurred due to their tendency that when they are studying pharmacy, it means that they must be a pharmacist, concerning to healthcare services in some healthcare institution, serving patients, and drug-oriented. Whereas, as in the era of Industry 4.0, new challenges have emerged in the pharmacy industry, where pharmacists are required to enhance their competencies, encompassing horizons, skills, and behaviors to effectively engage in direct interactions with patients, burgeoning of entrepreneurs within the pharmaceutical sector, where the pharmaceutical products such as vitamins, supplements, cosmetics, and herbal items are now considered essential needs in society during this era, highlights the remarkably high markets share of pharmaceutical products. This failure situation to navigate the business challenges in the pharmaceutical industry highlights that entrepreneurial motivation within the students of pharmacy might not be sufficient to overcome the various business challenges.

A similar situation is also appeared in the relationship of business innovation and the pharmacy entrepreneur. This situation occurred can be driven by the lack of industry-specific knowledge of the students in pharmaceutical industry. Understanding the intricacies of the field is crucial for identifying relevant opportunities and challenges. Therefore, before creating such a business innovation in the pharmaceutical industry, and being a genuine pharmaprenenur, the students should master multidisciplinary knowledge such as pharmaceutical science itself, business management, and healthcare expertise. It is because, overemphasizing business innovation without these diverse elements may hinder the development of well-rounded entrepreneurs.

Then, for the indirect relationship, the table revels that business innovation can significantly moderate the relationship between the MPL and the PE, considering the p-value is 0.044, which is lower than 0.05. Thus, the H4 is accepted. This situation highlights that for being a genuine pharmapreneur the student should mater in management of pharmaceutical literacy. This is important as it represents ability of people to comprehend written health information such as that found on medicine bottles is an important component of any health care experience (Mattingly et al., 2019). This is considered prominent to highly literate in health care particularly pharmaceutical, remembering that majority patients are lack of knowledge regarding the pharmaceutical products (Kosasih et al., 2020).. Thus, it is important for pharmacists to understand patients' health literacy status to provide the best possible care to these patients. Developing communication skills to effectively work with a broad range of people and recognize social determination of health are required by to achieve the standard of the pharmacists (Newsome et al., 2018). Moreover, with pharmaceutical literacy, students can actively participate in optimizing medication therapy management. This includes assessing the appropriateness of prescribed medications, identifying potential drug-related problems, and collaborating with healthcare teams to make necessary adjustments for improved patient outcomes, leading to their horizon to know well the pharmacy industry, which is possibly leads them to actively participate in developing this industry though the business innovation (Newsome et al., 2018). Therefore, it is evidence that the good quality of pharmaceutical literacy can significantly, and the creativity though business innovation can enhance the sense of pharmacy entrepreneur. However, the BI could not mediate the relationship between the EM and the PE. This situation occurred due to a high number of p-value, reaching higher than 0.05, particularly 0,299, which is the H5 is rejected. This situation highlights that entrepreneurial motivation and the lack of competency in business circumstances may not compensate for a lack of understanding of the complex dynamics in the healthcare and pharmaceutical sectors. Without a solid foundation in pharmaceutical literacy, students may overlook critical factors in their entrepreneurial pursuit.

After assessing the hypothesis, the R-squared result is also evaluated. The model is considered strong if the value is between 0.19 to below 0.33; moderate if between above 0.33 to 0.67; and strong if the value is above 0.67. The table 4 shows the result, revealing that the R-square is 0.554. it means that management pharmaetical lireacy and entrepreneurial motivation explain 55.4% of pharmaceutical entrepreneur in the university students of pharmacy in the Makassar city, South Sulawesi.

Tabel 4. R-Square Table

	R Square	R Square Adjusted
PE_	0.554	0.544

CONCLUSION

The research investigates the factors that influence university students of pharmacy regarding their quality of management pharmaceutical literacy, entrepreneurial motivation and the moderating role of business innovation to shape the pharmacy entrepreneur in the university students of pharmacy in the Makassar city,

South Sulawesi. From the hypothesis result, only management pharmaceutical literacy can shape the pharmacy entrepreneur in the university students of pharmacy in the Makassar city, and only management pharmaceutical literacy variable that can be moderated by business innovation to influence it. However, nor the entrepreneurial motivation and business innovation can shape the pharmacy entrepreneur directly. Moreover, the business innovation is also cannot moderate the former to the pharmacy entrepreneur.

Refers to the result, this research recommends that to be a good pharmacy entrepreneur, the students universities of pharmacy should be more pay attention to the management of pharmaceutical literacy as their foundation to understand the whole pharmaceutical industry both practically and theoretically. Because, understanding the intricacies of the field is crucial for identifying relevant opportunities and challenges. Nevertheless, this research also has a limitation, such as the result is cannot be generalized as it only asses in regional scope. For the future research, it is suggested to explore more variable of business management to shape pharmacy entrepreneur.

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