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MORALITY BEFORE KNOWLEDGE

Driving factors of innovation: Dimensions of open culture and conscious innovation management in the environmental context

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ABSTRACT

Background: Innovation is crucial for advancing businesses, organizations, and countries, especially amid rapid environmental changes and technological advancements. Universities, as key sources of innovation, must shift to include societal contributions. Despite progress, challenges in commercialization hinder the effective translation of research into marketable products. This study explores the driving factors of innovation at Universitas Indonesia, focusing on open culture and conscious innovation management in an environmental context. **Methods**: This study utilizes an embedded mixed-methods design, primarily focusing on quantitative research to analyze driving factors of innovation at Universitas Indonesia, employing descriptive analysis through SPSS software for data interpretation. **Findings:** This section analyzes the driving factors of the innovation process at the Universitas Indonesia, focusing on respondents' perceptions of collaboration, governance, communication, and financial motivation, highlighting areas for improvement. UI demonstrates high cooperation with the business sector but requires more dynamic regulations for effective collaboration. The Dimension of Conscious Innovation Management at UI demonstrates professionalism in innovation management; however, there are still challenges related to program regulations. **Conclusion**: Universitas Indonesia should enhance collaboration, establish structured remuneration, and allow flexible SOPs to foster sustainable innovation. **Novelty/Originality of this article:** This study uniquely investigates the interplay of cultural openness and conscious innovation management at Universitas Indonesia, offering practical recommendations to enhance commercialization and sustainability in the university's innovation processes.

KEYWORDS: innovation management; cultural openness; sustainable development.

1. Introduction

Innovation is the key for businesses, organizations, and countries to advance and develop. In the face of continuously changing environmental conditions and rapidly advancing technology, it is essential to adapt and respond appropriately to these changes. Research indicates that innovation is vital for maintaining business continuity and achieving success amid competition (Betaraya et al., 2018; Hanaysha et al., 2022). Innovation also positively impacts the long-term performance of businesses and organizations (Exposito & Sanchis-Llopis, 2018; Lichtenthaler, 2016). Not only on an organizational or business scale, innovation is also believed to be crucial for the growth and economy of countries, including global trade (Desai, 2016). Furthermore, innovation can help find solutions to global challenges such as climate change, global health, and food security. For example, innovations in renewable energy can help reduce greenhouse gas

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emissions, while medical technologies can improve life expectancy and the quality of healthcare. Therefore, topics related to innovation are becoming increasingly important to discuss.

Higher education institutions, which serve as knowledge generators, human resource producers, innovation creators, and disseminators, play a crucial role as key actors and agents in establishing a national innovation ecosystem (Guerrero & Urbano, 2011). According to the Triple Helix theory by Etzkowitz & Leydesdorff (1995), universities have a more significant role in facilitating innovation and economic development within society. Universities are regarded as institutions that support future innovation by providing research outcomes, skilled human resources, and knowledge for industry (Etzkowitz, 2003).

The Director General of Higher Education, Nizam, stated that the largest source of innovation comes from universities, with approximately 4,600 higher education institutions in Indonesia. Therefore, in addition to being demanded to excel, universities are also required to continuously foster a culture of innovation among the academic community. Universities must now shift from the traditional mission that focuses solely on teaching and research to also include a Third Mission, which emphasizes "contribution to society" (Compagnucci & Spigarelli, 2020). This mission was introduced to identify the contributions of universities to economic and social development and their interaction with society at large. Peter J. Wells, the Head of the Higher Education Sector at UNESCO, once said, “Never before in recent history has the role of higher education been so closely linked to the economic, social, and environmental networks of the modern world" (Cai et al., 2020). Universities play the role of "innovation engines," emphasizing the long-term economic impact of social engagement, such as enhancing the quality of the local workforce, transferring technology to industry, and increasing the attractiveness of the local environment for entrepreneurs. This emerging role shows that universities are becoming catalysts for sustainable development within the innovation ecosystem (Cai et al., 2020).

One tangible form of higher education institutions' contribution to society is through product innovation. To date, universities in Indonesia have developed various products that possess utility and value, capable of being commercialized in industry. The Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) has made efforts to support product innovation in universities, one of which is by organizing exhibitions of research and innovations produced by higher education institutions. The exhibition, held on National Technology Awakening Day, showcased more than 145 tested innovative products from various universities in Indonesia. These innovations spanned diverse fields, including food, energy, health, electric vehicles, and more. This indicates that universities play a significant role in creating product innovations in Indonesia.

Unfortunately, higher education institutions currently face challenges, particularly in generating product innovations. One of the issues related to innovation that universities are facing is the downstream commercialization of innovative products. This means that ideas and creativity in the form of research and innovations created by the academic community need to be effectively implemented into marketable products or services that can benefit the general public, government, and industry. The SINTA portal reports that between 2017 and 2023, 399,838 research and innovations were produced by lecturers. However, only 49% successfully transitioned into projects or programs for the community. Research and innovations from 12 state universities ranked in the QS World University Rankings also recorded high numbers, reaching 70,541. Yet, the commercialization within the industrial sector only materialized at 36%. Although not all research and innovations need to culminate in commercialization, this percentage is still relatively low, with many potential research and innovations being retained or enjoyed by only certain groups. Products created often do not align with market or industry needs, resulting in failure to commercialize. Furthermore, universities often have the capacity to produce innovative results but lack sufficient funding to realize them fully. This indicates that there are still aspects that need improvement in the innovation landscape of Indonesian higher education institutions, which represent a significant strength for the country. Thus, the factors

influencing innovation in higher education institutions become an important topic that needs to be discussed.

As a university that bears the name of Indonesia, Universitas Indonesia carries the responsibility to continuously play an active role and contribute to addressing the nation's problems. According to the Scimago Institutions Rangkings (2023), Universitas Indonesia is the best higher education institution based on research performance indicators, innovation results, and social impact. UI ranks first in Indonesia and 1531st globally, followed by Universitas Gadjah Mada and Universitas Syiah Kuala.

Holding the title of World Class University, UI has a vision to become a center of knowledge, technology, and culture that excels and is competitive, through efforts to educate the nation's life to improve community welfare, thereby contributing to the development of Indonesian society and the world. In 2020, UI received the award as the Most Innovative University in the category of Innovation Management, achieving the highest intellectual property with a total of 2,542 copyrights. In 2022, UI also succeeded in receiving awards as the "University with the Highest Number of Copyright Registration Applications" and "University with the Highest Number of Patent Applications," ranking among the top 10 in Indonesia from the Ministry of Law and Human Rights (Kemenkumham). UI has also been one of the universities contributing to addressing the pandemic through product innovations such as Convent 20 and Swab Stick. As of 2023, there are 33 other products that have successfully been licensed to the industry for production and commercialization, including eye implants, propolis (health supplements based on honey), DBD Kit, and educational services like UKMIndonesia.id. This demonstrates that Universitas Indonesia is an important actor in the innovation ecosystem in Indonesia.

The government also supports innovation development at UI by establishing a Science Techno Park (STP) focused on research downstreaming. STP was built to bridge research outcomes with the industrial sector. This area has also received support from the Asian Development Bank for its commercialization. UI ranks 6th among universities with the highest number of copyright applications and 10th among universities with the highest number of patent applications from 2020 to 2022. Prof. Nachrowi, the Chair of the Academic Senate at UI, stated that one of the issues faced is downstream commercialization, as many research results that have received funding ultimately fail to be marketed (FEB UI, 2020). The rapid and continually changing development of technology and information also poses challenges, such as the emergence of online classes and the implementation of distance learning during the Covid-19 pandemic, which has impacted the innovative behavior of the academic community. The Director of Innovation and Science Techno Park at UI, Ahmad Gamal, mentioned that to enhance the outcomes of innovation products at UI, a strategy is needed that encompasses not just the initial stages but also the entire innovation process from upstream to downstream so that innovative products can benefit society.

Previous studies have shown the importance of understanding the barriers and enablers of innovation in various sectors, including higher education and large organizations such as Olympic organizers. For example, Lašáková et al. (2017) explored the challenges and opportunities for innovation faced by European universities, while Hoff et al. (2023) examined the factors influencing innovation in Olympic organizing organizations. Both studies illustrate that both internal factors such as organizational culture and structure, as well as external factors such as government policies, play a significant role in influencing an organization’s ability to innovate.

In addition, Zlatanović et al. (2023) study shows that organizational and government support also play an important role in encouraging innovation in higher education. These findings provide a broader picture of how innovation is not only dependent on internal factors within an institution, but is also influenced by external conditions that can support or hinder the innovation process itself. This is in line with the topic of this research, which aims to dig deeper into the factors influencing innovation in higher education environments, as well as the role of external policies and support in encouraging the innovation process.

The concept of innovation was first introduced in Theory of Economic Development by Schumpeter (1934), which is also commonly known as the Theory of Innovation. Schumpeter defined innovation as the process of creating commercial products from an invention, which serves as a key dimension in economic change and creative destruction. Furthermore, Luecke & Katz (2003) defined innovation as the introduction or development of a new product or method that has a positive impact. Additionally, one of the most comprehensive definitions, which will be used in this study, is provided by Sutarno (2012) in his book Serba-Serbi Manajemen Bisnis. He defines innovation as the process or outcome of developing or utilizing skills and experience to create or improve products (goods or services), processes, or new systems that provide significant value.

However, unlike innovation, entrepreneurship is a tool or method that stimulates creativity and innovation, enabling them to be delivered to society through business. The definition of innovation in higher education used in this study is based on Brennan et al. (2014), who define innovation in higher education as a product, process, or organizational method that is either new or significantly improved and developed by the institution itself, having a meaningful impact on the activities of the higher education institution or its stakeholders.

Knight (1967) classifies innovation into four types: product or service innovation, production-process innovation, organizational structure innovation, and people innovation. Additionally, early research on various types of innovation employed binary distinctions such as product-process, administrative-technical, or radical-incremental (Evan, 1966; Damanpour, 2018; Dewar & Dutton, 1986). Product innovation can also be defined as a process encompassing ideation, implementation, and commercialization with the goal of creating new products or enhancing existing ones (Roxzna & Viorel, 2018). In this context, product innovation is not limited to technological aspects but also involves economic factors, consumer behavior, and management.

This concept originates from the literature on new product development (NPD), where a newly launched product undergoes a series of stages, starting from the initial product concept or idea, which is then evaluated, developed, tested, and finally introduced to the market (Bhuiyan, 2011). Innovation can occur at all levels, from teams and departments to individuals. Various factors drive organizations to innovate, each requiring continuous learning and creating a sense of urgency in developing new strategies or ideas to achieve these goals (Baporikar, 2015).

Lašáková et al. (2017), through their research findings, classify the key drivers of innovation into a culture of openness and freedom and conscious innovation management. Garrison & Kanuka (2004) also argue that establishing clear institutional policies for innovation, creating supportive organizational structures in higher education—such as specialized units—and adopting a managerial approach for selecting and evaluating innovations are essential. A skilled workforce is more likely to have a strong understanding of a company's products and organizational structure, enabling them to generate innovative ideas in response to technological and organizational changes (Diaz-Fernandez et al., 2015). Based on the background above, the researcher is interested to analyze the driving factors of innovation at Universitas Indonesia by examining the dimensions of open culture and conscious innovation management within the environmental context.

2. Methods

2.1 Research design

In this study, the researcher used an embedded mixed-methods design with a focus on the quantitative approach. Mixed-method research is a design in which researchers combine techniques, methods, approaches, or concepts from both quantitative and qualitative research into a single study to achieve a comprehensive and in-depth understanding (Cresswell & Clark, 2010). One type of mixed method is the embedded design, in which researchers integrate quantitative and qualitative data collection and

analysis with one of the designs being more dominant. Secondary data collection and analysis can occur before, during, and/or after the implementation of the data collection and analysis procedures traditionally associated with the larger design (Cresswell & Clark, 2010).

2.2 Research approach

The approach applied to analyze the issue in this study is the quantitative method. Quantitative research is an approach that emphasizes data analysis involving numerical values or metrics and serves as a method for testing specific theories by examining relationships between variables (Creswell & Creswell, 2018). The results of this research are presented descriptively using numbers and statistics. Through a systematic and measured approach, quantitative research aims to provide a deeper understanding of the phenomena under study.

2.3 Type of research

This research is categorized into four types based on research benefits, research objectives, time dimensions, and data collection techniques. The type of research based on benefits is divided into two categories: pure research (academically oriented) and applied research (change-oriented). This research is classified as pure research, as it will primarily contribute to the advancement of knowledge. It serves as a source of ideas and insights for innovation at the Universitas Indonesia, focusing on the logic and research design crafted by the researcher without any demands from sponsors.

Research based on objectives is divided into three categories, depending on the desired outcomes: exploratory, descriptive, and explanatory (Neuman, 2014). Exploratory research aims to investigate new topics, descriptive research aims to depict social phenomena, and explanatory research seeks to explain how a social phenomenon occurs. This study is descriptive, as it aims to provide a general overview of a phenomenon, which can serve as a foundation for further research or decision-making. Here, the researcher seeks to identify the variables involved in a phenomenon, specifically innovation at the Universitas Indonesia.

2.4 Data analysis technique

Data analysis is a systematic process for integrating and examining data by identifying patterns, relationships, and scientific concepts to generalize issues more broadly (Neuman, 2014). Quantitative data analysis is the process of interpreting collected data in numerical format, such as charts, graphs, or diagrams, to gain a better understanding of the data numerically (Neuman, 2014). In this study, data analysis is conducted using a univariate method to understand the value distribution of each variable. This research employs descriptive analysis with SPSS software to determine which driving factors are the most dominant.

3. Results and Discussion

3.1 Descriptive analysis of innovation process driving factors

This subsection will describe the driving factors of the innovation process at UI. It covers the overall distribution of respondents' answers, the assessment of driving factors for each dimension, and their relationship with certain respondent characteristics, such as occupation and field of study.

3.1.1 Distribution of respondents' answers

The statements used in this study were formulated using a Likert scale, resulting in responses for each item consisting of "strongly disagree (SD)," "disagree (D)," "agree (A)," and "strongly agree (SA)." A summary of the respondents' answers regarding the driving factors of the innovation process at the Universitas Indonesia can be seen in the Table 1.

Table 1. Summary of respondents' answers

No	Item	Scale							
		SD		D		A		SA	
		F	%	F	%	F	%	F	%
1	I feel that UI has strong collaboration with the business sector	0	0.0%	27	26.5%	45	44.1%	30	29.4%
2	I feel that UI implements participatory and autonomous governance	3	2.9%	30	29.4%	57	55.9%	12	11.8%
3	I feel that the level of cooperation among faculties/units at UI is high	10	9.8%	35	34.3%	36	35.3%	21	20.6%
4	I feel that UI has established an open communication climate	9	8.8%	27	26.5%	43	42.2%	23	22.5%
5	I feel that lecturers/students have been involved in decision-making at UI management	11	10.8%	36	35.3%	41	40.2%	14	13.7%
6	I feel that innovators have the freedom to determine the type of innovation and methods to be used	1	1.0%	9	8.8%	43	42.2%	49	48.0%
7	I feel that innovation management at UI has been conducted professionally	5	4.9%	26	25.5%	51	50.0%	20	19.6%
8	I feel that UI has a strategic plan and detailed vision related to innovation	6	5.9%	29	28.4%	43	42.2%	24	23.5%
9	I feel that UI always ensures that the standards of education and services are maintained or improved	5	4.9%	28	27.5%	48	47.1%	21	20.6%
10	I feel that UI has provided assistance and exemplification in terms of innovation	6	5.9%	26	25.5%	44	43.1%	26	25.5%
11	I feel that UI has adequately established positions/units specifically related to innovation development	6	5.9%	16	15.7%	45	44.1%	35	34.3%
12	I feel that UI has merged organizational units/faculty units in higher education, positively impacting innovation development	4	3.9%	29	28.4%	53	52.0%	16	15.7%
13	I feel that UI has supported lecturers and students to innovate through training and skill development	3	2.9%	15	14.7%	43	42.2%	31	30.4%

14	I feel that UI has clear rules for evaluating and assessing lecturers/students	9	8.8%	31	30.4%	40	39.2%	22	21.6%
15	I feel that the financial remuneration provided by UI for innovators is sufficiently motivating	16	15.7%	32	31.4%	41	40.2%	13	12.7%

Based on Table 1 above, the frequency and percentage of respondents' answers regarding the driving factors of the innovation process at UI can be observed. The response of "strongly agree" has the highest frequency for the item related to the freedom to determine the type of innovation and methods to be employed by innovators, with 49 individuals or 48% of the total responses to that statement. The highest agreement was found in the statement regarding the implementation of participatory and autonomous governance at UI, with 57 individuals or 55.9% of the total responses to that statement.

Conversely, the highest "disagree" response came from the statement regarding the involvement of lecturers/students in decision-making at UI management, with 36 responses or 35.3% of the total answers to that statement. The highest "strongly disagree" response was found in the statement that the financial remuneration provided by UI for innovators is sufficiently motivating, with 16 individuals or 15.7% of the total responses to that statement. This indicates that many respondents feel that there is a lack of involvement of lecturers and students in decision-making at UI, and that the financial remuneration is not sufficiently motivating. This serves as feedback for UI management to reassess these two factors.

3.1.2 Assessment of the driving factors of the innovation process at UI

To observe the trend of respondents' answers regarding the driving factors of the innovation process at UI, the researcher presents the mean results of each dimension to determine which indicators have the highest values.

3.1.2.1 Dimension of culture of openness and freedom

The dimension of culture of openness and freedom refers to a higher education environment that encourages open communication, new ideas, and collaboration. This dimension has two sub-dimensions: intensive cooperation with external parties, and empowerment and decentralization. The sub-dimension of cooperation with external parties can be identified through the following indicators.

Table 2. Results of the sub-dimension of cooperation with external parties

Items	N	Mean	Category
1	I feel that UI has a strong collaboration with the business sector	102	High
Total	102	3.029	High

Based on the Tabel 2, the indicator of cooperation with external parties is categorized as high, with a mean of 3.029. This figure indicates that the majority of respondents feel that UI has a strong collaboration with the business sector, which serves as a driving factor in the innovation creation process. This statement is supported by the numerous collaborations that UI has conducted. With its reputation and status as one of the best universities in Indonesia, UI has engaged in various national and international research collaborations with NGOs, the private sector, and industry (Research and Innovation Department, 2020). This is further supported by a statement from one of the students regarding her views on UI's cooperation with external parties.

> *"I think there is definitely something with UI's reputation, which is quite good in Indonesia and also in the capital, Jakarta, making it close to companies."* – SN, student of the Faculty of Public Health, UI

Furthermore, in an interview with staff from the Entrepreneurship and Innovation Unit (WIN) at FT UI, the informant explained about the collaborations with the business sector that are frequently undertaken. According to him, cooperation with the business sector is fundamental in promoting the creation of innovations. Without them, the innovations of higher education institutions would be difficult to implement and provide a tangible impact for community benefit. The first form of cooperation that is often conducted is licensing sales to companies, and the second is reverse engineering, where innovators create products based on the demands and needs of clients/companies.

> *"... from my experience, there are two types: the first is licensing cooperation, where the lecturer already has their own innovation, and then we license or sell the license to the company. The second is when a company needs a product, then they are assisted by the lecturers from FT along with the students."* – FF, WIN FT Staff

Another informant also mentioned that the current collaborations established by UI are better than before, enhanced by the presence of specialized units that accommodate innovation, allowing them to assist innovators in finding business partners.

> *"But indeed, for now, UI is better. I entered UI in 2016, before COVID in 2016. I think it helps if there is a special directorate for this."* – TA, FT Lecturer

However, in its implementation, there are still obstacles in managing collaborations with external parties. One informant, a lecturer from FIA UI, experienced an unpleasant situation with an external party due to UI's management unpreparedness. In managing partnerships with businesses/companies, there was a mismatch in regulations from upper management and staff regarding fund disbursement procedures. This resulted in innovators needing to exert extra effort, and fund disbursement was delayed, causing them to use personal funds. The informant argued that the existing procedures are not dynamic enough and are unsuitable for application outside, especially for private companies that tend to want to work quickly.

> *"But this, UI's experience with external parties — if I see that UI is not prepared for external parties (...) UI has never calculated that. Those who seek external partners must be reputable and willing to have their money used. Therefore, the supporting units do not, in my opinion, facilitate building networks with external parties. (...) What I mean is that the procedures should be made dynamic; for example, if we are working with outsiders, it should be like this. That's what I call dynamic."* – NI, FIA UI Lecturer

Based on this analysis, it can be concluded that UI has a high level of cooperation with the business sector; however, adjustments regarding regulations and procedures are needed to make them more dynamic.

Table 3. Results of the sub-dimension of empowerment and decentralization

Items	N	Mean	Category
1. I feel that innovators have the freedom to determine the type of innovation and methods to be implemented	102	3.376	High
2. I feel that UI has implemented an open communication climate	102	2.784	Moderate
3. I feel that UI practices participatory and autonomous governance	102	2.765	Moderate
4. I feel that the level of cooperation among faculties/units at UI is high	102	2.667	Moderate
5. I feel that lecturers/students have been involved in decision-making in UI management	102	2.569	Moderate
Total	102	2.83	Moderate

Based on the table above, the overall average of the sub-dimension of empowerment and decentralization is 2.86, which can be interpreted as moderate. The indicators have been arranged from the highest to the lowest mean. The highest mean value of 3.376 refers to the indicator of freedom in determining the type and method of innovation, which can be interpreted as high. This means that the majority of respondents agree that the freedom to determine the type of innovation and methods they wish to use is a driving factor in fostering innovation. Freedom has been recognized as one aspect that positively influences innovation. Lehmann & Seitz (2017) found in their research that social freedom positively impacts innovation.

At the Universitas Indonesia, both students and lecturers have the freedom to determine which innovations they wish to pursue. There are no limitations aside from grouping into certain topics. This is supported by statements from several sources, among others:

> *"Oh yes, that's our right, miss. For example, if a lecturer wants to create an innovative product, that's the right of the lecturer and also the right of the students."* – FF, WIN Staff

> *"If the restriction being referred to is certain topics, I don't think so; it's probably more about grouping. So there are fields, for example, renewable energy or health. It doesn't limit because if it does, it might be related to the research topics of the lecturers that have already been grouped."* – TA, FT Lecturer

Next, regarding the application of an open communication climate, which has a mean of 2.784 with a moderate interpretation. This means that most respondents agree that the environment at UI has allowed all members, including students, lecturers, and educational staff, to feel comfortable sharing ideas, thoughts, and problems honestly and openly; however, there are also quite a few who have different opinions. Based on interviews with sources, staff and students have experienced an open communication climate through formal forums such as meetings and advocacy with the student organization (BEM), as well as openness in establishing collaborations with other faculties.

> *"Currently, communication like that is open. So, in a way, FT can't go it alone. FT needs to be involved with the Faculty of Medicine, the Faculty of Economics. So, in FT, it's open like that. And also, if there are complaints from students or from educational staff or from lecturers, we are also very open about it."* – FF, WIN Staff FT

> *"It's already there, because I also know that in BEM there's the health and welfare division; they talk like advocating to the authorities about facilities and whatnot, and that can be advocated by the health and welfare division of BEM."* – SN, FKM Student

However, a different opinion is felt by some lecturers. According to one lecturer in FIA, communication between students and lecturers is still not fully open. There is a gap where the sense of fear feels greater than openness.

> *"As for communication between students and lecturers, not yet, because lecturers are often surprised when it comes to students. (…) Sometimes students are still weighing, 'If I speak, will I be scolded?' That still exists."* –- NI, FIA UI Lecturer

The gap between lecturers and the university is even greater, where there is not only a lack of openness but also a lack of trust built due to several conflicts experienced by the sources. One of them is between the source and the reviewers of a competition at UI Incubate. All teams registered by FIA UI were disqualified from the competition just because of an administrative process (stamp duty) that was deemed nonexistent, even though the stamp duty had actually been provided. Moreover, there was nothing in the guidelines

stating that a faculty stamp was required. When this was communicated to the reviewers, there was no clear response; they just said that the team would still fail.

> *"There was no communication, Verens. The nature of it is what action do we want to take; in the end, I boycotted and didn't want to register again in the incubate. Yes... how can innovation develop if we have an unhealthy relationship type? Openness is also not built well... we can't trust; we trust the students. So trust is the problem with the lecturers or the line between the faculty and UI. That's serious, especially if the problem lies there. That means there's no trust within the institution itself."* –NI, FIA UI Lecturer

From these answers, two different understandings related to communication openness can be seen. The first is openness in formal communication (cooperation, forums), and the second is personal communication. It can be concluded that the openness of formal communication, such as the presence of forums for students, openness in cooperation, and the availability of lecturers and faculties to assist students, is considered quite good. However, the communication established personally in the sense of "closeness" between units and individuals still needs to be improved, because without open communication, the innovation process cannot proceed well.

The next indicator related to participatory and autonomous governance has a mean value of 2.765, which can be interpreted as moderate. This means that a considerable number of respondents feel that UI has implemented participatory and autonomous governance. Participatory governance means there is room for all parties to contribute, whether in policy-making, academic processes, or general institutional management. Meanwhile, autonomy refers to the independence or freedom of higher education institutions to govern themselves concerning administration, academics, and finance. When combined, this means that even though higher education institutions have autonomy in governing themselves, the decisions made are through a participatory process that involves all parties concerned. Therefore, this aligns with the results of the indicator related to student involvement in UI management, with a mean value of 2.569, which is interpreted as quite a number of respondents feeling the involvement of lecturers/students in decision-making in UI management. This is supported by the statements of sources that there is participation from lecturers and students through certain organizations, for example, in meetings between department heads and professors, as well as through student organizations such as BEM and IM.

> *"Yes, from the FT side, maybe regarding regulations, there is also involvement from the leadership in FT, such as department heads and professors in FT. For students, that area falls under student affairs, like inviting friends from BEM or the IM Representative to create meeting agendas, something like that."* – FF, Staff WIN FT

> *"There is, from my faculty, through BEM as well. It's actually heard if there are comments like that."* – SN, student of FKM

The final indicator that needs to be discussed is regarding the level of cooperation among faculties/organizational units at UI, with a mean score of 2.667. This means that quite a few respondents feel that cooperation among faculties/organizational units at UI is high. This aligns with the earlier interview results with WIN staff, who mentioned that FT always collaborates with other faculties, especially in creating innovative products, as it cannot rely solely on one field of science but requires collaboration with other fields of study. This is also supported by the opinion of an FT lecturer. He believes that cooperation among faculties is already quite strong, but not yet structured, hence there is a need for a platform or regulation that can facilitate this cooperation.

> *"For example, the recent innovation in electromedicine, right? It definitely can't come from just electronics, but also from the Faculty of Medicine. It just hasn't been structured*

> *yet, like we can find what fields to collaborate on directly. It might not be structured like that yet, but I actually think every UI researcher is eager to collaborate because research or products should not be confined to one field."* – TA, FT Lecturer

Thus, it can be concluded that a more structured procedure is needed to facilitate cooperation among units/faculties.

3.1.2.2 Dimension of conscious innovation management

The Dimension of Conscious Innovation Management refers to a systematic and planned approach to managing the innovation process with a high awareness of the goals, values, and impacts of the innovation. This dimension has three sub-dimensions: management professionalization, organizational structure creation, and human resource management. The sub-dimension of management professionalization can be described through four indicators as follows:

Table 4. Results of the sub-dimension of management professionalization

Items	N	Mean	Category
1. I feel that UI has provided assistance and role models for me in terms of innovation.	102	2.882	Moderate
2. I feel that innovation management at UI has been conducted professionally.	102	2.843	Moderate
3. I feel that UI has a detailed strategic plan and vision regarding innovation.	102	2.833	Moderate
4. I feel that UI always ensures that the quality standards of education and services are maintained or improved.	102	2.833	Moderate
Total	102	2.847	Moderate

Based on the Table 4, the total mean of the sub-dimension of management professionalization is 2.847, which can be interpreted as moderate, as is the mean of each indicator present. The indicator with the highest mean value is the assistance and role models in terms of innovation, with a value of 2.882. This means that quite a few respondents feel that UI has provided assistance or role models in terms of innovation. This can be validated through the statements of the sources who say that, on average, lecturers, especially those who usually supervise theses, are willing to help the sources in conducting innovation.

> *"Regarding openness, discussions, introductions to connections, and suggestions, on average, the lecturers in my faculty (especially those who usually supervise theses) are very open. They are even willing to recommend guidance to their acquaintances in other faculties if the innovation is multidisciplinary."* – KP, Student of FT UI

A little different from engineering students, FKM students feel that the focus in their faculty is more on Community Service, so guidance and role models in terms of innovation are felt to be lacking.

> *"In terms of community service and public health, there are many examples from lecturers as they are already professionals. They have experience in various NGOs and in dedicating themselves to this field. They do provide guidance. However, for innovations outside that, it seems there isn't much yet. But if we say there are role models, yes, there are, but not in every aspect of innovation."* – SN, FKM student

It can be concluded that the assistance and role models that innovators receive regarding innovation may vary depending on the faculty environment. The next indicator refers to the management of innovation that has been carried out professionally, with a mean score of 2.843. This means that quite a few respondents feel that innovation

management at UI has been conducted professionally. This can be supported by observing how UI has established strategic planning for innovation development over the next four years through the Research and Innovation Roadmap. UI has also set strategic principles in innovation development and established a flow for the innovation management process at UI. UI has made efforts to provide protection for intellectual property (IP) from all research inventions, whether in the form of copyrights, patents, industrial designs, integrated circuit layout designs, or trademarks (Research and Innovation Division, 2020). The grant scheme has also been created professionally with a clear process. This also validates the results of the next indicator, which has a mean of 2.883. This means that quite a few respondents feel that UI has a detailed strategic plan and vision regarding innovation. The head of the DISTP unit, in an interview with the source, explained the innovation processes carried out by DISTP and how DISTP is responsible for fostering innovation at UI. With the existence of a special institution handling innovation, it can be concluded that UI has a strategic plan regarding innovation.

> *"So in UI, the relay goes like this: from the Directorate of Research and Development, it is handed over here. We plant the seeds, put them in a good place, provide funding, guide them, grow the seeds, and then the output bears fruit. The fruit is what is called intellectual property. This intellectual property is protected by law, right? So, the findings are protected by law, and then the results of this protection are given to the technology transfer unit to be licensed to user partners/companies. Then, these user partners will reproduce what the innovation produces, copy it in bulk, sell it, or make it non-commercial."* – SS, Head of DISTP

The final indicator referring to quality assurance at UI shows a mean score of 2.833, which is moderate. This means that quite a few respondents agree that UI always ensures that the quality standards of education and services are maintained or improved. This can be seen, among other things, through the emergence of BPMA UI (Academic Quality Assurance Agency). This internal body functions to build a quality assurance system in every area of UI that supports the Tri Dharma of Higher Education (BPMA UI, n.d.).

Looking at the analysis above, it can be concluded that the professionalization of innovation management has been carried out. However, in its implementation, there are still many obstacles. One of the obstacles faced by the sources is the lack of clarity in the regulations set by UI in the business grant program (UI Incubate), which resulted in the failure of competition participants.

> *"The failure of Incubate was due to something that actually existed but was said to not exist. They said there was no stamp. They claimed there was no seal. But there was a seal. In the guidebook, there is also no requirement that a faculty stamp must be included. Everyone from FIA was declared failed because they asked for a faculty stamp. So, for me, that's UI's unpreparedness."* – NI, Lecturer at FIA UI

According to her, this indicates a lack of professionalism in innovation management, especially in the UI Incubate program, as the regulations created differ from those set by the reviewers.

> *"This is poor innovation management in my opinion. That suddenly there are new regulations and those regulations, if searched for, do not exist. It was just communicated that it is simply not allowed. (…) I once protested to Mr. Sandi about this. I said, 'Sir, there should be a briefing for reviewers. Since DISTP is responsible for innovation, not doing that is fatal for me. Because it is part of the process of identifying innovation. Now those who truly have innovations become unfacilitated by such things."* - NI, Lecturer at FIA UI

Table 5. Results of the sub-dimension of organizational structure creation

Items	N	Mean	Category
1. I feel that UI has sufficiently established positions/units specifically related to innovation development	102	3.069	High
2. I feel that UI has integrated organizational units/faculty at the university, positively impacting innovation development	102	2.794	Moderate
Total	102	2.931	Moderate

Based on the Table 5, the mean value of the sub-dimension of professionalization management is 2.931, which can be interpreted as moderate. The highest mean is found in the indicator related to innovation units, with a value of 3.069, indicating that the majority of respondents feel that UI has sufficiently established positions/units specifically related to innovation development. Meanwhile, the subsequent indicator has a mean value of 2.794, categorized as moderate. This means that quite a few respondents feel that UI has integrated organizational/faculty units. Strengthening innovation institutions has become one aspect of the UI Research Innovation Roadmap for 2020-2024. This is evident from the existence of the Directorate of Innovation and Science Techno Park, which specifically plays a role in promoting innovation, research, and technology development within the Universitas Indonesia. With the presence of DISTP, both students and lecturers have more platforms for innovation through programs created such as PPI and UI Incubate.

The Sub-Director of Innovation Development at DISTP also explained the role of DISTP in fostering innovation at UI through research:

> *"So we are the ones who cultivate innovation from the research direction, into a product that can be seen or not seen, which we then transfer to the part that transfers technology to partners who utilize it. So, we are like the farmers. The farmers to grow the garden; once it is ready, we pass it on, and they can decide where to sell it. So, our task is to cultivate innovation. What is the seed? The seed is research."* – S, Sub-Director of DISTP

In addition to DISTP, innovation units have also emerged in each faculty/department. In FT UI, there is the Entrepreneurship and Innovation Unit. In FIA UI, there is the LSCC (Laboratory Studentpreneur and Co-Creation). In FK UI, there is the UKK PUSBANGKI (Special Working Unit for the Development of Indonesian Medicine). In FEB UI, there is the RPM Research and Community Service Center. According to a source, a lecturer from FT UI, the emergence of these units greatly assists in fostering innovation, especially in finding partners for product development.

> *"In my opinion, it is very helpful if there is a specific directorate. So, indeed, in every unit or in the faculty or in the university, if there is an institution that specifically supports innovation, it is easier. So sometimes, they have industrial partners or companies that are interested in developing products or need to develop products; usually, this is done through that institution. They will seek lecturers or researchers whose fields match."* – T, Lecturer at FT UI

Unfortunately, information regarding these smaller units is still lacking among students. This is felt by one student from FT UI. According to them, information related to innovation is still limited to lecturers. Students must reach out first to learn about such matters.

> *"As far as I know, if I'm not mistaken, there is an innovation unit, right? But I have not understood it so far; the innovation unit is about innovation in teaching, in terms of innovation for UI itself, or external innovation. If in my faculty, the innovation unit is more about innovation in teaching and showcasing the work of lecturers. So, in my faculty the flow is always: students discuss with lecturers about innovation then the lecturer is*

interested, then the lecturer informs them if there is an ABC scheme that can be followed, only after that stage, there are various things." – K, Student at FT UI

4. Conclusions

As a world-class university, Universitas Indonesia has undertaken various efforts to drive the development and creation of innovation. This study aims to analyze the driving and inhibiting factors in the innovation process at Universitas Indonesia. Based on the research findings, the driving factors influencing the innovation process at UI consist of the dimensions of Culture of Openness and Freedom and Conscious Innovation Management. Within the dimension of Culture of Openness and Freedom, the most significant factor in promoting innovation is strong collaboration with the business sector, as well as the freedom for innovators to choose their methods and innovations. In the Conscious Innovation Management dimension, the highest factor driving innovation is the emergence of dedicated positions or units directly related to innovation development, along with support for faculty and students in the form of training and skill development opportunities.

Based on the findings of this research, several suggestions and recommendations can be made to UI to enhance sustainable innovation. Strengthen collaboration with other universities in the field of innovation to broaden perspectives and resources. To increase student and faculty motivation, establish a clear and structured remuneration scheme. Grant each faculty's innovation unit greater authority to develop its own Standard Operating Procedures (SOPs), aiming to make innovation-related bureaucracy less rigid and more flexible.

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