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Smart System Empowerment Through Virtual Business Incubator to Increase Student Entrepreneurial Capacity in Higher Education

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Abstract

The purpose of this journal is to present the development and implementation of a virtual incubator aimed at assisting students in establishing their businesses. The virtual incubator offers the flexibility and accessibility required for entrepreneurial endeavors to thrive in an increasingly interconnected world. The research methodology employed a research and development approach, combining interviews with key personnel from university incubator departments, lecturers, and students, as well as conducting Focus Group Discussions (FGDs). The collected data informed the creation of a virtual incubator prototype, which was subsequently tested at the Nobel Indonesia Institute of Technology and Business. The virtual incubator serves as an assistant to student entrepreneurs, providing them with the necessary tools and resources to develop their business ideas Virtually. By utilizing information and communication technologies, the virtual incubator enables students to access mentorship, networking opportunities, and relevant resources regardless of their physical location. This eliminates geographical barriers and allows students to work on their businesses at their convenience, promoting a flexible and conducive entrepreneurial environment. The research findings demonstrate the successful implementation of the virtual incubator prototype, showcasing its effectiveness in supporting student entrepreneurs. Through interviews and FGDs, insights were gained into the preferences and requirements of students, as well as the challenges they face when establishing businesses. These findings guided the development of a user-friendly and comprehensive virtual incubator platform.

Keywords: Virtual Incubator, Student Entrepreneurship, Entrepreneurship Education

1. Introduction

The purpose of entrepreneurship education is basically to educate students to be ready for work and able to create jobs for that entrepreneurship education must weigh the demands of the real world of work, where entrepreneurship education must be directed so that students can master the knowledge, skills, attitudes, and values needed by the world of work, (Hidayat, et al., 2015); (Siregar, D., Yuslem, N., & Nawawi, Z. M , 2023). The flexible attitude of entrepreneurship education is also needed today, especially with the importance of adaptation to the increasingly massive development of science and information technology, especially in responding to the rise of the industrial revolution 4.0 which is currently underway.

Departing from the argument above, there needs to be a more comprehensive approach in developing entrepreneurship learning in higher education so that this course is not only a subject that is understood textually but must be comprehensively linked to real entrepreneurial practice. There are several things that must be done related to college management and entrepreneurship learning management in Higher Education. Among them is the need to apply and develop entrepreneurial learning by integrating a business incubator system that is integrated with the learning process in entrepreneurship courses, this is important so that learning Creative Products and Entrepreneurship in universities must be integrated with business incubator programs that are for. (Ari Saptono, S., & Disman, H. ,2020). Departing from the argument above, there needs to be a more comprehensive approach in developing entrepreneurship learning in higher education so that this course is not only a subject that is understood textually but must be comprehensively linked to real entrepreneurial practice. There are several things that must be done related to college management and entrepreneurship learning management in Higher Education. Among them is the need to apply and develop entrepreneurial learning by integrating a business incubator system that is integrated with the learning process in entrepreneurship courses, this is important so that learning Creative Products and Entrepreneurship in universities must be integrated with business incubator programs that focus on product development and student creativity in order to have an output that can be commercially viable on product development and student creativity in order to have an output that can be commercially viable.

The biggest problem in the implementation of the entrepreneurship curriculum is the imbalance between theory and practice, while proper entrepreneurship teaching is the existence of direct entrepreneurial practice considering that the entrepreneurial mentality will not be enough if it is only developed from a theoretical side, to meet these demands, the presence of a business incubator becomes one of the important units in bridging theoretical idealism with real practice. The existence of the Business Incubator as a student entrepreneurship mentoring institution is needed so that the development of student startups can be followed up properly until the commercialization value can be realized as intended as one of the goals of campus innovation management (Permendikti No. 14 of 2019).

Along with the times and real needs in the field, the demand for the effectiveness of business incubators is getting stronger today, almost all business incubators that are mentoring are currently carried out directly both in development practices (pilot projects) and in market development, the need for innovation in business incubators, especially related to accessibility, is felt because incubators can only be accessed directly by heading to the room Incubators Become a Problem When Their Implementation Is Constrained One of the valuable lessons is from the outbreak of the Covid 19 pandemic which makes the implementation of direct assistance difficult to do, so it is necessary to do the right way to implement assistance by compiling alternative assistance with the concept of Virtual incubator business. So that assistance can still be done even though it is not done directly (Vieqi Rakhma Wulan, Agus Hermanto, 2019),

One of the principles of incubation, namely to keep business startups can continue to be directed in accordance with the goals that have been set with the inherent concept of assistance, of course, it must remain a principle in the preparation of a mentoring system with the concept of Virtual incubator so that the results of Virtual assistance can be maximally no different from the results of direct assistance. Furthermore, ideally the presence of a Virtual incubator can provide wider services and space for movement because in accordance with the aims and objectives of the Virtual incubator is to provide assistance that is not limited to space and time can be accessed easily so that Virtuals can be more flexible in using these assistance facilities.

2. Literature Review

2.1. The Importance of Business Incubator

The business incubator developed in Higher Education, is a unit prepared to incubate business plans and business practices resulting from entrepreneurship lectures so that the plans grown from these lectures can develop as a real business, this is important to help students as prospective entrepreneurs or novice entrepreneurs in achieving goals by commercializing the results of student business practices, The existence of incubators in

universities is also to support the commercialization of university research results, provide infrastructure, improve technological capabilities and facilitate the improvement of student business capabilities so that these startups can be released to do business independently (Allahar, et al., 2016).

The development of business incubators in universities is also in line with the development of business incubators in general, some business incubator developments that also affect business incubators in universities, (Gozali, L., et al 2020), including innovative ideas related to the content and implementation system of business incubators as proposed by Wulan & Hermanto, (2019). Which proposes the design of a sociopreneurship (Social Entrepreneurship) business incubator system by integrating Library and Information Technology Infrastructure (ITIL) features as a supporting tool in managing business incubators. Through this proposal, the business incubator system is designed by integrating the features of the Information Technology Infrastructure Library (Information and Technology Infrastructure Library) as a supporting tool in managing business incubators. As an effort to accommodate the needs of the community for business fields so that business incubator services and programs are obtained that are in accordance with the needs of the community. This incubator system seeks to present a business incubator tailored to the needs of the community so that the community not only has economic independence but can be transmitted together and sustainably with other communities (sociopreneurship) and by utilizing information technology.

Allahar, et al (2016) stated the importance of understanding business incubators as a whole so that their utilization can have a maximum effect, of course, this understanding must be an understanding and can be a general reference including international references, these factors are the category of business incubator, type and evolution of business incubators, stages of business incubators, innovation-based Ikubortor, the incubation process and the role of universities in implementing and developing Business Incubator.

In its implementation, the results of the incubator function are not always positive as conveyed by Tengeh & Choto, (2015) which proves that, 55.1% of entrepreneurs who participated in the incubation program benefited from participating in the incubation program, while 44.9% indicated that they did not benefit from the program followed. In addition, lack of funding is a major challenge facing Business Incubator. Other less significant challenges include lack of support from stakeholders, and non-committed clients. The implication of this result is that just like what clients face, Business Incubator also faces a number of challenges that threaten its long-term existence, as well as the importance of improving the quality and quantity of services that can be provided., from this result it becomes relevant what was conveyed by Allahar, et al. (2016) which states that the implementation of business incubators requires a correct understanding of the effective functions offered by A Business Incubator.

From previous research references about business incubators, several important things can be taken as references in this study, namely: 1) All researchers agree that business incubators are very important to be carried out 2) Business incubators must be able to encourage innovation and creativity so that incubator participants can continue to adapt to market developments and demands 3) business incubators must evolve modernly by applying technology Information so that the incubation process can be carried out anytime and anywhere. Including the development of a WEB based business incubator so that the incubator is Virtual or virtual that can be accessed anytime and anywhere by the participants

In the virtual era, the importance of virtual incubators cannot be overstated. These incubators play a crucial role in supporting and nurturing entrepreneurial endeavors in a digital landscape. Here are some key reasons why virtual incubators are significant in the virtual era:

1. **Accessibility:** Virtual incubators break down geographical barriers and provide accessibility to aspiring entrepreneurs regardless of their location. With the widespread availability of internet connectivity and digital tools, students and aspiring entrepreneurs can access virtual incubators from anywhere, allowing them to participate in entrepreneurial activities without being constrained by physical proximity to traditional incubator spaces.
2. **Flexibility:** Virtual incubators offer flexibility in terms of time and resources. They enable entrepreneurs to work on their business ideas at their own pace and convenience, fitting entrepreneurship into their existing

schedules. This flexibility is particularly important for students who are juggling academic commitments or have other responsibilities. Virtual incubators allow them to pursue their entrepreneurial aspirations without compromising their other obligations.

3. **Networking and Collaboration:** In the virtual era, virtual incubators facilitate networking and collaboration among entrepreneurs, mentors, and industry experts. Through online platforms, entrepreneurs can connect with a diverse network of individuals who can provide guidance, advice, and valuable connections. Virtual incubators foster a sense of community and provide opportunities for collaboration, enabling entrepreneurs to tap into a global pool of talent and resources.
4. **Resource Sharing:** Virtual incubators offer a wealth of resources, including educational materials, tools, templates, and market research data. These resources are easily accessible to entrepreneurs, empowering them with the knowledge and tools necessary to navigate the complexities of starting and growing a business. Additionally, virtual incubators provide access to mentors and experts who can offer personalized guidance and support based on their expertise and industry experience.
5. **Cost-Effectiveness:** Virtual incubators are often more cost-effective compared to physical incubators. Without the need for dedicated office spaces or physical infrastructure, virtual incubators significantly reduce overhead costs. This cost-effectiveness allows more aspiring entrepreneurs, including those with limited financial resources, to participate in the incubation process and receive the support they need to succeed.
6. **Adaptability** Virtual incubators are well-suited to harnessing and leveraging the latest technological advancements.

Virtual incubators indeed have inherent advantages when it comes to harnessing and leveraging the latest technological advancements. Here are a few reasons why virtual incubators are well-suited for adapting to technological advances: Virtual incubator offer us on access to global talent, Virtual incubators can tap into a diverse pool of talent from around the world. By leveraging technology, they can connect with entrepreneurs, mentors, and experts regardless of their geographical location. This enables virtual incubators to bring together a broader range of skills and expertise, fostering innovation and collaboration on a global scale.

Virtual incubator gives the opportunity on Virtual collaboration and communication, technology has revolutionized communication and collaboration, making it easier than ever to work Virtually. Virtual incubators can leverage various digital tools and platforms to facilitate real-time collaboration, mentoring, and knowledge sharing among startups, mentors, and investors. This Virtual accessibility eliminates the need for physical proximity and allows for flexible working arrangements.

2.2. Business incubator models

The most common incubator model carried out by universities, especially in Indonesia, is the incubator function to support the growth and development of business plans which include three important stages, namely (1) the Pre-Incubation stage (2) the incubation stage and (3) the post-incubation stage with important pressures that have specific objectives at each stage, the complete specific objectives are as follows

1) Pre-Incubation Stage

At this stage, the condition of prospective tenants will be seen when they first enter the business incubator program, such as having research results and business prototypes that will be developed This information is important so that the incubation program can be run according to needs

2) Incubation Stage

At this incubation stage, there are three phases that need to be passed, *the first phase* that is important to do in incubating a business is the peak of education and training, internships, business plan preparation, market validation, market test stage 1 Product Revision and business sharing. *Second phase* Initial production, market test, Intellectual property rights, certification and standardization, business licensing, coaching mentoring, promotion, advance business sharing business Consulting and business expo *Third phase Commercial* production, market expansion, networking, business matching and business pitching

3) Post-Incubation Stage

Things that need to be considered in businesses that have passed incubation and have been declared graduated (graduation) then further assistance can be carried out to ensure the following; Achievement of

Profitability, Viable Companies, economic development, job creation, industrial competitiveness, bankable proposal and anchor tenant

Taking into account the entire series of incubation processes above, it can be seen that many parts can be done independently by incubator participants, meaning that not all materials must be carried out directly, many materials can be self-taught from this, Wulan & Hermanto, (2019). propose integration between business incubators and Information and technology Library by integrating libraries as part of business incubators. Thus incubators can be done with a virtual system as stated by Allahar, et al. (2016) who emphasized that business incubators can be done directly (traditional) or indirectly (Virtual Incubator) or in other words business incubators can be run directly or physically (Physical Incubator and incubator indirectly (Virtual Incubator) Allahar, et al. (2016).

3. Methodology

This research is qualitative research. This research was conducted using Research and Development approach. Data were collected through field observations by conducting systematic observation and recording activities of the phenomena investigated, especially those related to business incubator practices at universities in South Sulawesi, Indonesia. Through this observation, researchers also observe the implementation of Business Incubators to find out the categories of business incubators run by each university, the type and evolution of business incubators that have been carried out, standard operational procedures and stages of business incubators implemented, innovations that have been applied, and the role of universities in implementing and developing business incubators. In addition to the observation process, data collection is also carried out through Focus Group Discussion (FGD). It is an activity to conduct in-depth discussions that are followed by all interested parties to discuss the data found during the research. This forum is also intended to see trends, similarities, differences from participants in seeing a phenomenon. In this study, the data collected during the next research is used as a basis for the development of a virtual business incubator which is expected to be run effectively because it is developed by taking into account all the interests of all involved in developing a business incubator in Higher Education

4. Results and Discussion

4.1. Development of Virtual Features of the Incubator

Virtual Business Incubator was built with the intention to provide business assistance to students and other parties who can use the business incubator as tenants through mentoring materials that can be accessed online, for that the system needs to be equipped with the features needed to be able to provide maximum assistance. Through focus group discussion (FGD), it was agreed that what can be provided by the business incubator system virtually must cover all facilities that have been provided by traditional business incubators.

Thus the virtual business incubator has the same function as the traditional incubator, the difference is that in the virtual incubator all business assistance is carried out online based on the web, as an innovation, the advantages of the virtual incubator can be integrated with other systems that will add to the advantages of the virtual incubator, as an example is the integration of virtual incubator services with digital library services owned by universities so that tenants can directly access reference support through integrated digital library, another advantage is the integration of the incubator system with strategy tools through templates such as SWOT Analysis calculations, business performance calculations, Feasibility Studies and partner catalogs as support for business network development.

To meet these demands, the features in the virtual incubator must include three stages of the business incubator, namely: (1) the section used for access to incubator participant registration, (2) the incubator implementation section, in this section incubator participants can access all online mentoring materials, including providing references combined with the system on line library and questioner and answer (Q&A) facilities, (3) the post-incubator section is equipped with: Advanced facilities include a performance appraisal system that can help

participants to use Strategic tools in business development as well as a performance appraisal system equipped with accessible templates and interactive discussions.

To meet the increasingly complex and varied needs for assistance, incubator features must be prepared in a comprehensive manner resulting from in-depth discussions with all stakeholders related to business incubators, especially from universities, the core of the features of the business incubator can be described through figure 1 as follows:

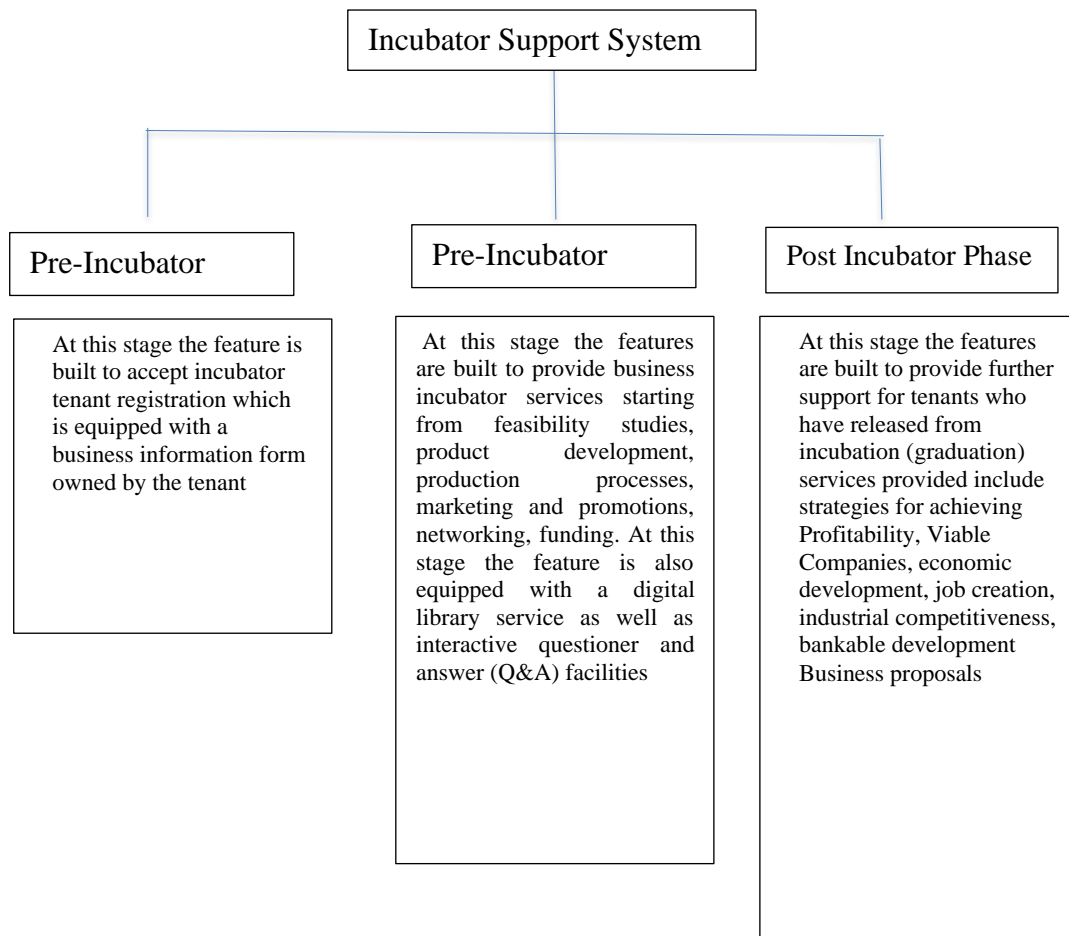


Figure 1: Features of a Business Incubator

4.2. Virtual Incubator Design

Design Virtual Incubator is built to achieve effectiveness and efficiency. Considering that this virtual business incubator will be aimed at students, the design is built to achieve the principle of user friendly that makes it easier for users. Virtual incubator design is divided into three main functions, namely the pre-incubator function, the incubator implementation function and the post-incubator function. The results of the Focus Group Discussion concluded the importance of a simple but comprehensive display so that the initial display of the virtual incubator web page can be seen in figure 1 as follows:



Figure 2: Incubator Virtual Start layer view

The main functions displayed in the screen display above are (1) Home, which is a page that will provide general information about the virtual incubator, by displaying the main layer and the features owned by the virtual incubator (2) About us, is a feature that explains why this virtual incubator was built, the purpose and purpose and benefits of the Virtual Incubator on this feature are also explained the person in charge and the resources owned by the Virtual Incubator (3) Sentra HKI is a service from Virtual Incubator to support the management of Intellectual Property Rights for products produced by students to obtain intellectual property rights certificates from the department of law and Human Rights (4) The Incubation Center is an incubator feature offered by the system to provide assistance to students in developing their products until the product is declared suitable to be marketed directly to consumer (5) contact, is a feature that provides information about important numbers that can be contacted and question and answer services used to conduct discussions from incubator participants with experts in the incubator (6) Register, is a registration feature used for incubator participants when registering as a member.

4.3. Flow map Business Incubator System

The virtual incubator system is arranged in such a way as to meet the needs of the implementation of the incubation system which is expected to meet the objectives of the implementation of business incubation, the flow map system proposed in the development of virtual business incubators at ITB Nobel Indonesia is illustrated in figure 3. As follows:

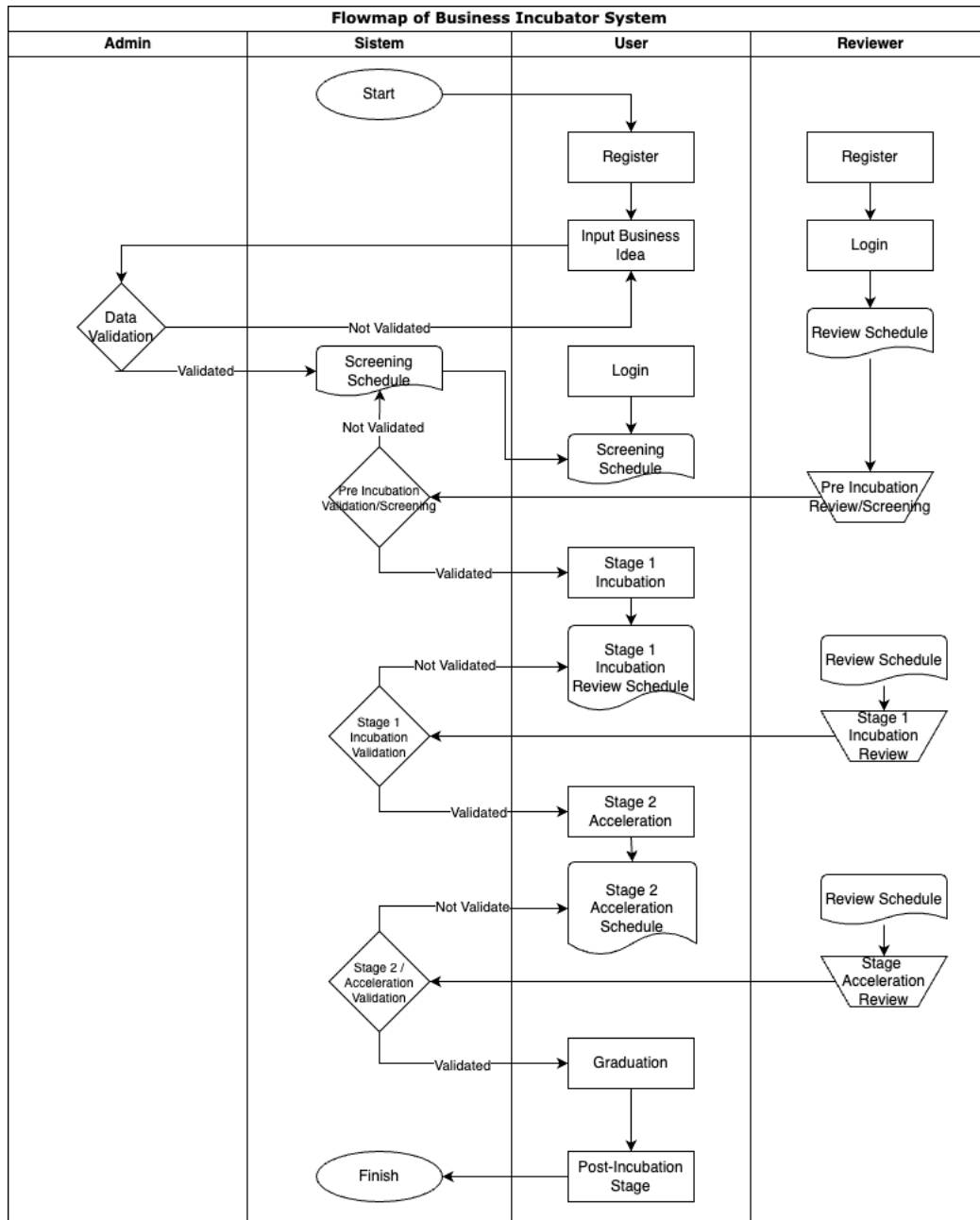


Figure 3: Flow map Business Incubator System

4.4. Discussion

Virtual incubator is a very important demand today so that business assistance can be done anytime and anywhere, especially for students who have a tight schedule because in addition to completing business incubator assignments, students also still have assignments in other courses, with the virtual incubator, time management can be done better. Based on the results of the discussion, the features that must be developed by the virtual incubator system must include all facilities owned by traditional incubator facilities.

The virtual incubator prototype built and reported in this manuscript has answered all the expectations of all FGD participants so that this Virtual Incubator can be realized immediately so that the need for comprehensive assistance for students in the field of business practice can be realized immediately

Web development for the Virtual Incubator program must continue to be done so that important things that have not been covered in the features can be updated according to needs, especially related to features that support the achievement of partnerships and networking, updating data from parties that can provide support for achieving

extensive networking continues to need to be developed and updated at any time so that important data that can be used by incubator participants is data which is real and valid.

In the era of digitalization, the development of a virtual incubator holds significant importance. A virtual incubator refers to an online platform or ecosystem that supports the growth and development of startups and early-stage companies. It provides a range of resources, services, and networking opportunities to entrepreneurs, allowing them to thrive in the digital world. Here are several reasons why developing a virtual incubator is crucial in the time of digitalization:

1. **Global Accessibility:** Virtual incubators break down geographical barriers and provide access to resources and support for entrepreneurs regardless of their physical location. It allows startups from Virtual areas or developing countries to participate in the entrepreneurial ecosystem and benefit from the expertise of mentors, investors, and industry professionals worldwide.
2. **Cost-Effectiveness:** Traditional physical incubators often require significant financial investments, including office space, infrastructure, and maintenance costs. In contrast, virtual incubators offer a more cost-effective approach as they eliminate the need for physical infrastructure. Entrepreneurs can access resources, guidance, and mentoring from the comfort of their own workspace, reducing expenses associated with office space and commuting.
3. **Diverse Support Services:** Virtual incubators provide a wide range of support services to startups, including mentorship, networking opportunities, training programs, and access to funding sources. These services are often tailored to the specific needs of digital entrepreneurs and cater to various aspects of business development, such as technology development, marketing strategies, and legal assistance.
4. **Flexibility and Scalability:** Digital startups often require flexibility and scalability to adapt to rapidly changing market dynamics. Virtual incubators enable entrepreneurs to scale their businesses more efficiently by providing guidance on technology infrastructure, market expansion, and customer acquisition. The virtual nature of the incubator allows for quick adjustments and changes in the support services as per the evolving needs of the startups.
5. **Collaboration and Networking:** Virtual incubators foster collaboration and networking among entrepreneurs, mentors, and industry experts. Online platforms enable startups to connect with like-minded individuals, potential partners, and investors from different parts of the world. This collaboration not only promotes knowledge sharing but also enhances access to diverse perspectives, innovative ideas, and business opportunities.
6. **Technological Advancements:** As the digital landscape continues to evolve, startups need to stay updated with the latest technologies and trends. Virtual incubators serve as a hub for sharing information on emerging technologies, industry best practices, and market insights. They can provide startups with access to cutting-edge tools, software, and platforms that can help them stay competitive in the digital era.
7. **Resilience and Adaptability:** The digitalization era brings both opportunities and challenges for startups. Virtual incubators equip entrepreneurs with the necessary skills and knowledge to navigate the ever-changing digital landscape. By fostering a culture of resilience and adaptability, virtual incubators empower startups to embrace innovation, iterate their business models, and overcome obstacles more effectively.

Developing a virtual incubator is essential in the time of digitalization. It promotes global accessibility, cost-effectiveness, diverse support services, flexibility, collaboration, technological advancements, and resilience for startups. By leveraging the power of the digital world, virtual incubators contribute to the growth and success of entrepreneurs in the digital era

5. Conclusion

Through the results of this study, it can be concluded that virtual incubators can be the best solution for mentoring incubator activities in business practices in student entrepreneurship development, through Virtual incubators business assistance can be done anytime and anywhere so that assistance can run effectively without disturbing by schedule or student time which is also quite tight.

The Virtual incubator has emerged as a vital tool in supporting students to establish successful businesses that can be managed from anywhere and at any time. This importance is particularly evident in the context of the rapid growth and utilization of information and technology. By leveraging Virtual incubators, students can tap into a wealth of resources, mentorship, and networking opportunities without being bound by physical limitations. The flexibility and accessibility offered by Virtual incubators empower students to pursue their entrepreneurial ambitions irrespective of geographical constraints, enabling them to take their businesses in any direction they choose. As the world becomes increasingly interconnected and reliant on technology, the Virtual incubator proves instrumental in fostering innovation and entrepreneurship among students, paving the way for a more dynamic and globally connected business landscape.

To maintain the elevation and suitability of virtual incubator facilities, the Virtual Incubator Facility must continue to be developed and updated so that the facilities owned are in accordance with the demands and updated business conditions, to anticipate this, questioner and answer services that have been prepared will provide very important input related to the needs of incubator participants and may even lack incubator facilities so that the results of questioners And answer will be used as one of the data in developing a virtual incubator.

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