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Development Model of Higher College Business Incubation Program in Respati Yogyakarta University

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***Abstract*— UNRIYO, as one of the private universities in Indonesia, has an entrepreneurial vision that targets the application of entrepreneurship in its various activities. In terms of academic activities, UNRIYO has an Entrepreneurship course as a compulsory subject, and other entrepreneurship courses developed by the Faculty such as Technopreneur, Sociopreneurship and Health Technology and Innovation. Based on the results of the 2022 Tracer Study, UNRIYO graduates who have become entrepreneurs have not yet reached the desired number. This is of course UNRIYO's evaluation of the graduate profile which is expected to be in accordance with the entrepreneurial vision.**

The university incubation program is one of the efforts that UNRIYO can undertake to achieve its entrepreneurial vision and mission, as well as facilitating the development of startup businesses in Indonesia. This program provides benefits for universities, startup entrepreneurs, government and society. Even though there are still many obstacles faced, with good collaboration between universities, industry and the government, the university incubation program can be an effective solution in developing the creative economy in Indonesia.

In order to execute business incubation, the UNRIYO entrepreneurship study center is attempting to develop a plan for the use of information and communication technologies. ICT is applied both in the form of an ICT-based business canvas and in the incubation process. The goal is to make the tenant's business procedures easier and the incubation process simpler. AI, cloud computing, and Internet of Things applications are a few of the technologies that may be utilized.

***Keywords*— Business incubation, UNRIYO, Start Up, Technology 4.0, Enterpreneurship**

I. INTRODUCTION

The advent of Technology 4.0 has brought about a substantial transformation in the corporate landscape, particularly in the area of start-up incubation processes in recent times. Technology 4.0 has completely changed the way that start-ups are supported and developed in its early phases. It is defined by the integration of cutting edge technologies like automation, big data analytics, internet of things, and artificial intelligence. The purpose of this study is to investigate how Technology 4.0 can improve the efficacy and efficiency of incubating new businesses, ultimately resulting in the success and long-term viability of these endeavors.

Numerous developments brought about by technology 4.0 have altered the conventional approaches to start-up incubation. Using artificial intelligence (AI) and machine learning algorithms to study consumer behavior, market trends, and competitive environments is one important use. With the use of these tools, start-up incubators can now provide their clients more individualized, data-driven advice, empowering them to make wise choices and modify their plans in response to changing market conditions.

The use of the internet of things (IoT) for startup incubation is another noteworthy development. Real-time data about a start-up's activities, including customer interactions, supply chain management, and production processes, can be gathered via IoT devices. Start-ups can increase their competitiveness and streamline their operations by analyzing this data to find inefficiencies and opportunities for improvement. Additionally, big data analytics is essential to the incubation of startups since it makes it possible to handle and analyze vast amounts of data in order to derive insightful knowledge. Big data analytics may be used by startup incubators to spot market trends, forecast demand, and evaluate the feasibility of new goods and services. This information may be used to help start-ups make critical decisions that will propel their expansion and success.

Another important aspect of Technology 4.0 that is revolutionizing startup incubation procedures is automation and robots. Entrepreneurs can free up time by using automation solutions to streamline repetitive processes like data entry, customer support, and inventory management. This allows them to concentrate on more important elements of their organization. Another technology that's being utilized more and more in startup incubation to automate manual workflows and processes is robotic process automation, or RPA. RPA can help startups lower expenses, increase overall market competitiveness, and improve operational efficiency.

Technology 4.0's incorporation into startup incubation has a number of ramifications for entrepreneurs and incubators alike. Adopting these technologies can help incubators offer more value to startups by giving them access to state-of-the-

art resources and knowledge that can spur growth and raise prospects for success. Utilizing Technology 4.0 can assist entrepreneurs in overcoming typical start-up obstacles such scarce resources, insufficient experience, and unpredictability in the market. These technologies enable business owners to automate repetitive operations, get insightful information, and make data-driven decisions that boost the growth and competitiveness of their start-up.

It is obvious that Technology 4.0, by giving startups access to cutting-edge tools and technologies that can boost their competitiveness and quicken their growth, has the potential to completely transform the incubation process for new businesses. Start-up incubators and entrepreneurs can create more successful and long-lasting start-up ventures by adopting these technologies, which will help them better traverse the intricacies of the contemporary business world.

II. REFERENCES

A. Enterprenuership

Entrepreneurship is the process of designing, launching, and running a new business, often initially a small business, typically with the aim of creating a profitable and sustainable enterprise. Entrepreneurs are individuals who take on the risks and rewards of starting and managing a business venture. They are often seen as innovators, creating new products, services, or business models that meet the needs of the market. Entrepreneurship plays a vital role in economic development, driving innovation, job creation, and wealth generation.

Here are some key aspects and considerations related to entrepreneurship:

a. Innovation: Entrepreneurship is often associated with innovation, as entrepreneurs identify and exploit opportunities to create new or improved products, services, or processes. This innovation can be technological, organizational, or related to the business model.
b. Risk-taking: Entrepreneurship involves taking on risks, as entrepreneurs invest their time, money, and effort into a new venture with the possibility of failure. Successful entrepreneurs are often willing to take calculated risks and learn from failure.
c. Opportunity Recognition: Entrepreneurs are adept at recognizing opportunities in the market or identifying unmet needs. They often have a keen sense of the market and are able to spot trends and gaps that others may overlook.
d. Resourcefulness: Entrepreneurs are resourceful, finding creative ways to overcome challenges and constraints. They often leverage their networks, skills, and knowledge to build their businesses.
e. Persistence: Entrepreneurship requires persistence and resilience, as entrepreneurs face numerous obstacles and setbacks along the way. Successful entrepreneurs are able to persevere in the face of adversity and learn from their experiences.

2. Impact: Entrepreneurship can have a significant impact on society, driving economic growth, creating jobs, and fostering innovation. Entrepreneurs are often motivated by a desire to make a difference and solve pressing problems.

B. Business Incubation

Business incubation is a process that supports the development and growth of new and early-stage companies by providing them with resources, services, and guidance. The theory of business incubation is based on the premise that start-ups face various challenges and uncertainties during their initial stage, and incubators can help mitigate these challenges and increase the likelihood of their success. Key components of the theory of business incubation include:

1. Resource Provision: Incubators provide start-ups with access to resources such as office space, equipment, funding, and networking opportunities. By providing these resources, incubators help start-ups overcome resource constraints and focus on developing their core business.
2. Mentorship and Guidance: Incubators often provide start-ups with mentorship and guidance from experienced entrepreneurs and industry experts. This mentorship helps start-ups navigate challenges, make informed decisions, and learn from the experiences of others.
3. Networking and Collaboration: Incubators facilitate networking and collaboration among start-ups, mentors, investors, and other stakeholders. This networking helps start-ups access new markets, partnerships, and funding opportunities.
4. Capacity Building: Incubators help build the capacity of start-ups by providing training, workshops, and educational programs. These programs help start-ups develop their skills, knowledge, and capabilities, making them more competitive in the market.
5. Risk Reduction By providing support, resources, and guidance, incubators help reduce the risks associated with starting and growing a new business. This risk reduction increases the likelihood of success for start-ups.

C. Start Up Business

Start-up businesses are newly established companies, typically in the early stages of development, often aiming to meet a marketplace need by developing or offering a unique product, service, or platform. These businesses are characterized by their innovative nature, rapid growth potential, and the pursuit of scalable business models. Start-ups often face high levels of uncertainty and risk, but they also have the potential for significant rewards and impact.

Several popular start-up businesses in Indonesia are Gojek which Founded in 2010, Gojek started as a ride-hailing service but has since expanded into a super-app offering various services such as food delivery, payments, logistics, and more. Secondly is Tokopedia founded in 2009, Tokopedia is one of Indonesia's leading e-commerce platforms, allowing individuals and small businesses to sell products online. Finnaly we have raveloka founded in 2012, Traveloka is a travel and lifestyle services platform that offers flights, hotels, trains, and activities booking services.

D. Technology 4.0

Technology 4.0, also known as Industry 4.0, refers to the fourth industrial revolution, characterized by the integration of digital technologies into the manufacturing and industrial sectors. This revolution is driven by advancements in technologies such as artificial intelligence (AI), the Internet of Things (IoT), cloud computing, big data analytics, and robotics. Technology 4.0 is transforming industries by enabling automation, data exchange, and smart decision-making, leading to increased efficiency, productivity, and innovation. Here are some key technologies associated with Industry 4.0:

a. Internet of Things (IoT): IoT refers to the network of physical devices, vehicles, home appliances, and other items embedded with sensors, software, and connectivity, enabling them to collect and exchange data. In Industry 4.0, IoT is used for real-time monitoring, predictive maintenance, and optimizing processes.
b. Artificial Intelligence (AI): AI involves the development of computer systems that can perform tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making, and language translation. In Industry 4.0, AI is used for automation, predictive analytics, and improving efficiency.
c. Big Data Analytics: Big data analytics involves the collection, processing, and analysis of large and complex data sets to uncover patterns, trends, and insights. In Industry 4.0, big data analytics is used for predictive maintenance, quality control, and improving operational efficiency.
d. Cloud Computing: Cloud computing involves the delivery of computing services over the internet, allowing organizations to access and use computing resources such as servers, storage, and databases on a pay-as-you-go basis. In Industry 4.0, cloud computing is used for data storage, processing, and collaboration.
e. Robotics and Automation: Robotics involves the design and use of robots to perform tasks in industries such as manufacturing, healthcare, and logistics. In Industry 4.0, robotics and automation are used to improve efficiency, accuracy, and safety in various processes.
f. Cybersecurity: With the increased connectivity and digitalization in Industry 4.0, cybersecurity has become a critical concern. Technologies and strategies to protect data, systems, and networks from cyber threats are essential in this context.

III. RESEARCH DESIGN

1. Research Design: Research Approach used was an exploratory approach to gain insights into the use of Technology 4.0 in start-up incubation. The purpose is to understand how Technology 4.0 is utilized in start-up incubation in higher education. This research also used qualitative method by conducting interviews with relevant sources.
2. Research Questions:
   a. How are Technology 4.0 integrated into start-up incubation programs in higher education institutions?
   b. What are the perceived benefits and challenges of using Technology 4.0 in start-up incubation?
3. Literature Review. Conduct a comprehensive review of existing literature on Technology 4.0, start-up incubation, and higher education. Identify key concepts, theories, and frameworks relevant to your research.
4. Data Collection. Data Sources used are academic journals, books, conference papers, and reports for your literature review. Search strategy in this research was used databases from Google Scholar and academic library catalogs to identify relevant literature. The inclusion criteria was include studies published within the last 5-10 years that focus on the use of Technology 4.0 in start-up incubation in higher education. Data extraction was conduct by extract key findings, methodologies, and conclusions from each source.
5. Data Analysis.
   a. Thematic Analysis: Identify themes related to the use of Technology 4.0 in start-up incubation.
   b. Interpretation: Interpret the findings in the context of this research questions and objectives.

Validity and Reliability. Ensure the credibility of this study by using reputable sources and conducting a thorough analysis.

IV. LITERATURE REVIEW

Start-up businesses are increasingly leveraging Technology 4.0, also known as Industry 4.0, to drive innovation, efficiency, and growth. This literature review examines the current state of research on the use of Technology 4.0 in start-up businesses, focusing on key technologies and their impact on start-up success.

Use of 4.0 technology in business:

a. Internet of Things (IoT): IoT enables start-ups to connect and control physical devices, leading to improved operational efficiency and customer experiences (1).
b. Artificial Intelligence (AI): AI allows start-ups to automate processes, personalize customer interactions, and make data-driven decisions, leading to increased competitiveness (2).
c. Big Data Analytics: Start-ups use big data analytics to analyze large volumes of data and gain insights for better decision-making and product development (Yoo et al., 2017).
d. Cloud Computing: Cloud computing enables start-ups to access scalable computing resources, reduce IT infrastructure costs, and improve collaboration (Gupta et al., 2016).
e. Robotics and Automation: Start-ups leverage robotics and automation to streamline manufacturing processes, improve product quality, and reduce labor costs (Yang et al., 2019).

Impact of Technology 4.0 on Start-up Businesses:

a. Innovation: Technology 4.0 enables start-ups to develop innovative products and services, disrupting traditional industries (Yunus et al., 2018).
b. Efficiency: Start-ups can improve operational efficiency through automation and data-driven decision-making, leading to cost savings (Lee et al., 2015).
c. Competitiveness: Technology 4.0 enhances start-ups' competitiveness by enabling them to offer personalized products and services tailored to customer needs (Bughin et al., 2018).
d. Scalability: Start-ups can scale their operations more easily with Technology 4.0, thanks to cloud computing and other scalable technologies (Gupta et al., 2016).

Despite the benefits, start-ups face challenges in adopting Technology 4.0, including high implementation costs, cybersecurity risks, and skills shortages (Lee et al., 2017). Future research should focus on addressing these challenges and exploring new applications of Technology 4.0 in start-up businesses.

V. ANALYSIS AND DISCUSSION

1. Triple Helix Model To To Build Commercial Ties With Interested Parties

Tenants and incubators must take an active part in the process of business incubation. Nevertheless, in order to establish a supply chain and ensure the tenant business's survival beyond incubation, investors' and the market's involvement is required. For these purposes, the Triple Helix idea makes sense.

The Triple Helix paradigm describes how government, business, and academia—three important players in the innovation process—interact and collaborate. This model, which was first put out by Etzkowitz and Leydesdorff in the 1990s, is a useful tool for understanding the dynamics of innovation in contemporary knowledge-based society. Every member in the triple helix concept represents a unique region of influence and action, as follows (3):

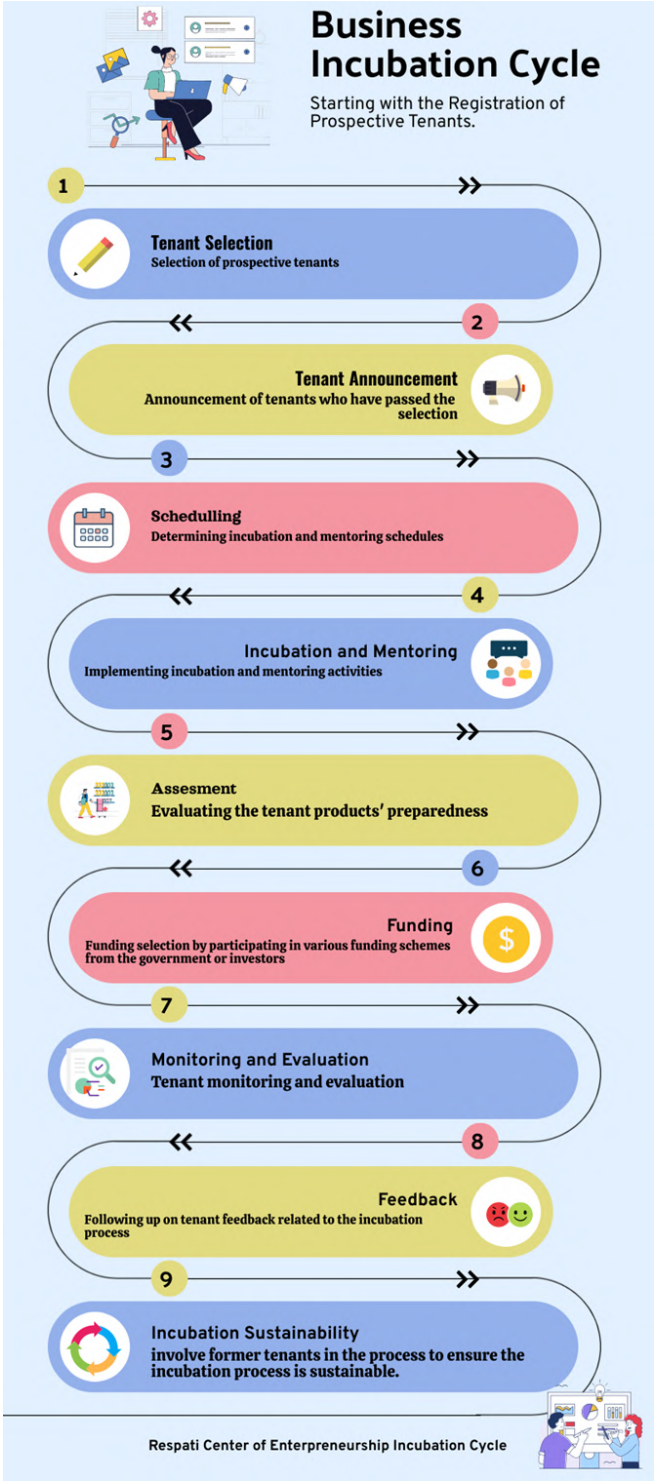
a. **Academics**: This sphere encompasses universities, research institutions, and educational bodies involved in knowledge creation and dissemination. Academics, especially universities, have an important role in conducting research with innovative outcomes that can be applied to industry or business. In this research activity, it is hoped that there will be synergy between universities, industry and government.
b. **Industry**: Industry's sphere primary focus is on the commercialization and practical application of knowledge generated by academia. Industries seek to translate scientific discoveries and technology developments into novel goods, services, and processes. They are propelled by market needs. Industry access to state-of-the-art knowledge and research is made possible by partnerships with government and university, giving them a competitive advantage.
c. **Government**: Government's sphere comprises governmental and public organizations responsible for setting policies, providing funding, and establishing regulatory frameworks. By developing regulations pertaining to science and technology, providing funds for research initiatives, and fostering collaborative conditions, governments significantly influence the innovation ecosystem. Their goal is to effectively apply scientific and technology developments to foster social development, economic progress, and general societal well-being.

The application of the Triple Helix model in business incubation at UNRIYO is expected to produce benefits including business empowerment for students and the community, and business sustainability after the incubation period is completed. The triple helix concept promotes cooperation and information sharing, which helps to develop new industries, higher productivity, and high-quality jobs. It encourages the conversion of knowledge into concrete results that are advantageous to society as a whole. The triple helix approach is especially pertinent to small and microbusiness growth plans. Establishing collaborations and partnerships with communities is crucial for promoting economic growth and innovation. It is envisaged that via encouraging collaboration between academic institutions, private sector companies, and governmental bodies, innovation and a knowledge-based economy would be formed, making micro and small firms more resilient and competitive.

2. Standard Operational Procedure of Business Incubation

Here is how the UNRIYO's entrepreneurship study center goes about executing company incubation (4):

a. Prospective incubation participants register with ReCEnt (UNRIYO Business Incubation), by submitting a business proposal that will be run or is already running
b. After the participant passes, the participant will undergo training and mentoring which is the main process of business incubation
c. The result of the incubation process is a canvas business, which will then be included in the award program in the form of a canvas business competition and providing business capital.
d. Participants will be asked to carry out a market test to get feedback before running the business. This is important to do in order to prepare tenant optimally to start a business.



Picture 1 Incubation Business Process

3. UNRIYO Entrepreneurship Study Center Business Incubation Plan Based On Information And Communication Technology

By building an incubation environment centered on information and communication technologies, business incubation engineering is accomplished. This is carried out throughout the tenant business's integration with the market and possible investors, as well as during the stages of monitoring, mentorship, and selection. Socialization of potential tenants is done during the selection stage. The purpose of this procedure is to attract potential tenants who satisfy the qualifications to register for ReCEnt's business incubation program by disseminating information regarding tenant selection.

In this instance, social media is utilized to spread information regarding tenant selection to a large audience, particularly the academic community at UNRIYO. Posting details regarding the application process, dates, and conditions for tenants can be done on Instagram. Currently, ReCEnt has Instagram social media with the RECENT account. The next development is to create a website as an integrated platform for ReCEnt to carry out the business incubation process. This website aims to facilitate business incubation for academics on campus, by providing information, resources and support to help them start and grow their businesses. The following is an explanation of the website development plan in question:

Features on the website include:

a. Homepage
   Provides details about the company incubator, such as its mission, vision, and objectives. Showcasing the achievements of former students who used incubators to grow their businesses. lists forthcoming seminars and events.
b. About Us
   Offers more thorough details about the team, partners, services, and business incubator. Describe the tenant selection procedure for the incubator.
c. Service
   Describes the several services that business incubators provide, including training, financial access, mentorship, and mentoring. Offers helpful tools for company owners, including information about funding options, legal guidance, and templates for business plans.
d. Tenants
   Present the existing occupants of the business incubator. Giving tenants a place to advertise their businesses.
e. Program
   The business incubator's forthcoming workshops and activities are listed here. Enables online registration and event attendance for users.
f. News
   Including the most recent reports and articles about innovation and entrepreneurship. Showcasing the accomplishments of tenants in business incubators.
g. Reach out to us
   Gives business incubators' contact details. Enables people to leave comments and ask inquiries.

This website design was prepared based on a comparative study from the UNRIYO entrepreneurship study center to the Yogyakarta Muhammadiyah University business incubation center. The team had the perfect image in mind to create a simple and functional website design that would streamline the incubation process. Furthermore, and to the benefit of

renters, this website permits the use of the post-incubation triple helix idea. The website has to be appealing to the academic community and have a contemporary, polished look. The website must to be simple to use and navigate. Websites need to be accessible and responsive across a range of devices, such as tablets, smartphones, laptops, and desktop computers.

Newer web technologies like HTML5, CSS3, and JavaScript should be used while creating websites. For websites to be easily found in search results, search engine optimization, or SEO, is necessary. The webpage needs to be secure and safe. Business incubators ought to use a variety of media, including email, social media, and brochures, to advertise these websites. To spread the word about the website to staff and students, the business incubator ought to collaborate with other departments and faculties on campus. To assess the efficacy of their websites, business incubators have to monitor user activity and website traffic. These data should be used by business incubators to enhance their websites and increase their value to the academic community.

4. Information Technology Used to Ease Tenants' Establishment of New Enterprises

Tenants in newly established businesses want convenience in order to reduce challenges during the first phases of business operations. One of the benefits is derived from business-related information and communication technologies, including e-commerce. E-commerce is one of Internet of Thing (IoT) technology application, which widely applied by business. The most popular e-commerce in Indonesia are Tokopedia and Shopee. These platform providing online shop for new business, and offer a lot of usefull feature. The potential benefits obtained from e-commerce include:

a. Convenience : Without having to go to a real store, customers may shop whenever and wherever they choose. Sellers can boost sales by reaching a larger market.
b. Efficiency and cost savings: E-commerce may assist consumers and sellers in reducing their operating expenses.
c. Greater choice and information: Customers may quickly evaluate the costs and goods offered by various vendors.
d. New business opportunities: E-commerce gives entrepreneurs new avenues to launch and expand their enterprises.

E-commerce is included in the Information and Communication Technology (ICT) type of technology. To be more precise, e-commerce is defined as an information and communication technology application that makes use of the internet to make electronic purchasing and selling of products and services easier. To be more precise, e-commerce is defined as an information and communication technology application that makes use of the internet to make electronic purchasing and selling of products and services easier. E-commerce involves various technologies, such as (5):

a. Internet: An international network that links computers and other electronic devices to facilitate online communication and information sharing.
b. Website: An online website intended to show details about goods or services so that customers may peruse and choose the ones they want.
c. Online payment systems: Websites that enable customers use digital wallets, bank transfers, or credit cards to make payments online.
d. Delivery systems and logistics: The framework that enables the transfer of goods and services from vendors to consumers.
e. Database: Product, customer, and transaction data is stored in this type of data storage system.
f. Security technology: Cybercrime and fraud protection systems for transactions and data.

With the introduction of new technologies, e-commerce keeps growing. Examples of these technologies are mobile commerce (m-commerce), which enables customers to shop using mobile devices, and social commerce (s-commerce), which leverages social media to sell. All things considered, e-commerce is a cutting-edge and revolutionary technology that has altered the way we purchase and conduct business.

Currently, social media in particular has transformed as a result of the e-commerce trend in other ICT fields. Social media can be categorized as one of IoT technology, specially its business features. Started with social media users who began using their personal profiles to advertise their own businesses. Social media developers saw this trend and spotted an opportunity to introduce a feature that could benefit both users and developers of social media.The following is a list of popular social media for business in 2024, along with their advantages, reference sources, and relevant journals or rating agencies:

a. Instagram. An ideal visual platform for showcasing products and building brand awareness.Features like Instagram Stories, Reels, and Shopping Ads make it easier to interact with customers and drive sales. Has a large and active user base, especially among millennials and Gen Z.
b. Facebook. The most comprehensive platform with a varied user base that enables you to connect with a large number of people. Fit for a range of business models, including B2C and B2B. Provides a range of tools for consumer targeting, community development, and advertising (6).
c. Tik Tok. A fast-growing platform with an emphasis on unique and innovative short videos. Ideal for connecting with a more youthful and fashionable clientele. Business can efficiently target advertising with the TikTok advertising tool.

Nowadays, social media is used in practically every business operation for marketing and branding. The social media elements listed below facilitate company marketing:

a. Instagram Ads (7)
   - Cost Per Click (CPC): IDR 2,000 - IDR 10,000

- Cost Per Impression (CPM): IDR 100 - IDR 1,000
- Conversion Cost (CPA): IDR 100,000 - IDR 1,000,000

b. Facebook Ads (8)
- Cost Per Click (CPC): Rp1.000 - Rp5.000
- Cost Per Impression (CPM): Rp50 - Rp500
- Conversion Cost (CPA): Rp50.000 - Rp500.000

c. Google Ads (9)
- Cost Per Click (CPC): Rp1.500 - Rp5.000
- Cost Per Impression (CPM): Rp50 - Rp500
- Conversion Cost (CPA): Rp50.000 - Rp500.000

The following are some ways that new company owners may use social media to promote their brand:

a. Make sure you are targeting the right audience. The more precise your target audience is, the more likely it is that the proper individuals will see your advertisement and the cheaper your cost per click will be.
b. Make pertinent and engaging advertisements. Attention-grabbing and pertinent advertisements for your intended audience will work better and cost less per click.
c. Make use of different ad formats. Test out several ad types, including text, video, and picture, to see which ones work best for your target demographic.
d. Track the effectiveness of your ads and make changes. To increase performance and ROI, evaluate ad performance on a frequent basis and make necessary changes to the goals, budget, and creative.

VI. CONCLUSION

Technology 4.0 offers significant opportunities for start-up businesses to innovate, improve efficiency, and enhance competitiveness. By leveraging key technologies such as IoT, AI, and big data analytics, start-ups can drive growth and success in the digital age. For student business start-ups, several Technology 4.0 tools and strategies can be particularly suitable due to their ease of use, cost-effectiveness, and ability to enhance productivity and competitiveness. Not only benefited new business, ITC also gives meaningfull benefit for university in incubation business process for their students.

Business incubation approaches may be realized by creating an atmosphere focused on information and communication technologies. This is carried out in the course of monitoring, advising, and selecting the tenant's business as well as integrating it with the market and possible investors. During the selection process, potential renters are socialized. By providing information regarding tenant selection, the approach seeks to draw potential tenants who fulfill the conditions to apply for the ReCEnt business incubation program.

In order to minimize difficulties in the early phases of company operations, tenants in newly established businesses want convenience. The advantages stem from business-related information and communication technologies, particularly e-commerce. In Indonesia, the two most widely used e-commerce sites are Tokopedia and Shopee. Convenience, effectiveness and cost savings, increased variety and knowledge, and new business prospects are some of the potential advantages of e-commerce.

In the other hand, there is social media that also offer a lot of features to ease business process. Social media platforms like Facebook, Instagram, and Twitter offer powerful tools for marketing and promoting student start-ups. These platforms allow students to reach a large audience, engage with customers, and build brand awareness at minimal cost.

In order to effectively market their brand on social media, new business owners need make sure that their target demographic is chosen, craft engaging and relevant advertisements, use a variety of ad types, and monitor and adjust their campaigns based on their efficacy. To increase ROI and performance, evaluate advertising results on a frequent basis.

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