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# Branding Vocational School with The Internet of Things (IoT) Production Competency of Students in Indonesia

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## ABSTRACT

There are many creative opportunities for Internet of Things (IoT) systems to positively impact schools, industries, and others. The purpose of this study is to describe how negative issues in vocational schools (SMK) can be overturned with the ability of SMK students in the field of IoT. Researchers used a qualitative approach with descriptive methods. The Results show that vocational schools in Indonesia prepared students to face the world of work supporting IoT learning such as curriculum synchronization, laboratories, and production units. Optimism that IoT will be the flagship of vocational school because the SMK has competent human resources in IoT technology and has been certified. A vocational school is producing the IoT smart lock RFID system products. The conclusion is although the IoT system is still straightforward, which is made in the form of a smart lock system, it can represent technology products made by vocational students. This can be a school branding for prospective students or their parents.

**Keywords:** *branding, vocational school, IoT production*

## INTRODUCTION

The opportunities for Internet of Things (IoT) systems will continue to grow, as IoT's unique benefits in many ways also grow. There are many creative opportunities for IoT systems to make a positive impact in schools, industries, and other sectors. IoT, which stands for the Internet of Things, is a network of devices connected to the internet to exchange information, collect data, or control processes (Morgan, 2021). This connectivity allows for greater control and automation, offering capabilities that are not available when devices operate independently. In schools, IoT can enhance learning experiences through smart classrooms, while in industries, IoT can streamline

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operations and improve efficiency by monitoring equipment and optimizing workflows. The applications of IoT in healthcare, agriculture, and smart cities further demonstrate its potential to transform various sectors, making processes more efficient, sustainable, and responsive. The role of IoT can significantly impact the industry and its applications, driving innovation and improving outcomes across different fields.

IoT devices encompass a wide range of smart building technologies, including intelligent lighting systems, locks, thermostats, speakers, and doorbells. Once installed, these devices can communicate with each other and be centrally controlled using a computer, tablet, or mobile phone (Perwej et al., 2019). This central control system enhances convenience and efficiency, allowing users to manage their home environment more effectively. Additionally, IoT devices can contribute to energy savings by optimizing lighting and heating, improve security through smart locks and surveillance systems, and provide seamless integration with other smart home technologies, enhancing the overall user experience.

Seeing the IoT industry opportunities as very wide open and in need of many human resources, in 2019, Vocational High School (SMK) Wira Buana 2, a school that was the subject of research for 62 days, engaged in continuous interactions, interviews, and in-depth observations. SMK Wira Buana 2 aims to equip students with practical skills through extracurricular IoT activities. From these activities, students have successfully produced several IoT products, including smart locks, smart homes, smart motorbikes, smart parking systems, and smart running text. These initiatives not only enhance the students' technical abilities but also prepare them for future careers in the rapidly evolving IoT industry. By integrating hands-on IoT projects into the curriculum, the school fosters innovation and practical problem-solving skills, which are essential in addressing real-world challenges and meeting the demands of the IoT job market.

SMK Wira Buana 2 has 627 students, and 411 are students of the Computer Network Engineering and Software Engineering Skills Program who study Information Technology (IT) -based learning. Information Technology (IT) will be interesting for SMKs to do branding on this matter. Not many SMKs who have IT majors choose IoT as an advantage to become a branding for these SMKs. This is aimed at advancing SMK as a means of advancing the nation.

On the other hand, there are researchers from Saudi Arabia who are pessimistic about education today. They say that most of the global education system is led by economists, not by educators. School leaders seek economic outcomes and benefits rather than the quality of education itself (Alandjani et al., 2018). Most of them focus their graduates on getting jobs, rather than creating how students have skills. Opinions like this, of course, tend to corner education, especially for SMK.

Apart from the issue of pursuing work and skills, another issue at school is the matter of the safety of people who are active in schools, such as the conclusion of the researcher from Malaysia who stated that safety must be the most important thing in teaching and research and other activities in learning (Sedghpour et al., 2013). These

factors must be applied in designing content for education that safeguards teachers' safety and, of course, students.

Researchers here are indeed discussing research in chemistry laboratory lessons that are considered harmful to their teachers. Discovery through IoT can be a solution. How schools become a fun place, interaction can also be online, safe for various things that support a school's branding. Inventions and making through IoT can be a solution for schools in compiling their branding programs.

Thus, this study aims to describe how negative issues that exist in SMK can be overturned with SMK students' ability in the field of IoT, as was done by SMK Wira Buana 2, Bogor-Indonesia. The research question is: How can branding through IoT become an advantage in Indonesian SMKs? How is IoT implemented in schools? What kind of IoT can SMK students produce?

## LITERATURE REVIEW OR RESEARCH BACKGROUND

### *School Branding through Students' Competency of IoT Production*

Leveraging existing strengths is a matter of branding. Action-oriented branding; SMK will have difficulty persuading others if the brand of the school lacks substance. Rhetoric alone cannot sell a brand (Lee & Kim, 2021). It is necessary to launch a campaign through TV and social media regarding SMKs' ability to make IoT, which is currently rare and expensive in Indonesia.

Students' ability to produce IoT must be disseminated into public trust information (Setyadi et al., 2023). Schools can rely on the website, if possible, through TV broadcasts, billboards, and other social media that are widely disseminated so that the public knows vocational students' abilities.

The ability to design IoT can be able as a professional competence for vocational students. By mastering IoT production, vocational students can be categorized as creative, have a high level of skill, can apply competencies in familiar and hardworking situations (Sobande, 2020). Thus, researchers from Indonesia recommend that vocational education provides provision of abilities as well as competency capacities that transfer skills or general skills (Willyarto et al., 2020). IoT skills can be used to act efficiently in various real-life situations for society, including at school. This is the provision of ammunition for vocational branding today.

There are two types of abilities in vocational education. Firstly, job competencies or specific skills are related to specific areas of expertise and work patterns. Secondly, transferable capacities or skills or general skills are broad abilities required by all areas of expertise and all work patterns (Azha et al., 2013). If the two are combined, it is called professional competence.

According to their fields of expertise, vocational education students must learn work competencies and develop their capacities to keep up with work patterns (Sukoco et al., 2021). Some elements need to be known to develop capacity or transfer skills for vocational education students. Economic studies found five capacity elements: problem-solving, teamwork, communication, critical thinking, and creativity. Other

researchers conducted a meta-analysis of various studies of 21st-century skills and found a formula that workers should be able to solve problems creatively and work in harmony with colleagues(Samani, 2018). People must be able to search for data and information to solve the problem creatively. These two abilities determine job success in the industrial era 4.0. All of these things can be designed as branding for SMKs with the IoT designs they produce.

*Implementation of IoT in School Buildings*

The integration of the Internet of Things (IoT) technology is transforming not only industries but also educational institutions, offering a plethora of benefits that enhance the overall learning environment and operational efficiency. As highlighted in recent studies, the application of IoT in schools has made them significantly safer and more efficient. The following points elaborate on how IoT is impacting educational settings:

Enhanced Safety and Security: IoT technology enhances school safety through a network of connected devices such as colored lights, digital signage, door locks, and sensors. These devices help monitor and respond to various security threats, including severe weather conditions and unauthorized intrusions. For instance, IoT-enabled emergency warning buttons in classrooms can provide immediate alerts during critical situations, ensuring rapid response and protection for students and staff.

Improved Learning Environment: Research indicates that installing programmable IoT-connected LED lighting positively affects students' experiences and motivation in the educational environment. These lights can be programmed to adjust brightness and color based on the time of day or specific activities, creating an optimal learning atmosphere. For example, brighter lights might be used during exams to enhance concentration, while softer lighting could be employed during reading sessions to create a calming environment.

Energy Efficiency and Cost Savings: IoT connectivity allows for the automation of various devices within the school, leading to increased building efficiency and significant energy savings. Lighting systems, for instance, can be scheduled to turn on and off based on the school's timetable or connected to motion sensors to ensure lights are only on when rooms are occupied. This not only reduces energy waste but also lowers operational costs. Additionally, IoT-enabled HVAC systems can adjust heating and cooling based on occupancy and weather conditions, further contributing to energy efficiency.

a. Real-Time Monitoring and Maintenance: IoT devices provide real-time data and analytics, enabling school administrators to monitor and manage school facilities more effectively. For example, sensors can detect when maintenance is required on various equipment, such as HVAC systems or lighting fixtures, allowing for proactive maintenance and reducing the likelihood of unexpected failures.
b. Enhanced Learning Tools and Resources: IoT technology extends beyond infrastructure to include innovative learning tools and resources. Smartboards, connected tablets, and other IoT-enabled devices facilitate interactive and

personalized learning experiences. These tools can adapt to individual student needs, track progress, and provide immediate feedback, making education more engaging and effective.

c. Streamlined School Operations: The automation capabilities of IoT streamline various administrative tasks within schools. For instance, IoT can support automated attendance systems that track students' presence through connected devices, reducing manual errors and saving time for teachers. Similarly, IoT can manage inventory for school supplies, ensuring that necessary materials are always available without overstocking.
d. Sustainable Practices: By reducing energy consumption and enabling efficient resource management, IoT contributes to the sustainability goals of educational institutions. Schools can leverage IoT to monitor and reduce their carbon footprint, promoting environmental responsibility and educating students about the importance of sustainability.

The implementation of IoT in schools not only enhances safety and learning experiences but also promotes operational efficiency and sustainability. As educational institutions continue to adopt IoT technologies, the potential for creating smarter, more responsive, and engaging learning environments becomes increasingly attainable (Al-Obaidi et al., 2022).

*IoT Competency of Vocational High School*

There is an assumption about the high unemployment rate among vocational school graduates, not only in Indonesia but even in African countries like Ghana and Nigeria (Akinsola, 2021; Kofi & Kassah, 2015; Psacharopoulos, 2006). This is predicted from the lack of skill acquisition and the mismatch of skills needed in the industrial world (Sukardi et al., 219 C.E.). This can be utilized by focusing on IoT skills. Given the growing need for IoT in Indonesia and the scarcity of this skill availability in Indonesian society. Thus, technical, vocational training is needed with the aim of SMK students acquiring practical skills. These skills are usually obtained through training or experience.

The recommendations mentioned by several previous researchers for SMK were: There is a need for seminars to review programs periodically. School administrators should orientate industry supervisors to understand their role fully. The government must encourage adequate program funding schemes. The government must provide tax breaks and incentives for areas that are in need, such as IoT. SMK administrators should ensure that students are placed in their field of study within the industry for training as promoted as link and match (Misbah et al., 2020).

SMK graduates have become a major source of concern, for the current government due to data that reveals industry dissatisfaction with the technical skills possessed by current SMK graduates. In line with that, the results of other studies indicate that SMK graduates are considered to have qualifications on paper only and do not have the salable skills needed to get a job. Lack of skills frustrates the industrial sector to affects the economy (İşgören et al., 2009). Although other fields are also

necessary, the opportunity for SMKs to improve their reputation is through the ability to create IoT networks, which are very much needed today.

## METHODOLOGY

Researchers used a qualitative approach with descriptive methods. According to (Creswell, 2007), a qualitative research method is a type of research that understands and explores meaning in several individuals or groups of people originating from the social problem. The qualitative research method is a study used to examine natural objects where the researcher is the key instrument, combined data collection techniques, inductive or qualitative data analysis, and the study results emphasize meaning rather than generalization. This research explores the meaning of SMK Wira Buana 2, Bogor, which comes from problems regarding the lack of reputation of SMKs in Indonesia.

This study's primary data refers to information obtained first hand, namely the Principal, Teachers at Wira Buana Vocational High School 2. This research's primary data is data in the form of a compilation of interviews and reports or report documents written during 62 days of research activities. Simultaneously, the results of researchers' observations are supported by secondary data related to the situation of SMK in Indonesia. SMK Wira Buana 2 Bogor was chosen purposively because it was the only vocational school that made school development programs with the theme of IoT from 86 schools researched by the research team for 62 days to experiment on the ideas of the selected principal. The number of SMK candidates who passed the selection for this experimental activity was 420 SMK. However, the focus on developing IoT production is SMK Wira Buana 2 Bogor.

## RESULTS AND DISCUSSION

After thorough analysis and interpretation of both primary and secondary data, we present a comprehensive discussion of our findings. The primary data, collected through interviews with the Principal and Teachers of SMK Wira Buana 2, Bogor, provided invaluable insights into the practical implementation and challenges faced in integrating IoT into the curriculum. These firsthand accounts were supplemented by detailed reports and observations documented over a 62-day research period. Secondary data, which included a review of relevant literature and contextual information about vocational education in Indonesia, offered a broader perspective on the current state and potential of IoT in vocational training. By triangulating these data sources, we were able to derive nuanced understandings of how IoT can be leveraged to enhance educational outcomes and establish a distinctive branding for vocational schools. The following sections will delve into the specific results and insights garnered from this study, illustrating the transformative impact of IoT initiatives at SMK Wira Buana 2 and offering recommendations for broader application.

*Branding through IoT is an advantage of SMK in Indonesia*

The IoT Production Unit at SMK Wira Buana 2 plays a pivotal role in enhancing student competencies in the burgeoning field of the Internet of Things (IoT). By providing a platform for hands-on experience, this unit allows students to engage in the development and production of IoT products that meet real-world societal needs, aligning with educational best practices and industry demands (Willyarto et al., 2019). The integration of practical skills with theoretical knowledge ensures that students are not only proficient in IoT technologies but also understand their practical applications and market relevance. This dual approach to learning significantly boosts their employability and readiness for the workforce.

The establishment and operation of the IoT Production Unit are grounded in solid legal foundations, specifically Government Regulation No. 29 of 1990, article 29, paragraph 2. This regulation states: "To prepare vocational high school students to become the workforce, vocational high schools can establish production units that operate professionally." This legal endorsement underscores the importance of vocational schools in equipping students with job-ready skills through practical, real-world experience. Key aspects of the IoT Production Unit include:

a. Real-World Applications: Students work on projects that address actual societal needs, ranging from smart home devices to automated agricultural systems. This real-world focus helps them understand the impact of their work and the potential of IoT technologies to solve everyday problems.
b. Professional Environment: The unit operates professionally, mirroring industry standards. Students are exposed to the full product development lifecycle, from ideation and design to production and marketing, fostering a holistic understanding of the IoT industry.
c. Collaboration and Teamwork: The Production Unit emphasizes collaborative learning. Students work in teams, simulating professional work environments where teamwork and communication are essential. This collaborative approach enhances their soft skills, such as problem-solving, critical thinking, and project management.
d. Industry Partnerships: The unit often collaborates with local businesses and industry experts, providing students with mentorship opportunities and insights into current industry trends and practices. These partnerships also facilitate internships and job placements, bridging the gap between education and employment.
e. Innovation and Creativity: Encouraging innovation is a cornerstone of the Production Unit. Students are given the freedom to experiment with new ideas and technologies, fostering a culture of creativity and continuous improvement. This innovative spirit is critical for staying ahead in the fast-evolving IoT sector.
f. Comprehensive Skill Development: Beyond technical skills, the Production Unit focuses on developing students' entrepreneurial abilities. They learn about

market research, business planning, and product marketing, preparing them not only to be skilled technicians but also potential entrepreneurs in the IoT space.

The integration of IoT-based smart home learning media and job sheets into the curriculum has proven to be an effective tool for enhancing student engagement and improving learning outcomes, particularly in the psychomotor domain, which focuses on performance skills. At SMK Wira Buana 2, significant efforts are made to equip students with the necessary skills and knowledge to thrive in the professional world or as entrepreneurs. This preparation involves providing state-of-the-art educational facilities and infrastructure that support IoT learning. The school has implemented measures such as curriculum synchronization, the establishment of specialized laboratories, and the creation of production units, all designed to align with the latest industry standards and technological advancements (van Griethuijsen et al., 2019).

By embedding IoT competencies within the educational framework, SMK Wira Buana 2 ensures that students are well-prepared for the demands of the Industrial Revolution 4.0. This modern era necessitates a workforce proficient in advanced technologies, and the school's curriculum is meticulously designed to meet these requirements. The practical application of IoT in learning environments significantly enhances students' technical skills, giving them hands-on experience with the tools and technologies they will encounter in their careers. This direct engagement with IoT technologies fosters a deep understanding and competence that theoretical learning alone cannot achieve.

Furthermore, the integration of IoT into the curriculum goes beyond technical training. It also contributes to the development of critical hard and soft skills. Hard skills, such as programming, systems analysis, and technical troubleshooting, are directly taught and practiced through IoT projects. Meanwhile, soft skills, including problem-solving, teamwork, and communication, are naturally developed as students collaborate on IoT-based projects and navigate complex challenges together. These skills are indispensable for meeting the evolving needs of the Business World and the Industrial World, where interdisciplinary collaboration and innovative problem-solving are highly valued.

The comprehensive approach to IoT education at SMK Wira Buana 2 serves as a strong foundation for students, enabling them to confidently enter the workforce or pursue entrepreneurial ventures with a competitive edge. By equipping students with both the technical and interpersonal skills required in modern industries, the school ensures that its graduates are not only job-ready but also capable of adapting to and thriving in dynamic work environments. This holistic educational strategy is pivotal in helping students develop a robust skill set that is versatile and highly relevant to contemporary industry standards.

Moreover, the focus on IoT education reflects SMK Wira Buana 2's commitment to staying at the forefront of educational innovation. The school's dedication to incorporating the latest technological advancements into its curriculum not only prepares students for the future but also enhances the institution's reputation as a leader

in vocational education. This forward-thinking approach positions SMK Wira Buana 2 as a trailblazer, setting a benchmark for other educational institutions aiming to prepare their students for the challenges and opportunities of the Industrial Revolution 4.0.

The activities described above demonstrate SMK Wira Buana 2's innovative approach to branding through IoT production. This branding material can be leveraged on various social media platforms, expanding the school's reach even during the COVID-19 pandemic. During the global pandemic, there was an increased public concern for each other, making engagement through social media more effective (Yunus et al., 2021). However, the pandemic also brought challenges such as heightened security concerns, as economic difficulties led to increased crime rates, including home thefts (Spurk & Straub, 2020).

In this context, IoT plays an increasingly vital role. The Smart lock products developed by SMK students for the Door Security System have proven to be highly beneficial. These innovative solutions address the pressing need for enhanced home security during times of heightened vulnerability. The ability of vocational students to produce such IoT products must be widely disseminated to enhance the school's branding. Utilizing channels like the school's website, social media, and other platforms can help the public recognize the capabilities of vocational students.

Branding and marketing efforts for SMK Wira Buana 2's Smart lock products are conducted both online and offline. Online efforts include placing products on various marketplaces, social media, and the school's website, complemented by paid advertisements. Offline marketing involves distributing brochures and conducting door-to-door sales. These strategies ensure that the innovative work of SMK Wira Buana 2's students reach a broad audience, thereby enhancing the school's reputation and demonstrating the practical impact of its IoT initiatives.

In summary, SMK Wira Buana 2's integration of IoT competencies within its educational framework exemplifies a comprehensive and forward-looking approach to vocational education. The practical application of IoT enhances both technical and soft skills, ensuring that students are well-equipped to meet the demands of modern industries. This educational strategy not only prepares students for immediate employment but also empowers them to adapt and innovate in their future careers, embodying the true spirit of the Industrial Revolution 4.0. The school's commitment to excellence in IoT education solidifies its role as a leader in preparing the next generation of skilled professionals and entrepreneurs (van Griethuijsen et al., 2019).

*Practice and Implementation of IoT in Schools*

Wira Buana Vocational High School collaborates with PT Sebelas Cipta Mandiri (SCM) to execute IoT production activities and market IoT smart lock products. PT SCM, a company specializing in IoT products, plays a critical role in marketing these products and identifying potential buyers. For now, products developed by SMK Wira Buana 2 are marketed under the PT Sebelas Cipta Mandiri Bandung banner. The primary market for these smart locks includes individual homes and offices, but they are also highly suitable

for schools, which often remain unoccupied for extended periods. Ensuring the safety and security of school assets with smart locks is a priority.

During the production process, PT SCM provides guidance and support to SMK Wira Buana 2, helping the school achieve both short-term and long-term goals. This collaboration allows students to gain practical experience while ensuring that their products meet professional standards.

Maintaining a good relationship with the local government is another critical aspect of SMK Wira Buana 2's strategy. This relationship ensures that program development objectives run smoothly and align with regulatory requirements. The school plans to install its smart lock products in local sub-districts or villages, enhancing security in these areas. Alumni and school committees are actively involved in these initiatives. Notably, SMK Wira Buana 2 has recruited two alumni to teach IoT to current students, ensuring the transfer of knowledge and skills across generations.

SMK Wira Buana 2 is optimistic about its future in IoT education due to its competent human resources. The school boasts 40 certified professional educators and industry teachers with significant academic and practical experience. Additionally, 25% of the teaching staff have educational backgrounds in Information Technology (IT), particularly in the Internet of Things (IoT). The school's proximity to local industry and government support further enhances its program's uniqueness and effectiveness, making it a standout institution in vocational education.

To ensure the quality and practicality of their products, SMK Wira Buana 2 conducts rigorous product feasibility tests. These tests are documented through photos and videos, and demonstrations are conducted at installation sites. Additionally, questionnaires are distributed to the school community and parents of students to gather feedback on the smart lock products. This feedback loop is crucial for continuous improvement and validation of the products developed by vocational students.

IoT technology significantly enhances school safety. Connected devices such as door locks, sensors, and intruder alarms provide comprehensive security solutions. Researchers have highlighted the importance of these technologies in mitigating security risks. The practical application of these technologies in schools not only ensures a safer environment but also serves as a real-world learning experience for students.

*IoT Produced by Vocational Students*

The findings from our interviews and observations highlight the advanced functionalities of the IoT smart lock RFID (Radio-Frequency Identification) system developed by Wira Buana 2 Vocational School. This innovative smart lock utilizes RFID technology to manage access rights and is powered by an Arduino ESP8266 microcontroller, enabling connectivity via wireless or Wi-Fi networks. Designed to secure various types of room doors, this system is highly versatile and suitable for schools, offices, and private residences. Its applications are comparable to those already prevalent in hotel rooms and office buildings, showcasing its practical relevance.

A standout feature of this smart lock system is its real-time monitoring capability. It meticulously records access events, logging who accessed the door and when, with all data available through a user-friendly web dashboard. This feature enhances security and accountability, making it easy to monitor and manage access in real time. Additionally, the RFID cards used with this system can serve multiple purposes. These cards can double as employee ID cards or student cards, integrating seamlessly into existing identification systems and adding an extra layer of functionality. The Smart Lock RFID system offers several key benefits:

a. Replacement for Conventional Keys: The IoT-based smart lock eliminates the need for traditional keys, replacing them with RFID cards that are both thinner and lighter. These cards are practical for everyday use, easily fitting into wallets and serving as dual-purpose ID cards. This transition from physical keys to smart cards simplifies access management and reduces the risk of lost keys.
b. Controlling Room Access: The smart lock system provides room owners with precise control over access. Only individuals with a programmed RFID card can unlock and enter designated rooms, ensuring restricted access to authorized personnel. The system's web monitoring feature further enhances security by providing a detailed log of access events.

The development of the smart lock system challenges the common misconception that vocational students lack the necessary skills for the industrial world. This project's success underscores the creativity, competence, and technical acumen of both the students and educators at Wira Buana 2 Vocational School. The students' ability to develop such a sophisticated IoT product demonstrates their potential when provided with focused training and resources in IoT technologies.

While the current iteration of the IoT smart lock system is relatively straightforward, it holds significant potential for further development into more advanced technologies. Future enhancements could include integrating biometric authentication, advanced encryption for data security, and expanded connectivity options to ensure compatibility with various smart home ecosystems. Such initiatives not only improve the product but also provide vocational students with the opportunity to work on cutting-edge technologies, further enhancing their competencies.

The implementation and success of the IoT smart lock system at SMK Wira Buana 2 exemplify how vocational education can be directly aligned with industry needs. By equipping students with practical skills and real-world experience, the school ensures that its graduates are well-prepared to meet the demands of the modern job market. This approach not only enhances employability but also fosters innovation and creativity among students, enabling them to contribute effectively to the Industrial Revolution 4.0.

## CONCLUSION

The Internet of Things (IoT) presents numerous opportunities for innovation across various sectors, including education and industry. IoT systems, which connect devices to the internet for data exchange and process control, can significantly enhance automation

and efficiency. In educational settings, IoT can improve learning experiences through smart classrooms, while in industries, it can optimize operations and monitor equipment. Specifically, SMK Wira Buana 2, a vocational high school, leverages IoT to equip students with practical skills. By integrating hands-on IoT projects, the school prepares students for future careers, fostering technical abilities and innovation essential for the evolving job market.

Branding through IoT production is a strategic advantage for vocational schools, especially in Indonesia. The ability to produce IoT devices enhances the school's reputation and showcases the practical competencies of its students. Effective branding requires publicizing these capabilities through various media, demonstrating the school's unique offerings. IoT skills not only align with industry demands but also equip students with transferable skills such as problem-solving, teamwork, and creativity. These competencies are crucial for success in the modern workforce, particularly in the context of Industry 4.0, where interdisciplinary collaboration and innovative problem-solving are highly valued.

This research employed a qualitative approach with descriptive methods to explore how SMK Wira Buana 2 integrates IoT into its curriculum. Primary data were collected through interviews with the school's principal and teachers, along with observations over a 62-day period. The study focused on understanding the challenges and successes in implementing IoT projects and how these initiatives contribute to the school's branding. Secondary data provided contextual information about vocational education in Indonesia, offering a broader perspective on the potential of IoT in vocational training. This triangulated approach allowed for a comprehensive analysis of IoT's impact on educational outcomes and school reputation.

The study found that SMK Wira Buana 2 successfully integrates IoT into its educational framework, significantly enhancing student competencies and school branding. The IoT Production Unit at the school provides students with hands-on experience, developing products like smart locks that address real-world needs. These projects not only improve technical skills but also foster teamwork, critical thinking, and innovation. Collaboration with industry partners and the local government further supports these initiatives, ensuring that students receive practical training aligned with market demands. The successful implementation of IoT projects enhances the school's reputation, positioning it as a leader in vocational education and preparing students for the demands of the Industrial Revolution 4.0.

## BIODATA

*Mario Nugroho Willyarto S.Kom, M.Pd* has been working in education since 2001, from basic education to higher education. He is now a lecturer for Indonesian Language, Business Process, Leadership and Cross-Cultural Management in Binus University. He is now focusing on research and publications in education, social education, and communication, from younger age to adult. Recently, Mario is doing research on social education and communication in controlling the number of stray cats that becoming

pest in society. Collaborating with some communities to do Trap-Neuter-Return for stray cats in some areas such as Bekasi, Bogor, Malang, Pati, Semarang and Depok. Using technology and information system is essential in supporting the work.

*Rizka Yona Paramith, S.Psi a* wanted to become a psychologist, even though in the past it never crossed her to become a psychologist, because in her opinion this profession is not very popular and developed in Indonesia, but after she made observations, it turned out that she felt her soul was more suited to being in the world of psychology, and finally she chose to take this major seriously. She also feel that psychology is really needed to regulate a person's emotions and mental stability so that people can live peacefully, and psychology can also create a new atmosphere. Right now she is the Principal of SMK Wira Buana 2, West Java, Indonesia.

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