

Evaluating Government Readiness for Industry 4.0: A Case Study of Batam City

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Abstract. This research aims to evaluate the readiness of the government in Batam City for the challenges and opportunities brought about by Industry 4.0. Industry 4.0 refers to the integration of advanced technologies such as artificial intelligence, internet of things, and automation in various sectors of the economy. The research utilizes a case study approach, focusing on Batam City as a specific context for analysis. Primary data is collected through interviews and observations, while secondary data is gathered from relevant documents and reports. The findings of the research shed light on the current state of government readiness, including its policies, infrastructure, and human resources, in adapting to the demands of Industry 4.0. The analysis explores the strengths, weaknesses, opportunities, and challenges faced by the government in Batam City. The research findings contribute to a better understanding of the preparedness of local governments in Indonesia for the transformative changes brought by Industry 4.0 and provide insights for policymakers and stakeholders in formulating strategies to enhance government readiness and ensure successful adoption of Industry 4.0 technologies. **Keyword:** Government Readiness, Industry 4.0, Batam City

1 Introduction

In recent times, there has been a notable progression in technology, leading to the emergence of the Fourth Industrial Revolution, also referred to as Industry 4.0 [1]. The current revolution is distinguished by the amalgamation of digital, physical, and biological systems, leading to unparalleled prospects and complexities for governments, industries, and societies on a global scale. Consequently, governments across the globe are confronted with the pressing necessity to comprehend and adjust to this paradigm-shifting surge of technological advancement [2]. The concept of Industry 4.0 encompasses a diverse array of technological advancements, such as artificial intelligence, robotics, the Internet of Things (IoT), cloud computing, big data analytics, and advanced manufacturing techniques [3]. The aforementioned technologies possess the capacity to fundamentally transform conventional

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industries, stimulate economic advancement, augment productivity, and enhance the overall well-being of individuals. Nonetheless, the effective utilization of the advantages presented by Industry 4.0 necessitates the implementation of a comprehensive strategy and a proactive stance by governmental entities.

The importance of governments' willingness to adopt and adequately address the challenges presented by Industry 4.0 cannot be overstated, as it plays a vital role in promoting sustainable economic growth, enhancing competitiveness, and fostering societal well-being [4], [5]. Governments play a crucial role in establishing a conducive atmosphere that nurtures innovation, encourages the process of digital transformation, and effectively tackles the consequential social and economic ramifications [2], [6], [7]. Moreover, it is imperative for governments to formulate and execute policies and regulations that effectively strike a balance between the prospective advantages of Industry 4.0 and the apprehensions surrounding privacy, security, ethics, and the trajectory of employment.

The significance of governments' readiness to embrace and effectively tackle the challenges posed by Industry 4.0 cannot be overemphasized [8]. In the contemporary era characterized by swift advancements in technology, the role of governments in facilitating and supporting the transition to Industry 4.0 is of utmost importance. The actions and policies implemented by leaders have the potential to exert a substantial influence on the course of economic growth, competitiveness, and societal well-being within their respective nations.

One of the fundamental responsibilities of governments is to establish a conducive atmosphere that promotes innovation and facilitates the extensive integration of nascent technologies. Governments can stimulate advancements in Industry 4.0 by enacting policies that promote research and development, allocate funding for technology initiatives, and foster collaboration among academia, industry, and research institutions [9]. These initiatives have the potential to foster the advancement and implementation of state-of-the-art technologies, ultimately yielding advantages across multiple sectors of the economy and bolstering global competitiveness. Moreover, it is imperative for governments to proactively promote and enable the implementation of digital transformation in both industries and public sectors. This entails the provision of essential infrastructure, including high-speed internet connectivity, data centers, and digital platforms, which facilitate the smooth integration of digital technologies. Governments can establish a strong basis for the extensive implementation of Industry 4.0 technologies by allocating resources towards the development of resilient digital infrastructure [10]. This would enable businesses and organizations to effectively harness the complete capabilities of digitalization.

Examining the social and economic ramifications of Industry 4.0 constitutes an additional pivotal facet of governmental preparedness. The advent of Industry 4.0 presents a multitude of advantages, yet simultaneously gives rise to apprehensions pertaining to privacy, security, ethics, and employment. It is imperative for governments to adopt a proactive approach in formulating and executing policies and regulations that effectively safeguard the privacy rights of individuals, protect sensitive data, and ensure the ethical utilization of emerging technologies. Furthermore, it is imperative to consider the implications for employment, as well as the necessity of reskilling and upskilling the workforce to effectively navigate the evolving landscape of employment opportunities in an era characterized by automation and technological advancements. Governments can promote public confidence in Industry 4.0 and facilitate its responsible and sustainable implementation by addressing these aforementioned concerns.

The significance of government preparedness for Industry 4.0 in Indonesia, specifically in Batam City, is underscored by the city's advantageous positioning as a prominent center for industrial and manufacturing activities. Batam City, being a significant hub for economic growth and development in Indonesia, encounters various prospects and obstacles in its

endeavor to adopt the revolutionary advancements brought about by Industry 4.0 technologies.

Batam City, situated in the Riau Islands Province of Indonesia, has garnered considerable recognition as a prominent industrial hub, drawing the attention of multinational corporations and foreign investments. The local government has acknowledged the necessity of adjusting to the evolving global environment and has implemented multiple measures to improve its preparedness for Industry 4.0. To begin with, the local government of Batam City has demonstrated a proactive approach in the development of infrastructure and implementation of policies that foster an environment conducive to digital transformation. Various initiatives have been undertaken to enhance digital connectivity and ensure the provision of dependable and high-speed internet connectivity across the urban area. This facilitates the utilization of technologies such as cloud computing, big data analytics, and IoT by businesses and industries to enhance efficiency and productivity.

In addition, the local government of Batam City has undertaken various measures to foster the advancement of innovation and entrepreneurship. This encompasses the creation of technology parks and incubation centers that foster collaboration among industries, research institutions, and startups. The primary objective of these initiatives is to cultivate an environment that facilitates the growth of innovation and provides assistance in the advancement and implementation of Industry 4.0 technologies. The primary objective of this study is to investigate the notion of government preparedness in relation to Industry 4.0 and its associated consequences. The research will examine the primary components of government preparedness, encompassing policy frameworks, infrastructure development, human capital development, and stakeholder engagement. Through the analysis of case studies pertaining to countries at different levels of preparedness, this research aims to offer valuable insights into the strategies and approaches employed by diverse governments in effectively addressing the challenges and capitalizing on the opportunities presented by Industry 4.0.

2 Research Method

In order to investigate the preparedness of governments for Industry 4.0, this study will utilize a qualitative research methodology to obtain comprehensive and detailed understanding of the subject matter [11]. Qualitative research is well-suited for the examination of intricate phenomena, such as the multifaceted dimensions of government preparedness within the framework of Industry 4.0. This particular research methodology facilitates a thorough comprehension of the viewpoints, encounters, and interpretations of principal stakeholders engaged in governmental endeavors pertaining to Industry 4.0. The qualitative data collected during the interviews and focus group discussions will be subjected to thematic analysis. The analytical procedure will entail the identification of recurring themes, patterns, and interconnections within the dataset. This will facilitate a thorough examination of the diverse aspects pertaining to the preparedness of the government in Batam City for Industry 4.0. The qualitative research findings will be presented in a descriptive narrative format, emphasizing the main themes and insights obtained from the interviews and focus group discussions [12]. The objective of this research is to gain a comprehensive comprehension of the strategies, approaches, and challenges encountered by the government of Batam City in their preparedness for the implementation of Industry 4.0. The findings derived from this study will make a valuable contribution to the current body of knowledge regarding government preparedness for Industry 4.0. Additionally, they will provide

guidance to policymakers, government officials, and other relevant stakeholders engaged in comparable endeavors.

3 Findings and Discussion

Batam City, situated within the Riau Islands Province of Indonesia, has emerged as a prominent hub for industrial endeavors and the facilitation of economic expansion. Batam City has emerged as a significant participant in the Indonesian manufacturing sector due to its advantageous geographical location in close proximity to Singapore and its designation as a free trade zone [13]. This has resulted in the attraction of multinational corporations and foreign investments to the region. In recent times, the municipality has acknowledged the significance of adopting Industry 4.0 technologies in order to augment its competitive edge and foster sustainable economic progress. The concept of Industry 4.0 encompasses the integration of digital, physical, and biological systems, resulting in significant advancements across multiple sectors. Within the specific context of Batam City, the advent of Industry 4.0 brings forth a multitude of prospects and obstacles for the indigenous industries, governing bodies, and the broader societal framework. The primary objective of implementing Industry 4.0 technologies in Batam City is to enhance productivity, efficiency, and innovation in various industries, thereby fostering economic growth and bolstering the city's global competitive advantage.

The augmentation of digital infrastructure stands as a prominent focal point within the Industry 4.0 endeavors of Batam City. Various initiatives have been undertaken to enhance internet connectivity and establish robust high-speed networks across the urban landscape. The allocation of resources towards digital infrastructure facilitates the utilization of various technologies, including cloud computing, big data analytics, and the Internet of Things (IoT), by businesses and industries [14]. This enables them to enhance their operational efficiency and enhance their decision-making procedures. The establishment of a smooth and uninterrupted flow of data and connectivity is essential for the successful integration and utilization of Industry 4.0 technologies, making digital infrastructure a fundamental component [15]. Furthermore, Batam City has been cultivating an environment that facilitates the development of innovative ideas and entrepreneurial activities. The establishment of technology parks, research and development centers, and incubation facilities by the local government serves the purpose of providing support to startups and fostering collaboration among academia, industry, and research institutions [1]. The primary objectives of these initiatives are to foster a conducive environment for innovation, promote the advancement and implementation of cutting-edge technologies, and offer assistance to entrepreneurs and innovators within the confines of Batam City.

The significance of human capital development in the era of Industry 4.0 has been acknowledged by the government of Batam City. Various endeavors have been undertaken to offer training programs and initiatives aimed at enhancing the competencies and capabilities of the indigenous labor force, enabling them to effectively navigate and excel in the era of digitalization. Partnerships have been forged among educational institutions, vocational training centers, and industries with the aim of equipping the workforce with the necessary skills to effectively respond to the evolving requirements of Industry 4.0. Batam City endeavors to foster a proficient labor force capable of harnessing technology and propelling innovation across various industries through the strategic allocation of resources towards the development of human capital. The impact of Industry 4.0 on the preparedness of the government in Batam City holds considerable importance. Government readiness can be defined as the inherent ability of the local government to comprehend, adjust, and proficiently address the various challenges and prospects brought about by the advent of Industry 4.0. In the specific context of Batam City, the preparedness of the government

encompasses multiple facets, including the establishment of policy frameworks, the advancement of infrastructure, the development of human capital, and the engagement of stakeholders.

The government's preparedness in Batam City is evident through the development of policy frameworks that facilitate the adoption and implementation of Industry 4.0 technologies. The role of the local government is of utmost importance in the formulation of policies and regulations that facilitate the creation of a conducive atmosphere for digital transformation and innovation [2]. This encompasses the establishment of frameworks that foster research and development, offer incentives for businesses to invest in Industry 4.0 technologies, and tackle legal and regulatory dimensions pertaining to privacy, security, and ethical concerns. The government's level of preparedness is evidenced by its proactive stance in developing and executing policies that facilitate the incorporation of Industry 4.0 into the domestic economy.

Furthermore, the government's preparedness is apparent in its efforts to develop digital infrastructure. The government of Batam City acknowledges the significance of a strong digital infrastructure in facilitating the adoption and utilization of Industry 4.0 technologies. The preparedness is demonstrated through initiatives aimed at enhancing internet connectivity, establishing dependable networks, and investing in data centers and digital platforms. The government facilitates the establishment of essential digital infrastructure in Batam City, thereby enabling businesses and industries to effectively harness the potential of Industry 4.0. This, in turn, leads to enhanced levels of productivity, efficiency, and innovation.

Another crucial element of government preparedness lies in its emphasis on the development of human capital. The significance of providing the local workforce in Batam City with the necessary skills for the digital era is recognized by the government. The demonstration of readiness is exemplified by engaging in collaborations with educational institutions, vocational training centers, and industries in order to offer training programs and initiatives aimed at developing skills. Through the allocation of resources towards the enhancement of human capital, the government endeavors to guarantee that individuals possess the requisite knowledge and skills to proficiently harness the potential of Industry 4.0 technologies, thereby facilitating their active participation in the city's digital transformation. The government's preparedness in Batam City is demonstrated through active engagement with stakeholders. The government proactively engages industries, community organizations, and citizens in deliberations and decision-making procedures pertaining to Industry 4.0. The aforementioned preparedness is evident in endeavors to establish a cooperative atmosphere wherein various stakeholders are able to contribute their perspectives, apprehensions, and recommendations. Through active involvement of various stakeholders, the government endeavors to ensure that policies and initiatives pertaining to Industry 4.0 effectively cater to the requirements and aspirations of the local community, thereby promoting inclusivity and fostering collective ownership of the process of digital transformation.

4 Conclusion

In summary, it can be concluded that Batam City in Indonesia has acknowledged the importance of embracing Industry 4.0 technologies in order to augment its competitive advantage and promote long-term economic advancement. The municipality has prioritized the enhancement of digital infrastructure, the promotion of innovation and entrepreneurship, the cultivation of human capital, and the active involvement of stakeholders in order to

establish governmental preparedness for the advent of Industry 4.0. Batam City has placed significant emphasis on prioritizing the advancement of digital infrastructure, including the establishment of internet connectivity and robust networks. This investment facilitates the utilization of technologies such as cloud computing, big data analytics, and the Internet of Things (IoT) by businesses and industries, thereby improving their operational efficiency and decision-making capabilities.

The urban environment has additionally fostered an ecosystem conducive to the cultivation of innovation and entrepreneurship. Technology parks, research and development centers, and incubation facilities have been established with the purpose of fostering innovative ideas and promoting collaboration among academia, industry, and research institutions. The prioritization of human capital development has been underscored in order to equip the indigenous workforce with the necessary skills demanded in the digital age. Collaborative endeavors with educational institutions and vocational training centers play a crucial role in equipping individuals with the essential skills and proficiencies required for success in the context of Industry 4.0.

Moreover, the government has proactively involved various stakeholders, such as industries, community organizations, and citizens, in the decision-making procedures pertaining to Industry 4.0. The adoption of an inclusive approach guarantees that policies and initiatives are designed to effectively address the specific needs and aspirations of the local community. The government of Batam City exhibits its level of preparedness through the development of policy frameworks that facilitate the adoption and implementation of Industry 4.0 technologies. The government's preparedness is further demonstrated by the advancement of digital infrastructure, the cultivation of human capital, and the active involvement of stakeholders.

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