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Government Agencies' Readiness Evaluation towards Industry 4.0 and Society 5.0 in Indonesia

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Abstract: The introduction of the Industry 4.0 and Society 5.0 concepts has been undoubtedly challenging, and the readiness towards them could be fundamentally enhanced by strategic management and entrepreneurial governance. Bureaucracy in the majority of developing countries, including Indonesia, is an impediment due to the delays in bureaucratic reform and weak patterns of communication and coordination between their institutions. This study aims to analyze the readiness towards the era of Industry 4.0, and Society 5.0 in Indonesia from the perspectives of strategic management of the bureaucracy and entrepreneurial government. We undertake a case study on the organization of the Deputy for Human Resources of the Indonesian Ministry of Empowerment of the State Apparatus and Bureaucratic Reform and use a mixed method that simultaneously combines quantitative and qualitative methods. The resulted data from observations, in-depth interviews, and focus group discussions were then analyzed using path analysis, descriptive methods, and qualitative approaches. Our results finding shows that there is a strategic value in data-based policies, and the ownership of data from various perspectives is strategically used as a direction for policymakers. One of the impacts of the Industry 4.0 and Society 5.0 concepts is that the world has become increasingly connected. Hence, there are no boundaries between systems. Bureaucratic strategic management and entrepreneurial government have a significant effect on the readiness towards the Industry 4.0, and Society 5.0 concepts, in Indonesia, either partially or simultaneously.

Keywords: strategic management; bureaucracy; entrepreneurial government; Indonesia

Citation: Kadarisman, Muh, Arie Wahyu Wijayanto, and Anjar Dimara Sakti. 2022. Government Agencies' Readiness Evaluation Towards Industry 4.0 and Society 5.0 in Indonesia: A Point of View from Bureaucracy and Entrepreneurial Government. *Social Sciences* 11: 331. <https://doi.org/10.3390/socsci11080331>

Academic Editor:
Svetlana Drobyazko

Received: 24 May 2022

Accepted: 12 July 2022

Published: 27 July 2022

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1. Introduction

Civilization is currently at a new stage, called the era of sustainable disruption. It is entering the era of Industry 4.0 and Society 5.0, where information technology acts as a catalyst. Disruption is the innovation that interrupts the normal business process and generates new values, opportunities, and markets thus further replacing established process and tradition (Ab Rahman et al. 2017). Society 5.0 is a group that applies technology focused on human life and based on Industry 4.0. One of the impacts of the Industrial Revolution 4.0 and Society 5.0 is that the world has become increasingly connected (Sima et al. 2020; Haseep et al. 2019). Hence, there are no boundaries between systems. The development of information technology has led to the digitalization of all aspects of life, including government bureaucracy, especially in developing countries that have been exposed to global pressure. Meanwhile, the world's social system has moved to a millennium that is based on Internet technology, which forms a new bureaucratic system. The Indonesian government and other countries, especially developing ones, have experienced fundamental changes in this era of disruption. The government

agencies that are heavily affected by the implementation of government policies claim that there is a delay in their bureaucracy and communication patterns in response to the ongoing disruption. Under these conditions and based on the concept of management strategy, the public bureaucracy must try to reformulate its strategic management in order to face changes in the era of sustainable disruption and enter the era of Society 5.0 (Gaddi 2016; Nakanishi and Kitano 2018). Numerous innovations are expected and have been developed in government agencies to strategically improve their business process, ranging from the effective knowledge management process (Putra and Wijayanto 2022) and improved public satisfaction (Wijayanto and Suhardi 2014), to efficient management systems (Pindarwati and Wijayanto 2015).

When implementing a management strategy in a sustainable Industry 4.0 business towards the current Society 5.0, bureaucrats must understand and be able to demonstrate the vision and mission of the organization in their work at all levels with the available supporting infrastructure. The importance of building a new organization and public service ethics in good governance is that it results in more honest and participatory public administration reform. However, this effort will not be an easy task. Therefore, bureaucracy must be oriented towards efficiency and effectiveness through the presence of professional employees and leadership with an entrepreneurial spirit and who are prepared to face challenges and changes that occur internally and externally. The government must be adaptive and able to optimize any technology to serve the community. This is especially true in the midst of the COVID-19 pandemic, which forces people around the world to limit their mobility and do activities at home so as to break the chain of virus spread. Under this condition, the presence of government services must immediately be transformed to an online form (Ondrušová 2016; Yusriadi et al. 2019).

Prasetya et al. (2022) investigated the potential benefit of innovation toward better public sector standard processes and its objection in Indonesia. The COVID-19 pandemic sheds light on the importance of strategic bureaucratic management of government agencies. Meyer discussed the strategic disruptive innovation to overcome socio-political challenges and lead the transition towards sustainable governance (Meyer 2022). On the other hand, Kovacs (2022) addressed the lessons learned from Japanese public governance on social innovation and automation toward inclusive Industry 4.0.

The public service system currently implemented by the Indonesian government faces several challenges and problems. The impression in the community thus far about public services is that they are complicated and tedious. Despite the implementation of e-governance through Law Number 30 of 2014, which concerns public administration and the digitalization of many public service sectors, the bureaucratic processing of certain documents is a long and complex process. Meanwhile, the digitalization of public services websites and applications in several regions in Indonesia is still not optimized, due to constraints on human resources at the community level, incompetent employees, limited access to electricity and the Internet, and the advice and supervision from various parties who do not meet the needs of related parties (Wicaksono 2018; Pollitt and Bouckaert 2017).

The first quarter of 2020 was the beginning of the emergence of COVID-19 cases in Indonesia and other countries, triggering their governments to issue new policies in response. Based on data from worldometers.info [as of 16 December 2021], the total number of COVID-19 cases in the world are 272,437,048, of which 5,344,819 have died, 244,744,780 have recovered, and 22,347,449 are active cases worldwide. The United States (US) accounts for the most cases, with more than 10 million, followed by the United Kingdom (UK) with 1 million cases. Indonesia is at number 101 with 4864 active cases, just below Singapore, which has 4874 active cases. In this era of disruption, it is predicted that 50% of jobs may be automated by adopting new technologies. Although less than 5% of the jobs can be fully automated, 60% can have 30% or more of their activities technically automated. In total, 52.6 million jobs have the potential to be replaced by digital systems, and the level of automation potential varies not only in the business sector, but also in the government (Sarjito 2020; Christensen and Gazley 2008).

Globally, automatable activities affect 1.2 billion employees. More than 50% of the automated jobs are in China, India, Japan, and the US. The technical employment potential in China and India can be automated, equivalent to 700 million full-time employees between them, while in France, Germany, Italy, Spain, and the UK this is equivalent to 62 million employees. Indonesia has three main issues related to human resources, namely, quality, quantity, and distribution. Quality refers to the effort to produce quality human resources to suit the needs of the digital-technology-based job market. Quantity refers to the effort to produce a number of qualified, competent, and industrial human resources. Meanwhile, the quality of human resources is still not evenly distributed (Rothan and Byrareddy 2020; McKinsey Global Institute 2019).

A 2018 discussion, titled "Human Capital-Answering the Challenges of the World of Education in Producing Superior Human Resources," (World Bank 2018) released the Human Capital Index which measures the influence of government policies on potential human resources capabilities from various aspects. The human capital index used the range of values between 0 and 1. If the value of a country is closer to one, the productivity of its population is guaranteed to be very high, supported by a healthy living environment and qualified education. Based on the data from the World Bank Group, Indonesia is ranked 87th out of 157 countries with a score of 0.53 (lower limit of 0.52 and upper limit of 0.55). This means that Indonesians born today can only reach 53% of their total maximum productivity potential by the time they turn 18. The low ranking of the human capital and education indices has a detrimental impact on Indonesia's competitiveness (Riminucci 2018).

The 2019 Global Talent Competitiveness Index (GTCI) survey, which ranks countries' competitiveness based on the capabilities or talents of their human resources, puts Indonesia at the sixth position in the ASEAN region with a score of 38.61. Ahead of it were Singapore (77.27), Malaysia (58.62), Brunei Darussalam (49.91), and the Philippines (40.94). Some of its indicators include income per capita, education, infrastructure, information computer technology, gender, environment, tolerance, and political stability. High-quality human resources are those that create not only comparative value but also competitive, generative, and innovative values using the highest energies, such as intelligence, creativity, and imagination, no longer solely relying on crude energy, such as raw materials, water land, and power (Roblek et al. 2016).

Currently, the condition of public services in Indonesia is far from ideal. Its government has not been able to provide quality services in accordance with the community needs. This can be seen from the results of the integrity survey, which shows that the quality of public services in the country has only reached a score of 6.64, on a scale of 1 to 10. The integrity score shows the characteristics of public services quality, such as the presence or absence of bribes and a standard operating procedure (SOP), conformity of service procedures with the existing SOPs, information disclosure, fairness and speed in service delivery, and convenience of public grievance redressal. Facts on the ground show that current bureaucratic practices are still dominated by the old bureaucracy paradigm, which is long and convoluted. In addition, corruption is still common in many public service deliveries. The Ombudsman has noted about 5800 problems that occurred in public services in all regions in Indonesia (Ombudsman of the Republic of Indonesia 2020; White 2000).

After eight years, in 2019, the number of complaints increased to 7903. Of these reports, 5464 have been registered and followed up, while the rest are still in the process of material inspection. Maladministration of protracted delays still dominates complaints, which were approximately 1837 cases, or 33.62% of the total complaints. This was followed by complaints on procedural irregularities, with as many as 1583 reports, and complaints of non-service, with as many as 967. The majority of complaints were dominated by the agrarian/land sector, which had 865 cases. There were also 749 complaints from the personnel sector, 558 from the education sector, 551 from the police sector, 249 from the population administration, and 184 from the manpower sector. The reported agencies are dominated by local government agencies and pursued by ministries, the police, and agrarian and spatial planning or national land agencies (Peters 2001).

The global economic crisis and decline in the industrial business have led to the emergence of a force that seems to have survived, that is, entrepreneurship. This activity is an effort to manage resources as optimally as possible, with the hope of obtaining optimal results on both the small and medium scales. However, entrepreneurship culture is still low in government circles, which is caused by several problems, including non-optimal government policies and their inadequate implementation in instilling an entrepreneurial spirit, the lack of facilities that can support entrepreneurial activities for the younger generation, and the low synergy between stakeholders to instill a digital entrepreneurial spirit. With a culture of entrepreneurship, innovation will emerge to compete and create new ideas that present innovative thinking, new creative breakthroughs, and improve risk appetite (Astri 2012).

Whereas existing recent studies have discussed important disruptive innovations in government agencies and the public sector, highlighting the opportunities and challenges of such innovation, there is an essential research gap existing that we are aiming to tackle. The readiness of government agencies toward Industry 4.0 and Society 5.0, especially in Indonesia, is yet to be sufficiently discussed. In this work, we take a point of view from bureaucracy and entrepreneurial government to further understand and evaluate government readiness. We are focusing on the organization of the Deputy for Human Resources of the Indonesian Ministry of Empowerment of the State Apparatus and Bureaucratic Reform as a case study and utilize a mixed method to simultaneously combine quantitative and qualitative approaches. The data were carefully collected from observations, in-depth interviews, and focus group discussions. Further, the collected data were then analyzed using path analysis, descriptive methods, and qualitative approaches.

2. Materials and Methods

2.1. Material

This study was conducted between February and September 2021. The primary data here are those collected by the researchers directly from the main sources, namely, the respondents, informants, and real-time experts. The primary data consisted of the results of the questionnaires that were distributed to several respondents. The explanatory sequential method was used to analyze the data to determine the independent, dependent, and intervening variables. This method was performed using Path Analysis in the Statistical Package for Social Science (SPSS) TM, version 20, to ensure its validity and reliability. The following primary data were obtained from observations, in-depth interviews, and focus group discussions (FGD), which were analyzed using the emic, ethical (*verstehen*), and triangulation approaches (Ghozali 2013). The secondary data in this study came in the form of documents or archives and expert opinions, which are scattered in the media or other resources in the form of research results published in journals or other records. These can improve the quality of research as they have been collected or provided for researchers from other parties and historical data. Both primary and secondary data were investigated, studied, and observed, and complement each other (Kadarisman 2019a).

2.2. Methods

This study used mixed methods, combining quantitative (i.e., positivistic, scientific, and discovery methods) and qualitative forms (i.e., post-positivistic, artistic, and interpretive research). The fundamental difference between these methods lies in their basic research strategies. Quantitative research is confirmatory and deductive, while qualitative research is exploratory and inductive. Meanwhile, the mixed method is a research approach that involves philosophical assumptions, the application of quantitative and qualitative approaches, and mixing them, starting with data collection and analysis and examining research techniques, research design, and the understanding research problems in a single study (Shauki 2019; Creswell 2008).

In this mixed method, several aspects were conceptually compared, distinguishing these three types of research. These aspects include the ontological view, logic model used, logical mindset, goals to be achieved, design used, chosen research strategy, data analysis techniques, research focus, data collection instruments, research paradigms, and type of knowledge found. The design used in this research was sequential explanatory. In this design, quantitative data are first collected and analyzed. It is followed by a second stage of data collection, which is built based on the initial quantitative results (with more weight or priority given to quantitative data), and ends with interpretation. Hence, it is more comprehensive, valid, reliable, and objective. Comprehensive data is a combination of quantitative and qualitative data. Valid data have a high level of accuracy between the actual data and the data reported by the researcher (Bhat 2019).

Through the combination method, the data obtained from the research will be valid because the data whose truth cannot be validated by the quantitative method will be validated by the qualitative method or vice versa. Hence, the data can be trusted. However, objective data are agreed upon by many people. Through the combination method, the objectivity of the data obtained by the subjective qualitative method can be increased to a wider sample using the quantitative method. Objective data relate to interpersonal agreements or those between many people. This means that the more people provide the same data, the more objective the data becomes. This study uses quantitative methods to investigate the research problem, to collect data and determine the variables, that are then measured by numbers so that analysis can be carried out in accordance with the applicable statistical procedures (Given 2008; Crossman 2019).

Based on its objectives, quantitative research has several advantages, including helping to draw conclusions or generalizing appropriate predictive theories. It also aims to develop mathematical models, which not only use theories taken from literature studies, but also build hypotheses that have a relationship with the phenomena studied and conduct analysis. Measurement is the center of research because its results will help determine the level of fundamental influence between empirical observations and quantitative data results, the magnitude of influence between variables in a population, and the research design (Sugiyono 2018).

Furthermore, this study employed a descriptive method using a qualitative approach. It describes the state of the object under study as it is, according to the situation and conditions when the research was carried out. This study also used a qualitative approach, namely, the mechanism of research guided by non-statistical or non-mathematical subjective assessments. The measure of value used in this study was not score numbers, but categorization of value or quality. This method was used because the qualitative approach aims to describe the actual situation or conditions that exist in the field, particularly in relation to the established research theme (Cohen et al. 2018).

2.2.1. Research Samples, Respondents, and Informants

The target of this study comprised 88 employees of the Deputy for Human Resources of the Ministry of Empowerment of the State Apparatus and Bureaucratic Reform. The variables used in this research include strategic management of bureaucracy [X_1] and entrepreneurial government (X_2) as independent variables; Era of Disruption [X_3] as intervening variable; and Industry 4.0, and Business and Society 5.0 (X_4) as dependent variables. The data was analyzed using path analysis to determine the magnitude of the influence of the independent variable on the intervening and dependent variables, which statistically describes the above variables (Foss and Ellefsen 2002).

Furthermore, in this study, the technique of determining informants was carried out purposively, namely, the appointment of informants with certain considerations. For example, the people who best understood the substance and problems in this study and knew about what we expected were determined to be the informants, who acted as the ruler in the interviews so that it would make it easier for researchers to explore the subject. In this purposive technique, the researcher selects research subjects with the aim of

determining key informants who are appropriate for the research focus that is carried out intentionally, to obtain the power of accuracy. To increase the data credibility, the researcher also used the snowball technique, which aims to develop information from predetermined informants. The informants in this study included 30 experts on the aspects studied, including academics and bureaucrats (Stepanie 2018).

Quantitative data analysis uses path analysis because it allows researchers to analyze more complex models than multiple linear regression. Path analysis can also be used to determine direct or indirect relationships, one of which is through the intervening variables. A piece of software that can be used to process and analyze data is SPSS (IBM 2018) to ensure validity and reliability. SPSS is the most popular and widely used statistical data processing software worldwide (Baker 2006).

Qualitative data processing requires a more subjective approach. However, it is also possible to extract the data first, as needed. There are several qualitative data processing methods used in this study, such as content, narrative, and discourse analysis. The steps of the qualitative data processing techniques include the following: First is data reduction, which is the process of selecting, simplifying, abstracting, and transforming rough data that emerge from written notes in the field. It is one of the stages in qualitative data processing techniques. At this stage, data reduction aims to select data that are relevant in accordance with its objectives.

Second is data presentation, which is a step to make reports on the results of research that has been conducted. Its purpose is for the collected data to be understood and so that future steps can be determined, such as choosing a method that fits the data. Data can be presented in various forms, including pictures, tables, diagrams, narrations, and videos. What needs to be understood here is that data should be conveyed clearly and attractively so that users can make decisions easily. Third is drawing conclusions. When a user makes a decision, it is also necessary to verify the meaning of each symptom obtained from the field. Users and researchers can read and describe the entire interview text. After being determined as valid, the user or researcher can draw appropriate conclusions.

2.2.2. Requirement Test, Linear Regression, and Correlation Analyses

Normality tests were conducted for the required test analyses using the SPSS software. Heteroskedasticity tests were subsequently conducted to determine whether the regression model exhibited a discrepancy in the residual variance among the observations. Multicollinearity tests were used to determine whether there was a correlation between the independent variables in the regression models. Linearity tests were conducted to verify that the model specifications were appropriate. There were two aspects to be scrutinized in the correlation analyses. The first was whether the sampled data provided sufficient evidence of interactions among the population's variables where the data originated. The second was the strength of the correlations between the variables. The Pearson product moment correlation formula was used because it is associated with data metrics in the interval or ratio scales (Elo and Kyngäs 2018).

2.2.3. Research Models, Hypothesis Development, and Path Analyses

Unlike correlation and regression analyses, path analysis tests whether the relationships are caused by the direct or indirect effects of independent variables on the dependent variables. It can also be used to examine the interdependency among variables in a model (causal model), and, finally, analyze the relationships among variables in the causal model that has been formulated by the researcher based on theoretical considerations. Using path analyses, several causal hypotheses were tested and the relationships (i.e., direct or indirect) were interpreted. The assumptions used in the path analyses included the following: (1) all relationships among variables were linear and additive; (2) the variables were measured on an interval scale or better; (3) the causal flow was one-way; and (4) the other requirements are the same as those for multiple regression (Stepanie 2018). The path analysis models used in this study are formulated as follows:

$$X_3 = pX_3 \times 1 + pX_3X_2 + e1 \quad (1)$$

$$X_4 = pX_4X_1 + pX_4X_2 + pX_4X_3 + e2 \quad (2)$$

where X_1 is the strategic management of bureaucracy, X_2 is the entrepreneurial government, X_3 is the disruption era, X_4 is Industry 4.0 and Business and Society 5.0, p is the path coefficient, and e is stray causes or causes outside the model (Flick 2013). Each variable is operationally defined and measured during the data collection from the in-depth interviews, focus group discussions, and observations.

The lack-of-fit testing was measured using the R^2 value, which is the coefficient of determination. This value represents the variance of a dependent variable, which is explained by an independent variable or variables in a regression model. The strategic management of bureaucracy in the disruption era helps realize that the entrepreneurial government faces Industry 4.0 and Business and Society 5.0. It is, therefore, expected that Industry 4.0 and Business and Society 5.0 would improve if the strategic management of bureaucracy and entrepreneurial government proceeded well (Baker 2006). In other words, independent variables collectively or partially affect the dependent variable, as shown in Figure 1 (Kothari 2004).

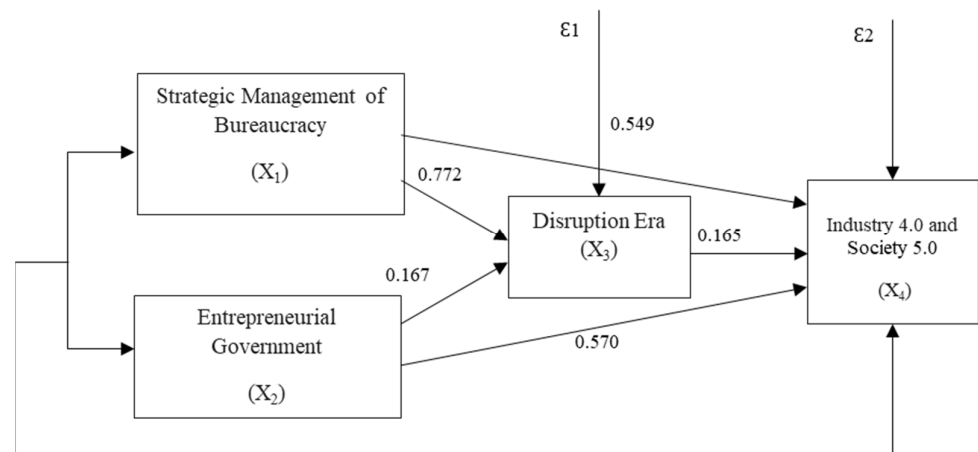


Figure 1. Design Diagram in this study.

The research hypotheses of this study are as follows.

Hypothesis 1 (H1). *Strategic management of bureaucracy influences the disruption era and indirectly affects Industry 4.0 and Society 5.0.*

Hypothesis 2 (H2). *Entrepreneurial government influences the disruption era and indirectly affects Industry 4.0 and Society 5.0.*

Hypothesis 3 (H3). *Strategic management of bureaucracy directly influences Industry 4.0 and Society 5.0 in Indonesia.*

Hypothesis 4 (H4). *The entrepreneurial government directly influences Industry 4.0 and Society 5.0 in Indonesia.*

Hypothesis 5 (H5). *The disruption era directly influences Industry 4.0 and Society 5.0 in Indonesia.*

Hypothesis 6 (H6). *Strategic management of bureaucracy, entrepreneurial government, and disruption era simultaneously influences Industry 4.0 and Society 5.0 in Indonesia.*

3. Results

3.1. Significance of Individual Parameters

The following is a summary of the results of the experiments carried out. Analysis of Variance (ANOVA) or F-test was used to determine whether the independent variables simultaneously affected the dependent variable (Table 1). ANOVA produced an F value of 172.811, a *p*-value of 0.00, a degree of freedom (df) of 3, and a residual of 87. With a *p*-value of less than 0.05, the regression model can be used to predict the disruption error. These results support the hypothesis that bureaucratic strategic management, entrepreneurial government, and the era of disruption simultaneously affect Industry 4.0 and Society 5.0 in Indonesia. The next experiment, based on the results of the individual parameter significance test (t-test), provides significant results regarding the influence of bureaucratic strategic management, entrepreneurial government, and the era of disruption on Industry 4.0 Business and Society 5.0 in Indonesia (Table 2). Therefore, the H0 in this study can be partially accepted. Meanwhile, the beta value experiment (standardized coefficients) resulted in a probability value (*p*-value/Sig) of less than 0.05 for each variable and the acceptance of H0. Hence, bureaucratic strategic management (X₁), entrepreneurial government (X₂), and the era of disruption (X₃) have partially significant effects on Industry 4.0 and Society 5.0 (X₄) (Table 3).

Table 1. ANOVA or F-test Results Statistics.

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	10,611.385	3	3537.128		
Residual	1719.331	84	20.468	172.811	0.000
Total	12,330.716	87			

Table 2. ANOVA or F-test Results Statistics.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	5.365	1.522		3.524	0.001
Strategic Management of Bureaucracy	0.503	0.052	0.772	9.627	0.000
Entrepreneurial Government	0.133	0.063	0.167	2.088	0.040

Table 3. Statistics Beta Value Experiment (Standardized Coefficients), Dependent Variables: Industry 4.0 and Society 5.0.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.841	2.625		0.701	0.005
Strategic Management of Bureaucracy	0.609	0.122	0.549	5.009	0.000
Entrepreneurial Government	0.768	0.105	0.570	7.329	0.000
Disruption Era	0.282	0.175	0.165	1.611	0.001

Based on the formulation of Structures 1 and 2 above, the following can be briefly understood: (1) the influence of bureaucratic strategic management (X₁) on the era of disruption (X₃) is 0.772 or 7.72%; (2) the influence of the entrepreneurial government (X₂) on the Era of Disruption (X₃) is 0.167% or 1.67%; (3) the influence of bureaucratic strategic management (X₁) on Industry 4.0 and Society 5.0 (X₄) is 0.549 or 5.49%; (4) the influence of the entrepreneurial government (X₂) on Industry 4.0, and Business and Society 5.0 (X₄) is 0.570 or 5.70%; (5) the influence of the Era of Disruption (X₃) on Industry 4.0 and Society 5.0 (X₄) is 0.165 or 1.65%; and (6) the influence of bureaucratic strategic management (X₁), entrepreneurial government (X₂), and the era of disruption (X₃) on Industry 4.0, and

Business and Society 5.0 (X_4) is 0.169% or 16.94%. These results indicate that bureaucratic strategic management and entrepreneurial government have a significant effect on the Era of Disruption, Industry 4.0, and Business and Society 5.0, in Indonesia, either partially or simultaneously. Therefore, the results of this study support the null hypothesis (Gorman and Clayton 2005).

3.2. Strategic Bureaucratic Management Experiment Results

The experimental results in this study show that the strategic management of bureaucracy has a significant effect on the era of disruption. These results need to be described more deeply. This plan is designed to ensure that the main objectives of the organization can be achieved through proper implementation. By contrast, strategy is an encompassing and integrated plan that involves excellence in an organization's strategy to address environmental challenges. This plan was designed to ensure that its main objectives can be achieved through proper implementation. Bureaucracy is a type of organization used by the government to carry out tasks that are specialist in nature, performed in the administrative system and undertaken by particular employees (State Civil Apparatus) (Kadarisman 2019b).

Thus, strategic management of bureaucracy involves the formulation, implementation, and evaluation of policies related to the achievement of the goals of public organizations. It can also be interpreted as saying that the strategic management of bureaucracy is a policy and activity that is directed at the formulation or design of an effective strategy to encourage the goals and growth of public organizations, namely, the formation of bureaucratic management with a professional character. To realize bureaucratic management with a professional character, the strategic management concept that will be applied must create a bureaucracy that is aware of the changing environmental conditions and situations in accordance with the principles of public administration reform (Christensen and Gazley 2008).

The public administration reform emphasized that, in the current era of disruption, strategic bureaucracy can be used as a code to solve internal problems, especially competition between employees. All elements of the organization must be encouraged to think creatively, and they must have autonomy and government control. The benefits derived from strategic management in this era of disruption provide clear and transparent long-term directions and goals, assist leaders in making changes and strategies to improve organizational capabilities and mitigate potential challenges, and increase the efficiency and effectiveness of resource utilization in public organization activities. In this era, it is important for public organizations to identify various existing comparative advantages and involve members in developing strategies to increase employee motivation during implementation and reduce redundancy of activities and tasks of each organizational unit (Lim 2018).

In everyday life, distractions often lead to fundamental changes. One of these is the evolution of technology, which has penetrated mankind and given rise to digitalization. It, in turn, has changed almost all aspects of life, including the way of doing business related to public services. The phenomena of disruption, Industry 4.0, and Society 5.0, have forced the global community to consider applying future knowledge to today's practices and the securing of future ventures. Disruption, as an innovative phenomenon, involves replacing the old system with the new by using digital technology to replace physical or analog mechanization to produce something that is more efficient and useful. This rapid change has resulted in breakthroughs in several fields, providing more efficient and economical solutions to various challenges. However, these changes can be perceived as a threat by some parties who feel safe and comfortable with the existing system. However, change must be embraced, not eliminated, in order to implement industrial strategic initiatives and new forms of business engineering and information systems (Kasali 2017).

3.3. Entrepreneurial Government Experiment Results

The experimental results of this study show that entrepreneurial governments significantly affect the era of disruption. These results need to be described more deeply as entrepreneurship in public organizations is a very important aspect that needs to be included in the mindset of state officials. Thus, the most important thing is to change the orientation of employees to be more anticipatory, creative, innovative, and able to seize opportunities. An entrepreneur possesses this type of orientation. The spirit of entrepreneurship or entrepreneurial government in public organizations is appropriate in the context of utilizing resources to increase productivity and effectiveness. However, it must be realized that even though government organizations adhere to the principles of business organization, these organizations do not work on a profit-oriented basis, and instead remain as public servants who must serve all Indonesian people (Ondrušová 2016; Schlechtendahl et al. 2015).

Fostering an entrepreneurial spirit and its characteristics has been explored by many experts. Entrepreneurship is an activity that moves various economic resources from an area with low productivity to an area with higher productivity, with better results. Thus, an entrepreneurial government is a government sector institution that carries out its functions but has used, and continues to use, resources in new ways to increase the level of efficiency and effectiveness. In public organizations, the orientation of attitudes and behavior, as well as real entrepreneurial actions, must be included in the mindset of state administrators. Thus, the most important thing is to change the orientation of employees to be more anticipatory, creative, innovative, and able to seize opportunities. Employees need this type of orientation when building an entrepreneurial government (Nakanishi and Kitano 2018).

There is also an interesting idea from Osborne and Gaebler (1996), that suggests, for government organizations' performance to be optimal in managing their resources, they must follow the principles adopted by business organizations. Therefore, they must have an entrepreneurial spirit or a spirit akin to that of a business organization. The entrepreneurial spirit in the government sector (executive, legislative, and judicial) can be interpreted as an effort to utilize resources in order to increase productivity and effectiveness. However, it must be realized that even though government organizations adhere to the principles of business organization, they are still in the service-oriented corridor. Thus, by implementing an entrepreneurial spirit in public sector organizations, employees are expected to be able to develop the quantity and quality of their performance and service as public servants.

Entrepreneurial government has become a symbol of business resilience and achievement. An entrepreneurial government's sensitivity to opportunity, and ability to innovate and achieve, have become the standard measure of a broad company today. We have experienced the entrepreneurial revolution around the world. The 21st century revolution was stronger than the industrial and governmental revolution of the 20th century. Entrepreneurial government will continue being an important contributor to economic growth through public sector leadership, management, innovation, research and development effectiveness, job creation, competitiveness, productivity, and the formation of new industries. Entrepreneurship is a dynamic process that involves vision, change, and creation. This requires the application of energy and passion for the creation and implementation of new creative ideas (Wahl 2015).

The following is a theoretical and empirical study of the implementation of entrepreneurial government. Entrepreneurship is a value-creation process that uses resources to exploit opportunities. The entrepreneurial government in the era of disruption is believed to have influenced various national relations in winning global competition. The state system and resources are heading toward an interrelated system that share economy to generate speed and efficiency in using resources. Disrupted the global world to think about how to change its approaches and practices, pertinently describing the phenomenon of disruption as an innovation. It will replace the entire old system with new systems, including old technology that is completely physical with digital technology that produces something truly real, new, and more efficient and useful (Soegoto and Kadisi 2017).

3.4. Analysis of the Effect of Entrepreneurial Government on the Era of Disruption

The results of the calculation using the path analysis show that the influence of entrepreneurial government on the era of disruption and Industry 4.0, and Business and Society 5.0 is significant. These numbers indicate what leverage can be used from the perspective of government entrepreneurship in the era of disruption, Industry 4.0, and Society 5.0. An entrepreneur will dare to make a breakthrough by thinking quickly and realizing their ideas in the form of real business activities. If this is carried out by the government and bureaucracy, then there will be many new innovations that encourage increased investment. The ability to think and act quickly distinguishes entrepreneurs from bureaucrats. A bureaucrat makes a plan first, then tests it on the market, and then slowly creates a product. However, why does it not sell when it is thrown into the market? It is because it took too long to plan, so the momentum had passed (Fang 2002; Gaddi 2016; Cabinet Office Japan Government 2021).

In contrast, entrepreneurs act immediately based on their intuition and ability to see opportunities. Often, they also experience failure, but learn from them and eventually reap success. Thus, the ability to think and act quickly, and make breakthroughs is urgently needed in order to elevate a country that is in a middle-trap economy, such as Indonesia. Technology is an important factor in production theory, and the industrial sector is no exception. Industrial technology has developed rapidly, starting from mechanization, assembly, computers, and automation to cyber systems, Internet of Things (IoT), and network technology. The industrial revolution, from 1.0% to 4.0%, has brought tremendous changes to business models in the manufacturing sector. Industrial Revolution 4.0 is able to increase performance by up to 50%, related to the integrated use of digital technology. Industry 4.0 is believed to spur productivity and quality, so that the products it produces are more innovative and competitive (Leffler 2009).

It is possible to solve all industrial problems using Industry 4.0, which has a positive role in solving data management and other technology problems. Because of its features, Industry 4.0 has a significant positive effect on the improvement of products and services. Various Industry 4.0 factors, such as big data, IoT, and smart factories, have a positive role in improving sustainable performance. Therefore, Industry 4.0 can improve sustainable business performance by solving various technological problems. There are also five main technologies that support the development of the Industry 4.0 system, namely, artificial intelligence, IoT, the human-machine interface, robotic and sensor technology, and printing technology. These can encourage the development of government and the business world in the era of Industry 4.0 or Society 5.0 (Gladden 2019; Lim 2018).

This initiative aims to help manufacturing companies, including small and medium-sized industries (SMIs), adapt to the pressures of global competition and latest technological developments. It will also help the industry meet global consumer demand. In this context, the Singaporean government has invested heavily in innovation and productivity subsidies to help manufacturers optimize their business operations. This means that technology is considered an essential ingredient that manufacturers need to implement for their business to be successful. Meanwhile, Indonesia still must deal with and adapt to technology 4.0. Several technologies are expected to develop in the years ahead and need to be anticipated by the industry and government in preparing regulations and policies. These include artificial intelligence (AI), which is no longer just an industry catch phrase (Njau et al. 2019). AI applications provide benefit to overcome many issues in a wide range of contexts within human daily life (Wijayanto et al. 2019; Sakti et al. 2022)

Chatbots or “digital citizens” have enabled or augmented human capabilities by enabling manufacturing and public service businesses to make decisions more quickly. What is important here, however, is the fact that chatbots do not replace the human element in customer service but instead add value by offering a touch point for customer needs. In addition to manufactured products, AI can be used to detect agricultural commodity products in terms of type, quality, harvest, and quantity. Furthermore, the IoT is closely related to Industry 4.0 because it is one of the main elements that influence many

industrial processes, especially its function as a data miner. The IoT works to find and collect various data from the field, which will be processed into new and more useful data. Various industrial fields in the era of Industry 4.0 are affected by IoT, which is a positive development because industry and community services can become more effective in carrying out their activities. Examples of industries include manufacturing, health, agriculture, automotive, and urban planning (Effoduh 2016).

4. Discussion

4.1. Discussion on Bureaucratic Strategic Management That Significantly Influences the Era of Disruption

The results of the calculation of the influence of the Bureaucratic Strategic Management variable on the Era of Disruption using path analysis can be interpreted as the disruption era having affected various national relations in winning global competition, the state system and resources are heading towards an interrelated system, and the sharing economy in order to gain speed and the efficient use of resources. This study also finds that the current era of disruption is a phenomenon that must be addressed quickly through the acceleration of substantial bureaucratic reform that is not only procedural. The central role of bureaucracy is not for big countries to beat small countries, but for fast countries to beat slow countries (Bagheri 2017).

Every state policy implemented by the executive is translated into a public or State administration policy. Meanwhile, the administration is implemented by a bureaucratic institution. The era of digitalization as a social phenomenon and the development of science in line with the movement of time is increasingly developing and starting to penetrate the world community. Hence, the capacity of bureaucracy to deal with such times needs to continue to adapt in order to create the effectiveness and efficiency of public organizations' performance. The world is currently experiencing a major shock in the era of disruption, which is formed by an accumulation of dramatic ecological changes and increased global competition, accelerated by the convergence of big data and information communications technology (ICT) (Santoso 2019; Sakti et al. 2021).

Bureaucracy is an organization that is fully appointed to achieve a certain goal. It is organized hierarchically with a firm chain of command from top to bottom, creating a clear division of work that assigns everyone to specific tasks. It has general rules and regulations that guide all attitudes and efforts to achieve such goals. Employees are selected primarily based on competence and training, so work in the bureaucracy tends to be a lifelong job. It is necessary to accelerate bureaucratic reform to resolve the inhibiting regulations, as well as the old system that is still in use. In this situation, the urgency of strategic management of bureaucracy at various levels needs to be continuously pursued so that planning, organizing, executing controlling, and feedback generation can accelerate the adaptive bureaucracy to change (Ahmad 2018).

In practice, the state of the bureaucracy is still quite alarming in Indonesia. Reformulating the strategic management of the bureaucracy is a necessity in this era of disruption, given its central role in contributing to increasing the nation's competitiveness. The urgency of bureaucratic strategic management reformulation at various levels, considering that bureaucratic actors currently do not understand the direction of their duties and the role of their functions in realizing organizational development, can be seen from: (1) low understanding of the vision and mission within bureaucracy; (2) low mental and spiritual development and employee behavior; and (3) low initiative of bureaucratic leaders in organizational development and adaptation to the external environment. Based on these problems, bureaucratic leaders must organize and adapt through managerial concepts implemented in management strategies to address the current era of disruption. The results of this study indicate that, in this era of disruption, public services are very important in realizing good governance. The public

service process is also the focus of the government as an indicator of success in measuring bureaucratic performance (Kopp et al. 2016; Xu et al. 2018).

The implementation of good governance and electronic-based governance (e-governance) is also in line with the current vision of the Indonesian government's Nawacita, in realizing the presence of the State and building transparent, effective, and reliable governance. The findings in this study also show that the implementation of e-governance is essentially the digitalization of data and information, such as e-budgeting, e-project planning, system delivery, e-controlling, e-reporting, e-money, and other custom applications. They need to be continuously implemented to realize that the substantial bureaucratic reform is the antithesis of procedural bureaucracy (i.e., administrative documents, reporting, attendance, and performance allowances). The use of information technology will make it easier for bureaucracy to provide fast, cheap, and precise services, as envisioned by some individuals and the business world, which directly increases competitiveness. The increase in competitiveness implies that change is a natural phenomenon that always occurs in every generation. However, in the current era of globalization, changes occur rapidly (Rahmanto et al. 2021; McKinsey 2017).

4.2. Discussion on Bureaucratic Strategic Management That Significantly Influences the Industry 4.0 and Society 5.0 in Indonesia

The results of the calculation of the influence of the Strategic Management Reform of the Bureaucracy on the Industry 4.0 and Society 5.0 reveals that entering this era, the use of technology focuses on aspects of the humanities in order to create various tools to solve social problems. This requires optimal management of apparatus resources (bureaucrats) to boost the credibility of public organizations by increasing the efficiency of each bureaucratic apparatus in the field of ICT, with the aim of facilitating the implementation of tasks in the future. As part of the efforts to realize good governance, the bureaucracy must always be oriented toward the use of technology in the administration of government services to simplify regulations and in bureaucratic reform. Efforts to improve structural governance in the fields of institutions, management, and human resources are known as bureaucratic reforms (ILO 2017).

The implication of this is that bureaucratic reform can be understood as a process to hasten changes for the better, with the aim of realizing a clean, open, and accountable government administrative bureaucracy. Government organizations need to strengthen the capacity of apparatus resources at both the central and regional levels in order to adapt to the current development era. Apparatus resource governance also has a strategic role in supporting success in Indonesia's bureaucratic reform. The early stages of bureaucratic governance in the government sector have similarities with the private sector, including planning appropriate and accurate personnel resources to achieve organizational goals. Apparatus resource planning is the basis for compiling a work plan for public organizations (Bagheri and Pihie 2010).

By carrying out the development and study of bureaucracy in the future, an organization can indirectly adapt to environmental changes and the development of the era to build a higher-quality bureaucracy. This will result in the improvement and increase in the organization's performance. Moreover, the development of bureaucrats is important because it will make it easier for government agencies, both small and large, to achieve their goals that are related to the number of workers with the necessary skills to assist the organizational processes in achieving the desired goals and objectives. Building apparatus resources includes the development of superior self-competence within the apparatus itself in accordance with the tasks and activities carried out and aims to develop aspects of superior intelligence, abilities, and mental attitudes (Effoduh 2016; Faruqi 2019).

Another implication is that bureaucrats in various types of public institutions at the central and regional levels need to increase their competence in e-resource management, managerial leadership, digital literacy, and research as well as carry out transformations in preparation for increasingly rapid changes in creating a knowledge society. Structural

improvements are required to build a fast and agile bureaucracy to provide public services. The sustainability of bureaucratic reform must continue to be carried out to improve the quality of public services so as to create a sense of trust from the public in the implementation of services from government officials. Bureaucratic reform is closely related to other aspects of reform, such as shifting mindsets, developing technology-based public service structures, and improving regulations and leadership. An electronic-based government system with a bottom-up approach can be an alternative in an effective, efficient, and transparent management process (Kadarisman 2019c; Fujii et al. 2018).

Therefore, innovation is needed to adapt to changes and sustainable development of the bureaucracy. They are important to be able create public service innovations that are oriented towards the use of information technology. The findings reveal that the public's desire for a transparent and accountable bureaucracy, coupled with increasingly uncertain environmental conditions, prompted the government to experiment with governance as part of its efforts to reform public sector administration. Thus, the revitalization of bureaucracy allows a bureaucratic transformation that is oriented towards e-governance carried out by developing innovation, building collaboration and synergy, and responding to rapid environmental changes. Moreover, the orientation of public services to the community not only plays a role in improving bureaucratic performance but also becomes a strategic element in developing government bureaucratic services in the future (Heng 2014; Kumorotomo 2019).

4.3. Discussion on Entrepreneurial Government's Significant Influence on the Era of Disruption, Industry 4.0 and Society 5.0 in Indonesia

With the strong influence of the entrepreneurial government in the era of disruption, Industry 4.0, and Society 5.0 in Indonesia, it is necessary to integrate academic culture into the bureaucracy. This would allow bureaucrats to have a learning mentality and the motivation to increase their knowledge and abilities in utilizing technology. In addition, future bureaucrats must possess mental, social, and manual skills. Mental skills include mastery of one's expertise in dealing with phenomena and events that appear around the world, as well as the ability to conduct an accurate study of events that occur. Social skills are the ability to get along with other people and collaborate effectively. Meanwhile, manual skills refer to a person's ability to use their limbs and senses to produce high-value and innovation-oriented creative goods and services. Innovation is needed to adapt to change, as well as the development of bureaucrats to create public service innovations that are oriented toward the use of ICT (Wijayanto and Suhardi 2014).

The implication of these results is that bureaucrats' specific skills and abilities can be the basis for the development of a professional mindset, as demonstrated by their capabilities in identifying community needs, setting goals, and prioritizing programs based on community needs and expectations. The bureaucracy is better able to respond to any problems that arise, show flexibility in all circumstances, and maintain public trust. Commitment and self-awareness are needed in every bureaucrat to build a bureaucratic culture, so as not to lose the public's trust. The professionalism of bureaucrats should not only be limited to expertise in technology and specialized knowledge but must be balanced with ethical behavior. This is because apparatus resources not only work for the benefit of individuals but also for the benefit of the society (Prasetyo and Sutopo 2018; Saksono and Manoby 2021).

Another implication is that a responsive and aspirational change in bureaucratic culture is needed to respond to every form of public demand. Therefore, bureaucrats need to internalize these values into the bureaucratic apparatus behavior that provides services to the community. Changes in the mindset of human resources towards modernity in the future must produce a bureaucracy with a work culture that is sustainable, effective, humane, disciplined, and competent. This is the basis of the efforts to integrate human resource governance into dynamic governance, based on the principles of anticipatory, reflective, and creative thinking that benefits government organizations themselves. Thus,

bureaucrats are not only institutionally well-positioned to deal with public issues but also have the mental capital to face potential challenges and increase public confidence. The bureaucracy in the era of disruption, Industry 4.0, and Society 5.0, will play a role based on characteristics that are more concerned with the community (Brown 2009).

Every state apparatus, such as bureaucrats and public servants, must understand and have a high awareness of their goal which is to fulfill the interests of the community to the fullest. In this era, the bureaucratic apparatus must have personal capacity in the form of professional ethics and morality based on the values of social life that is rooted in the society's value system. For bureaucracy in the era of disruption, Industry 4.0, and Society 5.0, is important to realize the development of knowledge supported by technology and the quality of apparatus resources that can contribute to various public sectors. The development of the era and technology in general will also develop apparatus resources as human resources with superior skills and positive mental attitudes. It will also encourage apparatus resources to have superior skills in utilizing technological sophistication to produce high bureaucratic performance while holding a humanist attitude in providing services to the community and solving public problems (Kagermann et al. 2011).

The era of disruption can be advanced by improving the strategic management of the bureaucracy and entrepreneurial government as well as by increasing Industry 4.0 and Society 5.0. Thus, the strategic management of the bureaucracy and entrepreneurial government must continue to be developed and improved to exist in the era of digitalization, which in turn will enable Industry 4.0, and Businesses and Society 5.0, to become optimal. The application of entrepreneurial government does not necessarily address efforts to improve bureaucrats' performance, and the development of government entrepreneurship must also be supported by conducive organizational development. The consideration and understanding of bureaucrats about entrepreneurial government is still lacking, as indicated by their lack of knowledge of the principles of customer-oriented services (Salgues 2018).

5. Conclusions

Industry 4.0 and Society 5.0 have the potential benefit to trigger both operational and strategic changes in how the government agencies evolve but assessing the readiness of government agencies towards them has been quite challenging. The era of disruption can be advanced by improving the strategic management of the bureaucracy and entrepreneurial government as well as by increasing Industry 4.0 and Society 5.0. The application of entrepreneurial government does not necessarily address efforts to improve bureaucrats' performance. To realize a competitive and efficient bureaucratic organization, sincere and full political will, and other aspirations, it must be understood and accepted that bureaucratic reform is not for the benefit of certain individuals or groups alone, but to ensure that countries such as Indonesia do not get overwhelmed by global competition. Therefore, bureaucratic reforms should not be limited to improving work structures, processes, and procedures, the morals and attitudes of all bureaucrats, but should also reduce or eliminate various forms of bureaucratic pathology, and reform towards efficient, innovative, and efficient bureaucratic responsiveness and accountability.

Currently, Industry 4.0, and Business and Society 5.0 have taken place and have affected Indonesia and other countries in the world. A myriad of activities has been transformed into digital systems. The disruption caused by the Fourth Industrial Revolution and generation gap require many institutions to continue to adapt to digitalization. Automation in strategic management is the best solution to build digital networks and develop entrepreneurship. The implementation of Society 5.0 which was created as a solution to Industrial Revolution 4.0, that is feared to be degrading humanity, will create people who can enjoy their lives and feel comfortable. In Society 5.0, technological innovation is directed at filling the gap by improving the quality of products and services, and even developing new products and services that were not produced in the previous era. Automation and the use of robots allow the production process to run

for 24 h, so that the production capacity of goods is more optimal, and the standardization of their quality is guaranteed. Finally, efficiency is created to maximize organizational profits. In Society 5.0, a large amount of information from sensors in the physical space is accumulated in the cyberspace, where big data are analyzed using AI, and the results are fed back to humans in various forms of physical space.

Author Contributions: M.K. conceived and designed the experiment, M.K. performed the experiments, M.K., A.W.W., and A.D.S. analyzed the data, M.K. pre-processed the base datasets, M.K., A.W.W., and A.D.S. wrote the paper. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Research Program of the University of Muhammadiyah Jakarta.

Data Availability Statement: The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Acknowledgments: The authors are grateful to acknowledge the support from Universitas Muhammadiyah Jakarta. We also thank the respondents, informants, real-time experts, and anonymous reviewers whose critical and constructive comments greatly helped us to prepare an improved and clearer version of this paper.

Conflicts of Interest: The authors declare no conflict of interest.

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