Impacts of IT Strategic Alignment and IT-enabled Dynamic Capabilities on Online Businesses

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***Abstract*—The lack of measurable and obvious IT strategic alignment, inadequate focus on customer experiences, absence of linkages between businesses and IT, weak IT-enabled dynamic capabilities, and unresponsiveness are commonly identified factors contributing to the failure or difficulty of companies in establishing online businesses. Furthermore, a restricted range of work establishes a connection between the alignment of information technology (IT) strategies and the development of IT-enabled dynamic capabilities while considering the impact of IT governance systems on organizational agility. The research aimed to validate and determine the degree to which the alignment of IT strategy and the existence of IT-enabled dynamic capabilities had a favorable impact on the organizational agility of online businesses. The research methodology used for this research was convergent triangulation, utilizing an explanatory design incorporating follow-up explanations. The sample population consisted of organizations operating online businesses in West Kalimantan, Indonesia, with a minimum operational experience of five years. A total of 258 respondents completed the questionnaires. The data collected was processed using Likert scales. The data underwent additional analysis using Structural Equation Modeling-Partial Least Squares (SEM-PLS). The findings indicate that the alignment of IT strategy has a significant and positive effect on the agility of organizations, achieved through the utilization of IT-enabled dynamic capabilities. On the other hand, the impact of IT-enabled dynamic capabilities on the organizational agility of online businesses is found to be insignificant.**

Keywords—IT Strategic Alignment, IT-enabled Dynamic Capabilities, IT Governance Mechanisms, Organizational Agility.

I. INTRODUCTION

IT (Information Technology) is becoming significant for all types of businesses. The organization's responsibilities are no longer limited to assisting operational operations in making managerial decisions. The advancement of information technology has become a key medium for ensuring the continuation of business performance [1]. Due to the existence of IT, all business processes have gone through major transformations toward digital disruption. This appears in the growth of numerous digital technology innovations that are increasingly competitive for online businesses. Managing them is inextricably linked to changes in consumer behavior and their ability to communicate with one another [2]. However, they are carried out in relation to the ability to adopt transformation to produce value through IT empowerment processes. Unlike traditional business competition, online competition is fierce because anyone may conduct it without requiring a huge investment [3]. Each product and its pricing may be browsed and compared by customers. As a result, to compete, agility and constant development of quality and services are required [4]. Empirical research suggests that organizational agility influences efforts to increase online company performance [5]. However, implementing IT governance methods depends on readiness and capability [6].

IT governance is critically needed, has a huge effect, and is becoming the primary driver for business process transformation, operational cost reduction, and more innovative and efficient performance. IT governance tools aid online businesses in identifying and prioritizing investment values based on goals to deploy limited resources [7] appropriately. Organizations can minimize excessive expenses and spend more efficiently if these processes are effective [8]. Structures, processes, and relational mechanisms are the foundation for achieving and developing organizational agility in conducting online companies. The ability to quickly adapt and respond to changes has become a daily activity [9]. IT governance mechanisms must be ready and available to support organizational agility, including efficiency improvements, data security, and privacy risk reduction, compliance with regulations and standards, service quality improvement through IT applications, and cost and IT investment reduction.

However, failure to build online businesses is frequently caused by a lack of measurable and obvious IT strategic alignment and focus on customer experiences, links between businesses and IT, IT-enabled dynamic capabilities, and unresponsiveness. Furthermore, there is a gap when referring to previous empirical research. There appears to be no literature directly analyzing the influence of IT governance systems on the organizational agility of online businesses as mediated by IT strategic alignment and IT-enabled dynamic capabilities. According to previous empirical research [10,11,12], the roles of IT strategic alignment and IT-enabled dynamic capabilities only play an important role in determining influences on business performance.

The findings of this research model confirm that IT governance procedures exert a positive influence on organizational agility. The observed path coefficient exhibits a value of 0.561. A comparable phenomenon is observed in the case of the effects of IT governance systems on IT strategic alignment (0.801) and IT-enabled dynamic capabilities (0.483). The path coefficient of the former impacts is the

largest, indicating that IT governance systems play a crucial role in ensuring the consistent integration of IT strategy alignment and online companies, ultimately leading to operational alignment. However, the latter effects exhibit dissimilarities compared to earlier investigations [13,14]. The focus of IT governance mechanisms is mostly on standard compliance, IT risk management, and regulatory systems rather than enhancing dynamic capabilities.

In another scenario, IT strategy alignment and dynamic capabilities afforded by IT positively affect organizational agility. There are path coefficients with values of 0.296 and 0.092. It should be highlighted that the former is more critical because it ensures that IT and businesses collaborate to achieve business objectives. Meanwhile, the latter focuses on accelerating innovation, optimizing business processes, expanding company scopes, and remaining flexible and responsive to market developments. Previous research [15,16,17] has also addressed the two influencing constructs. Meanwhile, the influence path coefficient of IT strategic alignment on IT-enabled dynamic capacities is 0.454 (positive and significant). Previous research [18] backs this up. But, the better the degrees of alignment between business strategy and IT in online businesses, the greater the development of IT-enabled dynamic capabilities. All construct interrelationships appear to be favorable. Nonetheless, a significance test shows that the effects of IT-enabled dynamic capabilities on online business organizational agility are insignificant. In other words, no direct contribution was discovered. These abilities can assist businesses in adapting to market changes and creating added value. However, because IT disruption is unavoidable, they indirectly influence organizational capacity to respond quickly and effectively to changes in online businesses.

This research focuses on the extent of IT strategic alignment and IT-enabled dynamic capabilities contributing to the mediation of the effects of IT governance mechanisms on the organizational agility of online businesses. Information about each indicator of each construct in the research models can be provided through this mediation relationship. Regarding path coefficients, direct and indirect effects on IT strategic alignment and IT-enabled dynamic capabilities will have lower values than direct influences on attempts to realize the organizational agility of online businesses. This is a novel circumstance in which the dependability of the first two aforementioned components can significantly contribute to the organizational agility of online businesses.

Formulated research problems take the form of interrelationships with allegations to ensure the ability to realize organizational agility of online businesses, which is inextricably linked to the direct and indirect influences of an exogenous construct (IT governance mechanisms) mediated by endogenous constructs (IT strategic alignment and IT-enabled dynamic capabilities) and each indicator. Problem statements are consistent with research objectives, confirming the extent to which IT strategic alignment and IT-enabled dynamic capabilities, as well as their indicators, positively affect online businesses' readiness to enhance and realize organizational agility. Given the development of commerce and increased competition, these businesses have become the main option for most individuals to provide for their needs.

II. Literature Review

A. IT Governance Mechanisms

IT governance procedures are a structure developed to ensure the business IT governance is executed effectively and efficiently depending on the needs of stakeholders [19]. All stakeholders, including senior management, business users, and IT teams, must be involved in the mechanisms long-term. IT governance is a mechanism for managing and controlling IT resources [20], making strategic IT decisions, managing IT risks, and ensuring IT use and administration accountability. IT governance tools encompass institutions, processes, and relational mechanisms to improve business-IT connections [21]. They improve both business performance and IT value. It should be highlighted that an IT capability management system is linked to a strong and guaranteed foundation for preserving competitive advantages.

B. IT Strategic Alignment

All investments in infrastructure, IT skills, and management methods must be aligned with business objectives as a criterion for IT strategic alignment [22]. As a framework for managing IT resources, IT governance is required. The synchronization of business activities related to IT IT investment systems is considerably aided by the IT strategic framework [23]. IT strategic alignment has emerged as the most pressing challenge for IT professionals attempting to map business prospects, including business strategy, IT strategy, business infrastructure and processes, and IT infrastructure and processes [24].

C. IT-enabled Dynamic Capabilities

IT-enabled dynamic capabilities are talents that enable businesses to build and update their performance by analyzing market changes, responding to new opportunities, improving operational efficiency, and innovating [25]. Integrating IT into corporate processes can open new opportunities by generating and capitalizing on competitive advantages [26]. Dynamic capabilities enabled by IT include sensing, coordinating, learning, integrating, and modifying routines. Understanding suitable technology, essential technical abilities, and a willingness to optimize company operations are all additions [27].

D. Organizational Agility

Organizational agility refers to an organization's ability to anticipate and respond swiftly to environmental changes. They require swiftness in spotting new opportunities, making judgments, and carrying out appropriate activities [28]. Organizations can efficiently and successfully adapt to market changes, technology, policies, or business conditions [29]. Agility also refers to an organization's ability to adapt to and recover from changes or crises that may occur. High-agility organizations can respond swiftly and recover efficiently [30]. Organizational agility components include the organizational ability to perceive and respond to change [31].

III. Research Method

The research processes included background description, literature review, problem definition and limitation, hypothesis design, data collection and processing, data analyses, results, and conclusion [32]. Convergent triangulation with follow-up feedback was used in the results section [33]. All online businesses in West Kalimantan, Indonesia that have operated for more than five years were

included in the population. This period may represent the performance outcomes of any online business influenced by IT governance mechanisms. From July to December 2022, data was successfully collected from 258 respondents. The questionnaires were distributed electronically. The Google Forms-based random sampling technique was used.

Likert scale methods were used to analyze data, with intervals ranging from strongly disagree (Score 1) to agree (Score 6) highly. These ordinal data can eliminate the tendency for uncertainties to ensure accuracy [32]. A variety of previous studies were consulted when developing the questionnaires. Due to variances in weather, time, and location, several adaptations were required. Furthermore, the validity and reliability of all questionnaires employed were evaluated. Structural equation modeling (SEM) formulas were combined with the partial least squares (PLS) technique for analysis purposes. Conceptual models, algorithm analysis methods, bootstrapping, path diagram models, model evaluation, findings, and suggestions are all part of the SEM-PLS stages [34]. Data were dispersed using bootstrapping and examined from a normal standpoint. They were then revalidated through in-depth interviews with five heads or managers running any internet business. Key informants were chosen expressly for their exclusive and inclusive approaches. Finally, feedback was gathered to verify the results of path coefficients related to implementing IT strategic alignment and IT-enabled dynamic capabilities impacted by IT governance mechanisms toward organizational agility.

Hypotheses in research models were evaluated to determine and assess the effects on organizational agility that occurred when IT governance systems were mediated by two essential requirements in winning competitions, such as IT strategic alignment and IT-enabled dynamic capabilities. H1: IT governance mechanisms influenced organizational agility positively through IT strategic alignment; H2: IT governance mechanisms influenced organizational agility positively through IT-enabled dynamic capabilities; and H3: IT strategic alignment influenced organizational agility positively through IT-enabled dynamic capabilities. The influence of each component may reveal the strengths and weaknesses of relationships that represent the suitability of doing online business.

IV. Result and Discussion

This study's initial phase involved path analysis of the research models. The distributed data was subjected to estimation utilizing PLS techniques with bootstrapping to meet the normalcy requirements. This approach was employed to produce optimal values. The bootstrapping methodology employed an algorithm that incorporated features generating substantial resampling via the resampling-with-replacement technique. The process of resampling computation involves the selection of a random subset of rows from the original dataset, with the ability to resample each row [31]. In the context of SEM-PLS, a set of latent exogenous and endogenous variables were identified and characterized as follows: (a) IT governance mechanisms encompassed structures (ITG1), processes (ITG2), and relational mechanisms (ITG3); (b) IT strategic alignment encompassed business strategy (ITS1), IT strategy (ITS2), business infrastructure and processes (ITS3), and IT infrastructure and processes (ITS4); (c) IT-enabled dynamic capabilities included sensing (ITDC1), coordinating (ITDC2), learning (ITDC3), integrating (ITDC4), and reconfiguring routines (ITDC5); and (d) organizational agility entailed the organizational abilities to perceive (OA1) and respond to changes quickly (OA2).

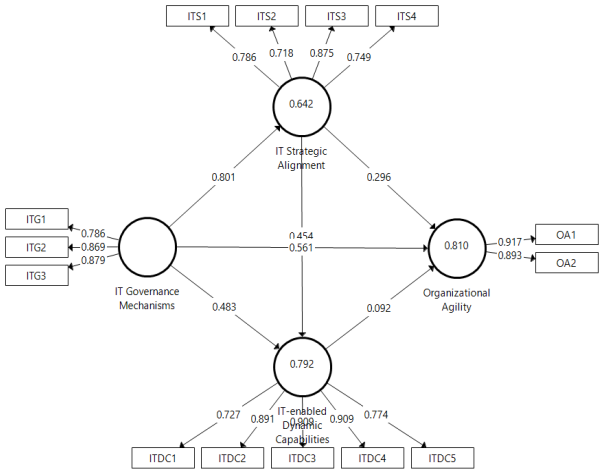

Fig. 1. Research Path Diagram

Subsequently, a series of tests were undertaken to ascertain convergent and discriminant validity coefficients, specifically in relation to Average Variance Extraction (AVE) as per the Fornell-Larcker criterion. The variance of each construct was assessed and compared to the variance attributed to measurement errors. The values reflected the extent to which average indicators demonstrated convergent validity. In other words, latent variables have the potential to account for more than half of the mean-variance seen in each indicator. The processed data from an external model revealed the effects of constructs depicted in the study path diagram (see Figure 1).

The findings from the analysis of the outer model revealed the impact of constructs on each other. The study revealed that all loading coefficients had values over 0.70 (higher than 0.70). The Fornell-Larcker criteria were employed to assess the discriminant validity coefficients. The assessment of reliability and validity in this study was conducted using Composite Reliability (CR), Cronbach's Alpha (CA), and Average Variance Extracted (AVE) values. The necessary conditions for this study include a composite reliability (CR) value greater than 0.80, an average variance extracted (AVE) value greater than 0.50, and a convergent validity (CA) value greater than 0.70, as shown by previous research [34]. Subsequently, the inner model was analyzed using the bootstrapping technique and the SmartPLS v.3.2.8 software application. The bootstrapping method was employed to derive values, and the statistical significance of indicators was assessed by examining t-scores, which indicate the presence of links between constructs in research models. An indicator is deemed statistically significant if its t-statistic exceeds the critical value of 1.96 (corresponding to a z-score with a 95% Confidence Interval (CI) of 1.96) and the p-value associated with the t-score calculation is below 0.05 [34].

Based on the results of significance tests conducted on path coefficients, it is evident that all original samples exhibited significant values and positive correlations among constructs. These associations were statistically significant, as indicated by the t-statistic values exceeding the critical value from the t-table (see Table I). An exogenous construct appears to have had a favorable impact on the endogenous factors. The current circumstances, though, did not conform to applying p-

values. The impact of IT-enabled dynamic capabilities on organizational agility was statistically insignificant ($p = 0.145$, which is more than the significance level of 0.05). Therefore, the hypothesis H6 remained unverified, which diverged from the findings of other studies [26,27]. The results of this research have the potential to make significant scientific contributions. The influence of IT-enabled dynamic capabilities on the organizational agility of online businesses was seen to be inconsistent.

TABLE I. PATH SIGNIFICANCE TESTS

Fornell-Larcker Criteria	Original Sample (O)	T-Statistic (|O/STDEV|)	P-Values
IT Governance Mechanisms → IT Strategic Alignment	0.801	32.986	0.000
IT Governance Mechanisms → IT-enabled Dynamic Capabilities	0.483	9.336	0.000
IT Governance Mechanisms → Organizational Agility	0.561	10.965	0.000
IT Strategic Alignment → IT-enabled Dynamic Capabilities	0.454	8.700	0.000
IT Strategic Alignment → Organizational Agility	0.296	6.306	0.000
IT-enabled Dynamic Capabilities → Organizational Agility	0.092	1.459	0.145

Furthermore, the adjusted R-squared values for organizational agility, IT strategic alignment, and IT-enabled dynamic capabilities were found to be 0.810, 0.642, and 0.792, respectively. Approaches to IT governance modified these three constructions in a manner that may be readily understood. In support of this assertion, the R-squared value indicating predictive significance was quite satisfactory, measuring at 0.986 (or 98.6%). Therefore, the chosen research models were suitable for predicting the values of dependent variables that were not directly observed. The remaining participants, however, were influenced by external factors that were not accounted for in the research models.

TABLE II. INDIRECT INFLUENCES

Specific Indirect Influences	Path Coefficient
IT Governance Mechanisms → IT Strategic Alignment → Organizational Agility	0.237
IT Governance Mechanisms → IT-enabled Dynamic Capabilities → Organizational Agility	0.044
IT Strategic Alignment → IT-enabled Dynamic Capabilities → Organizational Agility	0.042

The research focused on examining the relationship between research models, IT strategic alignment, IT-enabled dynamic capabilities, IT governance systems, and organizational agility in the context of online businesses. Based on the research path diagram, it can be observed that IT governance systems exerted an indirect yet favorable impact on organizational agility by means of IT strategic alignment. The path coefficient exhibited a value of 0.237, as seen in Table II. The significance of IT strategic alignment becomes apparent when considering its absence, as it can be inferred that without this construct, the potential for greater outcomes is diminished. The factor loading values for the indicators of this alignment were 0.786 for ITS1, 0.718 for ITS2, 0.875 for ITS3, and 0.749 for ITS4. The computational findings revealed that the most favorable indicator was business infrastructure and procedures (ITS3), and the least favorable indicator was IT strategy (ITS2). This observation indicates that the implementation of the IT strategy was only partially executed. The primary emphasis was placed on the product's availability, the market's development, and the application's preparedness to facilitate each transaction. In essence, it can be understood that information technology served solely as a mechanism for the execution of commercial transactions. The present research yielded contrasting results to previous research [22, 24], which underscored the limited influence of IT strategic alignment on organizational agility, specifically in the effective alignment of business and IT strategies to provide seamless online business operations. This phenomenon may arise due to limited adaptability, insufficient emphasis on innovation, and inadequate management engagement.

In addition, the path coefficient of indirect but positive IT governance mechanisms on organizational agility via IT-enabled dynamic capabilities was 0.044 (see Table II). Clearly, without IT-enabled dynamic capabilities, it could be improved, as this mediating structure was insignificant. Indicators of these capabilities had factor loadings of 0.727 (ITDC1), 0.891 (ITDC2), 0.709 (ITDC3), 0.709 (ITDC4), and 0.774 (ITDC5), respectively. Calculation results revealed that the indicators with the highest values were learning (ITDC3) and integrating (ITDC4). In contrast, the lowest one was associated with sensing (ITDC1). It became apparent that IT-enabled dynamic capabilities could not respond rapidly to the fluctuating demands for online-traded products. Moreover, this discovery differed from previous research [23,25]. It was noted that IT-enabled dynamic capabilities mediating IT governance mechanisms for organizational agility lacked synergy, management supports and resources, and IT knowledge about synchronization and interoperability of conducting online businesses.

Similarly, the path coefficient of indirect, positive effects of IT strategic alignment on organizational agility via IT-enabled dynamic capabilities was 0.042 (see Table II). Even though IT-enabled dynamic capabilities did not function as a mediating construct because they were insignificant, it was better. Their indicators had factor loading values of 0.727 (ITDC1), 0.891 (ITDC2), 0.909 (ITDC3), 0.909 (ITDC4), and 0.774 (ITDC5), respectively. The strongest indicators were learning and integration (ITDC3 and ITDC4, respectively). During this time, the worst was sensing (ITDC1). Consequently, IT strategic alignment and governance mechanisms that excluded mediation of IT-enabled dynamic capabilities still possessed adequate path coefficients. The insignificance of indirect influences on organizational agility was attributable to several factors, including defects in measurement mechanisms, relationships between sensing and other unmeasured variables or diverse business contexts, and patterns in responding to IT-related changes. Nonetheless, capabilities to collect and analyze business data and comprehend market trends and new business opportunities were still emphasized. This result contradicted prior research [17,18]. In this instance, IT-enabled dynamic capabilities had a negligible effect on the organizational agility of online businesses. IT-enabled dynamic capabilities were impacted by both strategic alignment and governance mechanisms. IT and business strategies effectively supported business objectives. Nonetheless, IT governance mechanisms played crucial roles

in ensuring that IT investments were made in accordance with online business strategies, manageable IT-related risks, and protected data.

The tested hypotheses referred to the influence of implementing IT strategic alignment and IT-enabled dynamic capabilities, with or without the mediation of IT governance structures, on the organizational agility of online enterprises. Despite this, there were only minor contributions to implementation. The path coefficient was smaller than the one on the direct effects of IT governance measures on organizational agility [21]. IT strategic alignment and IT-enabled dynamic capabilities were substantially associated with IT governance mechanisms that actualized the dependability of organizational agility of online businesses. IT governance mechanisms, particularly relational mechanisms, had the highest factor loading (ITG3 = 0.879). The representation was associated with how online businesses build and maintain effective relationships with others, cross-departmental work teams formed to ensure the success of IT projects, IT service patterns adapted to online business needs, and developing strategic partnerships with vendors, customers, and regulators.

IT strategic alignment and IT-enabled dynamic capabilities were two important interrelated concepts contributing to the success of online businesses. The former was oriented toward the strategy suitability of businesses and IT [20]. It assured the availability of IT to support business goals in achieving competitive advantages, contributed to online business optimization through IT performance, and increased operational efficiency. On the other hand, the latter referred to organizational abilities to change quickly and adapt easily to the business environment [25]. It primarily responded to rapidly changing trends and business environments regarding consumer behavior or new competition. The prerequisite of orientation relationships of both constructs was the adaptation of IT strategy. There should be efforts to ensure that IT-supported online business goals [27] to increase the flexibility and adaptability of operating system changes. IT strategic orientation created usability values in current and upcoming conditions.

Besides, the interoperability of implementing IT strategic alignment and IT-enabled dynamic capabilities significantly influenced online businesses. The former was associated with compatibility and synchronization between the strategy of businesses and IT, while the latter referred to organizational abilities to use IT to adapt to changes in online business environments quickly [27,29]. IT strategic alignment was the backbone of carrying out and managing the online businesses. The presence of IT in facilitating rapid adaptation allowed companies to receive real-time information and take preventive actions [30]. In this context, IT governance became another element enabling the business management to monitor processes and adequacy of IT and take opportunities and actions to support the implementation of organizational agility.

Feedback was further collected to obtain more accurate results compared to previous analyses. Similar questions were given to five previously determined informants. Most conveyed that IT strategic alignment could create necessary conditions for IT-enabled dynamic capabilities. This was indicated by the path coefficient of 0.454 (greater than the one representing its influence on organizational agility). Nevertheless, IT-enabled dynamic capabilities insignificantly influenced organizational agility. To achieve online business success, compatibility between the streategy of businesses and IT and business capabilities to rapidly adapt to changing business environments should be strengthened. This research was limited in terms of all businesses conducted online. It was obvious that types of products were not differentiated. Also, the data sample was represented by several respondents only living in West Kalimantan, Indonesia. Finally, data collection periods tended to be short.

V. Conclusion and Future Research

The evidence suggests that IT strategic alignment significantly and positively influences organizational agility through IT-enabled dynamic capabilities. Conversely, they insignificantly influence the agility of online businesses. It is strongly linked to abilities to collaborate and synergize with IT strategic alignment. There are, therefore, direct influences on organizational agility. This study can be continued by classifying the types of products and adding more respondents grouped based on business categories. There has been no realization that conducting online business relies on implementing IT strategic alignment and readiness to realize organizational agility.

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