

Enhancing Business Agility: The Effects of IT Capability and Digital Transformation

1st Sandy Kosasi
Information System
STMIK Pontianak

Pontianak, West Kalimantan, Indonesia
sandykosasi@stmikpontianak.ac.id

2nd Yudhi Fajar saputra
Computer Science
Universitas widya gama mahakam
Samarinda, Indonesia
fajaryudhi@uwgm.ac.id

3rd Susanti Margaretha Kuway
Information System
STMIK Pontianak
Pontianak, West Kalimantan, Indonesia
shantykuway@stmikpontianak.ac.id

4th I Dewa Ayu Eka Yuliani
Information System
STMIK Pontianak
Pontianak, West Kalimantan, Indonesia
dewaayu.eka@stmikpontianak.ac.id

5th Utin Kasma
Information System
STMIK Pontianak
Pontianak, West Kalimantan, Indonesia
utin.kasma@yahoo.co.id

6th Budi Susilo
Information System
STMIK Pontianak
Pontianak, West Kalimantan, Indonesia
budisusilo.stmikptk@yahoo.com

Abstract—Digital technology with IT capability support has been a significant driver of digital Transformation, leading to changes in business operating systems and customer, supplier, and stakeholder interactions. Nevertheless, there needs to be more previous research literature that discusses the impact of IT capabilities on enhancing family SME business agility through digital Transformation. The research aims to explore and confirm the extent to which digital Transformation has an effect and a positive influence on improving its agility—convergence triangulation research method with explanatory design through follow-up explanation. The research population comprises a family of small and medium-sized enterprises that have been managing the business for over five years. The questionnaires were distributed to 185 respondents online using random sampling techniques, and only 163 responded, with a response rate of 88.11%. Data processing with Likert scale and analytical tools using SEM-PLS. The research showed that small and medium-sized enterprises are heavily influenced by IT flexibility and IT integration, mediated by digital Transformation to improve operational efficiency, customer service, and opportunities to reach broader markets. Building IT integration requires the involvement of digital transformation processes in increasing business agility. While IT flexibility does not need to be supported by the digital Transformation process.

Keywords—IT Capability, IT Flexibility, IT Integration, Digital Transformation, Business Agility.

I. INTRODUCTION

Increasing reliance on information technology (IT) and the need to adapt to the rapidly changing digital landscape have given rise to the concept of digital transformation. Digital transformation refers to redesigning strategies, operations, and business processes by leveraging the power and capabilities of digital technology [1]. This condition has changed patterns and how to operate, interact, and build personalized relationships with customers, suppliers, and stakeholders [2]. Successful digital transformation improves business agility notwithstanding organizational IT capacity management readiness [3]. Digital transformation and IT capabilities play an important role in improving business flexibility. It enables organizations to adapt, respond to changing market dynamics, and quickly respond to customer needs [4]. Achieving business flexibility depends on digital transformation, digital skill readiness, continuous learning, and cross-departmental collaboration. Given all small and medium-sized enterprises (SMEs) run by families, it is still rare to switch to implementing digital transformation [5, 6].

It's interesting to observe that the rapid advances in digital technology in recent years have led to the switch to digital transformation to become more agile. This transformation allows the business world to adapt to changing markets and take advantage of various new business opportunities [7]. While investing in digital transformation can bring long-term benefits, there are concerns about the initial costs and risks of adopting digital technology. Given that the small and medium-sized enterprise managers of the family still do not understand the knowledge and capabilities of IT, the uncertainty of the return on investment value of the use of digital technology, the lack of change, and the risk of digital innovation will affect the overall loss of business, the limitations of financial resources, patterns, and management systems still depend on seniority in the family hierarchical structure, already feeling comfortable with the existing work mechanisms, lack of understanding or limitation of knowledge about the technologies of digitalization, and bound by the cultural heritage that remains very strong as well as the way of work that has been proven throughout this time. When there is a change in the way of working, it can arouse perception and be seen as a threat that destroys the harmony in the family [8, 9]. Senior family members or those with longer working experience may not fully understand the importance of digital transformation. Owners are already accustomed to how they run traditionally and are afraid or unsure of the proposed shift in the direction of digital transformation. Moreover, a family SME business may not have sufficient funding to invest in the IT infrastructure capabilities needed to carry out digital transformations effectively. [10].

Empirical studies from previous research showed that digital technology has had a positive effect, revolutionizing business processes through digital transformation and IT capabilities and enhancing competitiveness [11]. Digital transformation has the potential to drive inclusive and sustainable growth by driving service innovation to become more flexible while creating new opportunities for families [12]. Through digital transformation, families can grow more flexibly to launch a range of new services and products facing competitive challenges. Adapting quickly is crucial to adopting digital transformation in organizing and integrating more dynamic change to build family business agility [13]. It is also worth noting that the increasing proliferation of digital technology has been an important catalyst for consolidating digital transformation in recent decades. However, previous research still shows gaps where there is no literature

specifically dealing with the impact of IT capabilities and digital transformation in improving the agility of small and medium-sized families.

Referring to the initial survey, it is not far from reality that the average small and medium-sized family business in Western Kalimantan rarely performs digital transformation, increasing its agility. This situation is surprising given that research on the innovation of applying the digitization of family in the digital age is needed to improve competitive advantage and resilience to economic decline [14]. Digital technology motivates more inclusive and sustainable growth by driving innovation, generating efficiency, and improving services while creating new opportunities. This condition especially applies to SMEs and Families with the external environment and involving digital ecosystem stakeholders [15]. However, it hasn't formally implemented much of its own digital technology within the IT department and is largely dependent on the respective work units [9]. This condition shows that the small and medium-sized enterprises of the family have not all implemented the IT capabilities to carry out the digital transformation process. The family SME business has the potential for market growth and investment opportunities that are very promising because it borders the neighboring country of Malaysia. It provides an alternative opportunity for small- and medium-sized enterprise family growth to establish communications and personalized relationships with customers at home and abroad and enhance multinational competitiveness. Moreover, all this time, research discussions on IT capabilities and digital transformation focused only on the company's performance [10], and not yet or still rarely, there is an effort specifically associated with efforts to increase the agility of small and medium-sized enterprises' family businesses.

This research has become interesting given that most of the previous research findings have yet to be attempted to explore and re-confirm to any extent the impact of the influence of IT capabilities and digital transformation in improving the agility of small and medium-sized enterprise families. Given that research has been more focused on improving business performance in general without directly linking the digital transformation process [16]. Generally, previous research has tended to rely on the assumption that private business organizations work mechanistically according to business processes and work standards throughout [17]. This statement reflects the gap or novelty associated with research over the years, where the average has not yet been weighted on IT capabilities and is directly linked to digital transformation as a whole. This innovation is crucial to know the extent to which the impact of IT capabilities increases the agility of small and medium-sized families through digital transformation and, at the same time, as a scientific contribution to the far-reaching role of the presence of digital transformation processes for low-tech family SMEs.

As for the formulation of the research problem of connectivity, there is a presumption to ensure the ability to realize the agility of small and medium-sized enterprises of the family, where it is not independent of the consequences of the direct or indirect influence of any exogenous construction is a mechanism of IT capacity. It is mediated by the endogenous construction of digital transformation with each indicator. This objective is crucial given the highly competitive business and competitive situation demanding

that small and medium-sized enterprises and families become more flexible.

II. LITERATURE REVIEW

A. IT Capability (IT Flexibility & IT Integration)

IT capabilities are the ability of organizations to effectively and efficiently utilize IT resources, infrastructures, and systems to meet their goals and gain competitive advantages [18]. IT capability includes IT flexibility and IT integration. These two elements are closely linked to quickly adapting applications and platforms to changing market demands or internal business policies. IT Flexibility is the ability and ease of adjusting the level of IT services to constantly adapt to business changes quickly and effectively [19]. IT capacity support is required to connect different systems, applications, and IT resources to create essential unity and collaboration. IT Flexibility also provides easy accessibility, scalability, and adaptation to change [20]. IT integration is needed not only from the needs side and support for the flow of information from different work units across departments but also leads to the smooth flow of resources and speed in its responsibilities [21]. Integrated IT systems eliminate duplication from various parties so that it is easy to interact with other business functions, help organizations reduce the time required to respond to changes in market demand, and make businesses more responsive [22]. Combining these two elements makes IT capabilities essential to ensuring they can become more flexible.

B. Digital Transformation

Digital transformation refers to integrating digital technology into all business areas, resulting in fundamental changes in operations and customer value delivery [23]. Transformation involves not only the adoption of digital tools and technologies but also a shift in the mindset and culture within organizations. Digital Transformation not only replaces manual processes with technology but also transforms the culture and thinking of organizations to make the most of the power of digital technologies. It includes organizational restructuring and creating an environment that supports innovation and adaptation [24]. Moreover, digital transformation is driven by the need to adapt to the digital age and meet market demands. Digital transformation involves integration in all aspects of business, resulting in fundamental changes in the operation and delivery of customer value.

C. Business Agility

The ability of an organization to adapt and respond to change quickly and effectively in a changing business environment. It makes it easier for organizations to create and implement innovations. It helps organizations respond more to customer feedback, improves products and services faster, and increases customer satisfaction [25]. Flexibility refers to the ability of an organization to survive and recover from changes or crises that may occur in a business. An organization with high flexibility can respond quickly and recover efficiently [26]. Business flexibility consists of two dimensions: the ability to rapidly sense and respond to change to adapt and remain competitive in a turbulent environment [27].

III. RESEARCH METHOD

The research population comes from a small and medium-sized enterprise belonging to a low-tech family. It has been running its business for over five years and is limited to the West Kalimantan region. Given the time frame set, it is possible to represent the performance of every small business belonging to the family without distinguishing any business. Primary data was obtained through surveys from July to December 2023 by distributing questionnaires to 185 respondents online using random sampling techniques in the form of Google Forms, and only 163 responded fully, with a response rate of 88.11%. The time frame represents a mechanism using digital technology in running a family-owned SME business. Two forms of questionnaires were developed, namely for IT managers and any business organization. IT managers are asked to assess the use of IT, including IT flexibility, IT integration, and digital transformation, while business managers are asked to answer questions about business agility. The research method combines the convergence triangulation model with explanatory design through follow-up explanation [28]. The research phase begins with background, library review, problem formulation, hypothesis design, data collection and processing, data analysis, results, and conclusions [29].

The data was processed using the Likert scale method, which ranges from very disagreeable (score 1) to very agreeable (score 6). This method was chosen to ensure the accuracy and certainty of the data by overriding the tendency factor of doubt. The analysis used structural equation modeling (SEM) with a partial least square (PLS) approach. The SEM-PLS phase included conceptual modeling, algorithm analysis, bootstrapping, pattern diagram models, model evaluation, and conclusion drawings and suggestions. The data distribution technique used bootstrapping from the normal side. The re-validation process involved in-depth interviews with five SME business leaders from the family. These key informants were selected based on an exclusive and inclusive approach, and their feedback was used to re-confirm the track coefficient value analysis results related to the impact of IT Capability and digital transformation in improving business agility.

The research hypothesis was designed to test how the impact of IT Capabilities, including IT flexibility and integrity, can enhance business agility through the mediation of digital transformation. The hypothesis includes: H1-IT flexibility has a positive impact on increasing business agility; H2-IT integrity positively influences business agility; H3-IT flexibility has a positive effect on enhancing business agility mediated by digital transformation. These hypothesis tests were conducted to assess how business agility can be increased with the involvement of digital transformation, a crucial factor in winning competition. Each construction of the hypothesis shows the strengths and weaknesses associated with representing IT Capability to enhance the flexibility of family-owned SME businesses.

IV. RESULT AND DISCUSSION

A series of discussions on the research results began with the stage of conducting path coefficient analysis. Based on the analysis results, estimates are made using the PLS Algorithm method and the bootstrapping process to obtain the optimal value of the data spread in meeting the normality assumption. Then, bootstrapping is done using an algorithm

that creates several sub-samples using a method known as sampling with substitution. (resampling with replacement). Each resample contains a randomly selected order of rows from the original data set, with each row and can be selected again [30]. Referring to the SEM-PLS model, the study has a latent exogenous and endogenous variable construction covering IT capabilities (IT flexibility and integration), digital transformation, and business agility. Each construction has an indicator based on several previous literary studies.

The outline of each construction and its indicators consists of: (a) IT flexibility construction [19] covers IT systems that are easily adapted to new business functions (ITF1), IT systems can be easily expanded to accommodate new functions or applications (ITF2), IT systems allow for integrated access to business data (ITF3), all IT systems are connected smoothly (ITF4); (c) IT systems have modular software components that can easily be reused in other business functionality (ITF4); (b) IT integration design [19] includes IT systems which are easily utilized to integrate business processes (ITI1), IT system enabling integrated Access to Business Data (ITI2); (d) digital transformation construction [24] covers the ability of an organization to monitor change, identify problems and opportunities and formulate digital transformations (DT1), the ability to organize the alignment of business resources with the digital needs of an organisation (DT2), the ability for an innovative digital resource functionality to facilitate pro-innovation (DT3); (DBA) covers its ability to meet the needs of a rapidly changing marketplace, and the organization's ability to refine its business needs as well as possible (BA) [19]; (BA3).

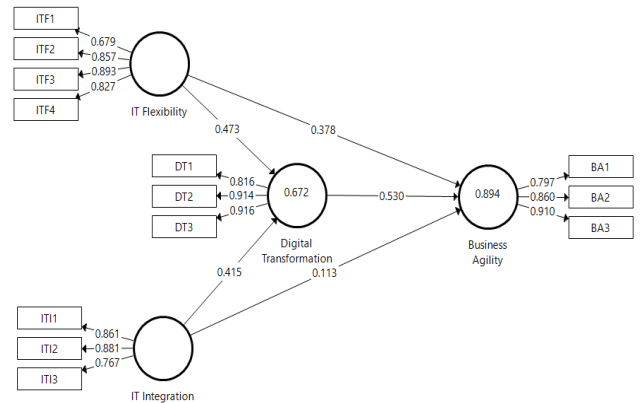


Fig. 1. Research Path Diagram Model

The outer analysis of the model shows the specification of the relationship between the latent variables with each indicator represented through the research path diagram model (see Figure 1). However, based on the outer model calculations, there is one indicator on the construction of IT flexibility, i.e., the IT system can easily be adapted to the new business function (ITF1) only has a loading factor value of 0.679. Hence, it needs to be removed from the model of the research route diagram because it is smaller than the minimum limit of 0.70 [30]. Further re-calculation of the PLS algorithm shows all coefficient values of the path undergoing significant changes. (see Figure 2).

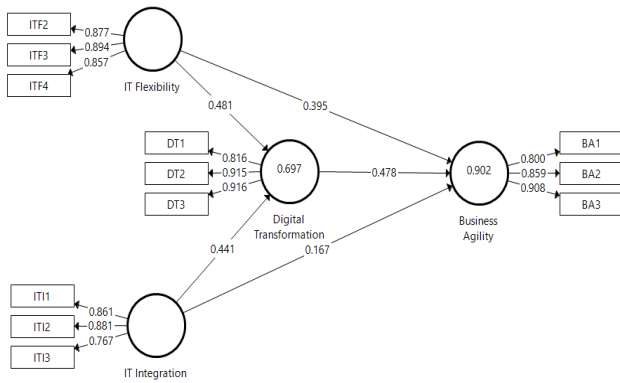


Fig. 2. Revised Research Path Diagram Model

The next step to determine convergent and discriminant validity values is a validity test using the result of calculating the average variance extracted (AVE) based on the Fornell-Larcker criteria. The AVE value measures the number of variances each construction can capture compared to the variants caused by measurement errors. Table I shows all the results of the validity tests discriminating from each construction. Table II shows the results from the reliability and validity testing based on the calculations of Composite Reliability (CR), Cronbach's Alpha (CA), and AVE values. The determination is that the calculation value of CR must be greater than 0.80, the calculating result of Cron Bach's Alfa must be larger than 0.70, and the calculated value of AVE must be higher than 0.50 [30]. All these values must be met to obtain good reliability and validity values.

TABLE I. DISCRIMINANT VALIDITY

Fornell-Larcker Criterion	BA	DT	ITF	ITI
Business Agility (BA)	0.857			
Digital Transformation (DT)	0.903	0.883		
IT Flexibility (ITF)	0.865	0.762	0.876	
IT Integration (ITI)	0.776	0.748	0.639	0.838

TABLE II. RELIABILITY AND VALIDITY OF CONSTRUCTS

Fornell-Larcker Criterion	CA	rho_A	CR	AVE
Business Agility	0.818	0.826	0.892	0.734
Digital Transformation	0.859	0.873	0.914	0.781
IT Flexibility	0.848	0.849	0.908	0.767
IT Integration	0.796	0.843	0.876	0.702

The next step is to perform an internal model analysis using bootstrapping techniques and the SmartPLS application v.3.2.8. The bootstrap process is performed to test the significance of the indicators of each structure, and the value of the t-value calculation is used to test whether there are influences and enter constructive relationships of the research model. An indicator is stated as significant if the T-Statistics value is greater than 1.96 (z-score on confident interval (CI) 95% = 1.96), and the probability value of the result of the t-value calculation must be less than 0.05 [30]. Based on the test of significance, the coefficient of the path shows all the original values of the sample t-statistics obtain a positive value, and the relationship between the constructs has a t-static value > t-table. (see Table III).

TABLE III. PATH SIGNIFICANCE TEST

Fornell-Larcker Criterion	Original Sample (O)	T-Statistic ((O/S TDEV))	P-Values
Digital Transformation → Business Agility	0.801	32.986	0.000
IT Flexibility → Business Agility	0.483	9.336	0.000
IT Flexibility → Digital Transformation	0.561	10.965	0.000
IT Integration → Business Agility	0.454	8.700	0.000
IT Integration → Digital Transformation	0.296	6.306	0.000

This condition reflects a positive and significant value relationship, meaning exogenous constructions have influences and relationships with endogenous ones. So, increasing the flexibility of small and medium-sized families needs to prepare IT capabilities that cover IT flexibility, IT integrity, and mediated digital transformation. The findings show that small and medium-sized SME family business owners already understand and adopt digital technology to improve operational efficiency, customer service, and opportunities to reach a broad market. This study reflects a novelty where previous research has rarely linked the influence of digital transformation to increase the flexibility of small and medium-sized enterprises belonging to families [11, 23, 24]. On the other hand, digital transformation increasingly strengthens the flexibility of small and medium-sized enterprises in the family. (see Table III). This condition can also be a scientific contribution, where the long-standing assumption that small and medium-sized families are difficult or very resistant to adopting and applying digital technology has yet to be proven. This R Square value is to test the Goodness of Fit model, and the R Square-Adjusted calculation shows that business agility and digital transformation are competing values of 0.900 or 90% and 0.693 or 69.3%, respectively. This value interprets business flexibility as strongly influenced by the flexibility of IT and IT integration mediated by digital transformations. (fleksibilitas IT dan integrasi IT).

The result of calculating the R Square predictive relevance value is 0.970 or 97%, which means that this research model has a very large, reliable, and valid predictive relevance to be used in predicting the values of other dependent variables that have not been observed from this study model. Constructions outside of this research model influence the rest.

TABLE IV. INDIRECT EFFECTS

Specific Indirect Effects	Path Coefficient
IT Flexibility → Digital Transformation → Business Agility	0.230
IT Integration → Digital Transformation → Business Agility	0.211

Based on the research results on the extent to which the impact of digital transformation mediates the construction of IT flexibility and IT integration, it affects the flexibility of businesses in running small and medium-sized enterprises

and family businesses. Referring to the pattern diagram model, research shows that IT flexibility and IT integration have an indirect and positive impact on improving the business agility of small and medium-sized enterprises mediated by digital transformation processes with pattern coefficients values of 0.230 and 0.211 (see Table IV). These values reflect that without going through digital transformations, the flexibility of IT has a higher pattern factor value. This situation reflects the digital transformation, which shows no significant influence on mediating IT flexibility and improving the agility of small and medium-sized enterprise families. The loading factor values of each digital transformation construction indicator are 0.816 (DT1), 0.915 (Dt2), and 0.916 (DT3). The calculation values show the highest indicator: an organization's ability to innovate in sustainable digital resources. In contrast, the lowest values exist in the organization's ability to monitor change, identify problems and opportunities, and formulate digital transformations. This situation is reflected in running small and medium-sized enterprises business. Yet, all can monitor changes in real-time, limitations on the knowledge side of adopting digital technologies, need for standardization patterns of digital service provision, still low digital skills, inadequacy of digital infrastructure, and resistance to changes in work culture. Lack of support and unflexible management from management and family SME business owners can also be obstacles to implementing digital transformation effectively. This finding differs from previous research [31, 32], where digital transformation is vital in improving organizational agility and is also necessary for the scale of small and medium-sized families. Furthermore, the indirect influence of IT integration in improving the agility of small and medium-sized enterprises through digital transformation is very significant. This finding further reinforces previous research studies [5, 6, 12], where IT integration cannot stand by itself and must be integrated with digital transformation. Given the coefficient value, the line is higher than without digital transformation. So, with the impact of IT integration, operational efficiency can be improved by reducing data redundancy, accelerating the flow of information, and removing barriers to interdepartmental coordination.

Further, referring to the value of the line coefficient of each construction, the highest value exists in terms of the influence of IT flexibility. It does not differ far from the IT integration towards the digital transformation of 0.481 and 0.441. All these values greatly reflect their influence in ensuring success and smoothness and improving the agility of the family SME business in every operational activity. IT flexibility directly and positively impacts business agility related to family SME business research with a line coefficient value of 0.395. This value reflects a more significant impact than through digital transformation of 0.230. However, this value differs from the direct and negative effects of IT integration in increasing the business flexibility related to SME family business research, where there is only a line factor value of 0.167. This finding also shows that there are differences related to treatment from the process of digital transformation. This fact differs from previous research [12, 18], which states that organizational agility is heavily influenced by digital transformation without any difference in the type of field of business. In this context, IT integration strongly requires the involvement of digital transformation processes to increase business agility. At the

same time, IT flexibility is little needed to be supported by the process of Digital Transformation. This condition represents that digital transformation can provide flexibility and increase business agility.

From the construction side, digital transformation seems to have a very significant role, where it is directly influenced by the construction of IT flexibility and IT integration with a positive value. This construction is an important contribution to improving the agility of small and medium-sized family enterprises. Further reference model research shows that business agility in the field of small and medium-sized enterprise families is significantly influenced by digital transformation, with a line coefficient value of 0.478. The existence of digital transformation with the ability and ease of adjusting the level of IT infrastructure services to adapt to the changes in running a small and medium-sized enterprise family. Allows for the development and launch of new products and services quickly. Connecting different systems, applications, and IT resources into a vital and collaborative unity. Easy access to real-time information from various data sources, faster and more accurate decision-making by directly accessing up-to-date data on market conditions, inventory, and business performance digitally.

Feedback will then be provided to get a more accurate result from the previous analysis. The same questions were asked of the specified five informants through the focus group discussion. The average delivery of digital transformation allows a family SME business to increase its agility. Processes and collaboration are becoming simpler, and decisions can be made faster. In addition, digital transformation allows every small and medium-sized enterprise family to collect and analyze data in real time. This research is limited to interconnections and interconstructions to confirm the impact and influence of digital transformation in improving business agility with a focus on family SMEs without further phases of analysis of each indicator and interpretation of the value of the path coefficients.

V. CONCLUSION AND FUTURE RESEARCH

Digital transformation has a significant role and influence in improving the flexibility of managing a small and medium-sized family business. Digital transformation is needed given its very significant role, which is directly influenced by the construction of IT capabilities that include IT flexibility and IT integration with positive value. It is an important contribution to improving the agility of small and medium-sized family enterprises. Research can continue to find more specific inter-constructive relationships, including analyzing the respective route coefficient values of the influence of IT flexibility and IT integration through digital transformation in improving the agility of small and medium-sized enterprises and family businesses. In addition, it can be clarified by adding scale coverage and type of each type of SME product and adding more quantity and characteristics of respondents according to the category of every kind of business.

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