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Effect of sustainability readiness on digital transformation adoption in SMEs

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KEYWORDS

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ABSTRACT

SMEs face the problem of sustainability and readiness to implement digital transformation as part of the industrial revolution. Therefore, a process is needed to identify sustainability factors that can increase the readiness of SMEs to adopt digital change. This study aims to determine the influence of sustainability factors in the form of people, process, and technology that influence SMEs' readiness to adopt digital transformation. The research object is SMEs in various sectors with a literature study approach to develop a conceptual framework and data collection using a questionnaire. Construction testing and data analysis used statistical methods from confirmatory factor analysis, while the data testing process used the Partial Least Square (PLS) method. The results of the study show that toward international orientation (IO) and digital transformation readiness (DT), the sustainable people (SPe) and sustainable process (SPo) factors have a substantial direct influence. However, on the contrary, the sustainable technology factor (STe) has a weak direct impact. In comparison, the IO factor has a significant effect on DT. As a mediator of DT, IO has an invalid role in mediating SPe and STe but significantly mediates SPo. The results also show that an independent attribute of 71.4% influences DT. While IO has an independent attribute effect of 49.4%.

Introduction

The development of the industrial world has now reached the industrial era of 4.0. This era arises due to the human desire to achieve progress in living standards by utilizing technology to increase process efficiency. The primary key to the industrial era 4.0 is digital transformation, namely changes in digital technology that play a role in revolutionizing business and industrial processes and being a driving force for innovation within companies. It affects not only the results of innovation but also how individuals are involved in the innovation process and the interactions and activities carried out (Hadjielias et al., 2021). Therefore, the ability of the workforce to understand the values of technology initiatives and their role in the transformation of creative and flexible business models is essential in the era of globalization.

Large-scale industries and small-medium enterprises (SMEs) are currently facing digital transformation. SMEs are expected to increase their competitiveness and adapt to the unpredictable business environment. To remain competitive and relevant, SMEs must adopt automation and digital technologies embedded in Industry 4.0. According to Ginevičius and Ostapenko (2015), a company can thrive if it continues to adapt to an ever-changing environment and understands the potential impact of environmental factors on its performance results as early as possible. Companies need to adapt the use of technology to change the business environment. However, despite the increasing interest in adopting and implementing digital technologies in enterprises leading to intelligent manufacturing. Only a few SMEs, even in countries worldwide, have managed to overcome the complexities and challenges of a successful migration to Industry 4.0.

SMEs often face challenges in achieving increased productivity in their operational processes. This challenge leads to decreased productivity, competitiveness, and profitability, even though SMEs are essential in developing the country's economy. With the influence of

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technology and automation in a competitive business environment, SMEs that cannot adapt to the requirements of technological evolution become uncompetitive (Türkeş et al., 2019). Their challenges include a lack of investment and workforce skills, especially those related to information systems. On the other hand, large companies have better resource spending when compared to SMEs, leaving them less burdened to make the necessary transitions (Lee et al., 2014). SMEs need to be aware of learning and adopting new technologies that will provide significant benefits in the future and help them survive in a global environment (Türkeş et al., 2019).

The power of digital transformation lies at the human level as the executor. Digital transformation readiness is defined as the level of readiness of employees in an organization undergoing technological transformation or digitalization (Limani et al., 2019). It shows whether the employee has the skills to use information technology, the right behavioral tendencies, and the cognitive abilities to manage the transformation effectively. Therefore, continuous efforts are needed from companies covering aspects of the workforce (people), production and managerial processes (process), and use of technology (technology) (Verhoef et al., 2021), which are the primary resources of SMEs to create new conditions in which humans can collaborate with technology to start a new work culture.

In the broadest sense, sustainability refers to continuously maintaining or supporting a process over time. In business and policy contexts, sustainability seeks to prevent the depletion of natural or physical resources so that they will remain available for the long term. Sustainability is the center of attention nowadays because it aims to continuously meet human and environmental needs (Hübel et al., 2022). Sustainability consists of economic, environmental, and social dimensions (Khan et al., 2021). In SMEs, sustainability is essential to the country's economic development. SMEs can increase industrial productivity related to industrial sustainability, where industrial sustainability involves various parties, including employees as individuals who work in it (Artin, 2022). This condition needs attention because it can be used to develop alternatives and opportunities to prepare for future life (Do et al., 2022). Sustainability can be classified into several types depending on its associated objects, such as the business environment, organizations, and employees (Amui et al., 2017). In SMEs, sustainability is essential in preparing organizations or businesses to develop and expand local and international markets.

However, international orientation in most SMEs is still not the main focus. The internationalization process is complicated for SMEs because they need more knowledge and experience to introduce SME products to international markets (Cahyadi, 2015). Lack of information about potential markets makes SMEs reluctant to undertake risky expansion, resulting in delays in the internationalization process. The lack of supporting infrastructure, such as weak transportation connectivity and logistics systems, also hinders business growth in Indonesia. Besides, limited human resources caused by a lack of motivation, skills, and ability to take over knowledge and technology management also become obstacles to increasing awareness of international orientation. As a result, SMEs cannot increase efficiency, productivity, and product quality.

The internationalization process provides opportunities for SMEs, such as exporting, entering new markets, and collaborating abroad. Along with the rapid growth of networks and communications between countries, SMEs have the opportunity to enter international market competition. SME products that previously only circulated in the local market must be able to improve their quality to have export standards. Exports positively impact a country's economic development, and exporting companies usually have higher productivity than those that do not export (Achtenhagen, 2011). SMEs can increase industrial productivity related to industrial sustainability, which involves various parties, including employees as individuals who work in it, so applying the sustainability concept can increase market orientation in companies (Wahid & Zulkifli, 2021). Implementing sustainability concepts can improve the performance of SMEs, whereby by improving sustainability readiness, SMEs can reduce costs, increase efficiency, and improve their reputation, increasing competitiveness and profitability (Prasanna et al., 2019). Sustainability readiness in SMEs is essential to increase the size and network of the organization, advance the sustainability trajectory, assess business sustainability, drive innovation, and measure the potential for green innovation. By focusing on people, processes, and technology, SMEs can integrate sustainability practices into business operations, contribute to sustainable development, and increase their competitiveness in the market (Sohns et al., 2023).

SMEs who decide to internationalize need to pay attention to the differences between export activities in the digital era and export activities a few years ago, where export-import activities in the Industry 4.0 era mean that we also have to think about how to sell and promote them, whereas, in the past few years, Import-export activities only focus on what kind of products are sold. SMEs need to consider the technology needed, including digitalization, such as the use of e-money (to facilitate interaction and distribution with business partners to transactions without wallets), and the use of platforms with large market shares, such as INA Access, eBay, Amazon, Rakuten, which can be used to introduce local Indonesian products abroad.

Seeing the importance of the relationship between sustainability, international orientation, and digital transformation, this research aims to enrich the literature on this concept by identifying how sustainability factors can increase the readiness of SMEs in preparing for international orientation and adopting digital transformation. This empirical study has the following specific objectives: (1) to examine sustainability factors in the form of people, processes, and technology that positively influence the international orientation and adoption of digital transformation in SMEs; and (2) to examine the role of international orientation, both directly and as a mediator, on readiness to adopt digital transformation. Factors influencing the readiness to adopt digital transformation in SMEs are identified, and the influence mechanisms are analyzed empirically using structural equation models. This research helps fill the gap in the limitations of digital transformation adoption readiness measurement models that comprehensively measure indicators of sustainability readiness and international orientation in SMEs.

Research and Methods

The research was conducted in multi-industry (food and non-food sectors) in Malang City, East Java. The research was conducted from March to November 2022. The method used in this study is quantitative, namely Partial Least Square-based Structural Equation Modeling (PLS-based SEM). This technique provides a flexible framework for developing and analyzing complex relationships between multiple variables, enabling researchers to test the validity of theories using empirical models. In addition, PLS is a powerful analysis method because it can be applied to all data scales and does not require many assumptions. Besides confirming the theory, PLS can also build relationships without a theoretical basis or test propositions (Hair et al., 2014).

Data collection

The research data used are primary data and secondary data. Primary data was obtained from Observation, In-depth interviews using the Participatory Action Research (PAR) approach (to collect information on existing problems and potentials objectively and directly to respondents) (Fogg et al., 2022), questionnaires, and documentation. Secondary data is obtained from data sources from the authorities and other sources like books and documents. The selected respondents are business actors (owners and employees), both food and non-food SMEs in Malang City. Selection of respondents using a purposive sampling method. Purposive sampling is a sampling technique from data sources deliberately based on specific considerations. The total number of respondents is 107 SMEs in Malang City. Respondents in this study were selected using random sampling techniques, namely selecting a workforce from selected SMEs according to the research boundaries, namely SMEs-scale creative industries engaged in the goods and services sector with a minimum business length of 5 years. The research object in the case study is the creative industry in the goods sector, such as the culinary, fashion, and craft industries. In addition, case studies were also conducted on service sector creative industries, such as the video, film, and photography industry, technology application and development, and advertising.

Research procedures

The research begins with a preliminary survey and literature study followed by problem identification. Preliminary surveys, literature studies, and problem identification were carried out to determine general conditions and variables that affect the maturity level of SME digital transformation adoption in Malang City (Table 1). Processing of the selected data in this study uses the PLS approach. According to Hair et al. (2014), PLS was chosen because, in its application, it can use a small number of samples, does not have to be the multivariate normal distribution, and can be used to explain whether or not there is a relationship between latent variables (prediction purposes). PLS is a powerful analytical method based on only a few assumptions. The next step is developing a structural model that shows the causal relationship between the latent variables used in the study. The structural model of the research can be seen in Figure 1.

Table 1. Research variables

Variables	Definition	Sub Variable	Indicator	Ref
Sustainable Readiness (SR)	The readiness and ability of an organization or individual to maintain its activities over a long period of time by considering environmental, social, and economic factors.	People	1. Job satisfaction and welfare 2. Work accidents 3. Awareness of business continuity 4. Turnover 5. Involvement in risk management	(Qerul et al., 2021)
		Process	1. Development of production processes 2. Reduce costs 3. Energy saving 4. Reduce waste	(Stentoft et al., 2020; Qerul et al., 2021)
		Technology	1. Utilization of technology 2. Environmentally friendly technology 3. Technology that does not interfere with community social activities	(Stentoft et al., 2020; Qerul et al., 2021)
International Orientation (IO)	The organization's approach to international markets and activities to improve its operations		1. Global technology 2. Utilization of resources and facilities 3. International standard products	(Oleksiuk et al., 2020)
Digital Transformation Readiness (DT)	An organization's level of preparedness to undergo a digital transformation.		1. Human resource 2. Digitalization of business 3. Capital 4. Analysis of technology utilization 5. Technology adaptation 6. Coordination 7. Assessment of adoption rates	(Agushi, 2019)

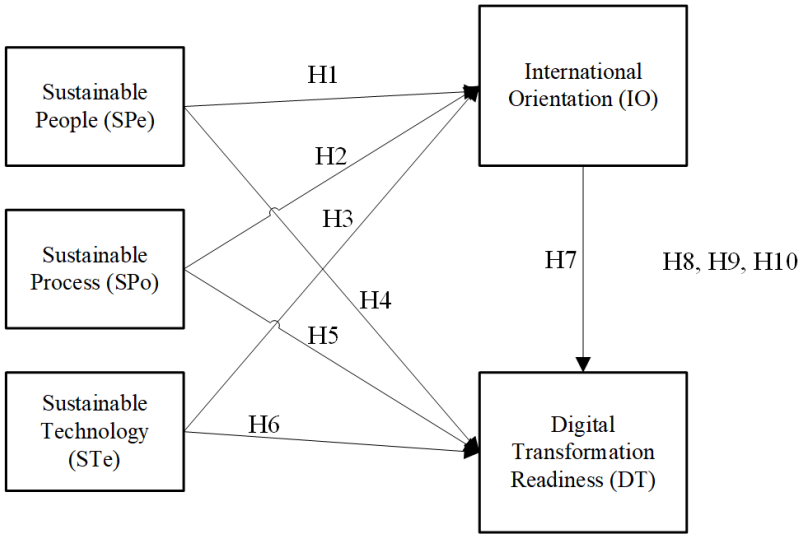

Figure 1. Structural model development

Then, arrange a questionnaire with a 5-level Likert measurement scale. Questionnaires filled in by respondents are then tested for validity and reliability. The criteria for validity testing are r count ≥ r table (two-party test with sig. 0.05). A reliability test can test one using Cronbach's alpha method. Questionnaire data is processed using descriptive analysis techniques and then analyzed using the SEM method with the PLS approach. The steps in inferential analysis using SEM are as follows:

1. Tabulate and prepare data with the Microsoft Excel program;

2. Input data into SmartPLS 3.3 software to start analysis;
3. Read and pre-process data;
4. Defining variables and picturing structural models;
5. Testing model fit;
6. Interpret the results and discuss.

Hypothesis testing determines the decision whether to reject or accept the truth of the statements that have been made. The hypothesis was tested with a probabilistic approach using the p-value from statistical tests performed with SmartPLS 3.3 software. The decision of the statistical test is carried out by comparing the p-value with the alpha (α) value, with the following conditions: If the p-value ≤ α value, the decision is H0 rejected (H1 accepted). If the p-value > α value, the decision is H0 accepted (H1 is rejected). The α value used is 0.1 or 10%. The value of α states that the level of accuracy used in this study is 10%. The development of the research hypothesis can be seen in Table 2.

Results and Discussion

The selected respondents

The population of this research is SMEs in Malang city. In determining the number of samples used, Hair et al. (2014) suggested sample size for multivariate analysis, namely, the number of sample members is at least ten times the number of variables studied. There are five variables in this study. Thus, the number of samples in this study is at least ten multiplied by five variables, namely 50 samples. One hundred fifty questionnaires were distributed, but only 107 respondents completed the questionnaire thoroughly. The respondents determined the questionnaire was aged between 20-60, of which 54.2% were female. Various SMEs participated in this research in the food and non-food sectors spread across Malang city. The year of establishment of SMEs varies between 1994 and 2021, with the number of employees working in SMEs ranging from 1 to 40 people. SMEs have an average of more than 1 product variant, with the most extensive product marketing area in the local area, namely 78.5%.

Data analysis

Validity and reliability test

Table 3 shows that in the convergent validity test, each variable's loading factor indicator values have fulfilled the criteria ≥ 0.30. It shows that the indicators used are valid. Based on these results, it can be concluded that the indicators used are considered capable of measuring the models built regarding digital transformation readiness. Convergent validity relates to the measurement principle of a construct that should have a high correlation. An instrument meets convergent validity when the scores obtained from two instruments that measure the same construct have a high correlation (Hair et al., 2014). Next, a composite reliability analysis was performed. The questionnaire is good if the composite reliability value is ≥ 0.70. In addition, measuring the reliability of the questionnaire is also seen from the value of Cronbach's alpha coefficients. According to Solimun and Nurjannah (2017), the questionnaire is reliable, with a Cronbach's alpha value ≥ 0.60. Composite reliability values for all indicators have met the requirements (≥ 0.70). From Cronbach's alpha value results, all variables met the reliability requirements, namely, the value ≥ 0.60. All of the questionnaire constituent variables were reliable regarding the two reliability tests.

Table 2. Research hypothesis

Code		Hypothesis
H1	:	Sustainable People (SPe) has a positive and significant effect on International Orientation (IO)
H2	:	Sustainable Process (SPo) has a positive and significant effect on International Orientation (IO)
H3	:	Sustainable Technology (STe) has a positive and significant effect on International Orientation (IO)
H4	:	Sustainable People (SPe) has a positive and significant effect on Digital Transformation Readiness (DT)
H5	:	Sustainable Process (SPo) has a positive and significant effect on Digital Transformation Readiness (DT)
H6	:	Sustainable Technology (STe) has a positive and significant effect on Digital Transformation Readiness (DT)
H7	:	International Orientation (IO) has a positive and significant effect on Digital Transformation Readiness (DT)
H8	:	Sustainable People (SPe) has a positive and significant effect on Digital Transformation Readiness (DT) through International Orientation (IO) mediation
H9	:	Sustainable Process (SPo) has a positive and significant effect on Digital Transformation Readiness (DT) through International Orientation (IO) mediation
H10	:	Sustainable Technology (STe) has a positive and significant effect on Digital Transformation Readiness (DT) through International Orientation (IO) mediation

Table 3. Validity and reliability test results

Construct	Item Code	Loading	Outer Weight	p-value	CA	CR	AVE
Sustainable People (SPe)	SPe1	0.550	0.348	0.000	0.400	0.800	0.295
	SPe 2	0.467	0.342	0.000			
	SPe3	0.466	0.306	0.000			
	SPe4	0.614	0.404	0.000			
	SPe5	0.600	0.431	0.000			
Sustainable Process (SPo)	SPo1	0.646	0.306	0.000	0.641	0.775	0.409
	SPo2	0.673	0.372	0.000			
	SPo3	0.559	0.240	0.000			
	SPo4	0.605	0.275	0.000			
	SPo5	0.704	0.357	0.000			
Sustainable Technology (STe)	STe1	0.750	0.517	0.000	0.631	0.674	0.571
	STe2	0.758	0.360	0.000			
	STe3	0.758	0.446	0.000			
International Orientation (IO)	IO1	0.719	0.485	0.000	0.613	0.794	0.563
	IO2	0.735	0.403	0.000			
	IO3	0.796	0.447	0.000			
Digital Transformation Readiness (DT)	DT1	0.558	0.173	0.000	0.766	0.833	0.417
	DT2	0.683	0.249	0.000			
	DT3	0.639	0.219	0.000			
	DT4	0.732	0.237	0.000			
	DT5	0.624	0.199	0.000			
	DT6	0.596	0.218	0.000			
	DT7	0.673	0.246	0.000			

Table 4. Fornell larcker criterion

	DT	IO	SPe	SPo	STe
Digital Transformation Readiness (DT)	0.646				
International Orientation (IO)	0.744	0.751			
Sustainable People (SPe)	0.693	0.599	0.543		
Sustainable Process (SPo)	0.729	0.624	0.571	0.639	
Sustainable Technology (STe)	0.574	0.558	0.547	0.626	0.756

Discriminant validity test

Table 4 shows that most of the constructs have high discriminant validity, so it can be concluded that the variables used are valid. It can be seen from each construct's AVE value, which is higher than the correlation between that construct and the other constructs. Based on Table 5, the indicator blocks have a higher loading for each measured latent variable compared to indicators for other latent variables so that all constructs are proven to have high discriminant validity, and it is concluded that the variables used are valid.

Classical assumption test

Based on the results of the multicollinearity test in Table 6, it can be seen that the International Orientation (IO), Sustainable People (SPe), Sustainable Process (SPo), and Sustainable Technology (STe) variables obtain a VIF value of <10 for the Digital Transformation Readiness (DT) and International Orientation (IO) variable. These results indicate that there are no symptoms of multicollinearity among the variables.

Coefficient of determination test

The coefficient of determination test was carried out by analyzing the endogenous latent variables' R-square value (R^2). This evaluation is carried out to find out how strong the influence of exogenous variables is on endogenous variables. Based on Table 7, the R^2 value for Digital Transformation Readiness (DT) is 0.714. This value indicates that digital transformation is influenced by independent attributes of 71.4%, and the rest (28.6%) is influenced by other factors outside the model. The International Orientation (IO) variable has an R^2 value of 0.494, meaning that international orientation is influenced by independent attributes with a large percentage of 49.4%. Other factors outside the model influence the rest (50.6%).

Multiple regression

Multiple regression is tested using the Smart PLS program version 3.3. The running process is carried out in 2 stages: the PLS Algorithm and Bootstrapping. The PLS Algorithm functions to

display research instrument tests displayed on the output Factor Loading, AVE and Composite Reliability, Fornell Larcker Criterion, and Cross Loading. PLS Bootstrapping functions to display multiple regression tests by displaying the output t and the respective coefficient values. The coefficient values in the regression model after the data running process can be seen in Figure 2, and the results of hypothesis testing can be seen in Table 8. Evaluation of the structural model was used to determine whether the hypothesis is accepted or rejected and to determine the effect of the variables in the structural model. Evaluation and hypothesis testing was carried out based on the p-value results. The decision rule for testing the hypothesis was carried out with the following requirements (Solimun & Nurjannah, 2017):

a. P-value ≤ 0.10 (alpha 10%) is weakly significant
b. P-value ≤ 0.05 (alpha 5%) is significant
c. P-value ≤ 0.01 (alpha 1%) is highly significant

Table 5. Cross loading

	Digital Transformation Readiness	International Orientation	Sustainable People	Sustainable Process	Sustainable Technology
DT1	0.558	0.474	0.375	0.244	0.197
DT2	0.683	0.524	0.452	0.587	0.395
DT3	0.639	0.464	0.536	0.400	0.315
DT4	0.732	0.498	0.431	0.555	0.370
DT5	0.624	0.465	0.356	0.422	0.445
DT6	0.596	0.495	0.411	0.461	0.346
DT7	0.673	0.453	0.552	0.556	0.490
IO1	0.623	0.719	0.484	0.485	0.424
IO2	0.488	0.735	0.431	0.433	0.368
IO3	0.550	0.796	0.428	0.479	0.456
SPe1	0.334	0.330	0.550	0.306	0.155
SPe2	0.324	0.330	0.467	0.308	0.331
SPe3	0.333	0.246	0.466	0.262	0.372
SPe4	0.389	0.382	0.614	0.265	0.285
SPe5	0.481	0.331	0.600	0.400	0.351
SPo1	0.479	0.357	0.386	0.646	0.415
SPo2	0.502	0.527	0.398	0.673	0.374
SPo3	0.327	0.337	0.280	0.559	0.293
SPo4	0.440	0.309	0.373	0.605	0.335
SPo5	0.549	0.427	0.379	0.704	0.553
STe1	0.462	0.520	0.387	0.450	0.750
STe2	0.341	0.342	0.470	0.368	0.758
STe3	0.474	0.371	0.397	0.582	0.758

Table 6. Multicollinearity test results

	Digital Transformation Readiness	International Orientation
Digital Transformation Readiness (DT)		
International Orientation (IO)	1.081	
Sustainable People (SPe)	1.217	1.179
Sustainable Process (SPo)	1.002	0.971
Sustainable Technology (STe)	0.797	0.866

Table 7. R^2 value

Variable	R^2 Value
Digital Transformation Readiness (DT)	0.714
International Orientation (IO)	0.494

Table 8. Multiple linear regression test results

Direct Effect	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Description
IO → DT	0.361	0.348	0.165	2.191	0.029	Significant
SPe → DT	0.279	0.270	0.100	2.797	0.005	Highly Significant
SPe → IO	0.311	0.331	0.120	2.585	0.010	Highly Significant
SPo → DT	0.340	0.364	0.105	3.242	0.001	Highly Significant
SPo → IO	0.334	0.326	0.115	2.896	0.004	Highly Significant
STe → DT	0.007	0.008	0.081	0.081	0.935	Weakly Significant
STe → IO	0.179	0.185	0.128	1.403	0.161	Weakly Significant
Indirect Effect	**Original Sample (O)**	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**	**Description**
SPe → IO → DT	0.112	0.121	0.081	1.389	0.165	Weakly Significant
SPo → IO → DT	0.121	0.103	0.051	2.366	0.018	Significant
STe → IO → DT	0.065	0.066	0.061	1.068	0.286	Weakly Significant

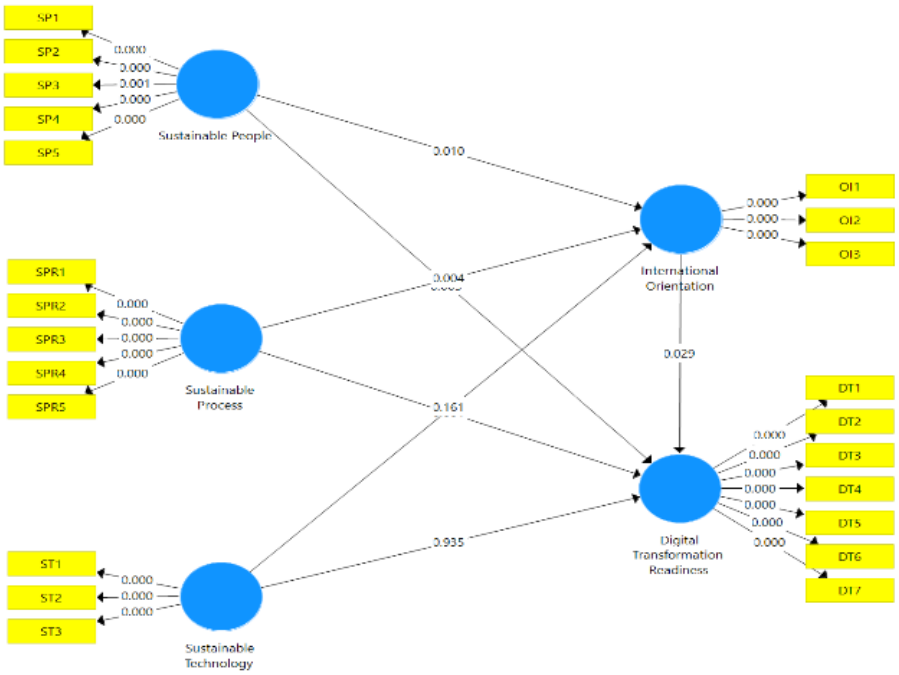

Figure 2. Path diagram

This study has achieved the overall objective and validated all hypotheses. Hypotheses 1, 2, and 3 test that Sustainable Factors (People/SPe and Process/SPo) have a positive effect and have a high level of significance on International Orientation (IO) with p-values of 0.010 and 0.004 respectively, except for Sustainable Technology (Ste), which has a low-level significance (0.161). This study reveals that workers who work in an environment that maintains and cares for the health and welfare of the workforce are considered very important in maintaining the quality and productivity of the workplace, which affects business performance (Florez et al., 2013). Sustainability oriented toward developing the company to a broader area can be carried out by improving business performance in line with economic, social, and environmental employee welfare (Paas et al., 2021). For example, a company with a high level of employee welfare can develop a better strategy so that its business has an international market orientation. Likewise, a sustainable process can affect an international orientation, where a sustainable process affects market performance, including the broad reach of a company's market (Artin, 2022). The market will respond positively if the company can manage policies and processes appropriately.

SMEs pay less attention to sustainability aspects, as evidenced by the workload and demands of employees who mainly focus on

completing work within the company's economic goals (Kossek et al., 2012). Research by Bousinakis and Halkos (2021) states that employees who are satisfied with their jobs can improve their performance and that of the company. If employees have low competence and ability to utilize technology and develop production processes, this can impact business continuity. To support the implementation of sustainability for SMEs so that they have an international perspective, an organization must have international standards regarding employee performance, processes, and technology.

Increasing the role of sustainability in people and process toward international orientation can be achieved by developing a long-term business sustainability strategy that considers all stakeholders' interests (employees, consumers, the environment, and society). It will impact the implementation of the sustainability concept, which allows companies to manage market performance and improve market orientation on an international scale (Onkelinx et al., 2016; Artin, 2022).

In contrast to the sustainable technology (STe) factor, which has a weak effect on international orientation, this is because the use of sustainable technology is still minimally applied by SMEs, so it has not played a significant role in building market orientation (Guimarães et al., 2014). Therefore, to increase the role of sustainability in technology toward international orientation, it is necessary to apply international standards in the selection and use of technology according to company needs (Bousinakis & Halkos, 2021).

Hypotheses 4, 5, and 6 show that Sustainable People and Process (SPo and SPe) substantially affect Digital Transformation Readiness (DT) with p-values of 0.005 and 0.001, respectively, but Sustainable Technology (STe) has a weak effect on Digital Transformation Readiness (DT) with a p-value of 0.935. This study reveals that various sustainability factors affect business change, including digital change (Lermen et al., 2018). In SMEs, sustainable people play a significant role in the readiness to adopt digital transformation. Onkelinx et al. (2016) stated that businesses with a high level of sustainability of employees or human resources in SMEs can increase their business because labour as the primary resource in SMEs can keep up with technological developments. Likewise, a sustainable process is influenced by various regulations that have been established and are influenced by employee attitudes and performance, which will also affect the digital transformation process. A company's sustainable operational processes that can be used in the long term will make it easier for companies or organizations to adapt and make changes in the digital era.

Several managerial improvements can be made to increase the role of sustainability in people and process for digital transformation readiness. The application of business models that are more cost-effective and the development of more effective operating practices can enhance the role of sustainable process in technological change readiness. Then, increasing technology management capabilities for employees can be an innovative and sustainable solution, resulting in further development of the role of sustainable people toward digital transformation readiness.

Unlike this study, sustainable technology has a low significance level for digital transformation readiness because, for most SMEs, technology is still an obstacle, and sustainability has yet to become their primary focus (Nair et al., 2019). It causes the success rate of digital transformation for companies, especially the SME scale, to be relatively low. Therefore, to increase the role of sustainability in technology for digital transformation readiness, it is necessary to have a policy on the strategic use of technology. For example, it can be started for SMEs by transferring data to a computer system, facilitating access (Rochmawati et al., 2023). Furthermore, technology selection can be carried out according to long-term use needs.

Furthermore, hypothesis 7 states that International Orientation (IO) positively and significantly affects Digital Transformation Readiness (DT) with a p-value of 0.029. Research by Dutta et al. (2020) states that market orientation in large-scale companies affects company performance, including the speed of adaptation to change. Meanwhile, for SMEs, market orientation can encourage product, process, and market innovation as well as a high level of competency, including in the use of technology. The role of an international orientation toward digital transformation readiness can be optimized by increasing business productivity and product quality according to international standards, considering technological changes toward digitalization.

This research also shows the complexity of International Orientation (IO) as a mediator in the relationship between Sustainable People (SPe), Process (SPo), and Technology (STe) toward Digital Transformation Readiness (DT).

Hypothesis 9 indicates that the Sustainable Process significantly affects Digital Transformation Readiness (DT) through International Orientation (IO) with a value of 0.018. Achieving an international orientation is easier if the company has implemented a sustainable process, such as saving production and managerial process costs. International orientation can be achieved if the company can adapt its products and business standards to international standards. Companies that have gone toward an international orientation will be better prepared to face digital changes (Rochmawati et al., 2023).

In contrast to Hypothesis 9, Hypotheses 8 and 10 show that Sustainable People (SPe) and Technology (STe) have little effect on Digital Transformation Readiness (DT), with values of 0.165 and 0.286, respectively. This is possible because Sustainable People (SPe) and Technology (STe) in SMEs still need more attention. If an organization has elements of social sustainability, for example, employees have a high level of job satisfaction, then international orientation will be easy to achieve (Lähdesmäki & Suutari, 2020). The view to achieving an international orientation can open a view of the importance of digital transformation. SMEs ready to face digital transformation will have the opportunity to grow and internationalize their business (Rochmawati et al., 2023).

Likewise, companies that have implemented the concept of sustainability in the technological aspect, including by utilizing appropriate and environmentally friendly technology, will facilitate an increase in market orientation toward the international market. Using appropriate technology will encourage process effectiveness and efficiency and improve product quality so that the resulting product complies with global standards (Kwilinski et al., 2019). It also affects business readiness when facing digital transformation, where companies with an international orientation will more easily adapt to changes in the digital era (Denicolai et al., 2021).

Conclusions

Based on the research results, sustainable people and process significantly affect international orientation and digital transformation readiness. In contrast, sustainable technology has a weak effect. In mediating digital transformation readiness, international orientation significantly mediates sustainable process but weakly mediates sustainable people and technology. However, international orientation has a significant effect on digital transformation readiness. The results of this study provide clues for SMEs still constrained in evaluating and implementing sustainability. To increase sustainability, companies must develop business strategies based on sustainability to have a global orientation in their business development plans. Paying attention to the market orientation of SMEs will provide opportunities for SMEs to be better prepared to face digital transformation. Future research should explore the three pillars of sustainable development (economic, social, and environment) so that the development of a more comprehensive policy strategy and the results of this study can provide a complete theoretical foundation regarding factors that can increase readiness for digital transformation adoption and can be applied by stakeholders.

Declarations

Conflict of interests The authors declare no competing interests.

References

Achtenhagen, L. (2011) *Internationalization Competence of SMEs* [Online]. Available at: https://entreprenorskapsforum.se/wp-content/uploads/2011/12/internationelization-comp_webb.pdf

Agushi, G. (2019) Understanding the Digital Transformation Approach – A Case of Slovenian Enterprises. Thesis. University of Ljubljana, Slovenia.

Amui, L. B. L., Jabbour, C. J. C., Jabbour, A. B. L., and Kannan, D. (2017) 'Sustainability as a dynamic organizational capability: A systematic review and a future agenda toward a sustainable transition', *Journal of Cleaner Production*, 142, pp. 308–322

Artin, P. (2022) 'Critical sustainability factors of regional SMEs: A case study of regional Australia', *Current Research in Environmental Sustainability*, *4*, pp. 1-7

Bousinakis, D. and Halkos, G. (2021) 'Creativity as the hidden development factor for organizations and employees', *Economic Analysis and Policy*. 7, pp. 645-659

Cahyadi, I. (2015) 'Tantangan internasionalisasi UKM di Indonesia dalam menghadapi masyarakat ekonomi ASEAN (Challenges of internationalization of Indonesia's SMEs towards ASEAN economic integration)', *Kajian*, 20(9), pp. 129–143 [In Indonesian]

Denicolai, S., Zucchella, A., and Magnani, G (2021) 'Internationalization, digitalization, and sustainability: Are SMEs ready? A survey on synergies and substituting effects among growth paths', *Technological Forecasting and Social Change*, 166, pp. 1-15

Do, H., Budhwar, P., Shipton, H., Nguyen, H. D., and Nguyen, B. (2022) 'Building organizational resilience, innovation through resource-based management initiatives, organizational learning and environmental dynamism', *Journal of Business Research*, 141, pp. 808–821

Dutta, P., Choi, T. M., Somani, S., and Butala, R. (2020) 'Blockchain technology in supply chain operations: Applications, challenges and research opportunities', *Transportation Research Part E: Logistics and Transportation Review*, 142, pp. 1-33

Fogg, C., Lanning, E., Shoebridge, J., Longstaff, J., De Vos, R., Dawson-Taylor, K., Glanville-Hearson, A., Carpenter, D., Court, S., Brown, T., Heiden, E., and Chauhan, A. (2022) 'The role of participatory action research in developing new models of healthcare: Perspectives from participants and recommendations for ethical review and governance oversight', *Ethics, Medicine and Public Health*, 24, pp. 1-9

Florez, L., Castro-Lacouture, D., and Medaglia, A. L. (2013) 'Sustainable workforce scheduling in construction program management', *Journal of the Operational Research Society*, 64(8), pp. 1169–1181

Ginevičius, R., and Ostapenko, A. (2015) 'A quantitative evaluation of the company environment for the formation of its effective expansion strategy', *Intellectual Economics*, 9, pp. 130-137

Guimarães, L. B. M., Ribeiro, J. L. D., Renner, J. S., and De Oliveira, P. A. B. (2014) 'Worker evaluation of a macroergonomic intervention in a Brazilian footwear company', *Applied Ergonomics*, *45*(4), pp. 923–935

Hadjielias, E., Dada, O., Discua Cruz, A., Zekas, S., Christofi, M., and Sakka, G. (2021) 'How do digital innovation teams function? Understanding the team cognition-process nexus within the context of digital transformation', *Journal of Business Research*, 122, pp. 373–386

Hair, J., Sarstedt, M., Hopkins, L., and Kuppelweiser, V. (2014) 'Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research', *European Business Review*, 26(2), pp. 106-121

Hübel, C., Weissbrod, I., and Schaltegger, S. (2022) 'Strategic alliances for corporate sustainability innovation: The 'how' and 'when' of learning processes', *Long Range Planning*, 55(6), pp. 1-20

Khan, I. S., Ahmad, M. O., and Majava, J. (2021) 'Industry 4.0 and sustainable development: A systematic mapping of triple bottom line, circular economy and sustainable business models perspectives', *Journal of Cleaner Production*, 297, pp. 1-16

Kossek, E. E., and Lautsch, B. A. (2012) 'Work–family boundary management styles in organizations: A cross-level model', *Organizational Psychology Review*, 2(2), 152–171

Lähdesmäki, M., and Suutari, T. (2020) 'Good workers, good firms? Rural SMEs legitimising immigrant workforce', *Journal of Rural Studies*, 77, pp. 1–10

Lee, J., Kao, H., and Yang, S. (2014) 'Service innovation and smart analytics for Industry 4.0 and big data environment', *Procedia CIRP*, 16, pp. 3–8

Lermen, F. H., Peralta, C. B. D., Echeveste, M. E., and Martins, V. L. M. (2020) 'Applying the framework to identify customer value: A case of sustainable product in agriculture', *Journal of Cleaner Production*, 270, pp. 1-14

Limani, Y., Hajrizi, E., Stapleton, L., and Retkoceri, M. (2019) 'Digital transformation readiness in higher education institutions (HEI): The case of kosovo', *IFAC-PapersOnLine*, 52(25), pp. 52–57

Oleksiuk, A., Plesniak, A., and Kowalik, I. (2020) 'Impact of international environment on the entrepreneurial marketing orientation of small and medium enterprises', *Conference: The 20th International Joint Conference: Central and Eastern Europe in the Changing Business Environment*, pp. 1-11

Onkelinx, J., Manolova, T. S., and Edelman, L. F. (2016) 'The human factor: Investments in employee human capital, productivity, and SME internationalization', *Journal of International Management*, *22*(4), pp. 351–364

Paas, W., San Martín, C., Soriano, B., van Ittersum, M. K., Meuwissen, M. P. M., and Reidsma, P. (2021) 'Assessing future sustainability and resilience of farming systems with a participatory method: A case study on extensive sheep farming in Huesca, Spain', *Ecological Indicators*, 132, pp. 1-18

Prasanna, R. P. I. R., Jayasundara, J. M. S. B., Gamage, S. K. N., Ekanayake, E. M. S., Rajapakshe, P. S. K., and Abeyrathne, G. A. K. N. J. (2019) 'Sustainability of SMEs in the competition: A systemic review on technological challenges and SME performance', *Journal of Open Innovation: Technology, Market, and Complexity*, 5(4), pp. 1-18

Nair, L., and Adetayo, O. A. (2019) 'Cultural competence and ethnic diversity in healthcare', *Plastic and Reconstructive Surgery. Global Open*, *7*(5), pp. 1-3

Qerul, M., Muhamad, B., Jamal, S., Nasir, A., Mohamad, S., and Nor, N. M. (2021) 'Navigating the future of industry 4 . 0 in Malaysia : A proposed conceptual framework on SMEs' readiness',

International Journal of Advanced and Applied Sciences, 8(7), pp. 41–49

Sohns, T. M., Aysolmaz, B., Figge, L., and Joshi, A. (2023) 'Green business process management for business sustainability: A case study of manufacturing small and medium-sized enterprises (SMEs) from Germany', *Journal of Cleaner Production*, 401, pp. 1-13

Solimun, F., and Nurjannah. (2017) *Metode Statistika Multivariat Pemodelan Persamaan Struktural (SEM) Pendekatan WarpPLS (Multivariate Statistical Method Structural Equation Modeling (SEM) WarpPLS Approach).* Malang: UB Press. [In Indonesian]

Stentoft, J., Wickstrøm, K. A., Philipsen, K., Haug, A., Stentoft, J., Wickstrøm, K. A., Philipsen, K., Stentoft, J., Wickstrøm, K. A., Philipsen, K., and Haug, A. (2020) 'The management of operations drivers and barriers for industry 4 . 0 readiness and practice : empirical evidence from small and medium-sized manufacturers from small and medium-sized manufacturers', *Production Planning & Control*, 32(5), pp. 1–18

Türkeş, C., Arslan, M., Demir, Y., Çoçaj, L., Nixha, A. R., and Beydemir, S. (2019) 'Synthesis, biological evaluation and in silico studies of novel n-substituted phthalazine sulfonamide compounds as potent carbonic anhydrase and acetylcholinesterase inhibitors', *Bioorganic Chemistry*, 89, pp. 1-12

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., and Haenlein, M. (2021) 'Digital transformation: A multidisciplinary reflection and research agenda', *Journal of Business Research*, 122, pp. 889–901

Wahid, R. A., and Zulkifli, N. A. (2021) 'Factors affecting the adoption of digital transformation among SME's in Malaysia', *Journal of Information Technology Management*, 13(3), pp. 126–140