

A Model for Creating Business Competitiveness Based on Technosociopreneur Innovation Characterized by State Defense Values

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ABSTRACT

Objectives: MSMEs in Surabaya are adapting to global economic challenges like unemployment and poverty through a technosociopreneurial approach, integrating digital technology with social motives and national defense values. This adaptation aims to enhance competitiveness and ensure sustainability during the new normal. The research focuses on a competitiveness model based on technosociopreneur innovation while addressing challenges like rising unemployment, requiring MSMEs to prioritize societal benefits over profit and embrace digital tools for success.

Methodology: This research uses a mixed method approach which is an approach in research that combines or connects qualitative and quantitative research methods (including philosophical foundations, using approaches and combining both approaches in research).

Finding: Technosociopreneurs have a significant role in dealing with technological changes and increasingly fierce business competition. They can combine technological and social elements to create innovations that positively affect business and society. The success of technosociopreneurs can positively impact achieving higher competitiveness in today's digital era.

Conclusion IT-based product innovation affects competitiveness mediated by technosociopreneur IT-based process innovation has an effect on competitiveness mediated by technosociopreneur. IT-based organizational innovation affects competitiveness mediated by technosociopreneur 7.

Keywords: Innovation; National Defense Values; Techno-sociopreneur; New Normal; MSMEs.

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INTRODUCTION

The profile of MSMEs in 2018 for micro businesses is around 63 million (98.68%), small businesses: 783 thousand (1.22%), medium enterprises: 60 thousand (0.09%), and large enterprises: 5 thousand (0.01%). (Ministry of Cooperatives and SMEs, 2019). Based on this composition, scaling-up efforts are needed to reverse the pyramid shape. The primary strategy to encourage scaling-up MSMEs in the new normal era, in order to survive and be sustainable, is through economic transformation and changing the classification of entrepreneurship to Technosociopreneur.

Techno-sociopreneur is a combination of technology entrepreneurship and social entrepreneurship. This combination of business models is ideal for the new normal. Digital technology-based entrepreneurs such as online MSMEs are becoming increasingly attractive due to changes in people's consumption patterns due to the COVID-19 pandemic.

The implementation of a collaborative partnership model with large businesses bridged by technosociopreneurs is a solution to encourage increased community income and create jobs. The utilization of appropriate cutting-edge technology is one of the achievements of an innovation. In business development based on an established entrepreneurial spirit and supported by the use of technology, it will be able to optimize the process and the results of the business unit developed. This is what is called technopreneurship: a collaboration between the application of technology as an instrument and an independent business spirit as a necessity. Technopreneurship has the spirit to build a business that is characteristically an integration of technology application competencies.

In addition, technopreneurship must succeed in two things, namely ensuring that the technology that becomes the object of business can function according to the needs, target customers and can be sold for profit and provide benefits or impacts economically, socially, and environmentally (NCIIA, 2006; and Suparno et al., 2013).

State defense is the attitude behavior and actions of citizens who are imbued with love for the Unitary State of the Republic of Indonesia based on Pancasila and the 1945 Constitution in ensuring the survival of the nation. Internalization of the entrepreneurial spirit as a form of state defense awareness, will move all participation and empowerment in loving the country through productive activities carried out. Through the internalization of the values of Bela Negara awareness through entrepreneurship will have a persistent, tenacious, and responsible character who believes in God Almighty, believes in the results that can be obtained after making efforts with all his strength and mind, and can control himself over every situation faced on the basis of the belief that all is God's will. The main problems of this research are as follows:

1. Does IT-based product innovation affect technosociopreneurs?
2. Does IT-based process innovation affect technosociopreneurs?
3. Does IT-based organizational innovation affect technosociopreneurs?
4. Does technosociopreneur affect competitiveness?
5. Does IT-based product innovation affect competitiveness mediated by technosociopreneur?
6. Does IT-based process innovation affect competitiveness mediated by technosociopreneur?
7. Does IT-based organizational innovation affect competitiveness mediated by technosociopreneur?

The digital era has fundamentally transformed business, with the adoption of Information Technology (IT) becoming a necessity for businesses, including in Indonesia. The emergence

of technosociopreneurs, entrepreneurs who combine technological expertise with social impact, demonstrates significant potential in addressing development challenges. However, there is a gap in understanding regarding the specific mechanisms by which various forms of IT-based innovation (product, process, and organizational) effectively develop the capacity of technosociopreneurs and, ultimately, contribute to the improvement of their business competitiveness. This research is urgently needed to provide an empirical roadmap for business owners, policy makers, and MSME facilitators in allocating limited resources to the most strategic IT investments, so that digital transformation can directly encourage the creation of highly competitive entrepreneurs with sustainable social impact. Based on this phenomenon, gap, and urgency, the research problem is formulated as follows: How do IT-based product, process, and organizational innovations influence the formation of technosociopreneur capacity and business competitiveness, and to what extent does the role of technosociopreneurs mediate the relationship between IT-based innovation and competitiveness?

LITERATURE REVIEW

According to a number of studies, there are several factors that will affect the development of MSMEs in Indonesia, namely:

1. Utilization of Technology, Information, and Communication Facilities
2. The progress of MSMEs is in line with the development of technology that continues to grow. In 2018, 8.3 million micro, small, and medium enterprises digitized. In the current pandemic, SMEs need to utilize technological advances to save their businesses. MSME participants can market their products through WhatsApp or Instagram applications, and the content can attract buyers to try the products or services provided (Amin, 2020).
3. Easy Capital Loan
4. The support of the Indonesian banking industry must support the development of Indonesian micro, small, and medium enterprises. The opening of banking financing channels and the decline in the nominal value of people's business loans have increased the growth of MSMEs. In addition, the minimum capital required to establish a company is considered manageable so that it can stimulate people's desire to become MSME participants (Lathifa, 2019).
5. Reduction of Final Income Tax Rate
6. Lowering the income tax rate will positively impact micro, small, and medium enterprises. MSME actors are included in the taxpayer category and need to calculate, deposit, and report taxes to the state. The government has set the final MSME income tax rate at 0.5% which aims to enable business actors to fulfill their tax obligations to the state (Lathifa, 2019).

The strategy is to increase the competitiveness of MSMEs and cooperatives so that they can develop into sustainable businesses on a large scale ("scale up") to support the independence of the national economy. According to Wilantara (2016), the strategy is as follows:

1. Improved quality of human resources;
2. Improved access to financing and expansion of financing schemes;
3. Increased product added value and marketing reach;
4. Strengthening business institutions; and
5. Increased ease, certainty, and business protection.

Referring to Law No. 7/2014 on Trade, Article 73 on the Empowerment of Cooperatives and Micro, Small, and Medium Enterprises provides space to provide facilities, incentives, technical guidance, access or capital assistance, promotional assistance, and marketing. Then Permendag 70/2013 jo 56/2014 concerning Guidelines for Structuring and Guiding Traditional Markets, Shopping Centers, and Modern Stores regulates, among others, "Shopping Centers and Modern Stores must provide domestically produced merchandise of at least 80% of the number and types of goods traded". The regulation also stipulates the task of strengthening and accelerating cooperation between traders and domestic producers through partnerships (Wilantara, 2016). A list of MSME development activities can be seen in Table 1.

Table 1. Table Information

Actualization	Product	Purpose
Workshop (packaging & design development, certification Halal, IPR) MSME Assistance (Repackaging)	Food products and non-food products	Improving the competitiveness of SME products
Training and guidance Technical		Domestic SME products will dominate the national market (implementation of MOT 70/2013 related to 80% domestic products) Promotion assistance for SMEs engaged in the food sector
SME Food Awards		Developing regional potential, especially the diversity of the archipelago's flavors and encouraging the development of culinary products national
Assistance with trade facilities (packaging machines, carts, tents, and coolboxes) stimulation		Promote and improve the competitiveness of local vegetables and fruits
Partnership forum (local trade missions and business meetings)		Develop the potential of local food products and make food icons in each region.

Source: kemendag.go.id, 2021

According to Zimmerer and Scarborough (2002), an entrepreneur creates a new business by taking the risk of uncertainty to achieve profit and growth by identifying opportunities and combining various resources. "Technopreneurship" consists of "Technology" and "Entrepreneurship," which can be explained as the process of formation and collaboration between the field of business and the application of technology as a supporting instrument and as the basis of the business itself, both in the process, system, parties involved, and the products produced.

In general, the word Technology refers to the practical application of science to the industrial world or as a framework of knowledge used to create tools, develop skills, and extract materials to solve existing problems (Craut et al., 2022). Meanwhile, the word entrepreneurship comes from the word entrepreneur which refers to a person or agent who creates a business/enterprise with the courage to bear risks and uncertainties to achieve profit and growth by identifying existing opportunities (Padilla Bejarano et al., 2023).

The concept of technopreneurship as expressed above basically integrates technology with entrepreneurship skills. In this technopreneurship concept, the basis of entrepreneurship development is based on invention and innovation in the field of technology. Technology understood in this context is not simply high tech; of course, it can be something other than technical. Technology is defined as the application of knowledge to human work. Thus,

accounting, order quantity economics, oral and online marketing, and well-formulated mentoring are basically technology too.

The context of implementation is carried out by mentoring, the mentoring itself is divided into several, including the type of mentoring based on the intensity of mentoring (Hackett & Dilts, 2004), the type of counseling (Rice, 2002) and the scale of intervention/incubator initiation (Bergek & Norrman, 2008).

The types of mentoring based on the intensity of mentoring are divided into three, namely:

- 1) Intensity of mentoring time, is the percentage of working hours devoted to monitoring and mentoring tenants;
- 2) A comprehensive level of mentoring, is the extent to which mentoring assistance includes strategic and operational assistance and tenant administration;
- 3) The quality of tenant assistance provided by the incubator (Hackett & Dilts, 2004).

There are three types of counseling based on the type of counseling:

- 1) Reactive and Episodic Counselling, is assistance where the tenant asks the incubator to help overcome the crisis or problem faced by the tenant and in general the duration of this type of assistance is limited;
- 2) Proactive and Episodic Counselling, is mentoring where the incubator manager is involved informally with tenant activities, adhoc counseling
- 3) Continual and Proactive Counselling, is mentoring where the incubator proactively provides assistance to tenants and schedules (Rice, 2002).

The proposed research hypothesis is as follows:

H1: IT-based product innovation affects technosociopreneurs.

H2: IT-based process innovation affects technosociopreneurs

H3: IT-based organizational innovation affects technosociopreneurs

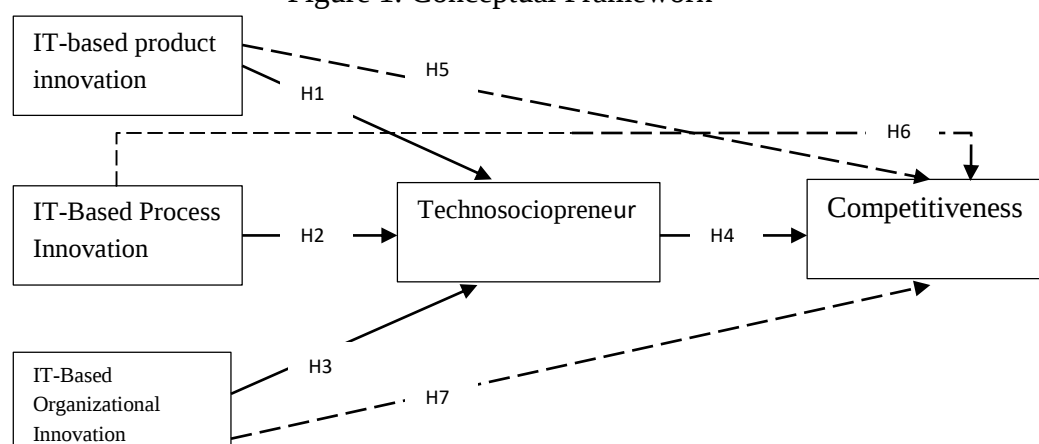
H4: Technosociopreneur affects competitiveness

H5: IT-based product innovation affects competitiveness mediated by technosociopreneur

H6: IT-based process innovation affects competitiveness mediated by technosociopreneur

H7: IT-based organizational innovation affects competitiveness mediated by technosociopreneur 7.

Figure 1. Conceptual Framework



METHOD

This research uses a mixed method approach which is an approach in research that combines or connects qualitative and quantitative research methods (including philosophical foundations, using approaches and combining both approaches in research). Data collection was conducted using online questionnaires and FGD (Focus Group Discussion) to respondents who have creative industry-based entrepreneurial businesses such as (food industry groups, printing, clothing, video studios, and video photos) in Surabaya. The analysis method used in this research is PLS-SEM (Partial Least Square-Structural Equation Model) analysis, because what will be sought is the influence of variables constructed by indicators and descriptive qualitative problem solving methods.

This study used a purposive sampling technique in selecting respondents. This technique was chosen because the aim of the study was to understand the phenomenon in depth in a specific population, namely creative industry-based entrepreneurial business actors in Surabaya who have unique characteristics and experiences in accordance with the focus of the study. The sample was selected intentionally based on the following main criteria: (1) being a micro, small, and medium enterprise (MSME) actor, (2) operating in a predetermined creative industry sector (food, printing, clothing, video studios, and videophoto industries), and (3) operationally located in the Surabaya area. The determination of these criteria aims to ensure that the collected data is relevant and can provide a rich representation of the local creative industry context. From the screening process, 148 respondents were obtained whose questionnaire data could be processed, with business backgrounds divided into food and non-food industries. The use of purposive sampling in this quantitative phase allowed the researcher to capture the right informants before then deepening the findings qualitatively through FGDs in the second year of the study.

This research used quantitative methods in the first year, while in the second year using a qualitative approach. The data collection technique used in this study is to use a questionnaire by making a list of written questions about the items of the research variable indicators to obtain the objectives to be achieved. The questions in this research questionnaire have been developed and adjusted by researchers from previous studies. The distribution of questionnaires was submitted directly via g-form or via email.

The analysis technique used in this research is Partial Least Square (PLS) with the help of WarpPLS software. PLS is a powerful analysis method because it is based on only a few assumptions. PLS because the PLS method has its own advantages including: data does not have to be multivariate normally distributed (indicators with categorical, ordinal, interval to ratio scales can be used in the same model) and the sample size does not have to be significant. Although PLS is used to confirm the theory, it can also be used to explain whether or not there is a relationship between latent variables. PLS can analyze at the same time constructs formed with reflexive indicators and formative indicators and this is not possible in the Structural Equation Model (SEM). Testing the goodness of fit of the outer model includes:

1. Convergent validity is intended to test whether each indicator on the latent variable can explain the latent variable. An indicator is said to be valid if it has a loading factor value above 0.5.
2. Discriminant Validity describes the amount of variance that items can explain compared to the variance caused by measuring errors. An indicator is said to have good discriminant validity if it has an AVE (Average Variance Extracted) value of more than 0.7.

3. Composite Reliability is intended to see the reliability of a construct. The indicators for each latent variable have reliability if they have a composite reliability value of more than 0.5.

RESULTS AND DISCUSSION

Result and discussion are essential sections of the research article. This section presents the results and discussion of the finding based on the research methods performed by author.

Quantitative results: provide statistical formulation, calculations and hypothesis testing results.

Qualitative results: provide detailed results in the form of sub-topics that are directly related to the research focus and categories.

Results

Description of Research Respondents

Based on the data collection of this study, 148 questionnaires were distributed and can be processed. All respondent data processed consisted of 63 male respondents (42%) and 85 female respondents (52%) of MSMEs in Surabaya, consisting of 38% food and beverage (F&B) MSMEs and 62% from non-F&B MSMEs with an average business age of less than 10 years as much as 72% and 38% more than 10 years.

Description of Research Results

Based on data that can be processed from questionnaire answers as many as 148 respondents with backgrounds as MSMEs in the food and non-food industry. All indicators used in the research model are valid, with a factor loading value above 0.50 and a reliability value above 0.60. This research model aims to test IT-based product innovation, IT-based process innovation, and IT-based organizational innovation through technosociopreneur on competitiveness. The results of the analysis test with WarpPLS software can be seen in the following discussion:

Validity Indicator (Outer Loading)

Table 2. Loading Value (Outer Loading)

	X1	X2	X3	Z	Y	Type (a	SE	P value
X1.1	0.673	-0.321	0.134	-0.053	0.035	Reflect	0.071	<0.001
X1.2	0.667	0.149	0.143	-0.204	0.119	Reflect	0.071	<0.001
X1.3	0.633	-0.028	-0.020	-0.070	0.089	Reflect	0.071	<0.001
X1.4	0.675	-0.214	-0.164	0.189	-0.137	Reflect	0.071	<0.001
X1.5	0.577	0.196	-0.242	0.143	-0.040	Reflect	0.072	<0.001
X1.6	0.570	0.264	0.302	-0.252	-0.122	Reflect	0.072	<0.001
X1.7	0.724	0.072	-0.093	0.113	-0.120	Reflect	0.070	<0.001
X1.8	0.609	0.312	0.057	-0.127	0.024	Reflect	0.072	<0.001
X1.9	0.590	-0.119	-0.218	0.146	0.044	Reflect	0.072	<0.001
X1.10	0.568	0.044	-0.015	-0.024	0.156	Reflect	0.072	<0.001
X1.12	0.592	-0.488	0.011	0.086	0.077	Reflect	0.072	<0.001
X1.13	0.747	-0.254	-0.026	0.079	0.043	Reflect	0.070	<0.001
X1.14	0.713	0.418	0.122	-0.053	-0.132	Reflect	0.070	<0.001
X2.1	0.180	0.686	-0.280	0.297	0.027	Reflect	0.071	<0.001
X2.2	-0.006	0.675	0.129	-0.393	0.051	Reflect	0.071	<0.001
X2.3	0.086	0.735	0.059	-0.191	0.143	Reflect	0.070	<0.001
X2.4	0.080	0.713	-0.161	0.011	0.081	Reflect	0.070	<0.001

	X1	X2	X3	Z	Y	Type (a	SE	P value
X2.5	0.105	0.753	-0.129	0.017	-0.022	Reflect	0.069	<0.001
X2.6	0.039	0.712	0.377	-0.342	-0.136	Reflect	0.070	<0.001
X2.7	-0.049	0.769	-0.105	0.259	-0.060	Reflect	0.069	<0.001
X2.8	-0.017	0.747	0.020	0.169	-0.178	Reflect	0.070	<0.001
X2.9	-0.179	0.718	0.022	-0.097	-0.074	Reflect	0.070	<0.001
X2.10	-0.362	0.462	0.119	0.366	0.281	Reflect	0.074	<0.001
X3.1	0.230	-0.430	0.646	0.159	-0.125	Reflect	0.071	<0.001
X3.2	-0.104	0.086	0.756	-0.088	0.002	Reflect	0.069	<0.001
X3.3	0.377	-0.395	0.714	0.126	-0.096	Reflect	0.070	<0.001
X3.4	-0.122	0.258	0.814	-0.084	0.050	Reflect	0.069	<0.001
X3.5	-0.348	0.413	0.691	-0.084	0.155	Reflect	0.070	<0.001
M1	-0.136	0.465	0.010	0.692	-0.150	Reflect	0.070	<0.001
M2	-0.029	0.032	0.376	0.605	-0.172	Reflect	0.072	<0.001
M3	0.007	-0.035	0.237	0.639	-0.344	Reflect	0.071	<0.001
M4	-0.190	0.259	0.001	0.727	-0.053	Reflect	0.070	<0.001
M5	0.183	-0.185	-0.150	0.745	0.060	Reflect	0.070	<0.001
M6	0.091	-0.101	0.084	0.772	0.028	Reflect	0.069	<0.001
M7	0.073	-0.162	-0.086	0.796	0.061	Reflect	0.069	<0.001
M8	-0.279	0.226	-0.178	0.801	0.226	Reflect	0.069	<0.001
M9	0.234	-0.215	-0.059	0.764	0.081	Reflect	0.069	<0.001
M10	-0.040	-0.242	-0.075	0.608	0.255	Reflect	0.072	<0.001
M13	0.131	-0.084	-0.103	0.367	-0.128	Reflect	0.076	<0.001
Y2	0.091	-0.193	0.258	-0.263	0.515	Reflect	0.073	<0.001
Y3	-0.226	0.017	-0.122	-0.006	0.707	Reflect	0.070	<0.001
Y4	-0.405	0.467	-0.229	0.004	0.799	Reflect	0.069	<0.001
Y5	0.128	-0.156	0.098	-0.016	0.813	Reflect	0.069	<0.001
Y6	0.261	-0.131	0.045	0.104	0.761	Reflect	0.069	<0.001
Y7	0.184	-0.080	0.030	0.095	0.730	Reflect	0.070	<0.001

Source: Warlpls Output (2023)

The outer loading values for all indicators in this research model are above 0.50. This indicates that each indicator has excellent convergent validity and is able to validate the construct it is intended to measure. Academically, a loading value above 0,50 indicates that more than 49% of the variance of the indicator can be explained by its latent construct, making these items a strong and reliable measure for representing research variables such as service quality, satisfaction, trust, and loyalty. These results meet the initial requirements for further analysis, as they demonstrate that the research instrument has accurately measured what it is intended to measure.

Table 2 shows the loading value generated from this research variable is more than 0.50, and the resulting significant level is less than 5%. This means that all indicators on IT-based product innovation variables, IT-based process innovation, IT-based organizational innovation, technosociopreneur and competitiveness are significant.

Cross Loadings

Table 3. Structure Loading and Cross Loading

X1	X2	X3	Z	Y	
X1.1	0.673	0.507	0.285	0.121	0.173
X1.2	0.667	0.575	0.304	0.117	0.209
X1.3	0.633	0.535	0.209	0.120	0.216
X1.4	0.675	0.527	0.162	0.135	0.140
X1.5	0.577	0.515	0.125	0.166	0.191
X1.6	0.570	0.482	0.321	-0.000	-0.010

X1	X2	X3	Z	Y	
X1.7	0.724	0.598	0.235	0.157	0.161
X1.8	0.609	0.548	0.250	0.105	0.162
X1.9	0.590	0.472	0.112	0.182	0.237
X1.10	0.568	0.495	0.211	0.198	0.269
X1.12	0.592	0.428	0.226	0.178	0.210
X1.13	0.747	0.588	0.268	0.214	0.252
X1.14	0.713	0.677	0.337	0.159	0.151
X2.1	0.571	0.686	0.206	0.384	0.387
X2.2	0.598	0.675	0.268	0.000	0.116
X2.3	0.617	0.735	0.319	0.175	0.267
X2.4	0.600	0.713	0.223	0.240	0.293
X2.5	0.639	0.753	0.258	0.219	0.245
X2.6	0.654	0.712	0.451	0.024	0.043
X2.7	0.614	0.769	0.318	0.415	0.376
X2.8	0.625	0.747	0.372	0.313	0.244
X2.9	0.577	0.718	0.279	0.149	0.191
X2.10	0.273	0.462	0.434	0.649	0.585
X3.1	0.102	0.121	0.646	0.260	0.080
X3.2	0.263	0.319	0.756	0.322	0.147
X3.3	0.277	0.282	0.714	0.298	0.115
X3.4	0.375	0.452	0.814	0.356	0.223
X3.5	0.287	0.382	0.691	0.386	0.291
M1	0.355	0.484	0.397	0.692	0.429
M2	0.213	0.290	0.526	0.605	0.299
M3	0.133	0.210	0.427	0.639	0.261
M4	0.178	0.297	0.314	0.727	0.477
M5	0.159	0.209	0.239	0.745	0.510
M6	0.190	0.290	0.393	0.772	0.504
M7	0.107	0.185	0.282	0.796	0.524
M8	0.093	0.236	0.218	0.801	0.611
M9	0.212	0.257	0.311	0.764	0.524
M10	-0.052	0.021	0.183	0.608	0.463
M13	0.087	0.127	0.120	0.367	0.205
Y2	0.144	0.169	0.201	0.275	0.515
Y3	0.007	0.088	0.032	0.437	0.707
Y4	0.156	0.313	0.068	0.485	0.799
Y5	0.251	0.302	0.262	0.533	0.813
Y6	0.343	0.383	0.259	0.540	0.761
Y7	0.310	0.345	0.226	0.507	0.730

Source: Warlpls Output (2023)

Table 3 shows that the cross loading results of IT-based product innovation variables, IT-based process innovation, IT-based organizational innovation, technosociopreneur, and competitiveness with their indicators are higher than the correlation of indicators with other variables. This means that IT-based product innovation, IT-based process innovation, IT-based organizational innovation, technosociopreneur and competitiveness predict their indicators in their own blocks better than the indicators in other blocks.

Composite Reliability

Table 4. Reliability test with composite reliability coefficient and Cronbach's alpha coefficient.

Composite reliability coefficients				

X1	X2	X3	Z	Y
0.901	0.906	0.847	0.908	0.869
Cronbach's alpha coefficients				

X1	X2	X3	Z	Y
0.881	0.883	0.774	0.887	0.817

Source: Warpls Output (2023)

Table 4 shows the results of the reliability test showed that the variables of IT-based product innovation, IT-based process innovation, IT-based organizational innovation, technosociopreneur and competitiveness are reliable, as seen from the composite reliability value generated above 0.70, while seen from Cronbach's alpha value <0.60. According to Adbillah and Jogiyanto (2015: 207), composite reliability is a statistical technique for reliability testing that is the same as Cronbach's alpha. However, composite reliability measures the actual reliability value of one variable. In contrast, Cronbach's alpha measures a variable's lowest value (lower bound) reliability so that the composite reliability value is always higher than the Cronbach's alpha value. According to Werts et al. (1974) in Salisbury et al. (2002), composite reliability is better used in PLS techniques.

Discriminant Validity (Average variance extracted - AVE)

Table 5. AVE (Average Variances Extracted)

Average variances extracted				

X1	X2	X3	Z	Y
0.881	0.883	0.774	0.887	0.817

Source: WarpPLS output (2023)

Table 5 shows the reliability test results indicating that the variables of IT-based product innovation, IT-based process innovation, IT-based organizational innovation, technosociopreneur and competitiveness have high discriminant validity, as seen from the resulting AVE value above 0.50. The Average Variance Extracted (AVE) values for each construct (service quality, satisfaction, trust, and loyalty) were all above 0.50. Academically, this is strong evidence that the model has adequate discriminant validity. An AVE value above 0.50 means that each latent construct is able to explain more than half of the variance of its indicators compared to the variance due to measurement error. In other words, the construct is more dominant in explaining its indicators than other factors outside the model. These results confirm that each variable in this study is a unique and distinct concept, making it worthy of being tested in a structural model.

Structural Model Evaluation (Structural or Inner Model)

Based on the Model Fit and Quality Indice Full Model output presented in Table 5 as follows:

Table 6. Model Fit and Quality Indice Full Research Model

<i>Average path coefficient (APC)=0.293, P<0.001</i>
<i>Average R-squared (ARS)=0.536, P<0.001</i>
<i>Average adjusted R-squared (AARS)=0.525, P<0.001</i>
<i>Average block VIF (AVIF)=2.081, acceptable if ≤ 5, ideally ≤ 3.3</i>
<i>Average full collinearity VIF (AFVIF)=2.485, acceptable if ≤ 5, ideally ≤ 3.3</i>
<i>Tenenhaus GoF (GoF)=0.212, small ≥ 0.1, medium ≥ 0.25, large ≥ 0.36</i>
<i>Simpson's paradox ratio (SPR)=1.000, acceptable if ≥ 0.7, ideally = 1</i>
<i>R-squared contribution ratio (RSCR)=1.000, acceptable if ≥ 0.9, ideally = 1</i>
<i>Statistical suppression ratio (SSR)=1.000, acceptable if ≥ 0.7</i>
<i>Nonlinear bivariate causality direction ratio (NLBCDR)=0.929, acceptable if ≥ 0.7</i>

Source: WarpPLS output (2023)

Table 6 shows that the APC value = 0.293 with P-value = 0.001, ARS value = 0.536 with P-value < 0.001, and AARS value = 0.525 with P-value < 0.001. The recommended P-value for APC, ARS, and AARS as a fit model is ≤ 0.05 (Latan & Ghazali, 2017). Thus, it can be concluded that this research model is a fit. This is also supported by the AVIF value of 2.081 and the AFVIF value of 2.485 whose values are much smaller than 3.3, indicating that there is no multicollinearity problem between independent variables. The model's predictive power described by GoF is in the small category because the value is $0.212 < 0.36$.

Table 7. R-squared, Adj R-squared, Full Collin. VIF dan Q-squared

	IT-based product innovation	IT-based process innovation	IT-based organizational innovation	Technosociopreneur	Competitiveness
R-squared				0.531	0.542
Adj R-squared				0.521	0.529
Full Collin.VIF	3.328	3.730	1.451	2.073	1.846
Q-squared				0.439	0.485

Source: WarpPLS output (2023)

The Variance Inflation Factor (VIF) values for all indicators in this research model are well below the critical threshold of 5.0 (even below 3.3). Academically, this indicates that there is no serious multicollinearity problem among the predictor indicators in the measurement model. High multicollinearity ($VIF > 5$ or 10) can make path coefficient estimates unstable and reduce the reliability of the results. The low VIF values found in this study indicate that each indicator contributes unique information and is not highly correlated with other indicators within the same construct. Thus, this model is stable and the parameter estimates are reliable for hypothesis testing.

Table 7 shows that R² and Adj-R² of this research model tend to be moderate because they are in the range of values above 0.25 and ≤ 0.45 . However, R² and Adj-R² for the influence of the Technosociopreneur mediation variable on the Competitiveness variable is relatively strong because the value is > 0.45 . Full collinearity VIF is used to check whether there is a vertical or lateral collinearity problem (Latan & Ghazali, 2017). The criterion for a model that is free from vertical and lateral multicollinearity problems is that the full collinearity VIF value must be lower than 3.3 (Latan & Ghazali, 2017; Sholihin & Ratmono, 2013). Table 6 shows

that the model used in this study is free from multicollinearity problems, because all full collinearity VIF values are much lower than 3.3.

Table 8. Path coefficients, P-value, dan Effect Size Full Model

	IT-based product innovation Path coefficient (P-value) & Effect Size	IT-based process innovation Path coefficient (P-value) & Effect Size	IT-based organizational innovation Path coefficient (P-value) & Effect Size	Technosociopreneur Path coefficient (P-value) & Effect Size
Technosociopreneur	0.020 0.038	<0.001 0.137	<0.001 0.355	
Competitiveness	<0.001 0.095	<0.001 0.150	<0.001 0.154	<0.001 0.401

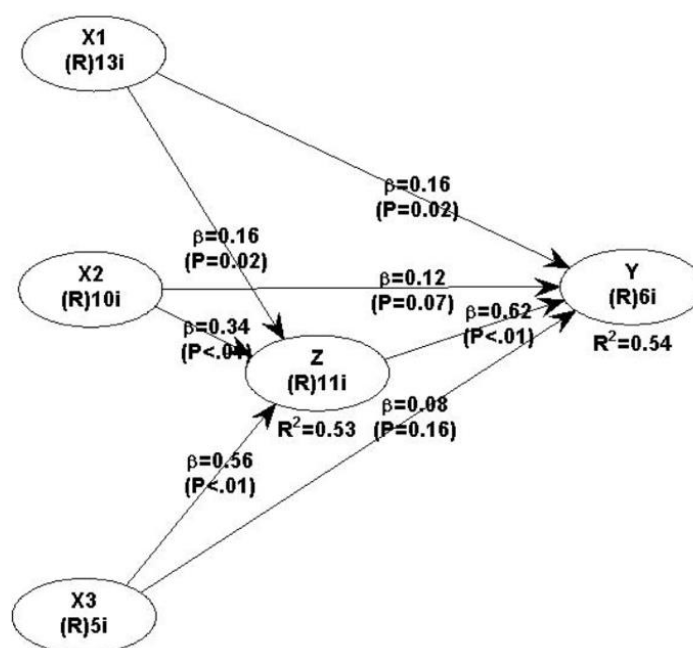
Source: WarpPLS output (2023)

Table 8 presents the output of the full research model's direct effect path coefficient, P-value, and effect size. The IT-based product innovation pathway to Technosociopreneur has a coefficient of 0.038 and is significant. The IT-based process innovation path to competitiveness has a coefficient of 0.137 and is significant. The IT-based organizational innovation path to Technosociopreneur has a coefficient of 0.355 and is significant. The Technosociopreneur path to competitiveness has a coefficient of 0.401 and is significant at the 1% level. Effect size is the variance of a particular independent variable on the dependent variable. Effect size measures the contribution of variables in the model to the R-square coefficient of a particular dependent variable. Effect size can be grouped into three categories, namely weak (0.02), medium (0.15), and large (0.35) (Sholihin & Ratmono, 2013). So the results of the contribution of IT-based product innovation variables, IT-based process innovation, IT-based organizational innovation, technosociopreneur and competitiveness are in the medium category and tend to be significant.

Statistical Test Results of the Research Model

This research data analysis uses Partial Least Square (PLS), assisted by WarpPLS 7.0 software. This study uses IT-based product innovation variables (X1), IT-based process innovation (X2), IT-based organizational innovation (X3), technosociopreneur (Z), and competitiveness (Y). The overall model of path analysis of all latent variables in PLS in this study can be described in Figure 2 as follows:

Figure 2. Research Model



Source: WarpPLS output (2023)

Figure 2 shows that the overall hypothesis testing model can be described as follows:

1. IT-based product innovation affects technosociopreneurs.
2. IT-based process innovation affects technosociopreneurs
3. IT-based organizational innovation affects technosociopreneurs
4. Technosociopreneur affects competitiveness
5. IT-based product innovation affects competitiveness mediated by technosociopreneur
6. IT-based process innovation has an effect on competitiveness mediated by technosociopreneur
7. IT-based organizational innovation affects competitiveness mediated by technosociopreneur

The results of testing the overall research model will be followed by the results of testing the research hypothesis. Structural model testing has the aim of answering the hypothesis by looking at the results of the p-value as follows:

Table 9. Hypothesis Test Results

	β	P-Value	Description
<i>IT-based product innovation affects technosociopreneurs</i>	0.16	0.02	H1 Accepted
<i>IT-based process innovation affects technosociopreneurs</i>	0.34	<0.01	H2 Accepted
<i>IT-based process innovation affects technosociopreneurs</i>	0.56	<0.01	H3 Accepted
<i>Technosociopreneur affects competitiveness</i>	0.62	<0.01	H4 Accepted
<i>IT-based product innovation affects competitiveness mediated by technosociopreneurs</i>	0.60	<0.01	H5 Accepted
<i>IT-based process innovation affects competitiveness mediated by technosociopreneurs</i>	0.56	<0.01	H6 Accepted
<i>IT-based organizational innovation affects competitiveness mediated by technosociopreneurs</i>	0.68	<0.01	H7 Accepted

Source: WarpPLS output (2023)

So the test results show that the technosociopreneur variable is an important mediating variable with the path of IT-based product innovation, IT-based process innovation, IT-based organizational innovation affecting competitiveness.

Discussion

IT-based product innovation has fundamentally changed the way businesses operate. Technosociopreneurs can create more efficient and technology-connected business models. IT-based product innovation has changed the landscape of business and society, and technosociopreneurs must continue to adapt and take advantage of these changes. This is an era where technology and entrepreneurship are closely intertwined, and an understanding of IT innovation is key to technosociopreneur success in this ever-changing world (Paško et al., 2022). IT product innovation has opened the door for technosociopreneurs to reach the global market more easily. With the internet, they can market their products internationally and run businesses with a global scope. IT-based product innovation also brings social and cultural impacts. Changes in the way people interact, shop, and access information can affect technosociopreneurs' marketing strategies and consumer understanding.

IT-based process innovation is key in improving the efficiency, flexibility, and competitiveness of technosociopreneurs in this digital era. MSMEs that can utilize information technology effectively can gain a significant competitive advantage and achieve success in their business. IT-based process innovation enables technosociopreneurs to automate routine and repetitive tasks, thereby improving operational efficiency and tapping into a broader market. With the adoption of e-commerce, for example, they can sell their products online to customers in various geographical locations. In addition, IT process innovation also has the potential to bring about positive impacts on society and the environment if managed wisely (Ahmad et al., 2023).

IT-based organizational innovation can provide technosociopreneurs with powerful tools to improve MSME businesses' efficiency, effectiveness, and competitiveness. By applying information technology wisely, technosociopreneurs can create adaptive and innovative organizations in this digital era. This can help technosociopreneurs make smarter decisions and be responsive to market changes. In addition, keep in mind that IT-based organizational innovation also brings responsibility in maintaining data privacy and security, which must be seriously managed in managing risks (Piro et al., 2025).

Technosociopreneurs have a significant role in dealing with technological changes and increasingly fierce business competition. They can combine technological and social elements to create innovations that positively affect business and society. The success of technosociopreneurs can positively impact achieving higher competitiveness in today's digital era. In the ever-changing digital era, technosociopreneurs have a crucial role in helping organizations and businesses utilize IT-based product innovation, IT-based process innovation, and IT-based organizational innovation to effectively facilitate the transformation of MSMEs to increase their competitiveness in an increasingly competitive market (Rupp et al., 2021).

The FGD results revealed that the adoption of IT-based innovations by creative industry MSMEs in Surabaya is driven by the pressures of market competition and increasingly digital customer demands, not solely by a technopreneurship vision. Participants acknowledged that the COVID-19 pandemic was a catalyst that forced them to shift to digital platforms for survival. However, this motivation was more reactive and pragmatic, with product innovation (such as creating digital catalogs) prioritized over process or organizational innovations that require fundamental changes.

While quantitatively, process and organizational innovations have a significant impact, the FGD revealed a wide implementation gap. Businesses struggle to implement IT-based automation and management systems due to limited resources, including funding, time, and technical competence. Furthermore, organizational innovations, such as project-based role allocation or a data-driven culture, often struggle with traditional mindsets and rigid family business structures. These innovations are more commonly implemented by businesses with larger scale or access to external mentoring.

The FGD deepened understanding of the technosociopreneur construct, measured quantitatively. Participants defined it not only as technical capability, but also as the ability to network and create social impact through their businesses. For example, a printing business helps local communities create promotional content, or a culinary business utilizes a donation platform to redistribute excess food. However, this capacity grows organically and unstructured, and is highly dependent on the personal characteristics of the business owner and the support of the surrounding community.

Quantitative findings on the mediating role of technosociopreneurs were confirmed and nuanced in the focus group discussions (FGDs). Participants explained that IT alone is not enough to increase competitiveness. What makes them superior is their ability to leverage IT to build strong relationships with customers (e.g., through personalized services on social media), create authentic brand storytelling, and manage online reputation. This process, the essence of technosociopreneurship, is seen as the bridge that transforms technical tools (IT) into customer trust and loyalty, ultimately driving sustainable competitiveness.

From a qualitative perspective, entrepreneurs provide concrete input to stakeholders. They require contextual and practical mentoring, not theoretical training. For example, workshops on digital tools specific to their industry, assistance in developing effective digital content, or facilitating networking with other technosociopreneurs to share resources. Furthermore, they emphasized the importance of affordable digital infrastructure support and regulatory streamlining, such as simplifying online business licensing. The FGD findings confirm that increasing competitiveness through technosociopreneurship requires holistic interventions, simultaneously addressing technical, managerial, social, and policy aspects.

Technosociopreneurial innovation linked to national values refers to the development of technology-based products, processes, or business models that intentionally integrate and promote cultural identity, local wisdom, or national principles such as mutual cooperation, economic independence, or cultural heritage preservation as core added value. Concrete examples include digital platforms for marketing traditional craft products with stories of their origins (digital storytelling), applications that support the circular economy and village independence, or community-based crowdfunding systems for social enterprises aligned with the spirit of togetherness. However, despite its significant potential, the benefits of this approach have not been systematically explained. Theoretically, there is no comprehensive framework linking the integration of national values in technosociopreneurial innovation with measurable competitiveness constructs (such as differentiation advantage or business resilience). Practically, the lack of a clear roadmap has resulted in supporting policies, incubation programs, and MSME strategies themselves tending to be fragmented between pure digitalization and cultural preservation, without considering the strategic synergy between the two as a source of unique and sustainable competitive advantage.

CONCLUSION

Based on the results of the research and discussion carried out, it can be concluded that:

1. IT-based product innovation affects technosociopreneur.
2. IT-based process innovation affects technosociopreneur
3. IT-based organizational innovation affects technosociopreneurs
4. Technosociopreneur affects competitiveness
5. IT-based product innovation affects competitiveness mediated by technosociopreneur
6. IT-based process innovation has an effect on competitiveness mediated by technosociopreneur
7. IT-based organizational innovation affects competitiveness mediated by technosociopreneur 7.

Based on the findings, strategic suggestions for stakeholders are as follows: For MSMEs/technosociopreneurs, the focus should not be solely on digital product innovation, but should encompass comprehensive transformation by integrating process innovation (such as automation and data-driven decision making) and organizational innovation (such as agile culture and network structure). Local governments and business incubators need to formulate mentoring programs that not only provide technology access, but also build sociotechnopreneurial mindsets and capabilities through training that integrates technical, business, and social impact aspects, while creating a collaborative ecosystem between business actors, academics, and communities. For further research, it is recommended to: (1) expand the geographic and sectoral scope to test the generalizability of the model, (2) use a longitudinal approach to capture the dynamics of causality in technosociopreneur capacity building, (3) explore moderator variables such as digital literacy or regulatory support that can strengthen/weaken the relationships in the model, and (4) adopt a more in-depth mixed-methods approach to uncover the narratives and qualitative context behind the observed quantitative relationships.

Based on the integration of quantitative and qualitative findings, this study recommends three strategic policy directions. First, local governments need to formulate a hybrid, multi-level mentoring program, for example through the "Creative MSME Contextual Digitalization Movement." This program should integrate technical training in sector-specific digital tools (product/process innovation) with management mentoring to build an adaptive and data-driven organizational culture (organizational innovation), while also incorporating modules on packaging local socio-cultural values as market differentiation. Second, for business incubators and associations, the recommendation is to develop a collaborative platform that connects MSMEs with IT students/societies (as technical partners), financiers, and specialized digital marketplaces, thus establishing a mutually supportive ecosystem that accelerates the development of technosociopreneurial capacity. Third, fiscal and non-fiscal incentives are needed for MSMEs that have invested in IT-based process and organizational innovation, such as tax breaks or special financing, to encourage deeper transformation beyond just product innovation.

This study has several limitations that provide opportunities for further study. The main limitations include: (1) Limited geographic and sectoral scope (only creative industry MSMEs in Surabaya), so generalization of findings to other regions or sectors requires caution; (2) Cross-sectional design that only provides a single point in time, so it cannot fully capture the dynamics of causality and the development of technosociopreneur capacity; and (3) Purposive sampling method that, although appropriate for the purpose, has the potential to contain bias

and does not represent the entire population of creative MSMEs proportionally. Suggested directions for further research are: (1) Conducting replication of the study with a wider regional and sectoral scope (multi-province or multi-country) to test the external validity of the model; (2) Adopting a longitudinal approach or panel study to analyze the evolution of relationships between variables over time; (3) Adding moderator variables such as government regulatory support or competition intensity to identify conditions that strengthen/weaken the influence of IT innovation; and (4) Developing in-depth qualitative research (case studies) to explore the specific processes and strategies of how successful technosociopreneurs transform IT innovation into sustainable competitiveness.

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