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ARTICLE

Technosociopreneurship Model in Local Economic Institutions for Agricultural Commodity Business Development

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ABSTRACT

The purpose of this study is to explain the role of technosociopreneurship based on local economic institutions by testing the influence of technosociopreneurship factors on the institutional economy of KPSU Solok Radjo. This research employs a quantitative method with a cross-sectional approach. Sampling was conducted using the simple random sampling technique. The results of the study indicate that innovation does not have a significant positive effect on local economic institutions. Innovation has a significant positive effect on technosociopreneurship. Collaboration has a significant positive effect on local economic institutions. Collaboration has a significant positive effect on technosociopreneurship. Technosociopreneurship has a significant positive effect on local economic institutions. Technosociopreneurship mediates the relationship between innovation and local economic institutions. Technosociopreneurship mediates the relationship between culture and local economic institutions. The R^2 value of 0.678 indicates that the variables of innovation, collaboration, and culture explain 67.8% of the factors contributing to technosociopreneurship, while the remaining 32.2% is explained by other variables not examined in this study. The R^2 value of 0.530 shows that technosociopreneurship, innovation, collaboration, and culture collectively explain 53% of the factors influencing local economic institutions, leaving 47% to be explained by other unexamined variables. Technosociopreneurship plays a key

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role in mediating the relationship between innovation and the local economic institution of KPSU Solok Radjo. Without the mediation of technosociopreneurship, innovation does not impact local economic institutions.

Keywords: Technosociopreneurship; Innovation; Collaboration; Culture; Cooperative

1. Introduction

Agricultural development plays a strategic role in the national economy. This strategic contribution to demonstrated by its role in the formation of capital, provision of food, industrial raw materials, feed and bioenergy, absorption of labor, source of state foreign exchange, and source of income through agricultural entrepreneurial practices [1]. Entrepreneurship is one of the most important aspects of agricultural development because it encourages innovation and proactive thinking about future trends [2]. The agricultural sector functions as a means to gain profit and is willing to take calculated risks to make farming profitable and their businesses grow. Previous research findings [3] explain that technosociopreneurship is a combination of technology entrepreneurship and social entrepreneurship. The collaboration model scheme for developing technosociopreneurship is through the synergy of academics, business actors, communities, government, and media to support the social entrepreneurship ecosystem by adopting technology.

Based on previous research studies, there are two concepts/models of entrepreneurship that are applied, namely social-based entrepreneurship (Sociopreneurship) and technology-based entrepreneurship (Techno-preneurship) [4–8]. This is also supported by the results of previous research using the Resource-Base View (RBV) concept [9], which shows that there is a tendency for RBV research on entrepreneurship to be directed at the concepts of social entrepreneurship and technology-based entrepreneurship in creating business competitiveness.

The development of social entrepreneurship is based on a framework for creating shared value and is voluntary with a Social Value, Civil Society, Innovation, and Economic Activity approach [10]. In the context of social responsibility for sustainable growth and maximizing local economic potential, this will realize well-institutionalized economic values [8]. Technopreneurship is the process of forming a new business that involves technology, with the hope that creating the right strategy and innovation will make technology one of the factors for developing the economy [11]. Technopreneurship is a solution to increase the nation's competitiveness because it is a process of synergy of strong capabilities in sustainable economic development [12,13].

The use of this technology will offer a path to sustainable agriculture through technology diversification, farm management, and networks among all agricultural sector actors. Farmers who gather in an institution will be able to support and facilitate the use of appropriate technology and have an impact on the sustainable use of technology to choose the most appropriate actions in both developed and developing countries. Entrepreneurship that adopts appropriate technology can be developed in agricultural commodity businesses. Entrepreneurs who understand and master technology, ang are creative and innovative have the potential to succeed in utilizing agricultural business opportunities with large resources [12]. Social and technology-based agricultural entrepreneurship is practical and relevant for rural communities because of its ability to leverage technological innovation. This study highlights the importance of farmers investing more resources into entrepreneurship that adopts technologies with social value for rural areas [14].

The application of the concepts of social entrepreneurship and technopreneurship is important for local economic institutions. By combining the social potential of the community with the utilization of technological developments in entrepreneurship within the agri-

cultural sector, new economic resources can be created for rural communities. Local economic institutions are organizations and regulations that affect local economic activities and business practices [15,16]. Karl Polanyi stated that local economic institutions are social and cultural networks that support and influence economic activity in an area [17].

Entrepreneurial approaches in the agricultural sector have long existed, including in the form of partnerships between farmers and business actors, but have not yet succeeded in becoming a solution. This has resulted in disharmony between actors in the form of institutions and small-scale farming businesses [18,19]. Understanding the importance of building togetherness through productive activities accommodated within an organizational framework is still relatively low, as the development of agricultural areas is still output-oriented [20,21]. Based on this, farmer independence needs to be built through farmer entrepreneurship based on local economic institutions by potentializing social and technological aspects as a model for increasing competitiveness.

Based on the results of previous research studies, there has not been much discussion about social entrepreneurship in utilizing local economic institutions and maximizing technological developments to increase the scale of business specifically. There are still few studies that explain the challenges of Technosociopreneurship in local economic institutions. What is interesting is that there is almost no previous research that distinguishes the application of large-scale industrial entrepreneurial management from that of micro and small-scale entrepreneurs, resulting in suboptimal business management in achieving goals. Based on previous research, it was found that digital social agricultural entrepreneurship is practical and relevant for rural communities because of the ability to utilize technological innovations [22]. This highlights the importance of farmers investing more resources into digital entrepreneurship especially those that have social value for rural areas [14]. To overcome this, innovation is needed in local economic institutional efforts so that this inertia can reduce uncertainty in the adoption of large-scale business institutional management in micro and small-scale businesses.

The results of initial observations on the research object show that in coffee farming cultivation, coffee processing, financial management and post-harvest product promotion, managers require knowledge in innovation to use digital equipment and technology so that they can achieve optimal results. Previous research suggests that open innovation provides incentives for managers to prioritize the use and integration of knowledge in the current business and innovation framework because entrepreneurial companies have the capacity to increase the amount of information coming in from innovation transparency and foster stronger relationships between various stakeholders [23].

Initial observations of the research object revealed that in coffee farming, coffee processing, financial management, and post-harvest product promotion, innovations in equipment and digital technology are needed. These innovations improve productivity and cost efficiency, as evidenced by a 50% increase in coffee exports in 2022, totaling 15 tons, compared to the previous year. KPSU Solok Radjo achieved third place in the world's specialty coffee rankings, thanks to collaboration with various stakeholders, such as Dimitri (an international coffee company providing the digital-based "My Coffee" application), the Netherlands' RPL Institute (providing the "Avenza" application for coffee farmer management), Robo Bank, Starbucks, Fili Konte America, BI, and Community Forest Management. These partners collaborate to strengthen the business process from upstream to downstream for Solok Radjo coffee products.

KPSU Solok Radjo was founded on familial ties by three siblings who initially started with coffee farming, and it has now grown to 350 members with various business units, including coffee plantations, coffee export, agro-tourism, and coffee shops. The advancement of Solok Radjo coffee cannot be separated from the influence of cultural conditions and the social capital of the local community, which directly strengthens the cooperative's institutional framework.

The preliminary survey also revealed that cooper-

ative managers and members had not fully adopted the available technology due to uneven human resource capabilities within the cooperative. Regular assistance is therefore required, such as training on how to use the digital-based "My Coffee" application. Institutional challenges persist due to suboptimal managerial human resources, which also impact innovation. Additionally, the social conditions of the local community pose resistance to the development of new business units, such as glamping and agro-tourism.

From the existing phenomena in local economies (cooperatives, farmer groups, etc.), all businesses operate but never scale up from micro to larger scales because they solely focus on economic aspects. To address this issue, a social approach is needed, giving rise to social entrepreneurship. However, a social entrepreneurship approach alone is insufficient. Based on the literature reviewed, this entrepreneurship model also falls short of improving the economic scale of local economic institutions due to suboptimal social innovation. The application of social innovation can be more effective in increasing business scale when technology is adopted in business management. To scale up local economic institutions, the technosociopreneurship model is needed.

KPSU Solok Radjo was chosen as the research object because this local economic institution has already approached the implementation of a technosociopreneurship model in running its business based on local economic institutions. It needs to be proven that technosociopreneurship can uplift the economy in the agricultural sector managed by local economic institutions. Therefore, the KPSU Solok Radjo local economic institution becomes the focus of this study, with the aim of intervening with the technosociopreneurship concept. Based on the aforementioned issues, this research aims to explain the role of technosociopreneurship based on local economic institutions by testing the influence of technosociopreneurship factors on the business of the local economic institution KPSU Solok Radjo in Nagari Air Dingin, Solok Regency.

2. Literature Review

2.1. Technosociopreneurship

The broader relevance of the currently popular opportunity-based conceptualization of entrepreneurship is to explore the entrepreneurial actors, events, processes, and outcomes associated with entrepreneurs and for-profit and non-profit organizations exploiting social and technology-based business opportunities (Technosociopreneurship) [24]. Social and technological agricultural entrepreneurship is relevant to rural communities because of its ability to leverage technological innovation. The findings of this study highlight the importance of farmers investing more resources into entrepreneurship especially those with social value and technological capabilities for rural areas [14].

The social entrepreneurship approach has been widely applied to micro and small-scale agricultural entrepreneurship, but this social entrepreneurship model has not had an impact on increasing the scale of the business, especially in agricultural commodity businesses. In the current condition, the technopreneurship approach is mostly applied only to medium and large-scale industrial businesses and has not been fully adopted by businesses based on social entrepreneurship. The micro and small-scale business sector, especially in the agricultural commodity sector, needs to adopt the concepts of technopreneurship and social entrepreneurship simultaneously in utilizing technology to innovate, which is called the Technosociopreneurship concept. By implementing this model, agricultural entrepreneurship businesses based on local economic institutions will be able to achieve a better economic scale and increase the scale of their business.

Social entrepreneurship was introduced in the 1970s to address social issues in a sustainable manner. The term "social entrepreneur" was first mentioned in 1972 by Joseph Banks in his work entitled The Sociology of Social Movements, where he used the term to describe the need to use managerial skills to address social problems as well as to overcome business

challenges. The practice of social entrepreneurship emerged in the 1980s with the founding of Ashoka, the first organization to support social entrepreneurs in the world [25]. Social entrepreneurship is the process of creating social value by pooling focused resources to pursue and explore opportunities [26]. Social entrepreneurship activity refers to the process of identifying and creating existing opportunities through innovative approaches for marginalized groups [27].

Technopreneurship is the process of establishing new businesses that involve technology, with the expectation that the creation of appropriate strategies and innovations will position technology as one of the key factors in developing the national economy [11,12]. A "technopreneur" is a solution to enhance competitiveness and represents a synergistic process of strong capabilities in mastering technology. In practice, technopreneurship involves technology as its foundation, with the hope that the creation of appropriate strategies and innovations will eventually position technology as a key factor in national economic development [13].

Several entrepreneurship experts define technopreneurship as the effort to leverage innovative or digital technology to create, develop, and manage innovative and growth-oriented businesses in highly competitive markets. According to Dr. Jeffrey Timmons and Stephen Spinelli Jr. (in their book "New Venture Creation: Entrepreneurship for the 21st Century"), technopreneurship is the creation of unique and valuable products or services through a combination of technology, creativity, and entrepreneurship to meet market demands.

Technopreneurship represents entrepreneurship in the realm of technology, where individuals or groups create and seize business opportunities in a rapidly changing technological environment while maximizing business strategies focused on utilizing technology as a key component in value creation and business growth. Technopreneurship involves becoming an entrepreneur who takes the initiative to develop and manage technology-based or innovative businesses. It entails a deep understanding of technology, sensitivity to market opportunities, creativity, leadership, and the ability to face risks to achieve business growth and success.

Technopreneurship has several characteristics that differentiate it from entrepreneurship that does not adopt technology. These include a revolutionary mindset, continuous product innovation, collective struggle, rapid product launches to market, the acquisition of new technology to sustain growth, motivation, ownership, managerial style, leadership, research and development (R&D), innovation, networking, growth potential, and market targeting [28]. From all the articles cited in this writing, a conceptual framework was discovered that explains the scientific basis of technosociopreneurship grounded in local economic institutions. This framework is grouped into three core scientific concepts: innovation, collaboration, and culture.

H7. *It is hypothesized that technosociopreneurship has a significant positive effect on the local economic institution of KPSU Solok Radjo.*

2.2. Local Economic Institutions

The concept of local economic institutions is derived from Ronald Coase's New Institutional Economics (NIE) theory from 1937, which discusses institutional issues and credible commitments as an enhancement of the Old Institutional Economics (OIE) theory. OIE theory is a branch of economics that does not rely on orthodox economic theories, whether classical or neoclassical. This theory rejects the neoclassical approach, as it is considered to neglect humanistic aspects in its analysis [29]. According to this perspective, OIE theory does not refer to institutions in a physical form but rather to economic behavior influenced by general considerations and emotions prevailing under specific conditions and times.

Elinor Ostrom, an expert in institutional studies, defines institutions as "rules, norms, and strategies that shape human interactions in various contexts." In the context of the local economy, these institutions include the rules and norms that govern community economic activities, such as local markets, cooperatives, and local trade associations [30]. Local economic institutions encompass various forms of local organizations and reg-

ulations that influence economic activities, including local government policies and local business practices [15,16]. The objective of local economic institutions is to provide hard technology, such as tangible agricultural tools and equipment, and soft technology, such as community engagement approaches, guidance on obtaining funds from the government through banks, and ensuring these resources reach the community [31].

Karl Polanyi emphasized that the economy cannot be separated from its social context and that economic institutions are always embedded in society and local culture. In this regard, local economic institutions are social and cultural networks that support and influence economic activities in a specific region [17]. Indicators used to measure local economic institutions include seven factors that contribute to the sustainability of economic institutions in rural areas: the suitability of characteristics, service effectiveness, the ability to mobilize internal capital, government policy on financial institutions, principles of trust, the formation of network systems, and the establishment of institutional norms [32].

2.3. Innovation

There are three main sources of productivity growth in the agricultural sector: technological change, improvement in technical efficiency, and business scale expansion (economies of scale) [33]. Innovation in creating alternative business opportunities can significantly improve the productivity of farming enterprises. Businesses that adopt innovation in producing products are more likely to capture the available market share [34]. Measuring innovation within an institution can be conducted through four indicators: (1) Creativity, (2) Marketing Innovation, (3) Technological Innovation, and (4) Financial Innovation [35].

Based on a review of previous research, which evaluated the number of authors, research outputs, and overall citations, comparing papers published between 2015 and 2024 from sources such as Google Scholar, Garba Rujukan Digital (Garuda), ScienceDirect, and other websites, it has been shown that innovation significantly influences the growth and development of technology-based entrepreneurs in the agricultural sector [36]. Entrepreneurial innovation and creativity significantly affect the success of small and medium enterprises (SMEs) [37,38] Additionally, entrepreneurial innovation has been shown to influence the competitive advantage of culinary MSMEs [39]. Innovation positively impacts product competitiveness [40], and it also has a positive and significant influence on competitive advantage [41,42]. Entrepreneurial marketing, which includes entrepreneurial orientation, market orientation, and innovation, significantly influences the financial performance of productive economic businesses within joint business groups [43]. Furthermore, innovation positively mediates the relationship between academia-government collaboration and competitiveness [44]. In summary, innovation plays a critical role in shaping socio-technopreneurship within local economic institutions to achieve agricultural commodity competitiveness. In the context of this study, it is hypothesized that effective innovation conducted by farmers (agropreneurs) can lead to the creation of technosociopreneurship within local economic institutions, fostering the competitiveness of agricultural commodities.

Previous studies on the relationship between innovation and technosociopreneurship [45] indicate that innovation partially influences entrepreneurial variables. Research results also show that innovation significantly impacts the business performance of entrepreneurial MSMEs [38]. The findings indicate that entrepreneurial innovation and creativity significantly affect the success of small and medium enterprises [37,39]. Researchers found that innovation significantly impacts the performance of entrepreneurial MSMEs [43].

H1. *It is hypothesized that innovation has a significant positive effect on the local economic institution of KPSU Solok Radjo.*

H4. *It is hypothesized that innovation has a significant positive effect on Technosociopreneurship in KPSU Solok Radjo.*

H8. *It is hypothesized that the Technosociopreneurship variable mediates the relationship between innovation*

and the local economic institution of KPSU Solok Radjo.

2.4. Collaboration

The limitation of resources at both the individual and organizational levels is one of the reasons why the concept of collaboration is essential for individuals and various types of organizations to achieve their goals [46]. The term collaboration originates from the word co-labour, which means working together. Philosophically, collaboration is an effort made by parties to achieve common goals. According to Schrage [47], collaboration is an effort to bring together various parties to achieve a shared objective. The collaborative process involves multiple actors, including individuals and organizations, working synergistically to complete tasks in order to achieve shared goals. A collaborative approach aims to create public value. Research conducted by [48] shows that processes and structures work closely together to promote effective cross-sector collaboration. The findings of [49] explain that insights into the collaborative effects of innovation efforts on collaboration patterns involved in entrepreneurship are of managerial importance, as they provide insights on how to build organizational collaboration strategies to facilitate an environment conducive to appropriate entrepreneurial innovation.

Previous Studies on the Relationship Between Collaboration and Local Economic Institutions. Setiawa and Soelaiman found that collaboration has a positive and significant influence on performance, proving that the better the collaboration, the better the performance of MSMEs [50]. Ranatiwi and Mulyana found that collaborative networks influence improvements in the performance of MSMEs [51]. Auna et al. Found that collaboration has a positive and significant effect on the productivity of small and medium enterprises [52].

H2. *It is hypothesized that collaboration has a significant positive effect on the local economic institution of KPSU Solok Radjo.*

H5. *It is hypothesized that collaboration has a significant positive effect on Technosociopreneurship in KPSU Solok Radjo.*

H9. *It is hypothesized that Technosociopreneurship mediates the relationship between collaboration and the local economic institution of KPSU Solok Radjo.*

2.5. Culture

Culture is a common phenomenon in every society and exists in every individual's mindset. Culture is an active process embedded in the normalcy of everyday life [53]. Culture has both direct and indirect effects on various dimensions of entrepreneurship. It appears to play an important role in business processes, as cultural diversity can influence dominant entrepreneurial characteristics, thereby moderating the impact of economic conditions on entrepreneurship [54]. Cultural values determine the extent to which a society views entrepreneurship as an attractive or unattractive professional outlet [55]. Consequently, the level of entrepreneurship varies significantly from one country to another based on cultural differences [56].

Previous studies have identified relationships between culture and entrepreneurship. Certain cultural dimensions tend to strengthen or weaken the relationship between individual factors and an individual's intention to engage in entrepreneurship [57]. Culture is a mental phenomenon, consisting of the content of thoughts rather than observable material objects or behaviors. Culture is cumulative, indicating that the entirety of a culture present today is partially shaped by the legacy of pre-existing cultural heritage [58]. To provide a more specific explanation of cultural factors in entrepreneurship, several indicators of culture related to entrepreneurship have been identified. These factors include Entrepreneurial Culture, Supportive Environment, and Public Policy [59]. Previous studies on the relationship between culture and local economic institutions indicate that the cultural variable has a partially positive and significant influence on business success [60]. Setiawan found that organizational culture collectively influences the performance of small businesses [61].

H3. *It is hypothesized that culture has a significant positive effect on the local economic institution of KPSU Solok Radjo.*

H6. *It is hypothesized that culture has a significant positive effect on Technosociopreneurship in KPSU Solok Radjo.*

H10. *It is hypothesized that Technosociopreneurship mediates the relationship between culture and the local economic institution of KPSU Solok Radjo.*

This study uses the Smart PLS (Partial Least Squares) method because this study aims to explain the role of technosociopreneurship based on local economic institutions by testing the influence of technosociopreneurship factors on the institutional economy of KPSU Solok Radjo. To make it easier to understand the description of this study, as explained in the hypothesis above (H1–H10), it can be seen in **Figure 1** about the theoretical framework of research. The conceptual framework of this study will provide a logical and structured description of the relationship between the concepts or variables to be studied.

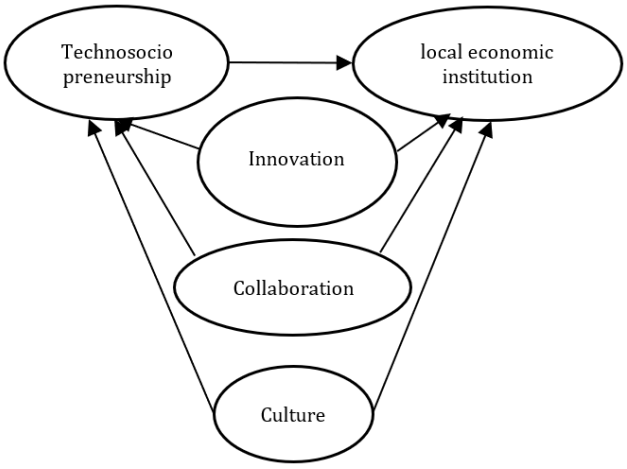

Figure 1. Theoretical framework of research.

3. Materials and Methods

Based on the conceptualization of the problem and the research questions that have been formulated, this study is designed with a quantitative approach to test the proposed hypotheses using direct and indirect influences through the synergy of the two constructs. This study will provide substantial information to detect the influence between research variables that conceptualize the problem and research questions with terms such as relationship, influence, impact, and words that imply a causal relationship between concepts.

3.1. Study Setting

Quantitative data used in this study were collected using a questionnaire. This questionnaire explores information from respondents related to the role of technosociopreneurship in local economic institutions to increase business scale by testing the influence of technosociopreneurship factors on the local economic institutions of KPSU Solok Rajo Nagari Air Dingin Solok Regency. The survey questionnaire was distributed to a sample of 120 respondents. The sample was obtained using a sampling model proposed by Ferdinand [62], which determines that the number of samples needed should be at least 5 times the number of indicator variables. The number of indicator variables in this study is 23, so a minimum of 23 × 5, or 115 samples, is needed. This sample determination is also in accordance with the Maximum Likelihood Estimation (MLE) technique [63], which states that in Chi-Square testing, the SEM model is very sensitive to the number of samples; therefore, the number of good samples according to MLE ranges from 100 to 200 samples. Consequently, the number of samples is 120.

3.2. Sample and Questionnaire Studies

The unit of analysis of this study is the local economic institutional cooperative, namely coffee farmers fostered by KPSU Solok Radjo with a population of 350 people. The sampling method uses a simple random sampling technique [64]. The use of samples in research has several fundamental reasons, some of which involve practical, economic, and logical considerations. The population of 350 people requires took a lot amount of time, resources, and costs. The population is relatively homogeneous, with the same profession,

living in the same Nagari/Village and sharing the same culture. By using simple random sampling, the study can be more efficient in terms of time and budget. Data collection uses a questionnaire instrument, which will later explore information from respondents regarding the role of technosociopreneurship in local economic institutions to increase business scale by testing the influence of technosociopreneurship factors on the local economic institutions of KPSU Solok Rajo Nagari Air Dingin Solok Regency. Respondents in this study were members of KPSU Solok Radjo.

3.3. Measurement and Statistical Methods

In order to explain the role of techno-sociopreneurship in local economic institutions by testing the influence of techno-sociopreneurship factors on local economic institutions in KPSU Solok Rajo Nagari Air Dingin Solok Regency, this research uses a Likert scale (1–4) [64]. Modifying the Likert scale by eliminating neutral answers is intended to avoid biased results in the choices given to respondents.

The data analysis in this study utilized descriptive quantitative analysis and structural model analysis using the Smart PLS (Partial Least Squares) method. The use of PLS-SEM in this study is justified as it aims to explain the role of technosociopreneurship based on local economic institutions in scaling up agricultural commodities by examining the influence of technosociopreneurship factors on local economic institutions at KPSU Solok Radjo in Nagari Air Dingin, Solok Regency.

In PLS-SEM analysis after the model meets the requirements, a multicollinearity test is performed. Multicollinearity is a situation where two variables have a very high correlation. The maximum threshold for correlation between variables indicating no multicollinearity is 0.7 [65]. In addition to using correlation analysis, multicollinearity tests can also be performed using variance inflation factor (VIF) analysis [65]. If the VIF value is less than 3.0, then there is no multicollinearity. The next step is to perform a PLS-SEM structural equation analysis [66]. The structural model is analyzed in four stages. To determine the level of significance of the path coefficient, the bootstrapping procedure is used.

The criteria for hypothesis testing are as follows: The hypothesis is accepted if the sample mean is positive, the *t*-statistic is greater than the *t*-table value (1.96), and the significance or *p*-value is less than α (5%). The hypothesis is rejected if the sample mean is negative, even if the *t*-statistic is greater than the t-table value (1.96) and the significance or *p*-value is less than α (5%) [67,68].

4. Discussion

4.1. Convergent Validity Test

In the SEM-PLS approach, a measurement meets convergent validity if it fulfills the requirement of having an indicator loading factor of at least 0.5 [67,68]. The loading factor results are presented in **Figure 2** as follows.

The indicator loading factor values for the dimensions presented in **Figure 2** range between 0.755 and 1.000. This indicates that all indicators of the latent variables in the study have loading factors greater than 0.5. Thus, the indicators are considered valid in measuring their respective dimensions and latent variables. As a result, the evaluation of the measurement model (outer model) in the SEM model is complete, and no further model re-specification is required.

4.2. Discriminant Validity Test

Discriminant validity is evaluated using the following test parameters [67] Maximum Shared Squared Variance (MSV), which must be smaller than AVE; 2) Average Shared Squared Variance (ASV), which must also be smaller than AVE; and 3) The square root of AVE must be greater than the correlations with other variables, referred to as the Fornell-Larcker criterion. **Table 1** shows that the AVE values for all dimensions and latent variables do not range between 0.500 and 1.000, meaning that the AVE values for all variables are not greater than 0.5. Specifically, the AVE value for the variable innovation is 0.395, which is less than 0.500.

Therefore, respecification of the measurement model is required by removing the indicator with the smallest loading factor. The results of the respecified measurement model are presented in **Table 1**.

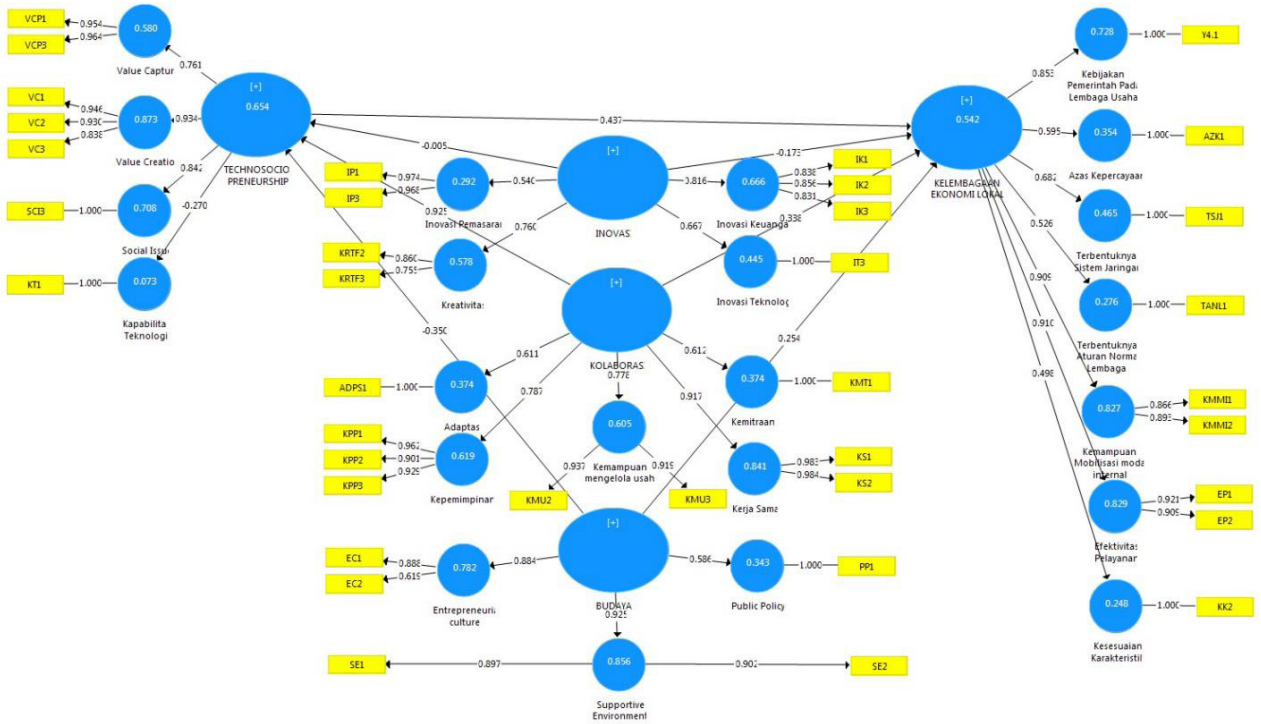

Figure 2. Second Order SEM PLS Measurement Model.

Table 1. AVE Value and Composite Reliability.

Dimensions/Latent Variables	Composite Reliability	Average Variance Extracted (AVE)
Technological Innovation	1.000	1.000
Creativity	1.000	1.000
Adaptation	1.000	1.000
Principle of Trust	1.000	1.000
Culture	0.872	0.634
Service Effectiveness	0.912	0.838
Entrepreneurial Culture	1.000	1.000
Innovation	0.819	0.531
Financial Innovation	0.874	0.776
Marketing Innovation	1.000	1.000
Local Economic Institution	0.906	0.527
Collaboration	0.916	0.580
Technological Capability	1.000	1.000
Government Policy on Business Institutions	1.000	1.000
Ability to Mobilize Internal Capital	0.873	0.774
Business Management Capability	0.925	0.861

Table 1. *Cont.*

Dimensions/Latent Variables	Composite Reliability	Average Variance Extracted (AVE)
Partnership	1.000	1.000
Leadership	0.951	0.866
Cooperation	0.983	0.967
Characteristic Compatibility	1.000	1.000
Public policy	1.000	1.000
Social issue	1.000	1.000
Supportive environment	0.894	0.808
Technosocio preneurship	0.918	0.653
Establishment of Institutional Norms	1.000	1.000
Formation of Network Systems	1.000	1.000
Value capture	0.959	0.920
Value creation	0.932	0.820

Table 1 presents the Composite Reliability (CR) and Average Variance Extracted (AVE) values for each reflective construct. According to Wong (2013), the AVE value for each item should be greater than or equal

to 0.5. It is necessary to ensure that the AVE achieves a minimum score of 0.5 and that the CR value meets the minimum threshold of 0.708 [67,69]. The AVE and CR results indicate that all latent variables have good discriminant validity and composite reliability. Therefore, the outer model or measurement model testing has been conducted, and the indicators, dimensions, and latent variables in this study exhibit good convergent validity, discriminant validity, and reliability. Thus, it is appropriate to proceed to the next stage, which is hypothesis testing or structural model testing.

4.3. Structural Model Testing (Structural/ Inner model)

Based on **Table 2** below, it can be concluded that the R^2 value of 0.678 indicates that the variables of innovation, collaboration, and culture can explain the factors contributing to the variable of technosociopreneurship by 67.8%, leaving the remaining 32.2% to be explained by other variables not examined in this study. The R^2 value of 0.530 indicates that the variables of technosociopreneurship, innovation, collaboration, and culture can explain the factors contributing to the variable of local economic institutions by 53%, with the remaining 47% to be explained by other variables not examined in this study.

Table 2. Coefficient of Determination R^2 Value.

No.	Variable	R^2 Value
1	Technosociopreneurship	0.678
2	Local economic institutions	0.530

The inner model is a structural model used to predict causal relationships between latent variables. The evaluation of the inner model aims to assess the influence between latent constructs and test the hypotheses. The structural model is evaluated using the R-Squared value for dependent constructs and the path coefficient or *t*-value for each path to determine the significance level in hypothesis testing. A higher R-Squared value indicates a better predictive model for the proposed research model [68]. The structural model is evaluated by comparing the t-statistic with the t-table value (the t-table value at a 95% confidence interval is 1.96). The results of the inner model evaluation to evaluate the influence of inter-latent constructs and hypothesis testing in the study of technosociopreneurship based on local economic institutions by testing the influence of technosociopreneurship factors on the institutional economy of KPSU Solok Radjo can be seen in **Figure 3** and **Table 3**.

5. Discussion

5.1. Direct Relationship Model

Culture has a significant positive influence on the local economic institutions of KPSU Solok Radjo. The hypothesis is accepted, as the positive sample mean (0.304) indicates that culture positively impacts local economic institutions. The *t*-statistic is greater than 1.96 (5.137), and the *p*-value is less than 0.05 (0.018), showing that culture has a positive and significant influence on local economic institutions. However, culture does not have a significant positive influence on technosociopreneurship at KPSU Solok Radjo, and the hypothesis is rejected. The negative sample mean (−0.255), despite a *t*-statistic greater than 1.96 (9.971) and a *p*-value less than 0.05 (0.005), indicates that while this relationship is significant, culture has a negative impact on technosociopreneurship.

Innovation does not have a significant positive influence on the local economic institutions of KPSU Solok Radjo. The hypothesis is rejected, as the negative sample mean (−0.046), despite a *t*-statistic greater than 1.96 (5.115) and a *p*-value less than 0.05 (0.018), shows that the relationship is statistically significant but contrary to the hypothesis expecting a positive relationship. However, innovation has a significant positive influence on technosociopreneurship at KPSU Solok Radjo. The hypothesis is accepted, as the positive sample mean (0.191) indicates that innovation positively impacts technosociopreneurship. The *t*-statistic is greater than 1.96 (153.051), and the *p*-value is less than 0.05 (0.000), demonstrating a significant relationship.

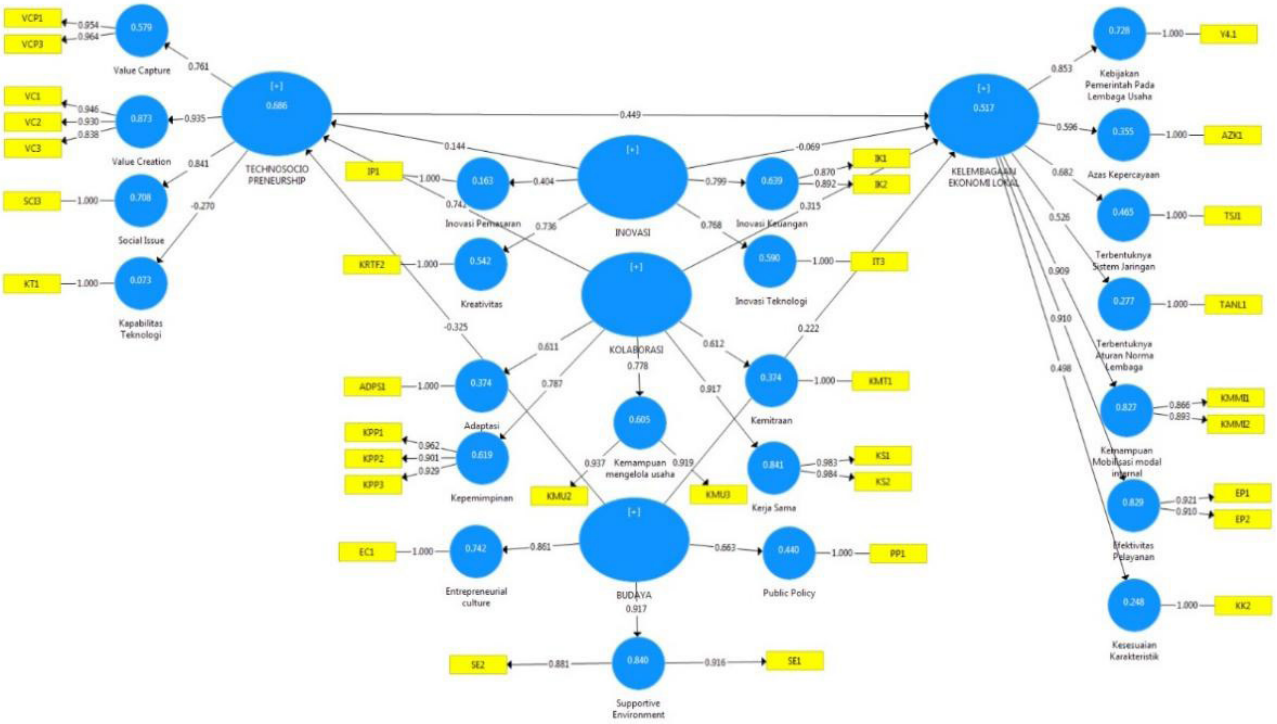

Figure 3. Summary of statistical *t* values of the structural model.

Table 3. Significance Testing Results of the Structural Model Path Coefficients.

Hypothesis	Sample Mean (M)	*t* Statistics	*p* Values	Information
1. Culture -> Local Economic Institutions_	0.304	5.137	0.018	Hypothesis Accepted
2. Culture -> Local Economic Institutions	−0.255	9.971	0.005	Hypothesis rejected
3. Innovation -> Local Economic Institutions	−0.046	5.115	0.018	Hypothesis rejected
4. Innovation -> Technosociopreneurship	0.191	153.051	0.000	Hypothesis Accepted
5. Collaboration -> Local Economic Institutions	0.226	7.178	0.009	Hypothesis Accepted
6. Collaboration -> Technosociopreneurship	0.683	105.610	0.000	Hypothesis Accepted
7. Technosociopreneurship -> Local Economic Institutions	0.506	19.118	0.001	Hypothesis Accepted
8. Culture -> Technosociopreneurship -> Local Economic Institutions	−0.128	13.930	0.003	Hypothesis Accepted
9. Innovation -> Technosociopreneurship -> Local Economic Institutions	0.097	16.118	0.002	Hypothesis Accepted
10. Collaboration -> Technosociopreneurship -> Local Economic Institutions	0.345	26.674	0.001	Hypothesis Accepted

Collaboration has a significant positive influence on the local economic institutions of KPSU Solok Radjo. The hypothesis is accepted, as the positive sample mean (0.226) indicates that collaboration positively impacts local economic institutions. The *t*-statistic is greater than 1.96 (7.178), and the *p*-value is less than 0.05 (0.009), confirming a significant relationship consistent with the hypothesis. Collaboration also has a significant positive influence on technosociopreneurship at KPSU Solok Radjo. The hypothesis is accepted, with a positive sample mean (0.683). The *t*-statistic is greater than 1.96 (105.610), and the *p*-value is less than 0.05 (0.000), indicating that collaboration positively influences technosociopreneurship. Technosociopreneurship has a significant positive influence on the local economic institutions of KPSU Solok Radjo. The hypothesis is accepted, as the positive sample mean (0.506) indicates that technosociopreneurship

positively impacts local economic institutions. The *t*-statistic is greater than 1.96 (19.118), and the p-value is less than 0.05 (0.001), confirming a significant relationship consistent with the hypothesis. Table 4 reveals significant *p*-values for the mediation paths from the three independent variables to the dependent variable of local economic institutions. All mediation paths have significant meaning because they have valuesless than 0.050. The relationship with the highest significance is collaboration on local economic institutions through technosociopreneurship with a significance level of 0.001.

Table 4. Significance Testing Results of the Structural Model Path Coefficients Direct relationship model.

Hypothesis	Sample Mean (M)	*t* Statistics	*p* Values	Information
1. Culture -> Local Economic Institutions_	0.304	5.137	0.018	Hypothesis Accepted
2. Culture -> Local Economic Institutions	−0.255	9.971	0.005	Hypothesis rejected
3. Innovation -> Local Economic Institutions	−0.046	5.115	0.018	Hypothesis rejected
4. Innovation -> Technosociopreneurship	0.191	153.051	0.000	Hypothesis Accepted
5. Collaboration -> Local Economic Institutions	0.226	7.178	0.009	Hypothesis Accepted
6. Collaboration -> Technosociopreneurship	0.683	105.610	0.000	Hypothesis Accepted
7. Technosociopreneurship -> Local Economic Institutions	0.506	19.118	0.001	Hypothesis Accepted

5.2. Mediation Relationship Model

Table 5 reveals significant *p*-values for the mediation paths from the three independent variables to the dependent variable of local economic institutions. All mediation paths are significant as they have *p*-values less than 0.050. The relationship with the highest significance is the collaboration with local economic institutions through technosociopreneurship, with a significance level of 0.001.

Table 5. Significance Testing Results of the Structural Model Path Coefficients Mediation relationship model.

Hypothesis	Sample Mean (M)	*t* Statistics	*p* Values	Information
1. Culture -> Technosociopreneurship -> Local Economic Institutions	−0.128	13.930	0.003	Hypothesis Accepted
2. Innovation -> Technosociopreneurship -> Local Economic Institutions	0.097	16.118	0.002	Hypothesis Accepted
3. Collaboration -> Technosociopreneurship -> Local Economic Institutions	0.345	26.674	0.001	Hypothesis Accepted

5.3. Hypothesis Testing

To simplify and enhance clarity, **Figure 4** below summarizes the analysis results. This figure was created by omitting indicators and focusing on the research hypotheses. Accepted hypotheses are represented by solid lines, while rejected ones are shown with dashed lines. The values displayed in the figure include the R^2 values for variables and the standardized path coefficient values. Seven (H2, H3, H4, H5, H7, H8, H9, and H10) out of the nine research hypotheses are significantly supported.

The R^2 (R-squared) value in **Figure 4** represents the coefficient of determination. The coefficient of determination indicates how well the model predicts future outcomes and the amount of variability in a construct. According to the research results, the amount of variation in technosociopreneurship explained by the model is 0.686 or 68.6%. This means that 68.6% of the variation in technosociopreneurship can be explained by innovation, collaboration, and culture. The remaining 31.4% of the variation in technosociopreneurship is explained by other variables not included in this study. Meanwhile, the explained variation in local economic

institutions is 0.517 or 51.7%, meaning that 51.7% of the variation in local economic institutions is explained by the variables of innovation, collaboration, culture, and technosociopreneurship. The remaining 48.3% of the variation in local economic institutions is explained by other variables not included in this study.

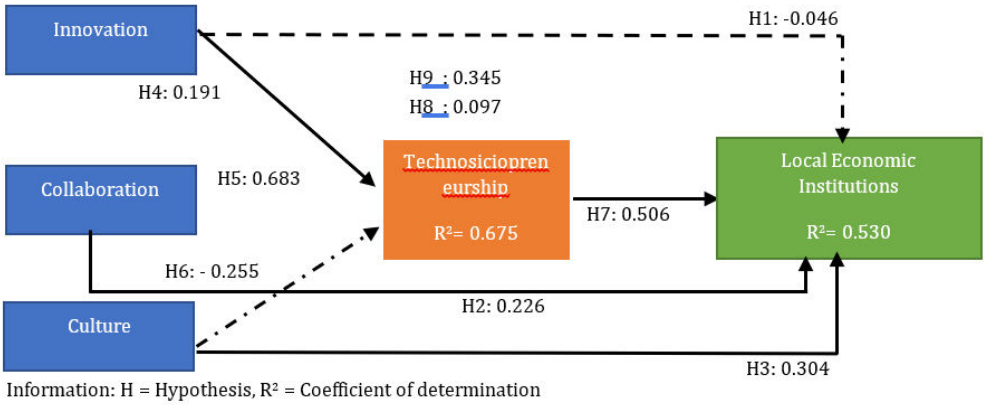

Figure 4. Hypothesis test results.

The revised conceptual framework of the study, as depicted in Figure 5 below, demonstrates that innovation, collaboration, and culture play a significant role in managing the local economic institutions of KPSU Solok Radjo by applying the Technosociopreneurship model to these institutions. The results of this study explain that the micro and small business sector based on local economic institutions needs to adopt the concept of technopreneurship and social entrepreneurship simultaneously in business management, called the Technosociopreneurship concept. By implementing this model, agricultural entrepreneurship efforts based on local economic institutions will be able to achieve a better economic scale and increase the scale of the business. The findings of this study will contribute to agricultural development through entrepreneurship based on local economic institutions by potentiating social aspects and technological aspects driven by innovation, collaboration and culture as a model for increasing the scale of agricultural entrepreneurship efforts in local economic institutions that have not been discussed comprehensively in previous studies [18,19,70–72].

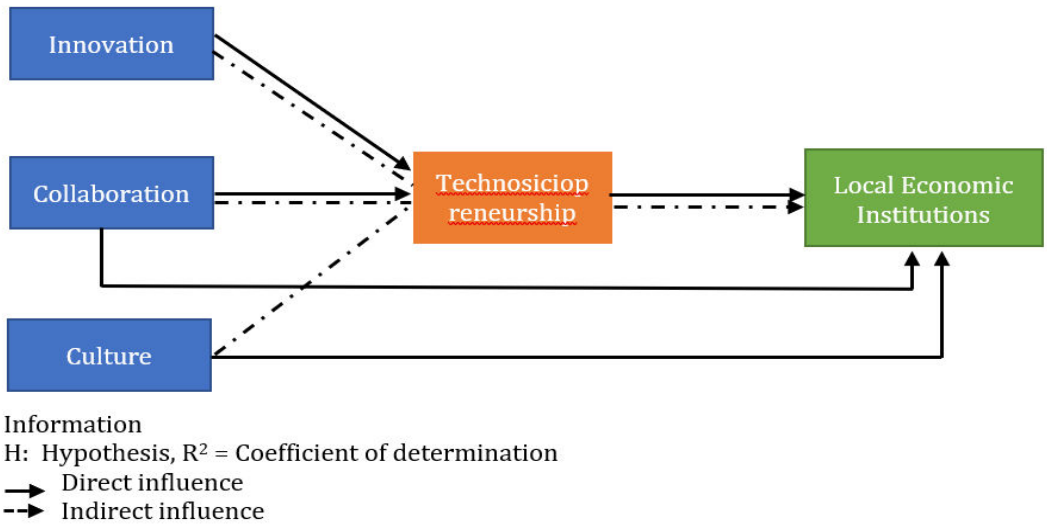

Figure 5. Revised Research Conceptual Framework as a Technosociopreneurship Model in Local Economic Institutions.

6. Conclusions

Innovation does not have a significant positive influence on the local economic institutions of KPSU Solok Radjo. However, innovation does have a significant positive influence on technosociopreneurship at KPSU Solok Radjo. Collaboration has a significant positive influence on the local economic institutions of KPSU Solok Radjo and a significant positive influence on technosociopreneurship at KPSU Solok Radjo. Technosociopreneurship also has a significant positive influence on the local economic institutions of KPSU Solok Radjo.

Technosociopreneurship mediates the relationship between innovation and the local economic institutions of KPSU Solok Radjo, indicating that innovation does not directly affect local economic institutions without the mediation of technosociopreneurship. Technosociopreneurship also mediates the relationship between collaboration and the local economic institutions of KPSU Solok Radjo, demonstrating that the effectiveness of collaboration in enhancing cooperative management is influenced by the technosociopreneurship approach. Furthermore, technosociopreneurship mediates the relationship between culture and the local economic institutions of KPSU Solok Radjo, suggesting that culture indirectly influences KPSU Solok Radjo without interventions that enable cultural adaptation to a modern economic system.

The final model of this study shows that innovation, collaboration, and culture have significant roles in the management of local economic institutions. Adopting the concept of technopreneurship and social entrepreneurship simultaneously in the form of technosociopreneurship allows cooperatives to achieve better economic scale and increase business scale. Other findings show that innovation does not directly have a significant effect on the local economic institutions of KPSU Solok Radjo. However, innovation can have a significant impact when mediated by technosociopreneurship. This means that innovation applied in cooperatives does not immediately increase the effectiveness and sustainability of local economic institutions but requires the role of technosociopreneurship as a bridge to optimize its impact. This study confirms that technosociopreneurship plays an important role as a mediator in the relationship between innovation, collaboration, and culture towards local economic institutions, as applied to KPSU Solok Radjo. Through this approach, local culture not only becomes a social identity but is also integrated as a valuable economic asset through technology-based innovation and collaboration. From an epistemological perspective, this study creates new knowledge about how innovation, collaboration, and culture can be utilized in the context of local economic institutions. From an ontological perspective, technosociopreneurship transforms culture from merely a social aspect into a real economic asset. From an axiological perspective, this approach ensures that innovation, collaboration, and cultural values are not only adopted but also preserved and developed sustainably.

Our research has practical implications for the government and stakeholders. In order for this technosociopreneurship model to be optimally implemented, support from local governments and stakeholders is essential, especially in the form of training programs, technology access, and funding for cooperatives that focus on preserving and developing local culture. With this strategy, KPSU Solok Radjo can proceed to develop as an inclusive, competitive, and culture-based local economic institution while strengthening its position as a driving force for the community economy based on innovation and collaboration.

Author Contributions

Conceptualization, S.Y.; methodology, S.Y. and M.N.; software, S.Y.; validation, S.Y. and Y.H.Y.; formal analysis, S.Y.; data curation, S.Y. and N.; writing—original draft preparation, S.Y.; writing—review and editing, S.Y. and M.N.; supervision, M.N. and Y.H.Y; All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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