

SOCIAL-ECONOMIC IMPACT OF GOVERNMENT REGULATION TO REVITALIZE PUBLIC MARKET: A BAYESIAN NETWORK APPROACH

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Abstract

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Public market revitalization has become a priority agenda of the Indonesian Government (Nuzuliaty et al., 2019), but it is indeed more focused on physical revitalization as an initial stage (Ardiansyah & Mahendarto, 2020). The purpose of this study is to develop a model that can predict the impact of public market revitalization in Indonesia. The analysis used is the Bayesian network (BN), where this technique is able to present causality and predictions that can occur from the developed model. Data for input was collected through stakeholder focus group discussions (FGDs). The results of the analysis have provided insight into the importance of non-physical revitalization, where non-physical revitalization can be a booster and ensure the sustainability and continuity of revitalization can have a real impact on trader turnover, comfort in activities in the public market, transportation access, and product quality. In addition, in realizing the optimization of the impact of market revitalization, the active participation of traditional market traders is important, traders are the main actors in activities in the public market. The government also needs to prioritize education for traders as a form of optimizing the non-physical revitalization of public markets.

Keywords: Public Market, Physical Revitalization, Non-Physical Revitalization, Government Regulation, Socio-Economic Impact

Authors' individual contribution: Conceptualization — I.P.S.W. and M.K.S.B.; Methodology — I.A.N.S. and N.N.R.S.; Resources — I.K.G.S. and I.G.A.A.A.A.; Writing — Original Draft — P.Y.W. and N.N.R.S.; Writing — Review & Editing — I.P.S.W., M.K.S.B., and I.A.N.S.; Visualization — I.K.G.S. and I.G.A.A.A.A.

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1. INTRODUCTION

Public markets are still an icon of economic activity in Indonesia. However, public markets in Indonesia tend to be close to the impression of inferiority, such as slums, dirt, inconvenient access, overcrowded trading activities, lack of air circulation, and poor sanitation (Tanuwidjaja & Wirawan, 2012). On the other hand, modern markets (supermarkets and minimarkets) are growing rapidly and becoming competitors for the existence of public markets. Nielsen (2015) stated that modern markets in Indonesia grew by 31.4% per year, while traditional markets shrank by 8% per year. On the other hand, the turnover and economic activity of public markets are very important for the lower middle class (Ujianti & Dewi, 2021).

Realizing this, the Indonesian government since 2015 has begun to seriously and massively target the revitalization of public markets (Haryono & Sentanu, 2022). The government even targets the revitalization of 5000 traditional markets in Indonesia to be revitalized within five years (Nuzuliaty et al., 2019). Moreover, local government will receive retribution (local income) from the public market, so local government should apply the principle of creative economy. The government has actually regulated that the revitalization of traditional markets does not only focus on physical or building revitalization, but also includes non-physical revitalization. However, in its implementation, revitalization is considered more "real" if massive physical revitalization is carried out (Ardiansyah & Mahendarto, 2020).

Public market revitalization often includes both physical and non-physical aspects aimed at improving the competitiveness and sustainability of traditional markets. Physical revitalization, such as infrastructure improvements, must be complemented by non-physical revitalization, including market management enhancement and promotional efforts, to achieve optimal results (Suryani et al., 2023). The role of government in public market revitalization is crucial, particularly in providing supportive policies and facilitating resources. A study by Damasyah and Abidin (2022) found that the active involvement of local governments in the planning and implementation of revitalization programs can significantly improve their effectiveness. Additionally, clear and transparent regulations can create a conducive environment for traders to operate and grow.

Trader participation is also a key element in the success of market revitalization. A study by Fitra et al. (2023) emphasized that involving traders in decision-making and program implementation can foster a sense of ownership and commitment to the changes being introduced. This participation can take the form of contributing ideas, engaging in training, and collaborating in market promotion. Thus, synergy between the government and traders is a critical factor in achieving sustainable revitalization goals.

One of the traditional/public markets with extreme physical revitalization is the Gianyar public market located in Gianyar Regency, Bali Province.

Bali is a popular tourist destination in the world with its natural and cultural beauty (Kawiana et al., 2024). In addition to its role in the economy, public markets or traditional markets in Bali also have social and cultural values.

The revitalization of the Gianyar public market is also called the most magnificent in Indonesia, by completely changing the physical building of the public market. The construction of the market was carried out in two years (2020–2021) and spent a budget of IDR 250 billion (Suasih et al., 2023).

Large-scale physical revitalization of the market is certainly expected to have a significant impact on economic activity in the public market. Market revitalization is believed to have an impact on: 1) trader turnover; 2) comfort in the market; 3) transportation access; and 4) product quality (Hermawan et al., 2018; Haryono & Sentanu, 2022).

Evaluation of market revitalization must be oriented towards the future, so that impact analysis also needs to be carried out prospectively with the Bayesian network (BN) technique. The purpose of this study is to develop a model that can predict the impact of public market revitalization, both physical and non-physical revitalization, especially in the Gianyar public market in Bali Province. In addition, the model is formed to determine the impact of the role of government and the participation of public market traders in optimizing the impact of revitalization. The impact of revitalization is reviewed in terms of turnover, market comfort, access, and product quality.

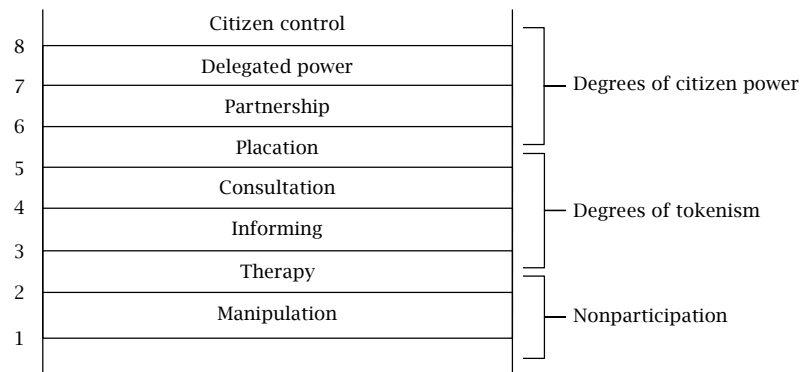
This paper is structured comprehensively. Section 1 describes the research problems and gaps, as well as the research framework and objectives. Section 2 presents a review of relevant literature. Section 3 explains the research design and data analysis techniques. Section 4 provides the results of data analysis and Section 5 gives a discussion of the findings. The final Section 6 specifies conclusions and recommendations based on the overall results of the study.

2. LITERATURE REVIEW

2.1. Participation in the formulation of public policy

Public participation in public policy formulation is an essential element in a democratic system, ensuring that the policies produced reflect the needs and aspirations of the community (Naufal et al., 2023). Active citizen involvement in decision-making processes not only enhances policy legitimacy, but also promotes government transparency and accountability (Suaree et al., 2024).

Arnstein (1969) developed the "Ladder of Participation" model (see Figure 1), which describes eight levels of public participation, ranging from manipulation to citizen control. This model emphasizes that genuine participation occurs when the public has the power to influence policy outcomes. This model serves as a foundation for analyzing participatory policies in various countries, including Indonesia (Shaumi et al., 2023).

Figure 1. Arnstein's ladder of citizen participation

Source: Arnstein (1969, 2019).

Habermas' (1984) communicative model emphasizes the importance of rational discourse in the public sphere as a means for society to participate in policy formulation. Through free and open communication, society can reach a consensus on public issues. This model is widely applied in deliberative policy systems, where the government provides discussion forums for the public to provide input on policies to be implemented (Tangkilsan, 2005).

Local governance is closely related to democracy and provides a central to the participation of citizens in decision-making. Participatory democracy theory stresses that the direct involvement of the public in decision-making processes improves the quality and legitimacy of public policies. Participatory democracy focuses on empowering citizens to play an active role in political and administrative processes. This theory emphasizes that direct public involvement in decision-making enhances the quality and legitimacy of public policies (Manganti, 2023). In practice, various countries have implemented mechanisms such as public consultations and deliberations to increase the role of citizens in government policies (Theresia, 2014).

The implementation of public participation in policy formulation can be carried out through various mechanisms, such as public consultations, development planning discussions ("*musrenbang*"), and citizen forums. For example, in the context of Indonesia, "*musrenbang*" serves as a platform for the public to express their aspirations and proposals related to development in their regions. This participation not only enhances the quality of policies, but also strengthens public trust in the government.

Although public participation has many benefits, there are several challenges that need to be addressed, including:

1) Limited access to information: Lack of access to relevant information can hinder effective public participation in the policy process (Theresia, 2014).

2) Lack of political education: Low political literacy among citizens can limit their ability to participate effectively (Shaumi et al., 2023).

3) Structural barriers: Factors such as complex bureaucracy and the lack of clear participation mechanisms can reduce community involvement (Naufal et al., 2023).

Gap theory identifies the gap between expectations and reality as a major source of dissatisfaction and problems in policy implementation. In the context of traditional market development, several key gaps can be identified.

• First, planning and implementation gap. There is often a difference between policy plans and their implementation on the ground. For instance, although the government plans revitalization policies with attention to the needs of traders and consumers, their implementation may not align due to a lack of coordination or resources (Wibisono & Purwanto, 2020).

• Second, a gap between traders' and consumers' expectations. Traders and consumers may have different expectations about the outcomes of market revitalization. Traders may expect increased income and better facilities, while consumers expect competitive prices and a comfortable shopping experience. This mismatch in expectations can lead to dissatisfaction (Hamodah, 2022).

• Third, capacity and resource gap. Limited management capacity and financial resources can hinder the implementation of market revitalization policies. For example, a lack of funds for infrastructure improvements or trader training can reduce the effectiveness of revitalization programs (Haryono & Sentanu, 2021).

To overcome these challenges, several strategies can be applied, including:

1) Enhancing transparency: The government needs to provide clear and easily accessible information to the public regarding the policy formulation process (Manganti, 2023).

2) Education and socialization: Improving public political literacy through education and outreach on the importance of participation in public policy processes (Arnstein, 1969).

3) Use of information technology: Utilizing information and communication technology to facilitate public participation, such as through online platforms for public consultations (Tangkilsan, 2005).

2.2. Public policy implementation

Policy implementation is a crucial stage in the policy cycle that determines how well the goals and objectives of a policy can be achieved. Several theories and models have been developed to understand the dynamics of policy implementation, including in the context of revitalizing traditional markets.

The top-down approach emphasizes that policy implementation begins at the top (the policymakers) and moves downward to the implementers on the ground. Its focus is on how central-level instructions and policies are translated and executed by local agents. On the other hand, the bottom-up approach emphasizes the role of local implementers and communities in shaping and adapting policies

based on local conditions and needs. In the context of revitalizing traditional markets, the bottom-up approach highlights the importance of trader and local community participation in the revitalization process to ensure that the policies implemented are aligned with their needs (Haryono & Sentanu, 2021).

Van Meter and Van Horn's (1975) synthesis model identifies six variables that influence policy implementation:

- 1) Policy standards and objectives — to clarify and consistency of policy goals.
- 2) Resources — availability of the necessary resources for implementation.
- 3) Characteristics of implementing agencies — competence and capacity of the implementing organizations.
- 4) Inter-organizational communication — coordination and communication between involved agencies.
- 5) Social, economic, and political conditions — external environment affecting implementation.
- 6) Disposition or attitudes of implementers — the attitude and perception of implementers toward the policy.

This model emphasizes that the success of policy implementation is influenced by the complex interaction between these factors (Van Meter & Van Horn, 1975).

Policy network theory stresses the importance of interactions between various actors and stakeholders in the policy implementation process. In the context of revitalizing traditional markets, the success of policy implementation is greatly influenced by the role and involvement of various parties, including local governments, market managers, traders, and the local community. Effective collaboration and coordination among these stakeholders can improve policy implementation and ensure that various interests and needs are accommodated (Wibisono & Purwanto, 2020).

2.3. Traditional market policies in various countries

Traditional markets play a vital role in the local economy across many countries. However, challenges such as competition from modern markets and changing consumer behavior necessitate appropriate policies to ensure the sustainability of traditional markets.

In South Korea, the government has implemented various policies to revitalize traditional markets. One key strategy is modernizing market infrastructure to enhance its attractiveness and comfort for consumers. Additionally, training programs for traders are conducted to improve service quality and business management. These efforts have successfully increased the number of visitors and traders' revenues in traditional markets (Damasyah & Abidin, 2022).

The Taiwanese government has adopted a holistic approach to revitalizing traditional markets by integrating aspects of culture and tourism. Traditional markets have been developed as cultural tourism destinations, showcasing local products and traditional cuisine. This approach has not only increased the number of visitors, but also strengthened the local cultural identity (Hamodah, 2022).

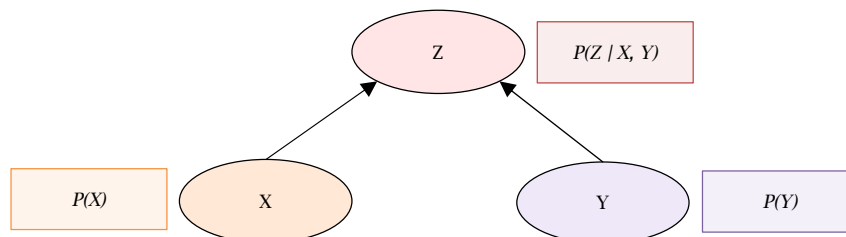
In Indonesia, the government has launched a program to revitalize public markets to improve the competitiveness of traditional markets against modern ones. The program includes infrastructure improvements, market management enhancement, and training for traders. However, the implementation of this program faces several challenges, including budget limitations and resistance from traders (Haryono & Sentanu, 2021).

3. RESEARCH METHODOLOGY

3.1. Bayesian network

A Bayesian network or Bayesian belief network (BBN) is a probability network that presents causal relationships. Where in this study the relationship presented is related to the impact of public market revitalization, especially the Gianyar public market. BBN analyzes problems in a structure (image) that clearly illustrates the relationship between each variable. This technique can also develop models more flexibly because it can add variables and simulate variables. The simulation in question is the ability to describe the impact if one or several factors/variables are in optimal conditions or other conditions that you want to know. The basic structure in BBN consists of as illustrated in Figure 2.

Figure 2. Simple structure for Bayesian belief network analysis techniques



Source: Suasih et al. (2024).

Figure 3 is a directed acyclic graph (DAG) that shows the relationship between variables. The variables that show the origin of the arrow are called "parents variables", while the variable Z which is the target variable is called the "child variable".

The probability distribution in a BN with n nodes (X_1, \dots, X_n) can be written as follows (Chakraborty et al., 2016).

$$P(X_1, \dots, X_n) = \prod_{i=1}^n P(X_i | P_a(X_i)) \quad (1)$$

where, $P_a(X_i)$ is the set of probability distributions corresponding to the parents of the node X_i . For Figure 2, the above equation can be formulated as follows below (Chakraborty et al., 2016).

$$P(Z) = P(Z|X, Y) * P(X) * P(Y) \quad (2)$$

3.2. Conceptual framework of public market revitalization

Bayesian belief network modeling is compiled based on a conceptual framework. Before compiling a conceptual framework, the variables to be analyzed must be identified and determined. After that, it is continued by placing and compiling these variables in a network. After the conceptual framework

(DAG) is compiled, a focus group discussion (FGD) is carried out to confirm and provide input values and simulations. Stakeholders involved in the FGD include local governments, community leaders, related agencies or apparatus, public market traders, and of course market managers.

The conceptual framework (DAG) in this study is presented in Figure 3.

To provide a clearer picture, the definition of each variable and its assessment criteria are presented clearly in Table 1.

Figure 3. Directed acyclic graph of Bayesian network structure of public market revitalization

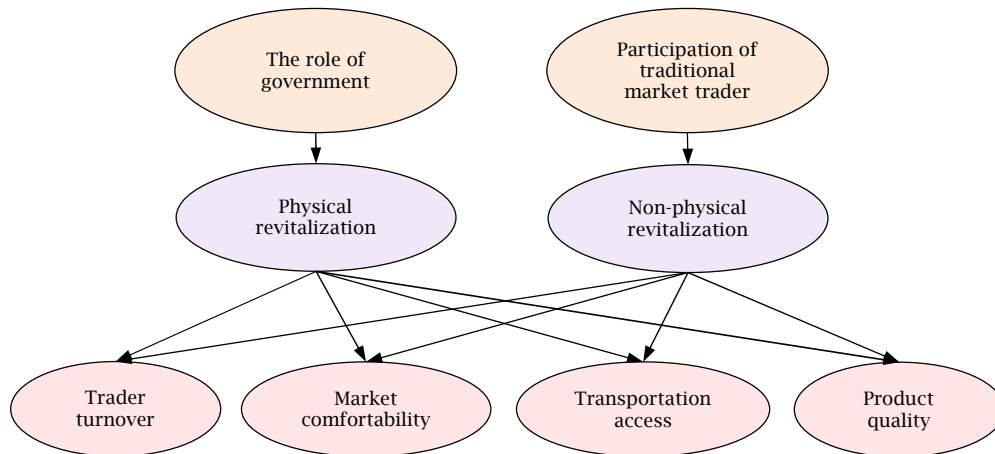


Table 1. Identification of research variables on the impact of the revitalization of the Gianyar public market

Variable nodes	Description	Node states
The role of government	The role of government in setting policies, planning, and implementing market revitalization programs.	<ul style="list-style-type: none"> • high • moderate • low
Participation of traditional market traders	Involvement of traditional/public market traders in market revitalization programs.	<ul style="list-style-type: none"> • very active • active • inactive
Physical revitalization	Physical revitalization of public markets which includes repairs and improvements to the quality and physical condition of buildings and areas.	<ul style="list-style-type: none"> • totally_physical_renovation • improved_physical_condition
Non-physical revitalization	Non-physical revitalization of public markets which includes management, social, and especially governance.	<ul style="list-style-type: none"> • implemented_continuously • not_implemented
Turnover trader	A certain amount of value or income is obtained from sales.	<ul style="list-style-type: none"> • significant • moderate • not_significant
Market comfort	Convenience of traders and visitors to public markets.	<ul style="list-style-type: none"> • very_comfort • comfort • uncomfortable
Transportation access	Ease of access to public transportation and availability of transportation-related facilities, including parking.	<ul style="list-style-type: none"> • easier_access • worst_access
Product quality	The quality of the products sold, including arrangement and circulation.	<ul style="list-style-type: none"> • excellent • medium • ordinary

After the BN structure is reconstructed and agreed upon, the stakeholders involved in the FGD then determine the probabilities of each relationship. The BBN analysis was carried out using the GeNIe Academic tool (Version 5).

4. RESEARCH RESULTS

4.1. Strength analysis directed acyclic graph impact of public market revitalization

One of the main results of BBN analysis is presenting the results of the analysis of the strength of the relationship between variables. Where the results

of the probability analysis on the affected variables (child nodes) are presented in Figure A.2 (see Appendix).

Figure A.1 (see Appendix) shows the results of the analysis that the revitalization of the public market has been able to provide the expected impact on the three main impacts, but it has not yet optimally impacted transportation access. Where market revitalization tends to ignore transportation access.

As previously explained, BBN analysis presents the potential for causal relationships which are the strength or influence between variables. The width of the arc represents the strength of each connection between parent and child nodes (Ali et al., 2024).

Table 2. Score of strength between parent and child nodes in the Bayesian network structure of public market revitalization

<i>Parents</i>	<i>Child</i>	<i>Average</i>	<i>Maximum</i>
non_physical	turnover trader	0.332	0.333
non_physical	market comfort	0.312	0.312
non_physical	product quality	0.264	0.264
the role of government	physical revitalization	0.222	0.222
non_physical	transportation access	0.200	0.200
physical revitalization	turnover trader	0.182	0.182
the role of government	non_physical	0.177	0.177
participation of traditional market traders	non_physical	0.155	0.155
participation of traditional market traders	physical revitalization	0.155	0.155
physical revitalization	transportation access	0.100	0.100
physical revitalization	product quality	0.100	0.100
physical revitalization	market comfort	0.100	0.100

Observation of Table 2 shows that the impact of non-physical revitalization on traders' turnover is the strongest influence with an average score of 0.33 and a maximum of 0.333. The relationship between the next variables that also have a strong influence is the impact of non-physical revitalization on market comfortability and product quality, with average scores of 0.31 and 0.26, respectively.

BBN also presents the results of the strength analysis more clearly as in Figure A.2 (see Appendix). Where the thickness of the arrows between variables (nodes) shows the strength of the parent nodes to the child nodes.

4.2. Bayesian network analysis with physical and non-physical revitalization optimization

As previously explained, the advantage of BBN analysis is that it can simulate variables/nodes. The current government policy, especially in the research locus, is to carry out total physical renovation of public market buildings, so simulations for this condition need to be carried out. Figure A.3 (see Appendix) shows the BN structure with revitalization or physical renovation of all public market buildings. So that the variable or node "physical revitalization" functions as "evidence" with a probability of 100%. Figure A.3 presents the results of the analysis with the optimization of physical revitalization. Figure A.4 presents the results of the analysis with the optimization of non-physical revitalization.

The current government has realized that the revitalization of public markets is not only with physical revitalization or non-physical revitalization, but both must be done in a balanced way. Some markets are generally revitalized physically first, and then followed by non-physical revitalization efforts. Figure A.5 (see Appendix) below presents the BN structure with optimization of physical and non-physical revitalization as "evidence".

4.3. Bayesian network analysis with optimization of government role and trader participation

In addition to capturing the impact of physical and non-physical revitalization, this study also looks at how the role of government and trader participation have an influence.

5. DISCUSSION

5.1. The development of the public market in Indonesia

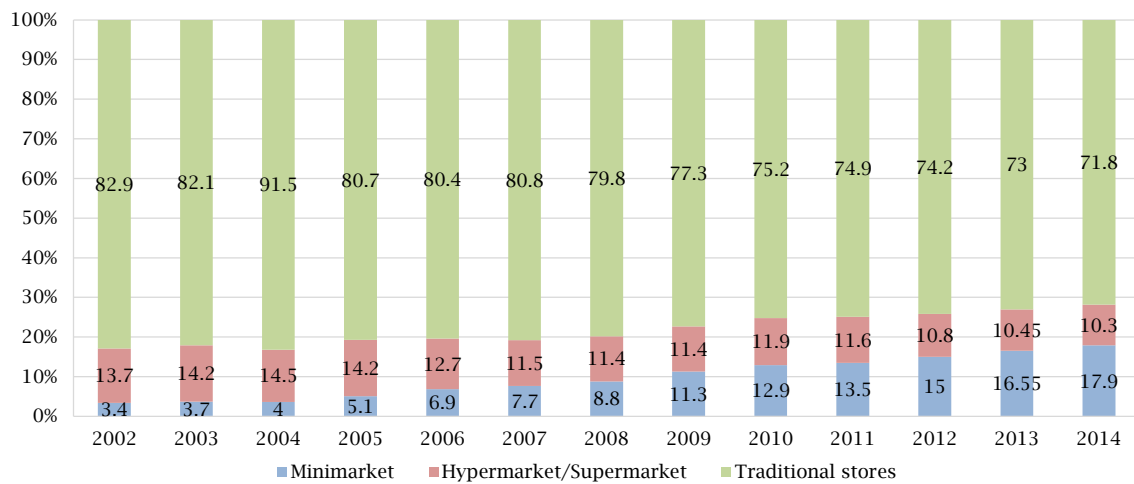
The most recent regulation for the development of traditional markets in Indonesia is SNI 8152:2021, which replaced SNI 8152:2015. The updated standard includes expanded requirements related to the digitalization of markets and sustainable management practices. SNI 8152:2021 (national standards that regulate general, technical, and management requirements for traditional markets in Indonesia) covers technical requirements for traditional markets, such as design, sanitation, waste management, and operational sustainability (National Standardization Agency of Indonesia, 2021). Additionally, the inclusion of digital systems and eco-friendly practices is part of the effort to modernize traditional markets without losing their cultural and local essence (Lesmana et al., 2024).

Other policies, such as the Regulation of the President of the Republic of Indonesia No. 112 of 2007 about the Arrangement and Guidance of Traditional Markets, also provide a legal framework for revitalizing traditional markets, addressing the planning, financing, and construction of markets. These regulations help ensure that revitalization efforts are systematic and aligned with the broader goals of economic development and sustainability.

Traditional markets hold an important role in Indonesia's economy, serving not only as centers of economic activity, but also as places that reflect the social and cultural life of local communities. These markets, often referred to as pasar rakyat or "people's markets", are essential for local economies, especially in rural areas where access to modern markets may be limited.

There are 13,450 traditional markets in Indonesia with around 12.6 million traders (Poesoro, 2007).

Over the years, traditional markets in Indonesia have faced numerous challenges, such as the growth of modern retail outlets and changes in consumer behavior. As a result, the government has been focused on revitalizing these markets to ensure they remain competitive while preserving their local character (Wibawa et al., 2024). The revitalization efforts aim to improve the infrastructure, management, and overall appeal of traditional markets, thereby enhancing their sustainability and relevance in the current economic landscape.

Figure 4. Growth of modern retail sales and traditional retail in Indonesia, 2002–2014 (%)

In recent years, the Indonesian government has launched various programs aimed at revitalizing traditional markets. These programs focus on improving infrastructure, providing training for vendors, and enhancing market management. However, despite these efforts, traditional markets still face significant challenges, particularly in competing with modern shopping malls and supermarkets, as well as securing sufficient funding for revitalization projects.

In Bali, traditional markets function as vital hubs for local trade, offering products ranging from food and daily necessities to handicrafts and ceremonial items. These markets are also important for religious and cultural life, as many are located near temples and palaces, linking the economic, social, and spiritual aspects of the community. The relationship between markets, temples, and palaces can be traced back to the kingdom periods, when markets were often placed close to the royal residence or temples to symbolize the interconnectedness of trade, religion, and governance.

Markets in Bali, particularly those in rural areas, also serve as venues for community gatherings. These markets not only facilitate economic transactions, but also strengthen social ties among the locals. The vendors in these markets are typically family-based businesses, and the products they sell are often locally sourced, reflecting Bali's rich agricultural and artisanal traditions (Lesmana et al., 2024).

In Gianyar, the traditional market is not just a place for economic exchange, but also a place steeped in culture and spirituality. The market is often situated in close proximity to significant

temples (pura) and royal palaces (puri), reflecting the historical ties between commerce, religion, and governance in Balinese society. This spatial relationship between markets, temples, and palaces emphasizes the holistic role that traditional markets play in Balinese life — connecting the material with the spiritual.

The revitalization of the Gianyar market also emphasizes the importance of preserving cultural heritage while modernizing infrastructure. This includes maintaining the traditional architectural style of the market while integrating sustainable practices like waste recycling, energy-efficient lighting, and digital transaction systems. The market's proximity to Pura Puseh Gianyar and Puri Gianyar highlights the traditional role of markets as places where both economic transactions and religious ceremonies intersect (Wibawa et al., 2024).

5.2. The impact of optimizing physical and non-physical revitalization

Figures A.3, A.4, and A.5 (see Appendix) show that there is a change in the probability of the impact of market revitalization. Of course, market revitalization (both physical and non-physical) can have a significant impact on increasing traders' turnover, the comfort of traders and visitors in the market, facilitating transportation access, and followed by an increase in product quality. To make it easier to compare the impact of optimizing physical revitalization with non-physical revitalization, the results are summarized in Figure 5.

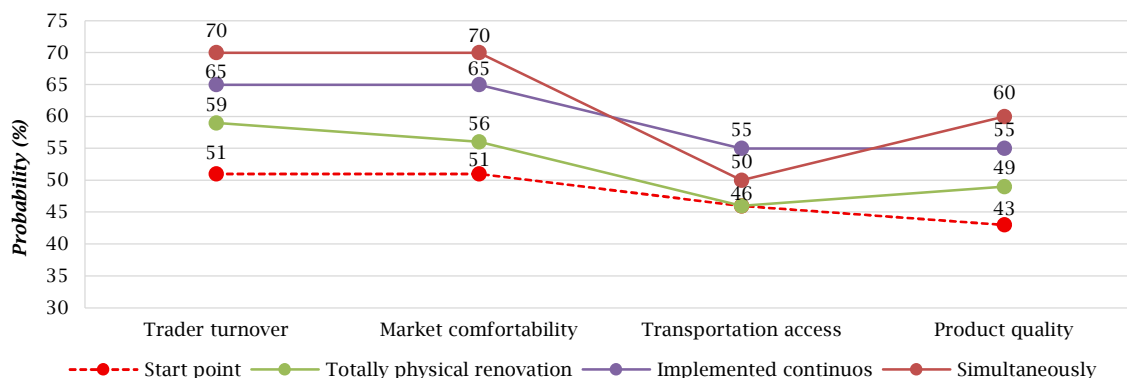
Figure 5. Comparison of probability on the impact of optimizing physical and non-physical revitalization

Figure 5 shows that the impact of physical and non-physical revitalization simultaneously is very significant for increasing traders' turnover, as well as the level of comfort in the public market and product quality. Meanwhile, better non-physical revitalization is needed for transportation access. Meanwhile, a revitalization that only focuses on the physical market building has not had a significant impact.

Recent studies have emphasized the importance of revitalizing traditional markets, focusing on both physical and non-physical aspects. Physical revitalization refers to the improvement of infrastructure, such as upgrading market buildings, enhancing sanitation, improving accessibility, and introducing modern amenities, which can increase market attractiveness and consumer satisfaction. A study by Adyatma et al. (2024) highlights the role of physical renovations in boosting local economic activities and attracting more visitors to traditional markets. These improvements, however, should be balanced with the preservation of cultural identity to maintain the market's unique appeal. Physical upgrades alone, without addressing the social dynamics, may not fully restore market vitality.

In addition to physical revitalization, non-physical aspects such as management, governance, and community involvement play a critical role in ensuring the success of market revitalization initiatives. A study by Rosiana et al. (2017) underlined that effective market management, which includes improved vendor organization, enhanced customer service, and community participation, can contribute significantly to the sustainability of revitalized markets.

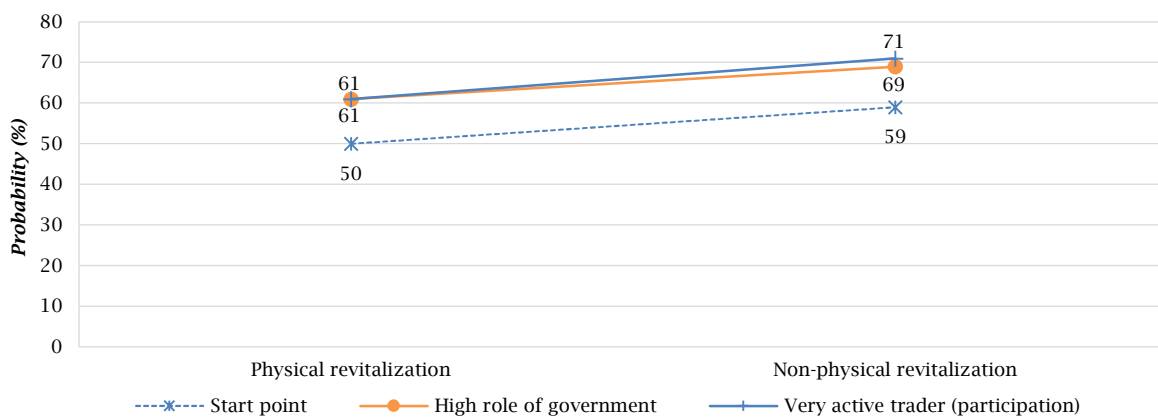
For instance, providing training for vendors on modern business practices, as well as promoting local products, can increase both the market's economic potential and its relevance in a rapidly modernizing retail landscape. Moreover, fostering stronger relationships between local authorities and market stakeholders can enhance the transparency and accountability of revitalization projects, ensuring their long-term success.

Furthermore, revitalization strategies must also integrate digitalization to meet the evolving demands of consumers. According to a study by Oluka (2024), incorporating digital systems such as e-commerce platforms, online payments, and digital marketing strategies into traditional markets can not only improve operational efficiency, but also increase market accessibility, particularly during periods of economic disruption, such as the COVID-19 pandemic. The integration of these non-physical elements can contribute to the sustainability of revitalized markets by enhancing consumer engagement and expanding their reach. Therefore, the revitalization of traditional markets should be viewed as a holistic approach, combining both physical improvements and non-physical strategies to ensure the longevity and competitiveness of these vital economic centers.

5.3. The impact of optimizing the role of government and market trader participation

Figure 6 presents a comparative visualization of the role of government and the participation of traditional market traders as evidence.

Figure 6. Probability comparison of the impact of optimizing the role of government and market trader participation



As the previous results showed that the more optimal impact was shown by non-physical revitalization, then when associated with Figure 6 it is known that more active trader participation will have a greater impact on the sustainability of non-physical revitalization. So, it is important to provide education for traders about non-physical revitalization of public markets.

Recent studies have underscored the significance of merchant and government participation in the revitalization of traditional markets, with a focus on both physical and non-physical aspects. In particular, merchant participation plays a key role in ensuring that revitalization initiatives meet the needs of those directly affected by the changes. According to research by Biswan and Widiastiti

(2024), when market vendors are involved in the planning and decision-making process of revitalization projects, they are more likely to support and adhere to new policies, thus enhancing the overall success of the initiative. Their participation ensures that the proposed physical renovations align with their daily needs and work practices, while also improving their willingness to adopt new business practices and regulations.

Government involvement is equally essential in the successful revitalization of traditional markets. A study by Prastyawan et al. (2020) emphasized the importance of collaborative governance in revitalization efforts, where both local authorities and market stakeholders, including traders, work together to establish a coherent strategy that

balances development goals with the preservation of cultural heritage. This partnership also ensures that policies are not only feasible, but also equitable. For instance, when local governments invest in improving market infrastructure while also providing necessary support in terms of training and financial assistance, traders are more likely to embrace the changes. This integrated approach fosters a sense of shared responsibility, leading to more sustainable outcomes.

Moreover, the integration of both physical and non-physical aspects in revitalization projects requires continuous dialogue and feedback mechanisms between the government and market vendors. According to a study by Ujianti and Dewi (2021), non-physical elements such as management reforms, vendor education, and community engagement are crucial in maintaining the market's social fabric. This collaboration helps ensure that the revitalized market functions not just as a commercial space, but as a community hub. Furthermore, the inclusion of digital tools, such as e-commerce platforms and cashless payment systems, has been shown to enhance the market's competitiveness and accessibility, making it more attractive to consumers. The active participation of both the government and traders thus leads to a more holistic and enduring revitalization process.

6. CONCLUSION

Public market revitalization has become a priority agenda of the Indonesian Government, but it is indeed more focused on physical revitalization as an initial stage. Physical revitalization carried out by the government has indeed shown major changes in traditional market buildings. The results of the analysis using the BN approach have provided insight into the importance of non-physical revitalization, where non-physical revitalization can be a booster and ensure the sustainability and continuity of revitalization can have a real impact on trader turnover, comfort in activities in the public market, transportation access, and product quality.

In addition, in realizing the optimization of the impact of market revitalization, the active participation of traditional market traders is also a determinant, considering that traders are the main actors in activities in the public market.

Despite the valuable insights gained from this study, there are several limitations that should be considered. Firstly, the scope of this research primarily focused on the physical revitalization of public markets in Indonesia, and while the non-physical revitalization was analyzed, it was done indirectly through a Bayesian network approach. Another limitation of this study is that it was conducted in a limited geographical context, specifically focusing on public markets in Indonesia. Although the findings are valuable in the Indonesian context, the results may not be fully generalizable to other countries with different market dynamics or levels of economic development.

Future research could compare public market revitalization efforts across different regions or countries to draw broader conclusions about the universal factors that contribute to successful market revitalization, both physically and non-physically. Furthermore, long-term studies that track the sustained effects of revitalization over time would provide a more comprehensive understanding of the long-term benefits and challenges, especially in terms of trader turnover, market accessibility, and consumer behavior.

Lastly, future research could explore the integration of digitalization in public market revitalization more thoroughly. While the study touches on the importance of non-physical revitalization, the potential for digital tools such as e-commerce platforms, mobile payments, and online marketing to enhance market performance remains underexplored. Given the increasing role of digital technology in retail, further research into how digital solutions can complement traditional market revitalization would be highly beneficial, especially in improving trader efficiency, consumer reach, and overall market competitiveness.

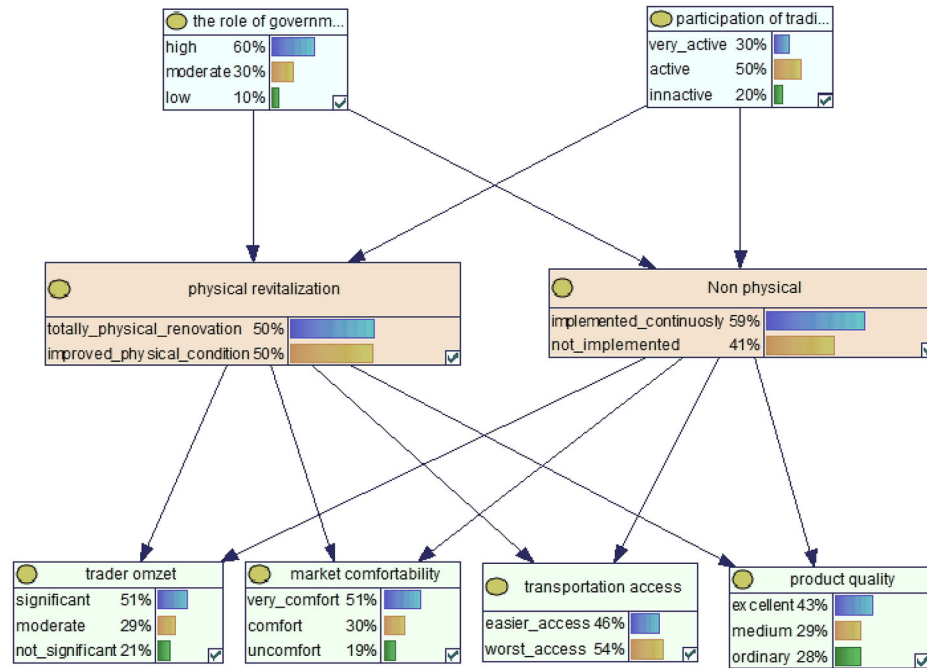
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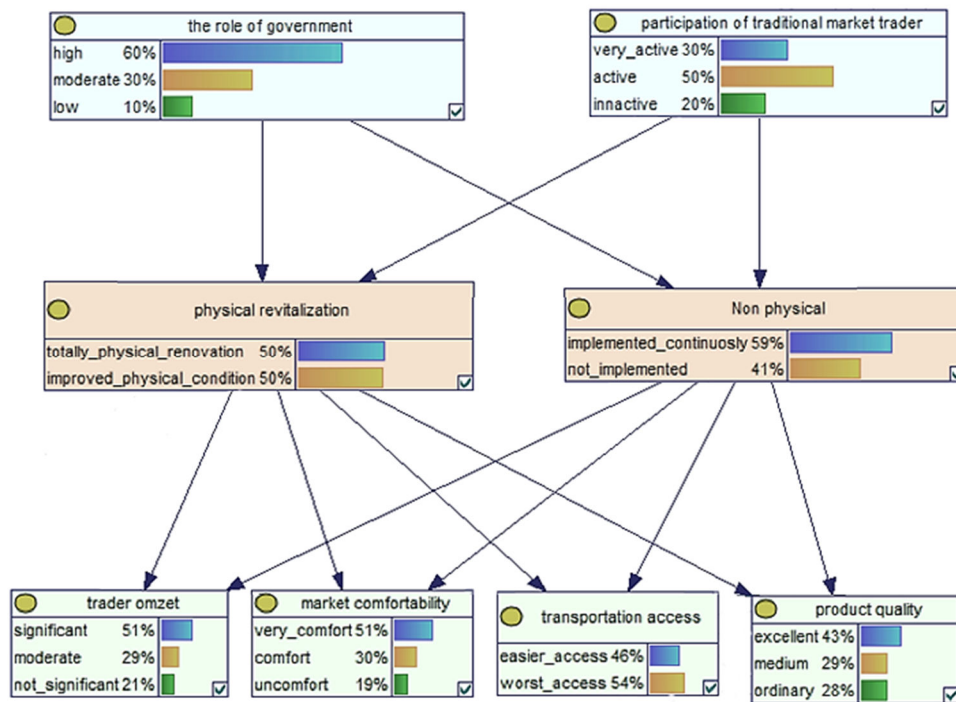
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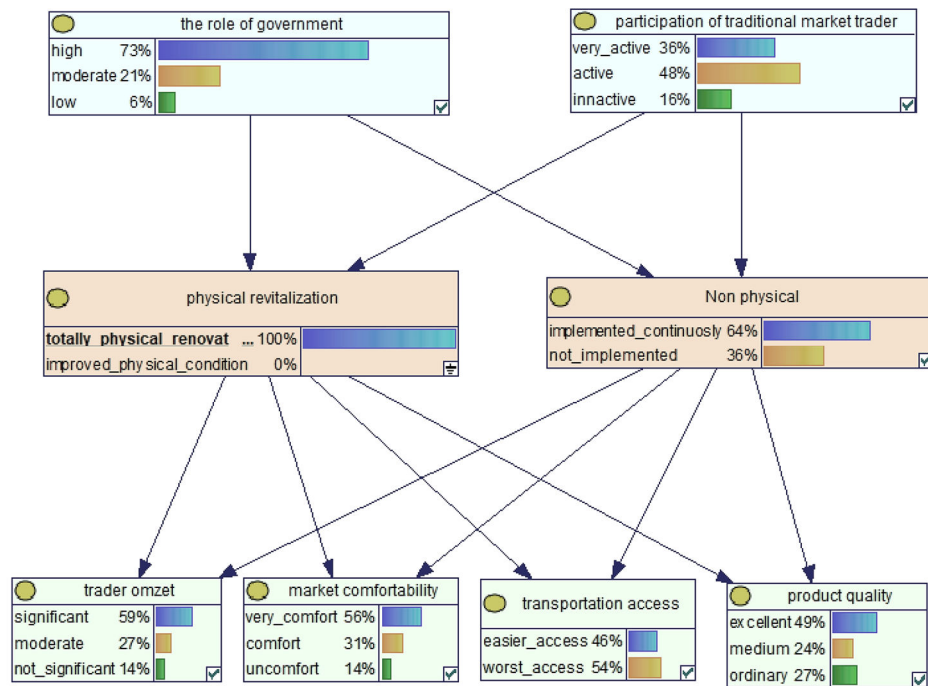
APPENDIX

Figure A.1. Structure of Bayesian network of the impact of public market revitalization with prior probabilities

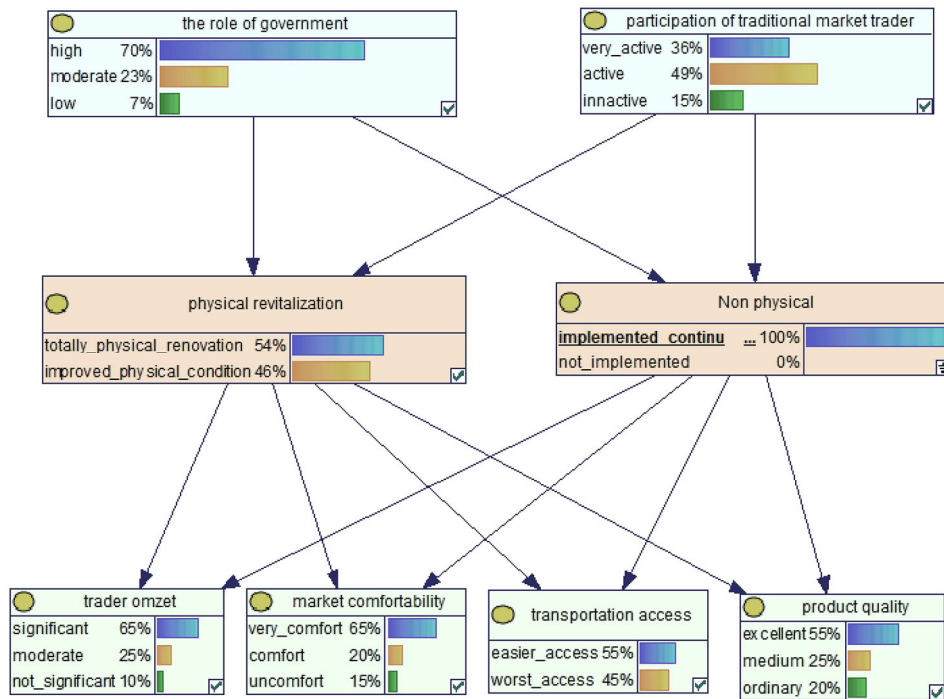
Source: Authors' elaboration.

Figure A.2. Strength of parent nodes against child nodes in the Bayesian network structure impact of public market revitalization

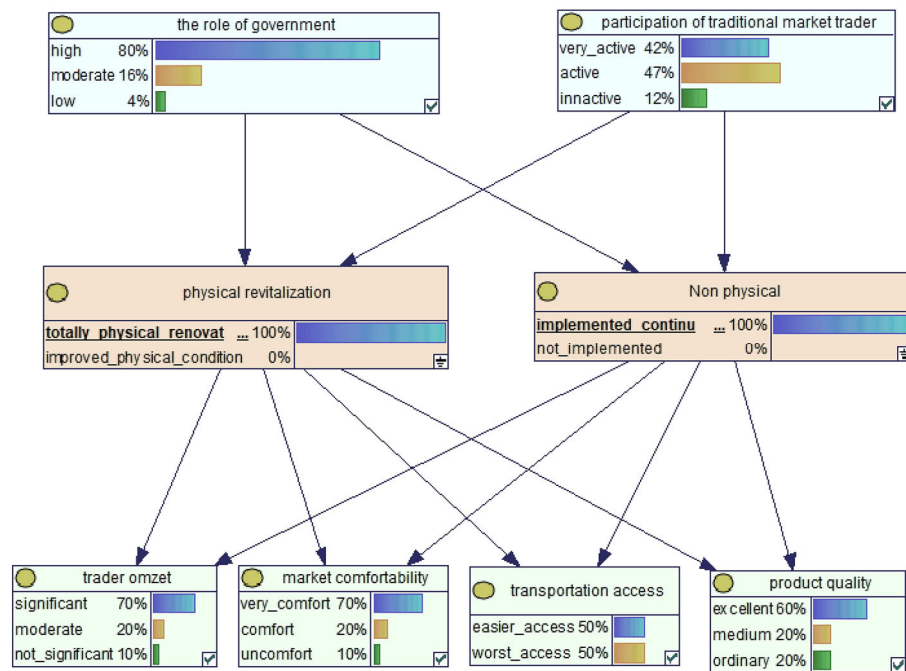
Source: Authors' elaboration.

Figure A.3. Bayesian network structure with physical revitalization as evidence

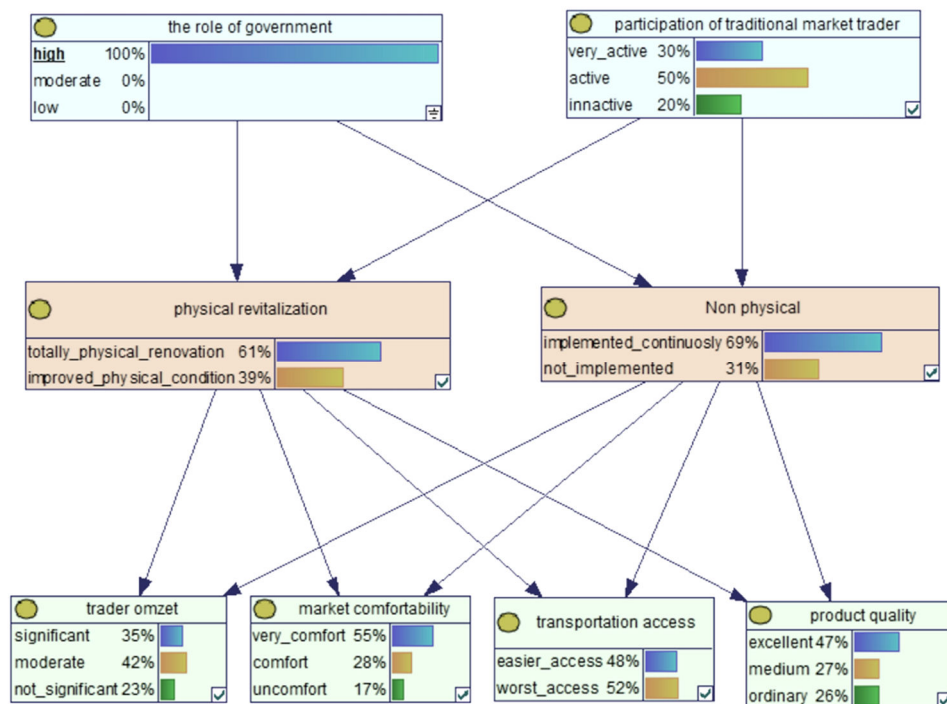
Source: Authors' elaboration.

Figure A.4. Bayesian network structure with non-physical revitalization as evidence

Source: Authors' elaboration.

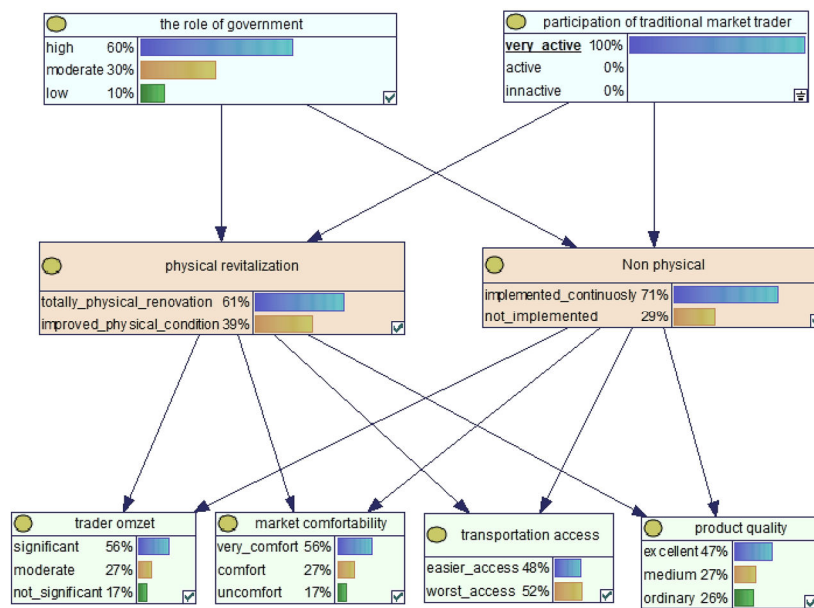
Figure A.5. Bayesian network structure with public market revitalization (physical and non-physical) as evidence

Source: Authors' elaboration.

Figure A.6. Bayesian network structure with the role of government as evidence

Source: Authors' elaboration.

Figure A.7. Bayesian network structure with participation of traditional market trader as evidence



Source: Authors' elaboration.