Construction and Application of a Mathematical Model of Resource Matching From the Perspective of Social Economy

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ABSTRACT
Mathematical models can be used to solve every single problem that exists in the world. The practical application of these problems is short in resource matching from the social-economic perspective field. In the real world, mathematical models can save a life and assist in economic growth, policymaking, optimization, and decision making. In addition to these, the models have been exploited to understand better the natural world and the conditions required to maintain life. The study below has been developed to construct a mathematical resource matching from the social economy perspective. The study is further divided into two research questions; is resource matching is referred to as unstable if the social-economic perspective prefers monetary valuation to the exchange of goods, and for all existing patterns of preferences, will it be possible to find an economically viable set to represent resource matching in social economy? The study develops some mathematical models that yield several responses to these questions to answer this question. The study comprises a theoretical and practical contribution. The results of the study, incidentally, prove that even though the problem of resource matching in social economies does no longer exist, we can still invert our absorption procedures to obtain the unique social economy, optimal through making bids to the sellers from resource matching who placed the most desirable bids up to resource matching's quota limit that is in normal case a saturation point, while the resource matching, on the other hand, will accept all bids from the social markets that it considers optimal. The study recommends developing methods for understanding the relationship between resource matching and social economy. The methodology of the existing models and methods for quantifying the study's outcomes are also recommended for future studies.

Keywords: *Mathematical model, resource matching, social economy, mathematical model development, cost-effective, research matching.*

1. INTRODUCTION

Mathematical models are used as a representation of the natural world characterized by applying mathematical-based formulas to represent the world and its parts that are of interest to the study. The research presents a general overview of mathematical modeling in informing the decision made by social economists and the application of resource matching. On the other hand, resource matching represents transferring unwanted and underutilized resources from a business organization to be recycled, reused, repackaged, or reprocessed by another business.

Mathematical models have gained much prominence through their application, especially in facilitating economic evaluations. The models have been used in other critical contexts, including risk assessments, capacity modeling, and decision-making contexts [1]. The models, by definition, involve assumptions, abstraction, and simplification that can be explicit, and the impact of these assumptions can be altogether assessed formally.

Mathematical-based models generate information based on the expected costs of resource matching and the consequences of any existing alternative solutions. The model will rest on the Bayesian framework that involves the synthesis of relevant and disparity information in the development, implementation, and interruption of the result from the model. The models can be categorized into three based its significance, the definition of the

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future relationship between the phenomena, the application of explorative methods through the projection of short come and long term results, as well as the transition between the intermediate and outcomes as a result of defined casual relationships, and the fusion of evidence from several sources [2].

Even though several applications exist, the two main areas of application of mathematical models in resource matching are to inform policy and economic decisions. In economics, the model has been used to describe the relationships between quantities, such as the prices of commodities, production, employment, investments, and savings, and some analysis of their logical implications [3]. In informing policy decisions, mathematical models involve the conceptual and mathematical representation of resource matching and their impact on the economic decisions that influence costs and consequences. For informing economic decisions, the models involve modeling systems across population groups in an organizational-based system that helps identify improvement terms like cost-saving and improving efficiency, as shown in the research below.

2. CONSTRUCTION AND APPLICATION OF THE MATHEMATICAL MODEL OF RESOURCE MATCHING FROM THE PERSPECTIVE OF SOCIAL ECONOMY

The development of mathematical models involves five main stages: understanding the problem, conceptual modeling, implementing the model, checking the model, and engaging with the decisions. The development process for these models does not represent a linear process where the five sets of activities are expected to follow each other gradually. In a real sense, the phases overlap, with a perfect example being model checking that is available throughout the process [4]. These phases define the cyclic system that involves the transformation of approaches from real-life situations to mathematical problems. Researchers have described several other processes for modeling mathematical solutions, with the most interesting model being the model suggested by Blum and Leiss[5].

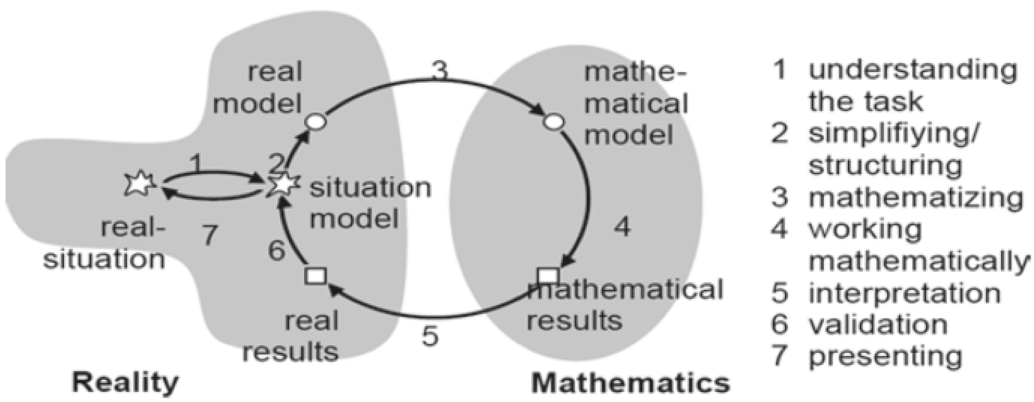

Figure 1 The mathematics modeling

The model development process involves understanding the underlying problem, its economic significance, and what the decision-maker must do to reach sound decisions effectively. The phase involves methods like the formal problem structuring methods that define the population, interventive measures, comparative methods, and outcomes. In this case, the population will be represented by the group of people that the interventional methods will affect. Interventions will involve using resources with the expectation to impact the required results from the represented population. The results may be broad in resource matching, including improving the operational costs and productivity, waste packaging, and cross-sectoral research matching representing the reuse of waste to developing new products. The outcomes will be economically oriented in terms of service planning.

Conceptual modeling will involve abstracting the decision to the problems within a coherent framework. It is described as the tangible expression of an intangible concept mental model of the system that is being considered [6]. The ultimate purpose will be to determine the relevant decisions to the problem, including decisions of what should go into the models, what is left out of the model, and the relationship between the phenomena in the model. Every mathematical model is based on the explicit and implicit models developed before the quantitative models.

The model implementation is the quantitative programming that involves conceptual models within the mathematical framework. The stage involves some iteration that achieves a tradeoff between the ideal and the best model to be used. The review of evidence is appropriate across the developmental model and is more important when identifying and selecting the relevant models in the study [7]. In the social economies model, resource matching evidence may include data on cost, resources, utilities, and probability of occurring events. The sources of evidence for these trials include randomized trials, data from observation, and common data sources. These parameters will be discussed through mathematical model development.

Model-checking involves verifying and validating the models to ensure the correctness of the model development practices. There are four min levels of model development practices that answer four basic questions, whether the experts will believe in these models, whether the model is doing the work that it is intended, make the predictions from the model agrees with the data that has not been used in the computation of the model, and can the model be used in the prediction of future outcomes[8]. The final stage of the development process involves the application of the model to solve the study question through the interpretation, communication, and generation of results based on the model. Below is a practical example of the mathematical model of resource matching from the socio-economic perspective.

The assignment criteria for the research involve the concept of resource matching, which will involve the transfer of unwanted materials from one organization to be used in the other organization through reusing, recycling, reprocessing, and repackaging. From the social-economic perspective, the field will be characterized by interdisciplinary perspectives filling the major gap in social sciences and providing the necessary knowledge for policymaking decisions. Today, the social economy is an essential tool that promotes inclusive global economies that puts people first and strengthens the relationship between social cohesion systems, inclusion, democratic values, sustainability, and a fair and solitary-based economy, where resource matching lies. Resource matching from this perspective will help promote these social economy classes, resource matching is not an easy task due to the growing economy. Still, with the help of mathematical models, the ideas of thinking big and starting small are incorporated. In the absence of monetary transfers, we will consider how the transfer of these resources will help the social economy and its perspective.

Question 1- is resource matching is referred to as unstable if the social-economic perspective prefers monetary valuation to the exchange of goods.

The above situation is a description of an imaginative model. In normal circumstances, the above situation should not occur. Still, if it occurs, resource matching will be monetized while the social economy will take the aspect of the exchange of goods. The first requirement in the assignment requires that we develop a model that does not exhibit instability that raises the mathematical question to the model, which asks whether it will be possible to find such situations.

Taking the assumption that a stable assignment exists, we will decide the most preferred solution among the several existing solutions required to explain the phenomenon that a stable assignment exists is either of the parties which is well off under any stable assignment known as optimal. If it ever exists, the optimal assignment method is a unique process. If two clauses exist in the assignment, one of the clauses would be better under one part than under the other one that renders one of the assignments non-optimal. With this in mind, the principle of stability and optimality will exist when all the questions are settled.

Stable assignments and research matching of the social economy will lead to the solution in settling the question of the existence and non-existence of stable assignments in the models. We shall look at the case whereby there are equal chances of resource matching and a social-economic perspective in all the available quotas present in unity. The situation is unnatural but can fit in the scenario that both perspectives to choose the exchange unit of choice that consists of either the monetary value or the exchange value of these commodities. The scenario will answer the question;

Question 2-For all existing patterns of preferences, will it be possible to find an economically viable set to represent resource matching in the social economy?

Represented in a social matrix, the following is the recommendation. Where (a) represents the monetary value, (b) represents the exchange value, (x) represents the resource matching, and (z) represents the social economy.

Table 1. The first social matrix

	a	b
x	1,2	2,1
y	2,1	1,2

There are four possible sets in this scenario, where two are stable, where every market clause is given the ability to choose the exchange value of its choice, and the reverse is also true. In this case, a will pair with x, and b pairs with y. although each market segment gets its last choice, the model is stable. The other stable arrangement will be represented if the monetary exchange value and the good exchange values are given a chance to dominate the two market situations. The third arrangement will be obtained if all the four dynamics are given a chance to pair with each alternative. Meaning the pairing between x and b, and y and a. Every other arrangement apart from this is usually unstable.

A second ranking matrix is described in the following diagram.

Table 2. The second ranking matrix

	a	b	c
x	1,3	2,2	3,1

y	3,1	1,3	2,2
z	2,2	3,1	1,3

The only stable pairs are the pairs between z and a, z and b, and a and c. If stability is achieved in this scenario, no pair will get its perfect choice.

3. DISCUSSION

To prove a stable set of these markets, we shall give an iterative procedure. If each market were to be matched with its preferences, one of the two exchange values would have the opportunity to be chosen twice in either the resource matching technique or the social economy model. Suppose a trader has waste resources but wants them exchanged for raw materials to be used in his plant. On the other hand, the buyer badly wants the waste materials from this trader but also does not want an exchange; he wants to buy them in cash. The trader will either have to choose between staying with his goods and exchanging them for money or purchasing the raw materials from another source. Since this closed system can only work in this way, everyone is assured that they will get a share of this market in either way they choose. The above set is stable, with the preferences dominating the setup. Provided there are an equal number of buyers and sellers, and the model will dominate. Once we get more of the seller than the buyer, the market will terminate once an equal number of buyers pairs with an equal number of sellers. With this situation in mind, it is now clear that there is an entire symmetrical procedure in the resource markets and social economy, which aims to lead to a stable set of market variables. In the following situation, we explore the aspect of optimism from both the resource matching and social economy perspective. The solution to the two variables will only be similar when there is a unique stability set.

Taking the example of several sellers of waste resources from institutions, and several buyers from the social market, for convenience, we will choose to assume that if the buyers are not willing to accept the offer from the sellers, then the sellers will not have any place to sell their unwanted resources. With this information in mind, either seller will look for their preferred buyers. The buyers with a given quota place the seller's bids ranking them among the highest. Once they have enough of them, they reject the rest. During this termination, the sellers are either on the waiting list or rejected by the buyers. The buyers, at this point, considers all sellers on the waiting list that achieves their stable assignment.

The principle of optimality does yield stability and an optimal set of conditions. In this case, we call the marketplace efficient for every seller who wishes to dispose of their products. Suppose we assume that at no point in time has the social market ever rejected resource matching. This scenario will conclude that the procedure only rejects resource matches from social economies that could not be previously admitted to any stable condition, resulting in an optimal assignment. Incidentally, we prove that even though the problem of resource matching in social economies does no longer exist, we can still invert our absorption procedures to obtain the unique social economy optimal through making bids to the sellers from resource matching who placed the most desirable bids up to its quota limit that is in normal case a saturation point. In contrast, on the other hand, resource matching will accept all bids from the social markets that it considers optimal.

4. CONCLUSION

The analysis of this mathematical model has introduced a certain trend in our discussion that involves certain assumptions in the analysis and discussion of the mathematical model of resource matching from the social economy perspective. The study tends to move further away from the main question and incorporate the medium of trade, either exchange of goods for goods or the exchange of goods for money, based on assumptions from the support from both the resource matching and social economy. The study abandoned reality and factually demonstrated the facts with mathematical approaches. The study covers the basic part of the mathematical formulas, which calls upon future mathematicians to take the research further and investigate matter containing the analysis that we may have left behind. The issue of the preceding analysis is particularly interesting to the student and teachers that the study calls for its development.

The research goes against the notion that most mathematicians believe that they need a lot of formulas and diverse knowledge to solve mathematical problems. It proves that mathematics requires them to have a basic illustration that shows mathematical models are more related to numerical and geometrical figures as described in the questions and answers in the study. The study explains the diverse options that lead to the required mathematical model in ordinary English. Statistical and calculus-based knowledge is not pre-supposed, yet the mathematical model is perfectly developed. Therefore, it is safe to conclude that mathematical models refer to any argument that is brought up with sufficient evidence in terms of precision and measurement.

The mathematical models currently being used need further methodological developments in the field of research matching and social economy. The extensive research conducted using mathematical-based formulas is mostly in healthcare, social works, and disaster management. The main contribution of this study is the innovative perspective of mathematical models that lies in the creation of a pool of resources that will be helpful in future studies.

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