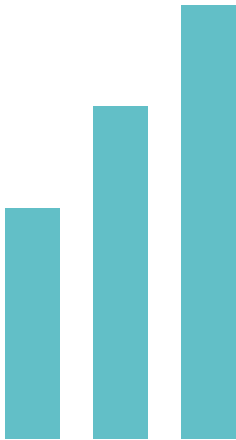


HOW EFFECTIVE IS POLICY MODELING IN ANALYZING AND SOLVING REAL SOCIO-ECONOMIC PROBLEMS?



Mario Arturo Ruiz Estrada

Faculty of Economics and Administration (FEA) University of Malaya,
50603 Kuala Lumpur, Malaysia

Correo electrónico: marioruiz@um.edu.my

Website: www.econonographication.com

Ibrahim Ndoma

Faculty of Economics and Administration (FEA) University of Malaya,
50603 Kuala Lumpur, Malaysia

Correo electrónico: ibrahim.ndoma@yahoo.com

Resumen

Este documento explora la efectividad del modelado de políticas en analizar y resolver problemas socio económicos reales. Adicionalmente, este documento propone una nueva sección que necesita ser incluida en el estudio del modelado de políticas. El principal objetivo de incluir la 'aplicación de políticas' está basada en la propuesta de una clara, práctica, adecuada, realista, y efectiva política que parcialmente o completamente resuelva problemas socio económicos reales que afectan en diferentes niveles a la sociedad respectivamente. Finalmente, proponemos un nuevo índice que es llamado: 'El Índice de Efectividad de la Aplicación de Políticas (EAP-Índice)' para evaluar la eficacia y capacidad de la implementación de políticas.

Palabras clave: modelado de políticas, proxis del modelado de políticas, investigación del modelado de políticas.

Abstract

This paper explores the effectiveness of policy modeling in analyzing and solving real socio-economic problems. Additionally, this paper proposes a new section that needs to be included in the policy modeling studies. This new section will be called "PolicyImplementation."The main objective to include the 'policy implementation' is based on proposed clear, practical, suitable, realistic, and effective policies to partially or fully solve real socio-economic problems that affect on different levels of the society respectively. Finally, we propose a new index that is called 'Policy Implementation Effectiveness (PIE-index)' to evaluate the effectiveness and capability of 'policy implementation'.

Keywords: policy modeling, proxy of policy modeling, policy modeling research.

Introduction

This paper will evaluate the effectiveness of policy modeling in analyzing and solving real socio-economic problems by using secondary data (bibliographical sources) such as the journal of policy modeling and primary data (questionnaire) that is based on diverse opinions from analysts and columnists specialized in finance and economics issues, academics, government advisers, supranational institutions researchers, and think tanks analysts. Additionally, the same paper propose an alternative section that need to be included in the study of policy modeling through the uses of a new index that is called 'Policy Implementation Effectiveness (PIE-index)'. When we are referring to effectiveness in this paper, we are making reference about the applicability of policy modeling papers in analyzing and solving partially or fully solve real socio-economic problems that affect the society on different levels. However, this paper is divided into six sections: (i) methodology; (ii) the general aspects about the perception about policy modeling; (iii) an introduction to the 'policy implementation' section in academic papers about policy modeling; (iv) the policy implementation effectiveness (PIE-index); (v) Application of PIE-Index and PIE-Surface: An Example; (vi) comments and discussion.



1. Methodology

The methodology of this paper is simple and concrete. Basically, we are using primary data and secondary data in our analysis. The methodology is divided into three basic stages: The first stage of our methodology is based on the reading of a single paper that is entitled "The Crisis of European Monetary Union – Lessons to be Drawn" by Otmar Issing (2011). This paper was located among the top twenty five hottest articles in economics, econometrics and finance by the journal of policy modeling in the year 2011 (sciences direct – Elsevier group, 2013). The main reason why we chose this paper is because his easy reading, clear methodology, and the large amount of information are supplied to the readers. Hence, we can say that this specific paper is very compressive for our readers. At the same time, we find that the same paper fit perfectly into the main objective of our research. Another reason to select this paper is originated by the economic conjuncture that we are experiencing at the world economy in our days such as the European crisis. The second stage in our methodology is the design of a specific multi-input-output table for this specific research that is based on nine main-variables (nine main questions) and forty sub-variables (forty sub-questions). The third stage, we sent by E-mail a short questionnaire that is going to help fill our multi-input-output table. The same E-mail we sent to a group of prestigious analysts and columnists specialized on finance and economics issues (five readers), academics

(five readers), government advisers (five readers), supranational institutions researchers (five readers), and think tanks analysts (five readers). These twenty five readers got a dateline of one month to fully complete read this paper wrote by Issing (2011). This questionnaire has nine main questions and forty sub-questions. After, we ask to all readers sent to us its answers by E-mail. The last stage of our methodology is about the storage and analysis of our database from all readers answers respectively. Each question was evaluated and analyzed carefully to understand much better the perception about policy modeling to analyzing and solving real socio-economic problems from different points of view. Finally, all results from each questionnaire were transferred to the multi-input-output table (see Table 1). The multi-input-output table is helping to calculate the PIE-Index and the draw of multidimensional graphs to observe the trend of readers about the applicability of policy modeling papers in analyzing and solving socio-economic problems. Furthermore, in the methodology section of this paper we also proposes the uses of a new section in the study of policy modeling that is called "Policy Implementation" section. The polices implementation section in academic papers related to policy modeling will tries to give more applicability to policy modeling papers in solving real socio-economic problems together through the uses of a new index that is called 'Policy Implementation Effectiveness (PIE-index)' respectively.

2. The general aspects about the perception of policy modeling

In my last two publications in the journal policy modeling (JPM) that are entitled "Policy modeling: definition, classification and evaluation" (Ruiz Estrada, 2011) and "The origins and evolution of policy modeling" (Ruiz Estrada and Yap, 2013). These two papers are treating to introduce a basic theoretical framework about policy modeling. Hence, this third paper tries to close this cycle about policy modeling theoretical papers in the journal of policy modeling with the study of the effectiveness of policy modeling in analyzing and solving real socio-economic problems through the uses of different point of views from different analysts and columnists specialized on finance and economics issues, academics, government advisers, supranational institutions researchers and think tanks analysts. Initially, we need to have a clear idea about the definition of policy modeling that according to Ruiz Estrada (2011) said: "an academic or empirical research work, that is supported by the use of different theories as well as quantitative or qualitative models and techniques, to analytically evaluate the past (causes) and future (effects) of any policy on society, anywhere and anytime". As an integral part of this definition, "policy" is defined as "a theoretical or technical instrument that is formulated to solve specific problems affecting, directly or indirectly, societies across different periods of times and geographical spaces."

Therefore, the definition about policy modeling among analysts and columnists specialized on finance and economics issues, academics, government advisers, supranational institutions researchers and think tanks analysts are totally different. We can observe a large number of divergences in form and content about policy modeling. It is possible to be observed by a large number of different opinions that the policy modeling is showed in our research. Hence, we are not interested to go far on the analysis of theoretical issues about the definition of policy modeling. Therefore, this paper is more concern about the adaptability of policy modeling studies in analyzing and solving real socio-economic problems. The gold question here

is how large is the gap that exist between theory and reality that make to us sometimes so much confuse, unsafe and suspicious in the praxis of policy modeling. The answer to this question is possible to be founding in our results that are originated from different point of views of our readers in this research that is going to be showed in this next section. According to this research some readers after read the paper authored by Issing (2011). They express that academic papers about policy modeling exists some distrust, but especially many of them found certain difficulties in the process of reading complicated econometrics models. Another important issue that needs to be mentioned here is about the origin of database sources that this academic paper is used in its analysis. Additionally, the uses of complicated economic vocabulary and different economic theories make sometimes readers scaring and boring in the process of reading this academic paper. This opinion is shared by the analysts and columnists specialized on finance and economics issues together with the government advisers' opinion. We also found that this type of readers prefer simple articles that there are easy to read and understand faster by using basic knowledge, intuition, simple logic, basic cause-effect deductions. In another cases the reaction of some readers were totally different such as academics, supranational institutions researchers and think tanks analysts. They are showing a deep interest to read this academic paper. In this sense, we can say that the impact of this academic paper in analyzing and solving real socio-economic problems were ready-witted according to different readers. However, our research is curious to find the perception about policy modeling after all readers finished read this paper wrote by Issing (2011). We found that these readers classified policy modeling as a theoretical tool (63%), technical tool (23%), and the rest of readers (15%) classified policy modeling such as a mix of both tools. Another issue in this research is about the difficulty that exists in the reading of this academic paper. We found that 36% of all readers got problem to read this paper and 64% of them got a clear picture about the European financial crisis. Additionally, we ask to all readers if exist the possibility to apply this academic paper in analyzing and solving the European financial

crisis, then they respond was 28% fully agree that this paper can be considered important to understand the present situation of the European financial crisis and given to us possible solutions, but the large part of readers 72% they fully disagree. The next question in discussion is about if the database is used by this academic paper can be trusted to analyzing the European financial crisis in our days. The results show that 46% of readers find useful the database of this academic paper and 54% of readers disagree with the database is presented on this specific academic paper. Finally, the last question about which part of this academic paper they are more interested to read. According to our results a large number of readers (46%) they are interested to read only the comments. Another group prefers to find data (23%), but many of them (20%) prefer to read the possible scenarios in the future about the European financial situation and finally another group of readers (20%) are interested to get only a general idea about the European financial crisis.

3. An introduction to the 'policy implementation' section in academic papers about policy modeling

According to the results in our research about the effectiveness of policy modeling papers in analyzing and solving real socio-economic problems, we propose to include in policy modeling papers a new section that we will like to call 'Policy Implementation' section. This special section need to be included after the conclusions and before the references according to our results in this research. The main reason to include this new section into academic papers about policy modeling is to propose clear, practical, suitable, realistic, and effective policies to solve partially or fully real socio-economic problems that affect on the society on different levels respectively. This section need to be shorted (max. 1 page), simple, realistic and applicable policies enough fast to be read by any type of reader. Additionally, this section needs to propose some ideas about the implementation of different policies into management and institutional levels. In fact, we like propose a new index to evaluate

this specific section in academic papers related to policy modeling. This new index will be called 'Policy Implementation Effectiveness (PIE-index)'.

4. The policy implementation effectiveness (PIE-index)

With the *Omnia Mobilis* assumption (Ruiz Estrada, 2011), this paper proposes the 'Policy Implementation Effectiveness (PIE-index)' as a tool to evaluate policy modeling in analyzing and solving real socio-economic problems. This purpose-built index performs the following functions: (i) to evaluate the consistency level of any policy; (ii) to identify the strengths and weaknesses of any policy.

The construction of the PIE-Index involves the use of forty (40) sub-variables distributed in nine (9) main-variables. These 9 main-variables are: (X1) policy vision; (X2) policy approach; (X3) database sources; (X4) policy orientation; (X5) type of policy; (X6) policy institutional vision; (X7) applicability of this policy; (X8) policy geographical coverage; (X9) policy benefits.

There are three basic steps in the implementation of the PIE-Index. These steps are: (i) the use of multi-input-output table; (ii) classification of variables and identification of parameters; (iii) measurement of the PIE-Index.

4.1 Steps to implement PIE-index

4.1(i) The use of multi-input-output table

The multi-input-output table (see Table 1) is an alternative database analysis framework that permits storage of a large amount of data to measure any single variable. This single variable can show the evolution of any policy from a general perspective. In the construction of the PIE-Index, the multi-input-output table functions as the basic analytical framework to measure the "m" number of main-variables. Each main-variable is formed by "n" number of sub-variables. The number of sub-variables in each main-variable is unlimited. As such, the multi-input-

output table concept does not include any notion of ranking of variables according to importance. All sub-variables are given the same importance (weight) because we are interested to measure a single value, which is the PIE-Index in this case. In order to give the same weight to all sub-variables, it is necessary to use the binary system. The binary system (0,1) helps to maintain a balance among all variables.

4.1.(ii) Classification of variables and identification of parameters

The construction of the PIE-Index involves 9 main-variables and 40 sub-variables. The 9 main-variables are: (X₁) policy vision; (X₂) policy approach; (X₃) database sources; (X₄) policy orientation; (X₅) type of policy; (X₆) policy institutional vision; (X₇) applicability of this policy; (X₈) policy geographical coverage; (X₉) policy benefits.

I. The first main-variable (X₁) ('policy vision') is formed by three sub-variables: (X_{1:1}) short run; (X_{1:2}) medium run; (X_{1:3}) long run. **II.** The second main-variable (X₂) ('policy approach') is formed by five sub-variables: (X_{2:1}) microeconomic level; (X_{2:2}) macroeconomic level; (X_{2:3}) global level; (X_{2:4}) theoretical approach; (X_{2:5}) technical approach. **III.** The third main-variable (X₃) ('database sources') consists of five sub-variables: (X_{3:1}) primary data; (X_{3:2}) secondary data; (X_{3:3}) mix data; (X_{3:4}) supranational institution data source; (X_{3:5}) domestic data source. **IV.** The fourth main-variable (X₄) ('policy orientation') is made up of (X_{4:1}) fiscal policy; (X_{4:2}) monetary policy; (X_{4:3}) international trade policy; (X_{4:4}) economic growth policy; (X_{4:5}) social welfare policy; integral policy (X_{4:6}). **V.** The fifth main-variable (X₅) ('type of policy') comprises eight sub-variables: (X_{5:1}) economics; (X_{5:2}) social; (X_{5:3}) technological; (X_{5:4}) political; (X_{5:5}) environment; (X_{5:6}) institutional; (X_{5:7}) sciences; (X_{5:8}) multi-disciplinary. **VI.** The sixth main-variable (X₆) ('policy institutional vision') comprises three sub-variables: (X_{6:1}) private sector; (X_{6:2}) public sector; (X_{6:3}) public/private sectors. **VII.** The seventh main-variable (X₇) ('applicability of this policy') is made up of three sub-variables: (X_{7:1}) adaptability to the real making decisions level; (X_{7:2}) benefit/cost; (X_{7:3}) the existence of financial and human resources; (X_{7:4}) easy implementation of this policy. **VIII.** The eighth main-variable (X₈) ('policy geographical coverage') comprises the following three sub-variables: (X_{8:1}) domestic level; (X_{8:2}) regional level; (X_{8:3}) global level. **IX.** The ninth main-variable (X₉) ('policy benefits') is made up of three sub-variables: (X_{9:1}) large part of population; (X_{9:2}) minorities; (X_{9:3}) integral projection (see Table 2). Besides variables and sub-variables, two (2) parameters are used in the construction of the PIE-Index. These parameters are: (i) if the sub-variable can fit into the policy modeling, then this sub-variable is denoted by "1"; (ii) if the sub-variable cannot fit into the policy modeling, then this sub-variable is denoted by "0". Each parameter uses the binary digit "0" or "1". The binary system is applied to every sub-variable because all sub-variables have the same level of importance and exert the same level of influence in the multi-input-output table.

4.1(iii) Measurement of PIE-Index

The measurement of the PIE-Index involves three steps. (i) The first step is to put the 9 main-variables and 40 sub-variables into the multi-input-output table. (ii) The second step is to evaluate sub-variable by sub-variable according to the parameters mentioned above. (iii) The third step is to calculate the value of each main-variable. This value is the sum of all sub-variables (of the particular main-variable) divided by the total number of sub-variables (see Expression 1). The last step is the actual measurement of the PIE-Index. The PIE-Index is equal to the sum of all main-variables (see Expression 2).

$$EPI = \sum_{i=1}^{\infty} \left(\sum_{j=1}^{\infty} X_{ij} \right) / t * K \quad < i, j, t > = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, \dots, \infty \quad (1)$$

i = main variable; j = sub-variable; t = total variables in analysis

$$EPI = \left(X_1 \left(\sum_{i=1}^3 X_{i3} \right) + X_2 \left(\sum_{j=1}^5 X_{2j} \right) + X_3 \left(\sum_{k=1}^5 X_{3k} \right) + X_4 \left(\sum_{l=1}^5 X_{4l} \right) + X_5 \left(\sum_{m=1}^8 X_{5m} \right) + X_6 \left(\sum_{n=1}^3 X_{6n} \right) + X_7 \left(\sum_{o=1}^4 X_{7o} \right) + X_8 \left(\sum_{p=1}^3 X_{8p} \right) + X_9 \left(\sum_{q=1}^3 X_{9q} \right) \right) \quad (2)$$

4.1(iii)(a) Evaluation of Consistency of PIE-Index

The PIE-Index can be used to evaluate the level of consistency of any policy modeling. The PIE-Index is classified according to one of these four levels of research consistency: 'perfect policy consistency'; 'good policy consistency'; 'acceptable policy consistency'; 'low policy consistency'. If the PIE-Index is between 1 and 0.90 points, then the research is of 'perfect policy consistency'. If the PIE-Index is between 0.89 and 0.70 points, then there is 'good policy consistency' in the research. A PIE-Index that is between 0.69 and 0.50 points shows 'acceptable policy consistency' in the research. If the PIE-Index is between 0.49 and 0 points, then we are referring to a 'low policy consistency' research.

4.1(iii)(b) Construction of Policy Implementation Effectiveness Surface (PIE-Surface)

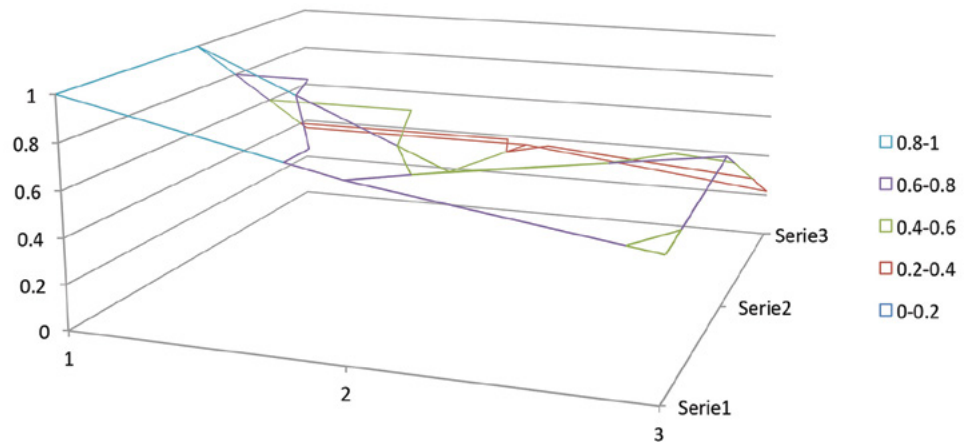
The full implementation of the PIE-Index requires one fourth step, that is, the construction of the PIE-Surface. The purpose of constructing the PIE-Surface is to graphically represent all results in the PIE-Matrix. The PIE-Surface shows the strengths and weaknesses within any policy modeling on a multi-dimensional coordinate space (Ruiz Estrada, 2011). (see Figure 1). The construction of the PIE-Surface is based on the PIE-Matrix results (see Expression 3). The PIE-Matrix is a three by three matrix that contains the individual results of all nine main-variables (taken from Table 2). The idea here is to use the results of strictly nine main-variables in the PIE-Matrix to build a symmetric surface. When the PIE-Matrix keeps the number of rows strictly the same as the number of columns, then the PIE-Surface can always show a perfect symmetric view (see Table 3).

$$PIE\text{-Surface} = \begin{pmatrix} X_1 & X_4 & X_7 \\ X_2 & X_5 & X_8 \\ X_3 & X_6 & X_9 \end{pmatrix} \quad (3)$$

Table 3
TRE-Surface Data

$$\text{EPI-Surface} = \begin{pmatrix} 1 & 0.75 & 0.58 \\ 1 & 0.50 & 0.67 \\ 0.36 & 0.36 & 0.22 \end{pmatrix}$$

Figure 1
TRE-Surface Data



4.1(iii)(c). Evaluation of Strengths and Weaknesses of Main-Variables in Policy Modeling

The result of each main-variable in the PIE-Matrix is evaluated according to five levels of performance. If the result of the main-variable is between 1 and 0.90, then this main-variable is of 'excellent performance'. If the result is between 0.89 and 0.70, then the main variable is of 'good performance'. If the main-variable has a result between 0.69 and 0.50, then this main-variable is of 'acceptable performance'. If the main-variable shows a result between 0.49 and 0.30, then this main-variable has 'non-satisfactory performance'. If the main-variable has a result between 0.29 and 0, then its performance is 'poor performance'.

5. Application of PIE-Index and PIE-Surface: An Example

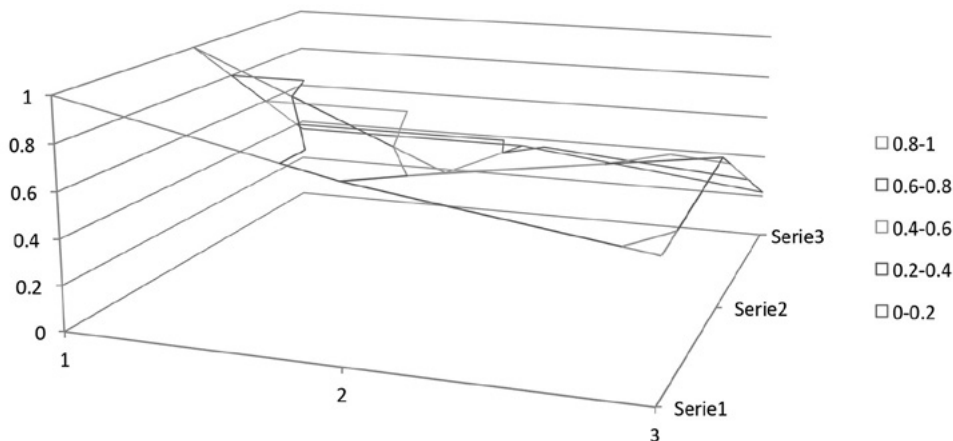
For demonstration purposes in this paper, the PIE-Index and PIE-Surface was applied to a single paper that was featured in *Journal of Policy Modeling* respectively. This paper is entitled "The Crisis of European Monetary Union – Lessons to be Drawn" by Otmar Issing (2007). This paper was analyzed by six experts such as one single analysts specialized on finance and economics issues (R₁), one single journalist specialized on finance and economics issues (R₂), one single academic (R₃), one single government advisers (R₄), one single supranational institution researcher (R₅), and one single think tank analysts (R₆). This paper has a PIE-Index of 0.6 points that according to our parameters. This paper is located on 'acceptable policy consistency' (see Table 2). Hence, the result of each main-variable in the PIE-Matrix shows three weak main-

variables: main-variable X3 'data sources' (0.36 = non-satisfactory performance); main-variable X6 'policy institutional vision' (0.36 = non-satisfactory performance); main-variable X9 'policy benefits' (0.22 = poor performance) (see Table 4). According to our results three main variables have 'acceptable performance'. These variables are type of policy (X5 = 0.50), applicability of this policy (X7 = 0.58), policy geographical coverage (X8 = 0.67). Additionally, only one main-variable has good performance, this variable is the policy orientation (X4 = 0.75). Finally, only two main-variables are receiving the top marking of 'excellent performance'. These two variables are 'policy vision' (X1 = 1) and 'policy approach' (X2 = 1). All results of the above nine main-variables in this can be seen on the PIE-Surface (see Figure 1). Here the PIE-Surface shows the weaknesses within a specific case of the effectiveness of policy implementation through a multi-dimensional graphical representation. The first recommendation in this paper is to include non-economic variables in its modeling to improve the main-variable (X5). Secondly, this paper should identify the adaptability to the real making decisions level, benefit/cost, evaluation of financial and human resources, and possible implementation of this policy that is relevant to improve the main-variable (X7) in the model. Finally, the recommendation is for main-variable (X9) by proposing more integral projection policies to solve problems in different social groups in different levels (see Table 4 and Figure 1).

Table 4
Evaluation of Strengths and Weaknesses of Main-Variables in the effectiveness of Transportation policy implementation

(X1) Transportation Policy Vision	1	Excellent performance
(X2) Transportation Policy Approach	1	Excellent performance
(X3) Transportation Database Sources	0.36	Non-satisfactory performance
(X4) Transportation Policy orientation	0.75	Good performance
(X5) Type of Transportation Policy	0.50	Acceptable performance
(X6) Transportation Policy institutional vision	0.36	Non-satisfactory performance
(X7) Applicability of this Transportation Policy	0.58	Acceptable performance
(X8) Transportation Policy Geographical Coverage	0.67	Acceptable performance
(X9) Transportation Policy benefits	0.22	Poor performance

Figure 1
TRE-Surface Data



Concluding Remarks

This paper is encouraging to use a new model that is entitled "Policy Implementation Effectiveness (PIE-index)". This new index is willing to evaluate the effectiveness of any policy modeling paper to analyzing and solving real socio-economic problems that affect the society on different levels, a way of as well as a model of evaluating the effectiveness of policy modeling. This research is given the starting point to develop a new section in academic papers about policy modeling. The main idea to introduce this new section is to propose clear, practical, suitable, realistic, and effective policies to solve partially or fully real socio-economic problems that affect on the society on different levels respectively. This new section will be called "Policy Implementation". This new section will be included between the conclusions and the references section in any academic paper related to policy modeling. The unique characteristics of this section is following by a maximum of one page, easy and fast to be read by any type of reader, together with applicable recommendations and clear steps to implement any policy under management and institutional level respectively.

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