Modeling of the Mahdist State's Financial System in Sudan in (1885-1898)

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ABSTRACT:

The purpose of this paper is an attempt to model the financial system of the Mahdist state during the period (1885-1898). The literature was reviewed to determine and identify the elements and components of the said system. The selected elements are used to develop the model. The Interpretive Structural Modeling(ISM) techniques were applied as a methodology for this study. The result is hierarchical structure model with three levels. The resulting structure is the Mahdist state financial system which pursuing Islamic economic teachings. The study recommends further analysis of particular element and level of the system which form a hierarchical structure.

المستخلص:

تهدف هذه الورقة الى محاولة عمل نموذج للنظام المالي لدولة المهدية في الفترة ما بين 1885-1898. وبمراجعة الاعمال السابقة في هذا المجال تم تحديد و اختيار عناصر النظام المالي لدولة المهدية، و التي استخدم في بناء النموذج. و بتطبيق منهج النمذجة الهيكلية التفسيرية، توصلت الورقة الى نموذج من هيكل للنظام المالي لدولة المهدية في الفترة المشارة اليها.و يتكون النموذج من ثلاث مستويات للنظام المالي في دولة المهدية في ذات الفترة الزمنية . و توصي الورقة بدراسة هذا النموذج و بحث كل مستوى من مستوياته و تحليل كل عنصر من عنلصره.

KeyWords: InterpretiveStructural Modeling(ISM), Reachability Matrix, Financial, SSIM, MICMAC Analysis

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I.INTRODUCTION

All societies use an economic system to organized ways of providing the wants and needs of their people. In this study the focus is on the financial system in Mahdist state in Sudansince 1885-1898(Nakash, 1988).The important of this study stem from the Mahdist state as the first movement came after the Turkey-Egyptian regime that used financial system which Sudanese people reject (Nakash, 1988; Suleiman, 2016). That system is solely based on collection taxes. The question, is what the financial system the Mahdist state developed? What is the model of this financial system? Here, the paper triesto answer these two questions using methodology that enhance developing of the model of said system.

RELATED WORK:

Mahdist state economic system based traditional agriculture and pasturing, and they are primitive without sustainability because they depend on natural factors such as rain fall which uncontrollable. Due to this system of economic the state was faced by famous famine in 1306 Hijerya (Musa, 1986; Abu Shouk, 1991, Serels, 2012)

The central problems of an economy revolve around one of the most important aspects of human life that our resources are scarce to fulfill our unlimited wants. The scarcity of resources creates a dilemma for economic managers who have to make a choice from among the set of alternative. To make the economic choices, economists and economic managers confront the following questions. What to produce? How much to produce? How to produce? When to produce? For whom is produce?

An economic system is a set of principles on which an economy can run and make decisions about the central problems it faces in form of scarcity of resources and unlimited wants. There are following economic systems that the countries adopt in running their economies: traditional, capitalism, socialism, mixed economy and Islamic economic system. Mahdist state adopts Islamic economic system. The Mahdist state is based on Islamic teaching (Abu Slim, 1969, 1992).

The financial system of the Mahdist state is a traditional economy, composed of Mahdist treasury -Bait al mal- 'The house of wealth'; was intended to contain all material resources of the movement, in both cash

and kind. Elaborate tax system authorized by holy law of Islamic where substituted. The booty acquired in the battle (plunder taken in war). The treasurer is Ahmad Suleiman (Musa, 1986). And the development of specialized treasuries, notably the Khalifa's own privacy treasury, siphoned off from the original Bait almal the cream of its revenue (Holt, 1976, Abu Shouk, 1991, Musa, 1986 and Nakash, 1988)). The Mahdist Authorities established many custom posts on the commercial routes, such as Kukarayb on the eastern borders of the Mahdist State, Kassala, al- Qadarif and Berber. At these posts the Bait al-Mal appointed agents to collect the dues (Musa, 1986; Nakash, 1988; Abu Shouk, 1999).

Mahdist set up treasury bait mal al Muslim (the Muslims' treasury) at jabal Qadir for storage and distribution of booty among them (Al-Qadal, 1992). Ahmad Suleiman was appointed as amin (commissioner) of this financial system followed by five other commissioners. This system was both the central and store of the Mahdist state, its revenues included proceeds of taxation which were often paid in kind, booty, and confiscated property (Nakash, 1988). No system for regulating revenue and expenditure, but the treasurer (Ahmad Suleiman) carried out his job according to Mahdi's orders (Abu Shouk, 1991). the system was comprise of, the bait al-Mal, the commissioners of the bait al-Mal, the government property, provincial treasuries, taxation system which was the core of the financial administration of the Mahdist state, custom duties, revenue and expenditure, the main source of the Mahdist State revenue were booty of war, Zakat and ushur, goods tax, contributions, rents, fines, exchange profits. The expenditures were military and administrative (Abu Shouk, 1991; Musa, 1986).

At Omdurman Mahdist state capital the previous functions of Baytown al-mal were extended to include minting coinage. Besides this central treasury there were provincial ones in al-Fashir, Al Ubayyid, Berber, Dongla, Tukar, and alQadarif etc (Abu Shouk, 1999).In 1886 the Khalifa dismissed Ahmad Suleiman, replacing him by Ibrahim Adlan. Ibrahim Adlan reorganized the Bait almal, dividing it into several sections, introduced an effective system of accounts and reappointed competent clerks with experience under former (Musa, 1986).

In 1890 Ibrahim Adlan was dismissed and the bait al mal was divided into sub-treasuries, each under a separate administration which was responsible directly to the Khalifa or his brother Yaqub (Musa, 1986).

The Khalifa set up specialized treasuries (Abu Shouk, 1991). These treasuries were, Bait al Mal almulazimi (bodyguard of the Khalifa), Bait almal alkhums (a fifth of the booty was allocated under Sharia for Imam), Bait almal warshat al-harbiyya wa l-tarasana (the treasury of the military workshop and dockyard), Bait almal al-Jihadiyya (they are from South and Nuba mountains), and Bait almal Dabatiyat al-suq (the treasury of the market police station) (Abu Shouk, 1999, and Musa, 1986)

II. METHODOLOGY

To develop a structural model among factors and to determine relationships between elements of the said system, interpretive structural modeling (ISM) methodology has used. ISM is an interactive learning process. The method is interpretive in that the individual's or group's judgment decides whether and how elements are related, it is structural relationships among elements of a system (Mandal, 1994; Neena, 2.12). However, the direct and indirect relationships between elements describe the situation far more accurately than individual element taken in isolation (Dawood, 1987, and deManial, 1999). Therefore, ISM develops insights into collective understanding of these elements. The various steps involved in the ISM techniques are: Identification of elements, which are relevant to the problems or issues, this is done in literature review. Establishing a contextual relationship between elements with respect to each pairs of elements will be examined. Developing a structural self- interaction matrix (SSIM) of elements, this indicates pair-wise relationship between elements of the system (Mandal, 1994; and Neena, 2012).

2.0. Identification andSelection ofSystem Elements:

The starting point for developing an ISM model is the selection and identification of the elements relevant to the problem. From previous literature review the following elements ofMahdist's financial system are selected and identified. (1)Provincial treasuries (2) Specialized treasuries, (3) Revenue, (4) Treasurers (commissioners), (5) Taxationsystem ofBait almal (6) Bait al-mal (the Central treasury), 7. Custom Duties, 8.Government property and (9) Expenditure (Musa, 1986, Nakash, 1988, Abu Shouk, 1991, Abu Slim, 1992).

2.1. Interpretive Structural Modeling of the Mahdist's Financial System

2.1.1. Structural Self-Interaction Matrix (SSIM):

For analyzing criteria a contextual relationship of "lead to" is chosen here for developing contextual relationships among elements; options based on brain storming was considered, for expressing the relationship between different elements. Four symbols have been used to denote the direction of relationship between the parameters i and j (here i,j)

V: parameter i will lead to parameter j

A: parameter j will lead parameter i

X: parameter i and j will lead to each other; and

O: parameters i and j are unrelated

Following identifying and enlisting the 9 elements, a contextual relationship among them is presented. Relationship may comprise relative, influential, or sequential relations (Austin and Burns, 1985, Warfield, 1994). The following table 1 shows the SSIM.

Table 1. Structural self-interaction matrix of Mahdist's financial system

	9	8	7	6	5	4	3	2	1
1	A	A	X	O	A	O	O	A	1
2	O	O	O	O	A	O	O	1	
3	O	O	O	O	O	V	1		
4	O	O	O	O	O	1			
5	A	X	A	O	1				
6	O	A	A	1					
7	X	A	1						
8	O	1							
9	1								

2.1.2. Formation of Initial Reachability Matrix (IRM):

In this step SSIM of the above table has been converted into a matrix of binary elements named as IRM. In this regard following rules are used.

SSIM Notation Symbols	Reachability matrix	
	i,j entry	j,i entry
V	1	0
A	0	1
X	1	1
O	0	0

IRM, thus, developed is shown in Table 2.

Table 2. Initial Reachability matrix of Mahdist's financial system

Elements	1	2	3	4	5	6	7	8	9
1	1	0	0	0	0	0	1	0	0
2	1	1	0	0	0	0	0	0	0
3	0	0	1	1	0	0	0	0	0
4	0	0	0	1	0	0	0	0	0
5	1	0	0	0	1	0	0	1	0
6	0	0	0	0	0	1	0	0	0
7	1	0	0	0	1	1	1	0	1

8	1	0	0	0	1	1	1	1	0
9	1	0	0	0	1	0	1	0	1

2.1. 3.Final Reachability matrix:

Here when establishing the relationship between various elements transitivity was also considered. As per the rule of transitivity, if an element A leads to an element B and if B leads to another element C, then A leads to C. Following this rule a final Reachability matrix was developed and driving power and dependence of elements are also computed. Driving power is the total number of ones in the corresponding rows and dependence is the total number of ones in the corresponding columns of final Reachability matrix. Final Reachability matrix is shown in the table 3.

Table 3. Final Reachability matrix of Mahdist's financial system

Elements	1	2	3	4	5	6	7	8	9	Driving power
1	**1**	0	0	0	1	1	1	0	1	5
2	1	**1**	0	0	0	0	1	0	0	3
3	0	0	**1**	1	0	0	0	0	0	2
4	0	0	0	**1**	0	0	0	0	0	1
5	1	0	0	1	**1**	1	1	1	1	7
6	0	0	0	0	0	**1**	0	0	0	1
7	1	0	0	1	1	1	**1**	1	1	7
8	1	0	0	0	1	1	1	**1**	1	6
9	1	0	0	0	1	1	1	1	**1**	6
Dependence	5	1	1	4	5	6	6	4	5	**37**

2.1.4. Level partition:

From the final Reachability matrix, the Reachability antecedents of each element of Mahdist's financial system were developed. Then level partition comes. This will help to categorize the equal valued elements of financial system. To get level partitions five iterations are necessitated. In the iterations, elements are the elements themselves. Reachability set consists of a group of element itself and other elements, which may help achieving it. The element which is common in Reachability sets and antecedent leads are assigned at the intersection set. The Reachability sets, the intersection sets and antecedent sets help to pinpoint the top level elements. If all the elements of the intersection se and Reachability sets of a particular element are same, then that element is assigned in the top level group (level I group).

The top level elements in the iteration I are removed from the set for the formation of the next table. This process I repeated till all levels of each element are found. These levels recognized by this procedure are exploited for the formation of diagraph. These subsequent iterations are shown in tables 4 to 6.

Table 4. Iteration I

Elements	Reachability set	Antecedent set	Intersection set	level
1	1,5,6,7,9	1,2,5,7,8,9	1,5,7,9	
2	1,2,7	2	2	
3	3,4	3	3	
4	4	4	4	I
5	1,5,6,7,8,9	1,5,7,8,9	1,5,7,8,9	
6	6	1,5,6,7,8,9	6	I
7	1,5,6,7,8,9	1,2,5,7,8,9	1,5,7,8,9	
8	1,5,6,7,8,9	5,7,8,9	5,7,8,9	
9	1,5,6,7,8,9	1,5,7,8,9	1,5,7,8,9	

Table 5. Iteration II

Elements	Reachability set	Antecedent set	Intersection set	Level
1	1,5,7,9	1,2,5,7,8,9	1,5,7,9	II
2	1,2,7	2	2	
3	3	3	3	II
5	1,5,7,8,9	1,5,7,8,9	1,5,7,8,9	II
7	1,5,7,8,9	1,2,5,7,8,9	1,5,7,8,9	II
8	1,5,7,8,9	5,7,8,9	5,7,8,9	
9	1,5,7,9	15,7,9	1,5,7,9	II

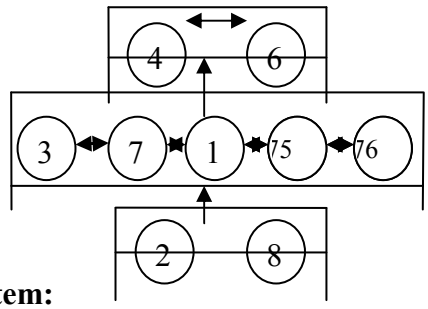
Table 6. Iteration III

Elements	Reachability set	Antecedent set	Intersection set	level
2	2	2	2	III
8	8	8	8	III

2.1.5. Diagraph of Mahdist Financial System:

Diagraph simply signifies the relationship between the elements of financial system as per the numbers assigned to them if there is a relationship between elements j and i, this is represented by an arrow which points from i to j. Diagraph of opportunities is shown in figure below.

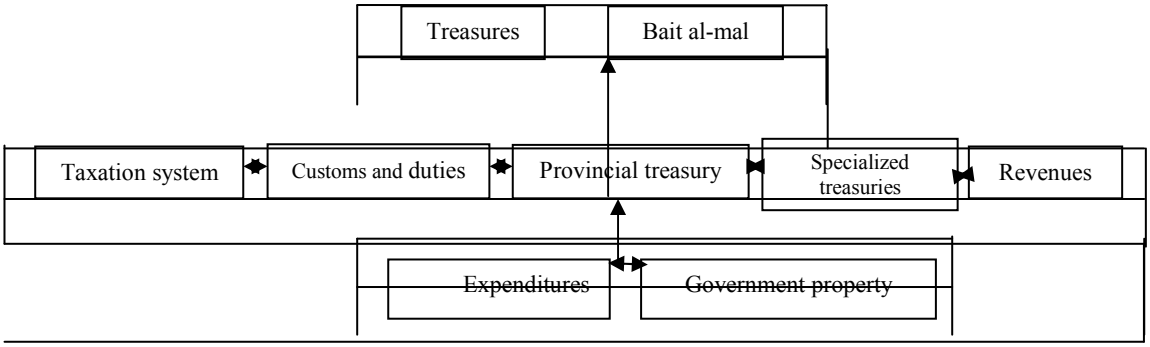
Figure 1. Diagraph



2.1.6. ISM of Mahdist's Financial System:

Diagraph does not give a wide ranging picture of the context. Digraph is converted to ISM to get complete representation of the interrelationship among the elements. In the ISM elements of financial system are represented by names of elements itself and not by numbers and is shown in the following figure.

Figure 2.ISM of Mahdist's Financial System



2.1.7. MICMAC Analysis

Based on the driving power and dependence, a graph is plotted as shown in the graph below, classifying the elements into four clusters. They are (1) Autonomous. (2) Dependent (3) Linkage and (4) Independent elements. Autonomous group has low driving power and low dependence. They can be eliminated from the system. Dependence group has low driving power and high dependence. Linkage group has high driving power and high dependence. They are the most important elements. Any action on this will affect the entire system. Independent group has high driving power and low dependence. Driving power-dependence diagram for elements of Mahdist's financial system is shown in graph 1 blow.

Table 7. Driving power and Dependence power for the element

Elements	Number	Driving power	Dependence power
Provincial treasuries	1	5	5
Specialized treasuries	2	3	1
Revenues	3	2	1
Treasurers	4	1	5
Taxation system	5	7	5
Bait Al-Mal	6	1	6
Custom Duties	7	7	6
Government Property	8	6	4
Expenditures	9	6	5

D	9									
R	8		Cluster IV Independent					Cluster III Linkage		
I	7									
V	6	6						7		
I	5	4				1	9	5		
N	4		Cluster I Autonomous				8	Cluster II Dependent		
G	3									
P	2									
O	1		3	2						
W		1	2	3	4	5	6	7	8	9
R										

DEPENDENCE

Graph 1

Linkage group has high driving power and high dependence and is the most important elements.

III. RESULTS AND DISCUSSIONS

Mahdist's financial system is highly implied in the field of fiscal and monetary systems, and it suits the governance system applied during the Mahdist era (1885-1889). the resultant model is an hierarchy of the three levels: level occupied by Betel-Mal and Treasures; the middle level with, taxation system, customs and duties, provincial treasures, specialized treasures, and revenues; and the last level is compose of two elements, expenditures and government property. The finding in this paper is different from those of Abu Shouk and Musa. The paper developed a model using interpretive structural modeling (ISM) approach. This model is interpretive and structural easy to understand and perceived easily. The paper encounters with limitations of time and resources.

IV. CONCLUSIONS AND RECOMMENDATIONS

This paper illustrates the interrelationships between the elements of Mahdist's financial system during the period (1885-1889), using Interpretive Structural Modeling (ISM). An easier and commonly adopted practice to study structure of a system to develop a standard model. This gave rise to the materialization, of innumerable models in financial and management. However, these models usually have many limitations, the real-world applicability and the fitness of these models always supersedes. In the present work nine elements of Mahdist's financial system were identified and considered for analysis. The identification of these points and awareness of their driving power and dependence helps the experts in economy to focus on them and prioritize them as tactical issues. The analysis can further be extended for intimidations of Mahdist's financial system. The paper recommends the model as investigating tool for further research particularly at the levels

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