

# Development Of Inter-State And Inter-Generational Mawquf Model Based on Sustainable Water and Energy Resources

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## Abstract

*Both voluntary and non-voluntary sources of funds for higher education are non-perpetual and may only concern the current and immediate future generations. A resource based corporate Waqf to sustain higher education sector may realize the true meaning of perpetuity in Waqf financing. The resource based (from output of harnessing water and energy resources for public good) corporate Waqf financing are themselves inherently sustainable and may be perpetual through many generations of students in higher learning. However, the conventional theory of resource flows across state borders and through generations may constraint the inter-state and inter-generational flow of Waqf funds. The approaches of Islamic economic principles of fairness (Al-Adalah) and public accountability (Al-Hisbah) are investigated for optimization of the equitable values of corporate Waqf funding flow across state borders and through generations such as between poor/rich states and present/future societies respectively. Preliminary model simulations indicated that Al-Hisbah can maximize the inter-state Waqf transfer function. Also, the use of Al-Adalah has been shown to increase the value of Waqf funds across generations of higher education students.*

## Key Words:

**Natural resources, corporate waqf, resource economics, Al-Hisbah**

## 1. INTRODUCTION

A hydro-power plant company may voluntarily dedicate a portion of its net revenue to *Waqf 'Amm*. Which means a "dedication in perpetuity of the capital and income of an asset (that is the *mawquf*), recognized by Islamic Law" (Mahamood, 2006; Pg.16). This contribution was for the

purpose of financing the public good of higher education. The problem is when part of the Waqf would be allotted for the purpose of financing present and future generations of students of institutions of higher education in a neighboring state. It implies inter-state and inter-generational Waqf financing from the *Mawquf* (Waqf sources) of a state to the *Awqaf* (Waqf receptors) or beneficiaries of another state across the state boundaries. The other problem is the inter-generational altruism of present generation commitments for the better of future generation which is patched with inter-generational unfairness of a lot of unsolved social inequities to present society (Cox, Fiedman & Sadiraj, 2008). This is partly due to present generation 'pampering' welfare of future generations with the so-called social discount rates which expresses the degree of inter-generational altruism (Freeman & Perez, 1988).

This paper is about the study of inter-State Waqf flows that will not only sanctify the jurisdictions of the State over its natural resources but also allow Waqf financing across State boundaries and through generations of higher education students. A conceptual inter-State and inter-Generational model was explored, simulated and the initial results discussed in this paper. The model will be built on multi-source *mawquf* corporate Waqf financing of multi-receptors of Waqf namely the institutions of higher learning between two States and through generations, based on the principles of Islamic economics. These Waqf inter-state flows are monetized from the sales of the perpetual resource-based output of harnessing water, energy, land banks and forests. This paper will also explore the Islamic principles of how present generation would increase the welfare of future generations with sustainable Waqf financing of their higher education

## 2. INTER-STATE AND INTER-GENERATIONAL WAQF FINANCING ISSUES

The inter-state Waqf problem is due to the uniqueness in Malaysia as the State Islamic Religious Council (SIRC) or the "Majlis Agama Islam Negeri" has vested rights for all *Mawquf* within the state (Enactments, Ordinance & Acts for *Provisions of Wakaf*; State Enactments 1978; 1962; 1986; 1994; 1991; 1991; 1991; 1993; 1992; 1964; 1992; Sarawak Ordinance, 1954; FTs Act, 1993). The administration of the Waqf revenue of the *Mawquf* (hydro, solar, geothermal power plant would make its administration to be under the purview of the State Waqf Control Committee (Perak Enact. 1992). Although the SIRC acts as a corporate body, its financial, legal and administrative constraints would make it almost impossible to manage a complex reality of multiple natural resource based *mawquf* utilizing the natural resources of a state to the multiple *Awqaf* institutions of higher learning within and across the State borders. Let alone the complicated mechanics of transferring a certain amount of Waqf from the movable *mawquf* (running river, flowing steam from geothermal wells) through a common transmission conduit or a flowing asset of a river stream (Izham, Adnan & Aziz, 2014)..

Perhaps in an attempt to overcome the inter-state issue, Yayasan Waqf Malaysia, was created in February 2008 to act as a national-level entity embracing Federal and State Islamic Religious Councils (SIRCs). In essence though, its power is very limited. Its role has become merely for raising public awareness of Waqf and promoting the Waqf concept to be more relevant to contemporary needs. In fact, by law it cannot possibly supersede the "SIRCs of each state that have been legally appointed by their respective legislations to supervise all *Mawquf* assets and be responsible for their development and management" (Mahamood, 2006; Pg. 97).

The sustainable energy resource-based power plant may be a corporate *Mawquf* probably as part of or a subsidiary of the SIRC. The intention is for the resource-based *Mawquf* to be a sole vehicle to finance the higher education sector within and across the state. This may be close to a corporate Waqf financing in Malaysia (such as the Johore based Waqaf An Nur Corporation Berhad) which is “different from the Waqf of shares and equity, it is a full fledged, autonomous corporation and Waqf enterprise itself” (Hashim, M. Ali, 2013). It may be one of the “Islamic reforms in economic and financial institutions in the past 25 years which are followed by very important developments in supporting areas namely in the education and legal spheres” (Haneef, M. A., 2013). However, similar to Zakat, corporate Waqf financing does not have a coherent Islamic economics framework for development (Haneef, M. A., 2013).

### 3. THE INTER-STATE & INTER-GENERATIONAL WAQF CONCEPTUAL MODEL

The current economic theoretical frameworks may have the provision of Waqf in higher education, but the problem is that these are based on the assumptions of mainstream neo-classical economics (Haneef, M.A., 2013). These assumptions may not be in-line with the contemporary Islamic worldviews of moderation or *Wassatiyah* (Hassan, 2011). They may not take into account Waqf beneficiaries who are not just Muslims but also the non-Muslims through the unwritten social contract of Muslims (*Aqd al-Dhimmah*) and non-Muslims (*Aqd al-Musta'man*) in a peaceful multi-religious society (El-Muhammady & El-Muhammady, 2009). In addition, the current economic theory of perpetual resource flows remains constrained by the lack of interest by the affected parties to come into terms for burden sharing of resource production despite certain structural adjustments (Norgaard & Howath, 1991). An approach to this problem may be through a critical look of current economic theories to be based on an Islamic framework. In the case of Malaysia, the approach may also take into account the inter-state issues of how ‘rich’ states could assist ‘not-so-rich or poor states’. At the global level, this approach could be applied to rich OIC nations and not so rich/poor OIC nations. This paper would explore an Islamic economic theoretical framework of inter-state resource-based corporate Waqf financing. It would also examine the attributes of the economic agents, their goals and meanings (Haneef, M.A., 2013). In short, the Islamic purpose of Waqf financing in higher education is “good governance with *Tadbir* and *Adab* encompassing all the elements that are deemed primary and necessary for such governance” (Zaidi & Sani, 2012; Pg. 9).

Public choice involves people’s values and perceptions which are both embedded in their “act-of-giving” or voluntary economy. However, pure altruism may impose heavy investment to present generation for the benefit of future generation which would not be a preferred approach. The Islamic principles of “Economics of Voluntarism” may be relevant to view this problem which has been neglected from GDP, transfer payments and transactions. Yet these economics are from the well beings to equity distribution for the poor and becoming a vibrant Third sector economy provided by spiritual, moral, remunerative and coercive incentives. Although perfect altruism may reduce voluntarism, the Islamic virtues of love, brotherhood, caring, sympathy, benevolence, etc. includes the approaches of *Hibah*, *Sadaqah*, *Waqf*, *Mariyah* (productive asset), *Qard al-Hassan* in the 3rd-sector economy model of Voluntarism (Arshad, 2014).

As an initial conceptual study, a 2-State dynamic mathematical model of Inter-State and inter-generational Corporate resource-based Waqf burden sharing is proposed. The dynamic Waqf simulation model between multi-sources of *mawquf* and multi-receptors would be used to formulate the Waqf transfer function. The Waqf wealth may presumably flow between states with inter-state burden sharing factored in with State costs such as resource premiums and transfer charges as part of its governance by the SIRC's as shown in the Inter-State Dynamic Waqf Simulation model for hypothetical State A and B in Figure 1 below.

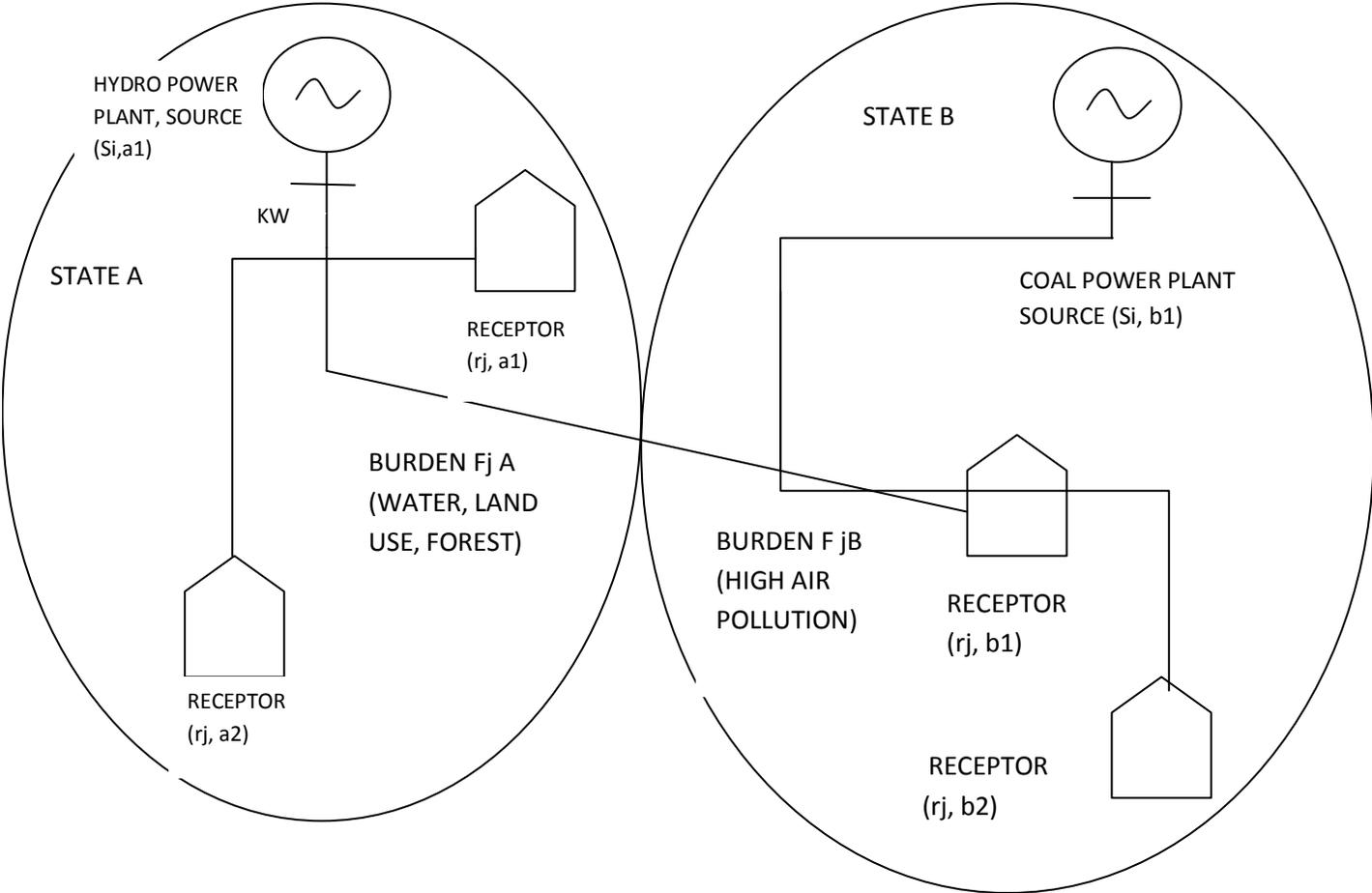


Figure 1. Conceptual Model of 2-State Inter-State Waqf Dynamic Flow

The objective function of the Inter-State resource-based Corporate Waqf model above is the maximization of Waqf flow ( $Kr$ ) to the receptor between the source ( $Si$ ) and the corresponding receptor ( $rj$ ) by modulating the source burdens ( $Fj$ ) to be shared between State A and State B respectively. An optimal Waqf Transfer Function ( $Cij$ ) may be discovered with maximization of objective function of the model being achieved. This is illustrated in the Figure 1 above. State A has a hydropower plant *mawquf* as a source ( $Si, a1$ ) to two within State A Receptor ( $rj, a1$ ) and Receptor ( $rj, a2$ ).

az) and to State B Receptor ( $r_j, b1$ ). At the same, time State B has a coal-fired power plant *mawquf* as a source ( $S_i, b1$ ) with State B Receptor ( $r_j, b2$ ). State A has the burden ( $F_j, A$ ) of utilizing water, land and forests in order to harness the hydro resources to produce electricity. Whereas State B bears the burden of high air-pollution ( $F_j, B$ ). Burden sharing could be State A reciprocating to State B (e.g.,  $1 - (F_j, A)/(F_j, B)$  or  $1 - (F_j, B)/(F_j, A)$ ).

As shown in Fig. 1 above,  $(Kr)$  is the at the receptor,  $(C_{ij})$  is the corporate Waqf transfer function that translates the costs of resource at source ( $S_i, a1$ ) in State A (that include the costs of State A premiums for water use, land conversions, forest revenue, ownership transfers, etc.) into the costs of burden/equity to be shared by receptor ( $r_j, b1$ ) in State B. These are factored into the costs of corporate Waqf financing for higher education to the receptors. That is, the receptors may receive the nett amount Waqf flow after subtracting these costs.

In this context, an Islamic economic theoretical framework of resource-based corporate Waqf financing is explored for cost-effective allocation of Waqf by optimizing the burdens of responsibility amongst the inter-State sources and resources that can be represented by the equation 1.1 shown below [Tietenberg, T., 2006];

$$Kr = \{\sum(C_{ij} \cdot F_j) + B\} \quad \text{[Equation 1.1]}$$

The number of receptors  $r$  can be 1, 2, 3, ...j. The source  $i$  may have to bear the burden that incorporates its effect on all receptors. Various Islamic economic concepts such as *Al-Hisbah* (Adminstrating public interest) (Ibn Taimiyyah) and *Al-Adalah* (Justice), *Al-Khayr* (Fairness, Equity), *Adab Tadbir* (Good Governance) etc., that depict an Islamic economic worldview may be applied to optimize  $F_j$ , or the burden/equity to be shared by receptors  $i$  and  $j$ .

A civil society of voluntarism and altruism may affect government policy as both are for the public good. If you give incentives will people be altruistic? How do you make people to participate? Perhaps a heterogeneous model of equilibrium and simulation, of voluntarism and altruism. Perhaps too, *Maqasib Shariah* may improve the 'act of giving' (Mohd. Ghani, 2014). As such, distortions of voluntarism economics may include *burdens of lack of educational management, diversionary Waqf commitment of rich families, misunderstanding of Waqf, poor acceptance and marketing, negative perceptions and poor leadership* will be investigated for optimization of equitable value of Waqf funds across generations such as poor/rich populations and present/future societies.

The inter-generational model would need to attain the 'fair' marginal user costs based on societal, political and environmental externalities. The 'fair' level may be attained by new approaches in determining the equilibrium between sources and receptors. Fairness concern on the future generation with the allocation of Waqf funds over time may maximize the present value of the benefits obtained. Adapted from altruistic economics (Stephan, G. & Muller-Furstenberg, G., 1999), the additional costs of societal damages to future society such as environmental disaster, economic depression, etc. would create the marginal Waqf receptor costs. In an economic efficient Waqf fund the additional receptor costs for each period would be the difference between the economic value and marginal receptor costs. This economic efficiency factor may be represented by discount rates (dR) for low and high risk profiles that may define the future worth (e.g., less worth if discounted heavily) in balancing the future and present Waqf fund use.

This can be illustrated in Equation 1.2 below, by the effects of different scenarios of future generations on how the economic efficiency of Waqf funds would respond to changes in the marginal costs to society. As described in equation 1.2 which computes the economic efficiency of Waqf ( $\epsilon_w$ ) where the additional marginal receptor cost ( $\Delta RC$ ) is a function of the difference between economic value of Waqf funds ( $mE_w$ ) and marginal receptor costs ( $mRC$ ), the discount rate ( $dR$ );

$$\epsilon_w = (\Delta RC) f\{mE_w, mRC\} / dR \quad (\text{Equation 1.2})$$

The initial economic efficiency of Waqf Funds ( $\epsilon_w$ ) may be lower for conventional means of creating human capital of present generation due to high marginal receptor cost ( $mRC$ ) perhaps from high social costs of higher education. It may be discounted lower ( $dR$ ) if there is less risks of social change despite the high costs but high standard of higher education. A transformation scenario of self-sustainable future generations may attain a higher economic efficiency of Waqf Funds with lower marginal receptor costs ( $mRC$ ) with almost no social costs. However, the future may be discounted higher ( $dR$ ) (Norgaard, R.B. & Howarth, R.B., 1991) due to the risks of social instability or an unproven transformation plan of higher education.

#### 4. METHOD

Multi-sources and multi-receptors of selected states and their reactions to the burden-sharing on resources of land, water and forest products between states form the basic stakeholders of this paper. The method would be to initially estimate voluntary 'act of giving' in the Islamic theoretical framework for corporate Waqf financing. This would involve using a conceptual model for inter-state utilization of natural resources and resource-based Waqf financing for higher education.

The method of scenario analysis is used because of uncertainty and long period of legislative process before the *mawquf* of an intended asset or the Waqf amount is transferred. The discovery of the corporate *Waqf transfer function* and the *optimum burden sharing* between states may contribute to the development of perpetual resource based corporate Waqf;

- Scenario A: The amount of Waqf from the assigned *mawquf* will be counted into the amount of Waqf to be transferred from the Source ( $S_i, A$ ) in State A. Assuming that there is no burden to be shared  $F_i=0, F_j=0$  between the States A and B., thus the Waqf transfer function  $C_{ij} = 0.05$  is minimal, Receptor amount  $r_j=0$ , the value of Waqf ' $Al-Amm=0$ '; The objective function  $C_{ij}$  reflects the true value of the *mawquf* available.
- Scenario B: Applying the Principles of *Al-Hisbah* only some of the receptors in State B may be eligible for the amount ( $K_r$ ) to be transferred to them inter-State from Sources ( $S_i, A$ ) in State A. The burden to be shared will be at Source ( $S_i, A$ ).
- Scenario C: Without applying *Al-Hisbah*, all the receptors are opened for Waqf transfer function regardless of their status, with some within State A and others State A. The Waqf transfer amount may reflect maximum/minimum transfer of Waqf that is transferrable to the beneficiaries in the receptors.

The objective function (Kr) for each scenario may differ and they are used to determine optimality of the burdens to be shared.

The issues of -generational waqf financing will include inter-generational model for resource-based Waqf; Altruism, marketing and promotion of Waqf ; *al-waqf al ahli* or *al-waqf al-dhurri* of inter-generational rich/poor families; inter-generations of rich/poor students, communities Waqf; Inter-generational Waqf management for higher education; human resource and leadership in higher education Waqf.

In this paper inter-generational scenario analysis based on those issues will be investigated. This is the study on the additional Waqf receptor costs future scenarios of higher education students' population. These costs may include the marginal receptor costs of;  $mRC_i = \text{burdens of lack of educational management}$ ;  $mRC_j = \text{diversionary Waqf commitment of rich families}$ ;  $mRC_k = \text{poor acceptance and marketing}$ ;  $mRC_l = \text{poor human resource and leadership}$ .

The economic efficiency of Waqf fund is attributed to the additional receptor costs for each period and the difference between the economic value of Waqf and marginal receptor costs of higher education to students.

The effects of different scenarios of future generations of students in higher education on how the economic efficiency of Waqf funds would respond to changes in the marginal costs to society reflected by the Social Discount Rate (SDR) which is a summation of the factorial marginal costs above that is, as shown in equation 1.3;

$$SDR_{sc} = \sum_{sc} mRC (i, j, k, l) \quad \dots\dots\dots \text{Equation 1.3}$$

The objective function (SDR) of the Inter-generational Corporate Waqf model for higher education is the minimization of marginal costs to Waqf funds reflected by the SDR in equation 1.2 above, where sc = scenarios of future generations of students, an i, j, k and l are the marginal costs of educational mismanagement, family disputes, poor marketing and poor human resource planning respectively. Thus an optimal economic efficiency for future inter-generational corporate Waqf funds may be discovered if such minimum objective function is attained.

## 5. RESULTS

Scenarion A: Receptors = 0, Waqf Function  $\rightarrow$  0, Burden Sharing  $\rightarrow$  0  
Objective Function = RM 62.26 million/year

2. WAQF FROM SALES OF ELECTRICITY			Source i	Receptorj	Cij	Fj	Kr
2.1. MAWQUF Hydro 1 (4 sen/kwh)		mw	rm				
a. PLANT A (3000jam/tahun)		100	12000000	0	0.05	0	600000
b. PLANT B (3000jam/setahun)		30	3600000	0	0.05	0	180000
c. PLANT C (3000jam/setahun)		20	2400000	0	0.05	0	120000
d. PLANT D (6000jam/setahun)		30	7200000	0	0.05	0	360000
2.2. MAWQUF Thermal (7 sen/kwh)							
a. MAWQUF Coal (8000jam/tahun)		1000	5.6E+08	0	0.1	0	56000000
						YearlyTotal	62260000
						Jumlah tempoh hayat	

Scenario B: *Al-Hisbah* applies to State B Receptors = 3, State A Receptors = 2, Waqf Function → 0.3, Burden Sharing → 0.2 (Hydro), Burden Sharing → 0.35 (Coal) Objective Function = RM 168 million/year

FORECAST OF RESOURCE-BASED CORPORATE WAQF							Waqf trf	Burden	Waqf
			rm	Receptorj	function	sharing		setahun	
1. JUALAN BEKALAN AIR OLIH LAP			1E+08	0	0.05	0		5000000	
2. JUALAN TENAGA ELEKTRIK TNB & IPP			Source i	Receptorj	Cij	Fj		Kr	
2.1. MAWQUF Hydropower (4 sen/kwh)		mw	rm						
a. PLANT A (3000jam/tahun)		100	12000000	0.15	0.3	0.2		3600000	
b. PLANT B (3000jam/setahun)		30	3600000	0	0.05	0.2		180000	
c. PLANT C (3000jam/setahun)		20	2400000	0	0.05	0.2		120000	
d. PLANT D (6000jam/setahun)		30	7200000	0.15	0.4	0.2		2880000	
2.2. MAWQUF Steampower (7 sen/kwh)									
a. COAL PLANT (8000jam/tahun)		1000	5.6E+08	0.1	0.3	0.35		1.68E+08	

Scenario 3: No *Al-Hisbah* applied State B Receptors = 5, Waqf Function → 0.3, Burden Sharing → 0.5 (Hydro), Burden Sharing → 0.35 (Coal); Objective Function = RM 125 million

2. SALES OF ELECTRICITY		Source i	Receptorj	Cij	Fj	Kr
2.1. MAWQUF Hydropower (4 sen/kwh)	mw	rm				
a.PLANT A (3000jam/tahun)		100	12000000	0.15	0.3	0.5 3600
b.PLANT B (3000hrs/year)		30	3600000	0.18	0.3	0.5 1080
c.PLANT C (3000jam/setahun)		20	2400000	0.25	0.3	0.5 7200
d.PLANT D (6000jam/setahun)		30	7200000	0.15	0.3	0.5 2160
2.2. MAWQUF Steampower (7 sen/kwh)						
a. COAL-FIRED PLANT (8000jam/tahun)		1000	5.6E+08	0.2	0.2	0.35 1.12E+09
					Jumlah setahun	1.25E+09
					Jumlah tempoh hayat	

Scenario 1: developed society, Scenario 2: developing society, Scenario 3 = authoritarian society; Inter-State Sources A, B, C, D and E

TABLE 1. Effects of Marginal Costs<sup>1</sup> to Waqf Values (in Ringgit Malaysia)

Inter-Generational Waqf for Higher Education				
InterState Transfer	Scenario1	Scenario2	Scenario3	
250 SDR	0.01	0.1	0.15	
mRCi	0.005	0.05	0.05	
mRCj	0	0.025	0.05	
mRCk+l	0.005	0.025	0.05	
108 SourceA	106.9307	98.18182	93.91304	
5.4 SourceB	5.346535	4.909091	4.695652	
3.6 SourceC	3.564356	3.272727	3.130435	
86.4 SourceD	85.54455	78.54545	75.13043	
1120 SourceE	1108.911	1018.182	973.913	
Waqf				
Value	1310.297	1203.091	1150.783	

<sup>1</sup>Marginal Costs: mRCi= burdens of management, mRCj=commitment of rich families, mRCk=poor acceptance, mRCl = poor human resource

## 6. DISCUSSIONS

The results indicated the minimization and maximization of the objective functions of available Waqf Flow from State A to State B with the increase in burden sharing and effects of applying *Al-Hisbah*. When burden sharing is none with no receptors (beneficiaries), the Waqf Flow is about RM 62 million. When burden sharing between State A and State B increases to 0.2, with the application of *Al-Hisbah* on the three State B receptors, objective function of Waqf Flow becomes RM 168 million. However, when burden sharing increases further to 0.5 with no *Al-Hisbah* applied to 5 State B receptors, the objective function decreased to RM 125 million. This indicates that an optimal level of burden sharing can be achieved by modulating the burden sharing and the application of *Al-Hisbah* in selecting State B receptors. The effect of State B receptors is the high costs of State A premiums and transfer costs.

The motivation of using Islamic Principles such as *Al-Hisbah* is to maximize efficiency of Awqaf institution is mainly for social welfare and the development of the society as a whole; hence, it is generally seen as a non-profit institution. The non-profit activities require the initial asset to generate an income stream and only the income portion over and above the initial sum can be used for benevolent activities. *Al-Hisbah* is the proper administration of the benevolent activities which can cover health, education and research activities, economic and socio-economic projects, provision of infrastructure facilities, public utilities and goods. Using *Al-Hisbah*, initial assets of inter-state corporate Waqf that generates income for the benefit of the public need to be selective for beneficiaries across the State boundaries. Some beneficiaries may incur high costs of inter-state transfer and premiums that could reduce the net Waqf flow across the State border.

The scenarios of future student population generations are based on the political-economic status of the nation. The results in Table 1 showed that under Scenario 1 of a developed nation student generation the social discount rate  $SDR = 1\%$  is contributed by the marginal costs of management, acceptance and human resources assuming that institutional altruism is drastically reduced while voluntarism of rich family waqf is largely increased with no marginal costs. In Scenario 2 of a developing student generation for the nation,  $SDR = 10\%$  comes from the marginal costs of management, family, acceptance and human resources. The marginal costs contribution of voluntarism of rich family waqf or *Waqf Dhurri*, is expected to increase significantly as rich families are less in charity giving for a developing student generation. Other marginal cost contributions are from management, acceptance and human resource. On the other hand, the marginal costs contribution increased significantly for student generation under an authoritarian or militaristic society with  $SDR = 15\%$ .

The objective functions or the Waqf value are shown to have reduced from RM 1301 million from student generation in developed status scenario to RM 972 million for student generation under authoritarian scenario. The inter-generational maximization of Waqf values for financing students of higher learning is shown to be dependent on minimizing the marginal costs.

A preliminary finding is reported in this paper on the conceptual inter-generational Waqf model for financing student generations of higher education. The behavior of altruism and voluntarism in different generations need to be studied further looking from Islamic perspectives. The *maqasib shariah* principles can be further investigated to further minimize the marginal costs.

## 7. CONCLUSION

This paper reports a preliminary finding of a conceptual inter-state Waqf model for financing higher education institutions within an across the states. There is a need to study more details of Inter-State model such as the social and environmental accounting flows and the *maqasib shariah* of burden sharing. The true dynamic inter-state model will be based on the real-time inter-state power systems analysis that has been used to determine optimal pricing. The Islamic principles of *Al-Hisbah*, *Al-Adalah*, *Al-Khayr* need to be studied further so that Waqf flows to finance the appropriate higher education institutions can be efficient and effective. It would then become an important component of the fair and just redistributive system in the Islamic socio-economic order.

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