Success Factors of ITC in Enhancing the Knowledge and Skills of Rural School Students by Leveraging Quadruple Helix Model Collaboration: Empirical Findings

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Abstract: **This paper is to gather some findings on the outcome result from the enhancing the knowledge and the skills of rural school students by harnessing on capabilities of information and communication technology (ICT) via Islamic Transformation Centre (ITC). There are few focused areas and targeted groups of stake holders been collaborated to get the successful result. The important area focuses are mainly on the availability of information and communication technology tools to the rural schools in Malaysia. This will be in collaboration with the "whole-of-government"(WoG) concept of information and communication technology (ICT) implementation across the schools in Malaysia mooted by Ministry of Education (MOE) and Ministry of Rural and Regional Development (MORARD) in understanding the plans and executions method to benefit the development of the rural schools in Malaysia. The paper is based on literature review, adopting the business model canvas (BMC) framework in building a conceptual solution for knowledge and skill development of the rural schools children. This paper explores the important collaboration of Quadruple Helix Model (QHM) in integration of Government, University, Industry and Citizen ICT infrastructure for education in rural schools, and the success rate of it.**

Keywords: **Islamic Transformation Centre (ITC), Knowledge, skills, rural school students,** *Quadruple Helix Model (QHM)***, Stake Holders.**

I. INTRODUCTION

There are researchers, academic practitioners, politicians and entrepreneurs in Malaysia who are focusing on the government transformation programs especially on RTC [1] into how it accommodates their needs and brings success to the Rural Transformation Centre (RTC) establishment. This paper is focus purely on the roles of ITC in enhancing the knowledge and skills of rural school students by harnessing on capabilities of Information Communication Technology (ICT) and leveraging on Quadruple Helix Model (QHM) collaboration [1]. This suggested program synergize with the Whole of Government (WoG) concept implementation where related government agencies collaborate to achieve the common goals of enhancing the knowledge and skills of rural school students [8]. QHM is an innovative implementation concept where the Government, University, Industry, and Citizen collaborate in achieving a common goal [7].

This studies also discuss the current ITC policies in rural areas and how its impact the school students. The strength, weaknesses of current system and the future plan should be analyzed in detail for the improvement. In particularly the focus will be on the RTC that could help in improving the skills and the knowledge of the rural school students mainly with the collaboration of Network of Mosque (NOM) in setting up on stop centre for the students, teachers, volunteers, Subject Matter Experts (SMEs) and professionals to contribute for the improvement of the rural students knowledge and skills [1]. RTC implemented by the government of Malaysia brings a unique opportunity for members of the rural

communities to benefit from a myriad of initiatives and activities related to their livelihood and wellbeing within the same premises [9]. The study's results are outlined base on the survey questions to the target group of people base on BMC [1]. The customer segments are Rural School Student, Teacher and SMEs [1]. The survey question been conducted separately base on their level of requirements. Value proposition Design (VPD) model is used to gather the pain and gain of these customers. Finally, the paper concludes with the implications of the study, limitations, and suggestions for future research. This paper also investigates the main barriers in implementing technology and ICT in Islamic Education teaching and learning [1].

II.   PROJECT BACKGROUND

Malaysia is divided into Peninsular Malaysia and East Malaysia which is also known as Sabah, Sarawak. State of Sabah and Sarawak are classified as a highest rural population in Malaysia [1] [10]. There are many programs, initiatives and activities been introduced by government of Malaysia, for better development and wellbeing of the people in rural location. The areas of development that been initiated were Basic Infrastructure; Improving Service Delivery; Intensifying Economic Activities, Promoting Entrepreneurship, Empowering Community and Modernize Teaching [1] [10] [12]. This paper studies is about the on how to develop with existing infrastructure as a stepping stone for rural development base on Malaysian government programs and initiatives. One of the initiative by government of Malaysia is RTC, implemented under the National Blue Ocean Strategy 4 (NBOS4), is a site to implement some integrated initiatives for the rural communities within 100 kilometre radius of the site. There are eight major initiatives under the RTC implementation programmes [1] [3] [5]. The implementation of these initiatives is led by various ministries with the support and cooperation from other relevant ministries. Under the initiative of skills training for rural population, The Ministry of Rural and Regional Development (KKLW) provides training opportunities to rural communities with the objective of enhancing their knowledge, skills and abilities [1] [3].

This paper explains the systematic and theoretical analysis of the methods applied. All theoretical analysis and principles associated with this branch of knowledge discussed. The QHM as shown in Figure 1 below, explains on how the collaboration of different agencies through WoG concept and NOM. WoG is an approach were bringing together of Government sectors, Industry and Private sectors, Institutions and finally the Rural Citizens. The best place that can be implemented is through RTC with the existing 2 initiatives of government; training of rural population and university cooperation. Since the collaboration of universities, the formal students of those institutes can contribute their selves to provide education to rural students at RTC one-stop knowledge [1]. The Business Model Canvas (BMC) [1] is a strategic management and lean start-up template for developing new or enhancing existing business models. A BMC has 9 essential components: Customer Relationship, Customer Segments, Channels, Value Proposition, Key Activities, Key Resources, Key Partners, Cost Structure, and Revenue Streams.

Figure 1: QHM Model

III. RESEARCH METHOD

A combination of data collection base on Value Proposition Design (VPD) [2] is a plug of the Business Model Canvas [1]. It helps to project, test and build the business Value Proposition of customers in a more structured and reflective way, as the Business Model Canvas [1] helps you during the process of design of Business Model. VPD is divided into 2 categories: Value Proposition and Customer Segment as Figure 2, to describe them in more detail are thru the this studies to project in the best way the business Value Proposition to solve problems, difficulties and needs of customers that been chosen or target from the BMC [1]. The three customer segments that been evaluated base on BMC [1] are rural school students, teachers and subject matter experts [1]. The survey has been conducted by emailing the questionnaire to them. The finding has been tabulated and discussed as Figure 3 for Students, Figure 4 for Teachers and Figure 5 for SMEs
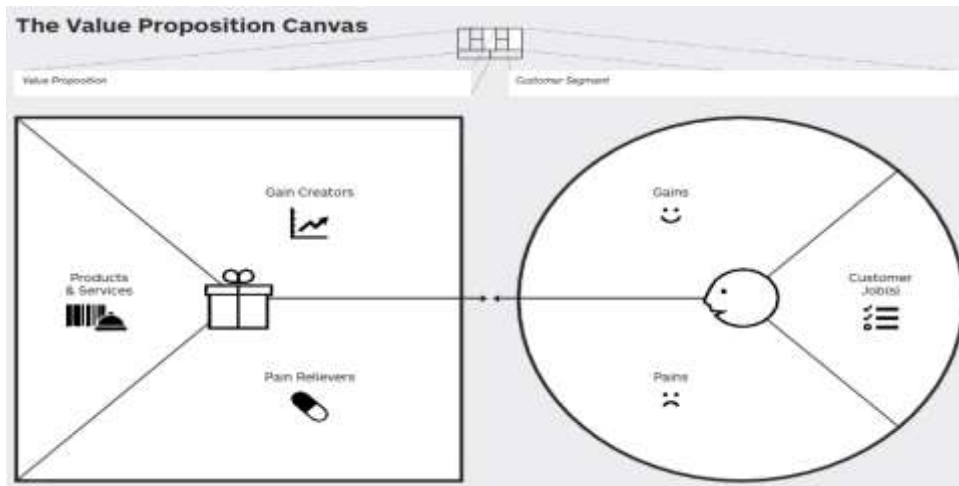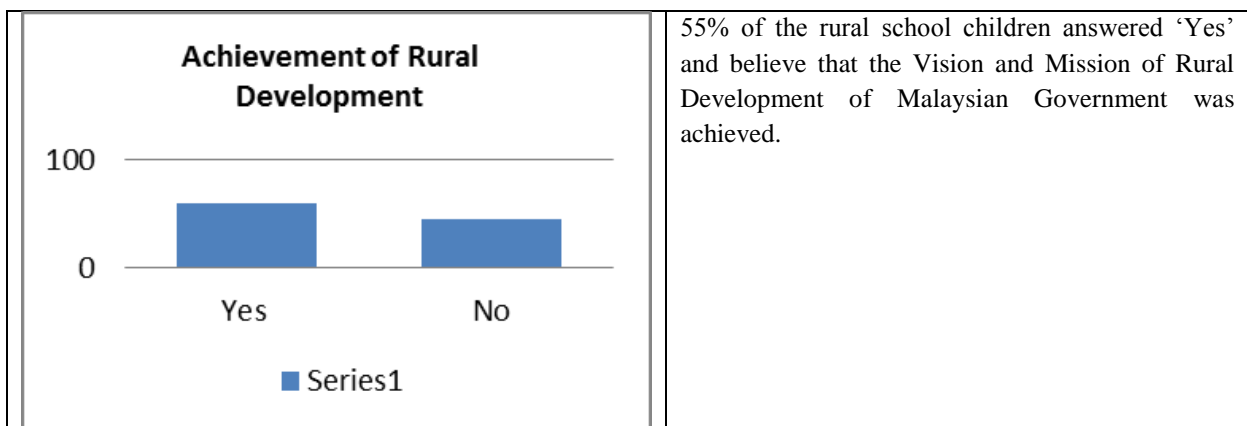

Figure 2: Value Proposition Design

IV. DATA ANALYSIS AND DISCUSSION

There were a few sets of questionnaire-based survey conducted in collecting data for this study. The population sample consists of three groups of different level in Malaysia as per BMC [1]. There were 30 out of 40 Rural School Students; 20 out of 40 Rural School Teachers and 15 out 40 Subject Matter Experts (SMEs) who answered this questionnaire. This population was chosen because of their important values, roles and contributions that are required in this study. All the items in the instruments were developed and adapted based on several literature reviews on critical success factors on implementation domain. The target populations and findings are such as:-

A. Analysis of Rural School Students:

1. What according to you is the Vision and Mission of Rural Development of Malaysian Government was achieved?

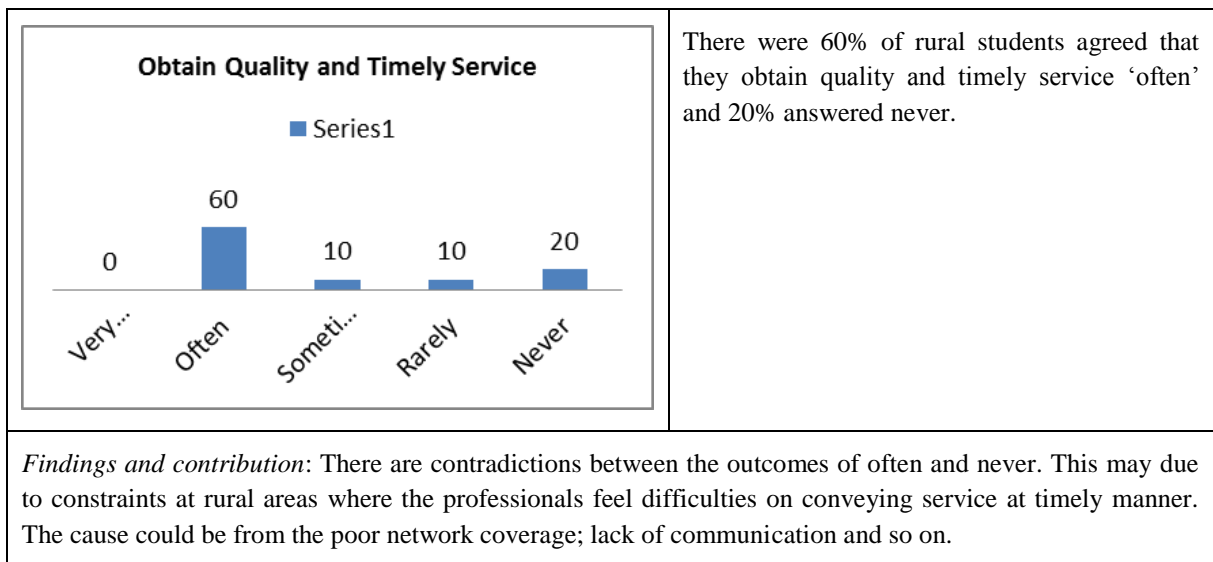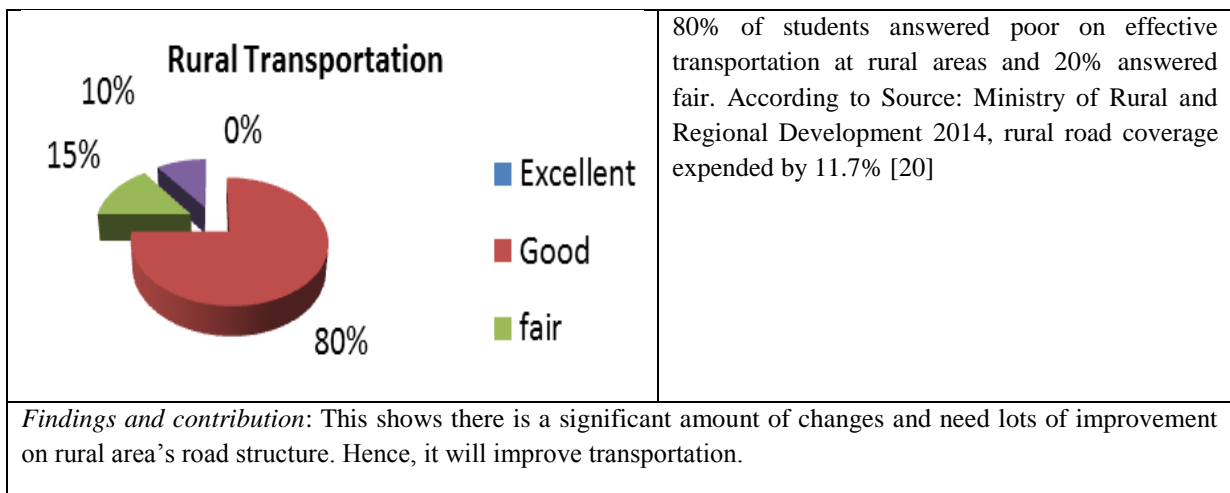|	
	55% of the rural school children answered 'Yes' and believe that the Vision and Mission of Rural Development of Malaysian Government was achieved.
Findings and contribution: The percentage shows that government contribution does not reach rural areas at satisfactory level.	

2. Skills: How good the capabilities and competencies that exist within local citizens (teachers, subject matters experts, SMEs) to rural school children?

	There are 50% of students are satisfied. These shows the skills that obtained by the tutors are only at satisfactory level.

Findings and contribution: There should be more training for staffs and tutors to improve themselves.
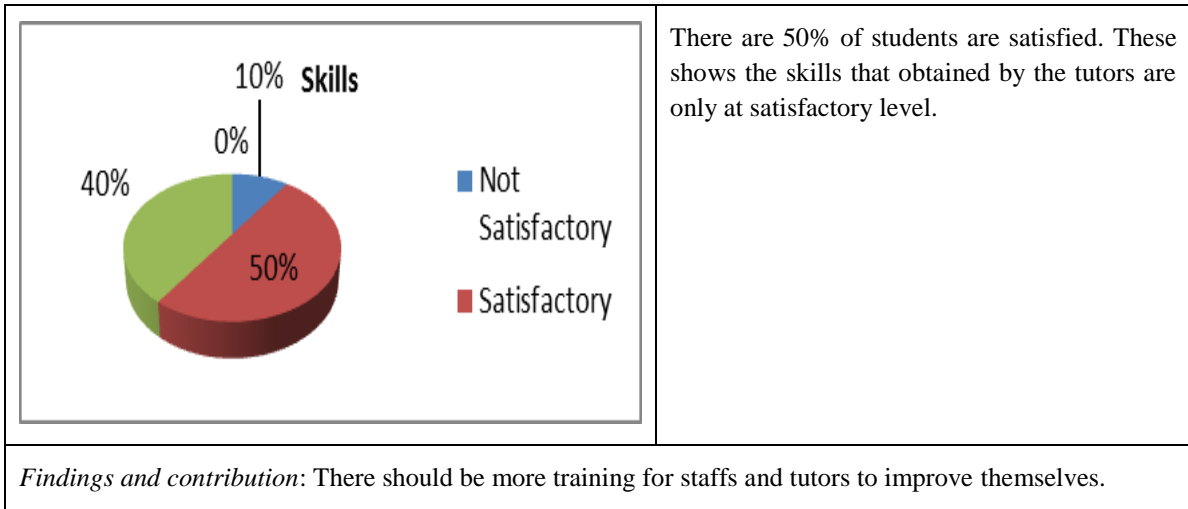
3. Process Management: How effective are the processes in delivering quality and timely service?

	There were 60% of rural students agreed that they obtain quality and timely service 'often' and 20% answered never.

Findings and contribution: There are contradictions between the outcomes of often and never. This may due to constraints at rural areas where the professionals feel difficulties on conveying service at timely manner. The cause could be from the poor network coverage; lack of communication and so on.

4. Transportation: How effective the transportation at rural areas?

	80% of students answered poor on effective transportation at rural areas and 20% answered fair. According to Source: Ministry of Rural and Regional Development 2014, rural road coverage expended by 11.7% [20]

Findings and contribution: This shows there is a significant amount of changes and need lots of improvement on rural area's road structure. Hence, it will improve transportation.

5.   Resources: Please rate the resources such as teaching materials and IT infrastructure availability at rural areas?
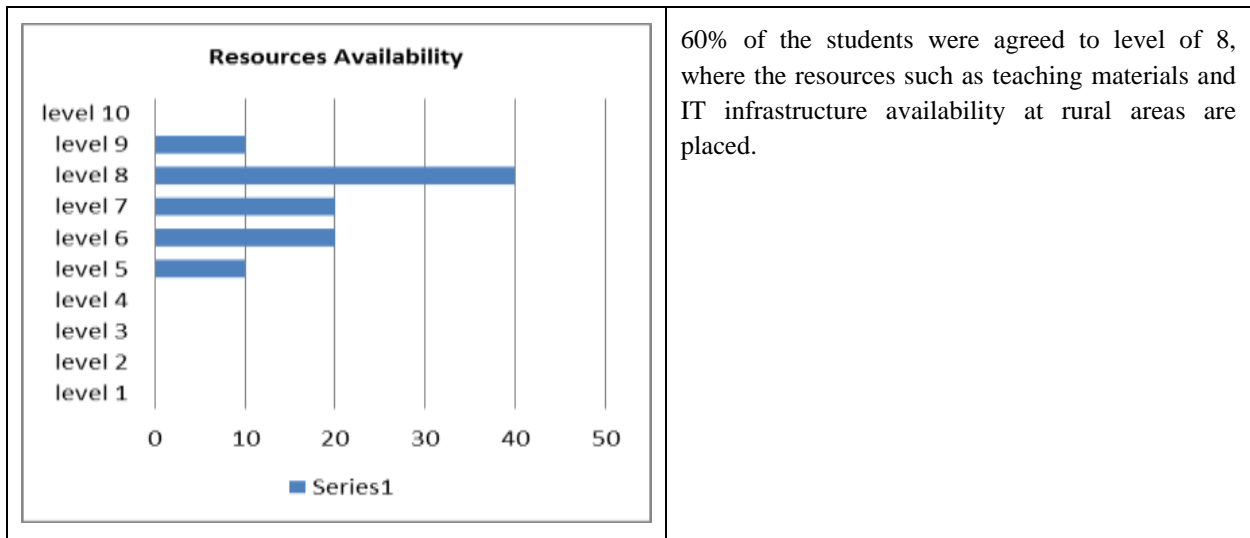
	60% of the students were agreed to level of 8, where the resources such as teaching materials and IT infrastructure availability at rural areas are placed.

Findings and contribution: IT infrastructure availability at rural areas is in place. However, it should be improved by *the "whole-of-government" (WoGs) concept of information and communication technology (ICT) implementation across the schools in Malaysia mooted by Ministry of Education (MOE).*

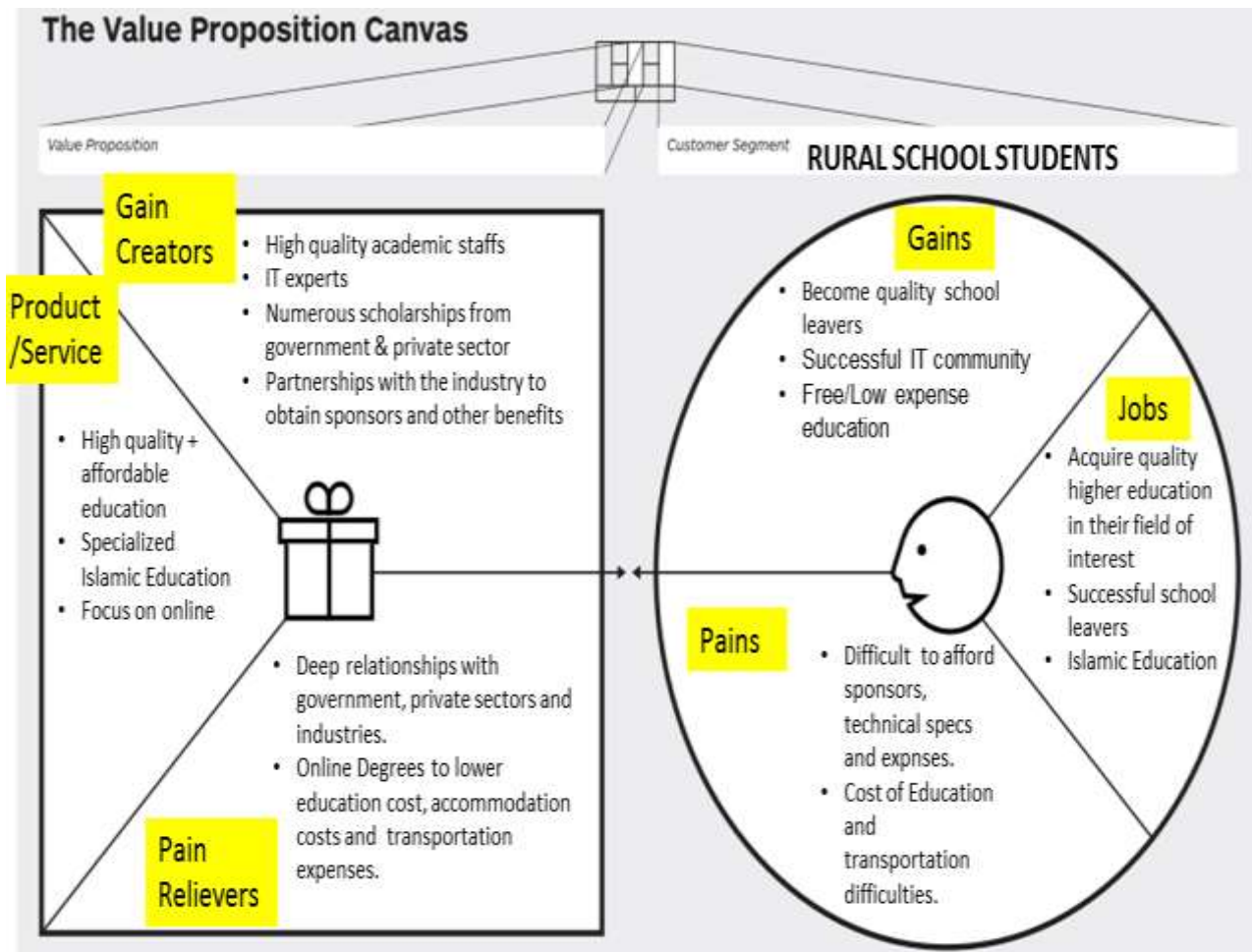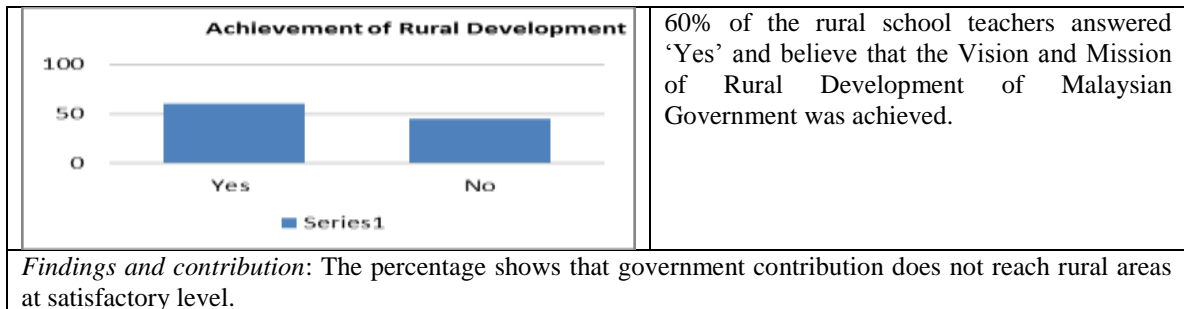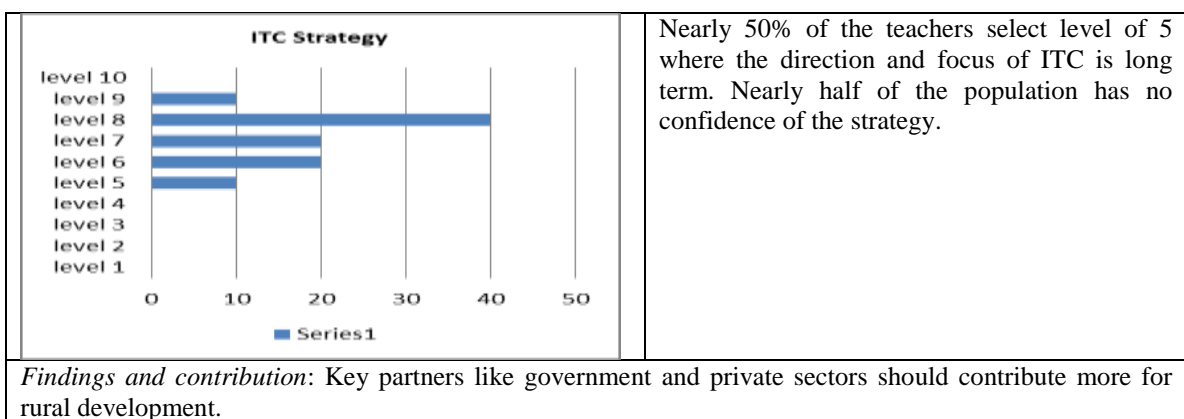- **The Value Proposition Canvas for *Rural School Students* as follows:**

Figure 3: Value Proposition Canvas for *Rural School Students*

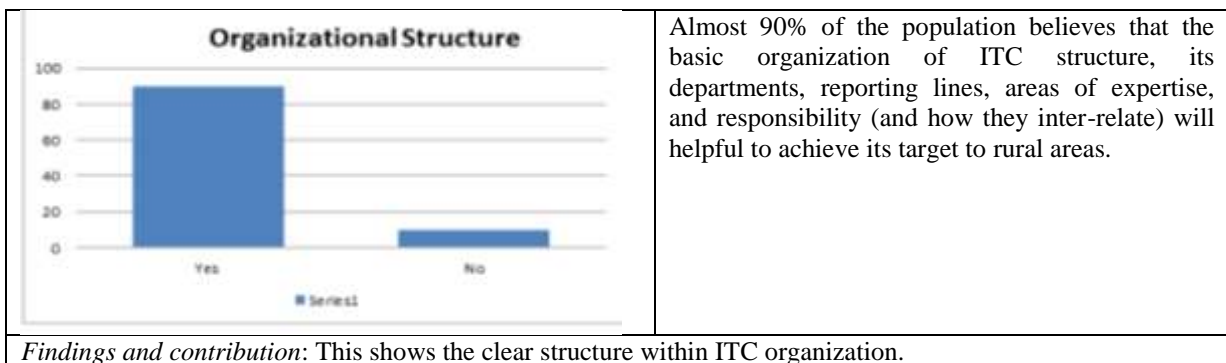**B. Analysis of Rural School Teachers:**

1. What according to you is the achievement of Vision and Mission of Rural Development of Malaysian Government is achieved?
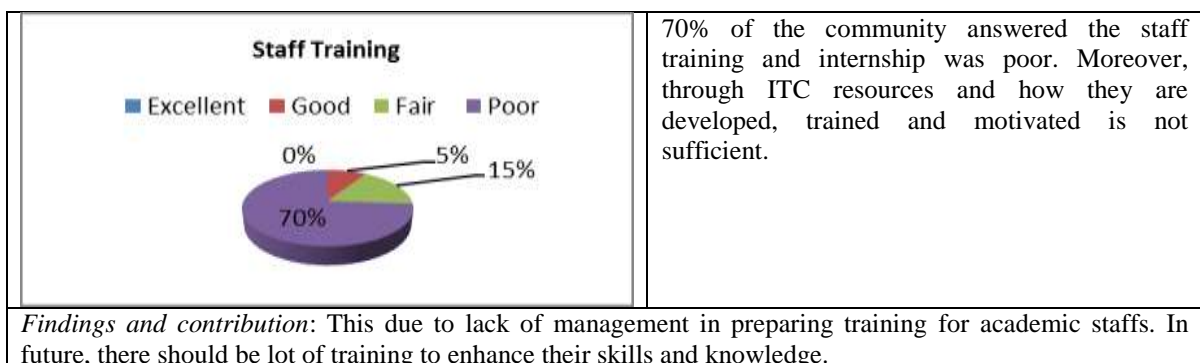
	60% of the rural school teachers answered 'Yes' and believe that the Vision and Mission of Rural Development of Malaysian Government was achieved.
Findings and contribution: The percentage shows that government contribution does not reach rural areas at satisfactory level.	

2. Strategy: Are the direction and focus of ITC over the long term?

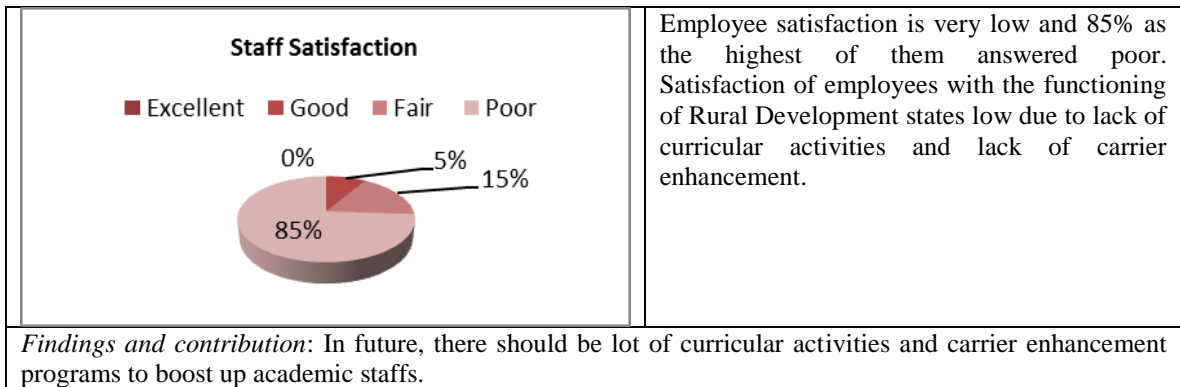|	
	Nearly 50% of the teachers select level of 5 where the direction and focus of ITC is long term. Nearly half of the population has no confidence of the strategy.
Findings and contribution: Key partners like government and private sectors should contribute more for rural development.	

3. Structure: The basic organization of ITC, its departments, reporting lines, areas of expertise, and responsibility (and how they inter-relate) will helpful to achieve its target to rural areas?

	Almost 90% of the population believes that the basic organization of ITC structure, its departments, reporting lines, areas of expertise, and responsibility (and how they inter-relate) will helpful to achieve its target to rural areas.
Findings and contribution: This shows the clear structure within ITC organization.	

4. Staff: ITC resources and how they are developed, trained and motivated is sufficient?

	70% of the community answered the staff training and internship was poor. Moreover, through ITC resources and how they are developed, trained and motivated is not sufficient.
Findings and contribution: This due to lack of management in preparing training for academic staffs. In future, there should be lot of training to enhance their skills and knowledge.	

5. Employee satisfaction: How satisfied are the employees with the functioning of Rural Development?

Staff Satisfaction ■ Excellent ■ Good ■ Fair ■ Poor 0% 5% 15% 85%	Employee satisfaction is very low and 85% as the highest of them answered poor. Satisfaction of employees with the functioning of Rural Development states low due to lack of curricular activities and lack of carrier enhancement.

Findings and contribution: In future, there should be lot of curricular activities and carrier enhancement programs to boost up academic staffs.

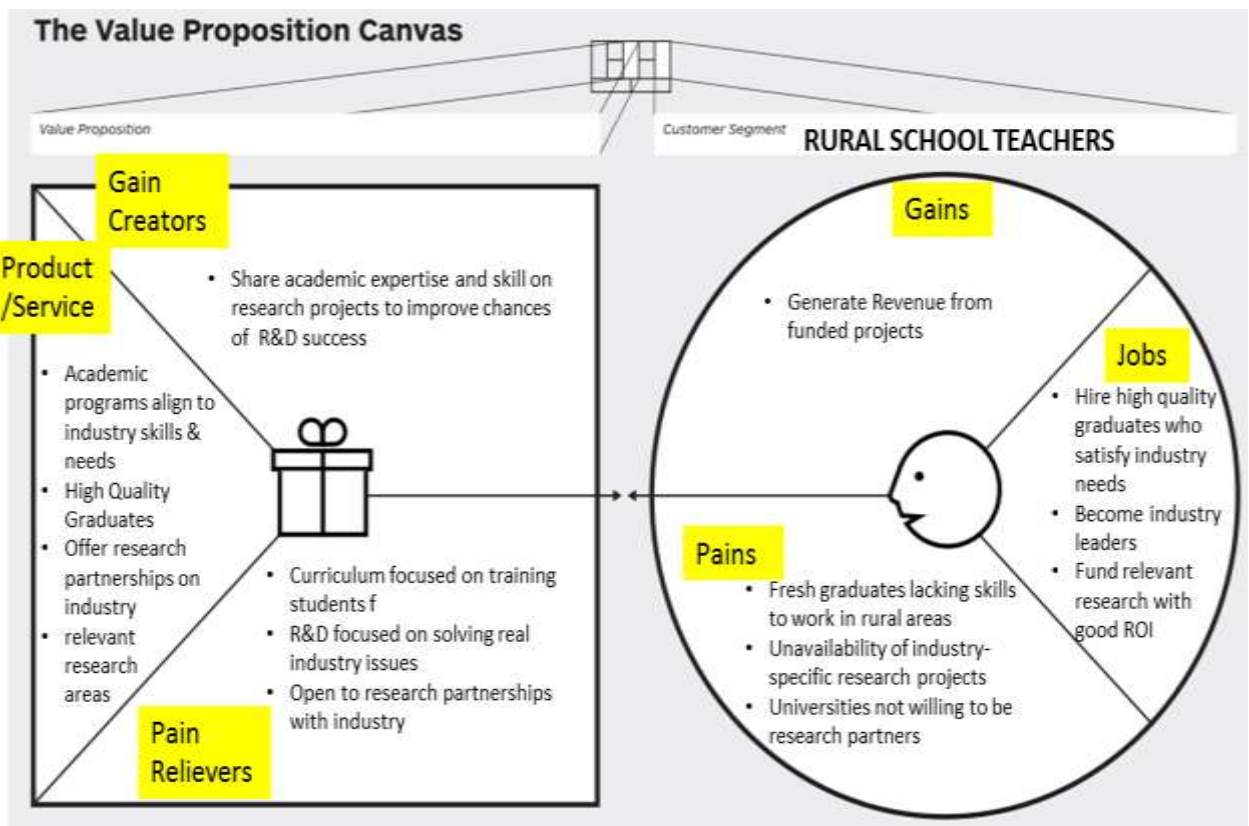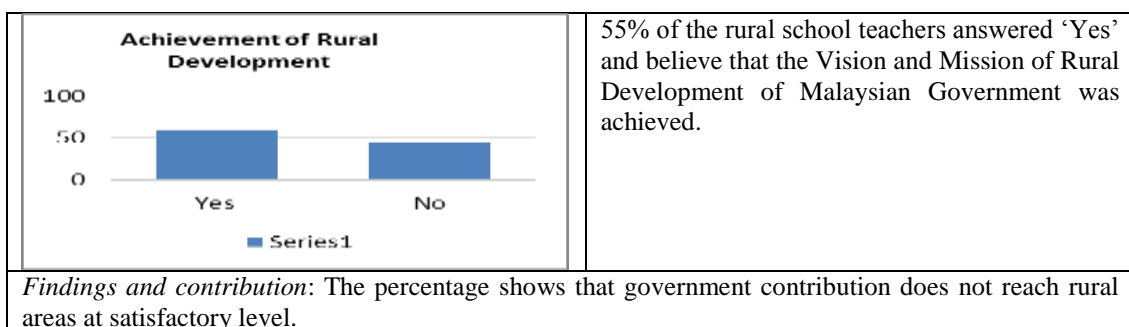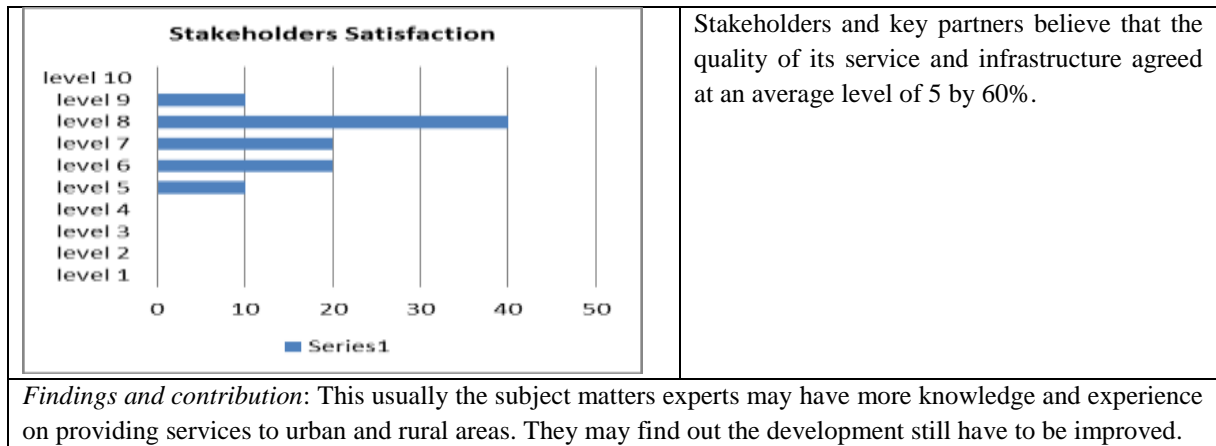- **The Value Proposition Canvas for *Rural School Teachers* as follows:**

Figure 4: Value Proposition Canvas for *Rural School Teachers*
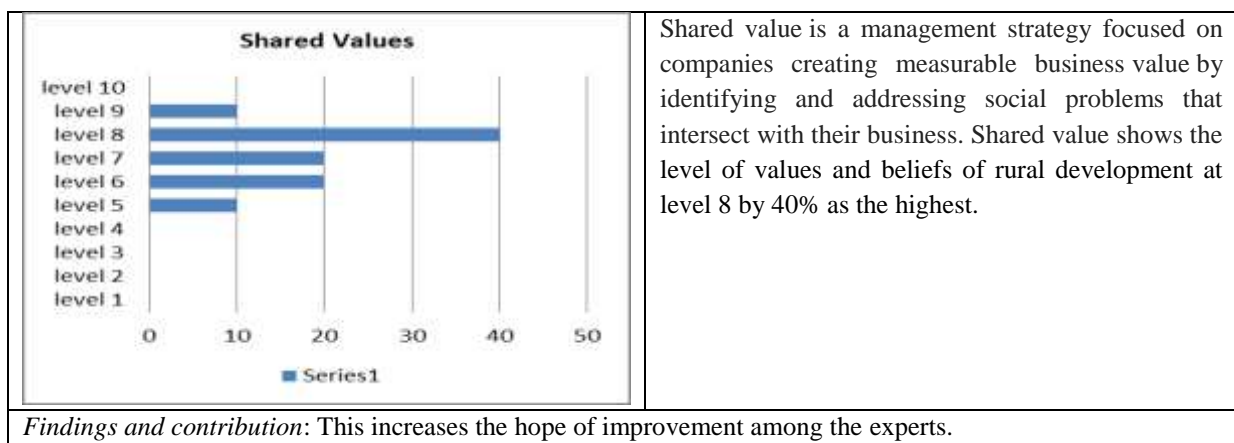
C. Analysis of Subject Matter Experts (SMEs):

1. What according to you is the achievement of Vision and Mission of Rural Development of Malaysian Government is achieved?

Achievement of Rural Development 100 50 0 Yes No ■ Series1	55% of the rural school teachers answered 'Yes' and believe that the Vision and Mission of Rural Development of Malaysian Government was achieved.

Findings and contribution: The percentage shows that government contribution does not reach rural areas at satisfactory level.
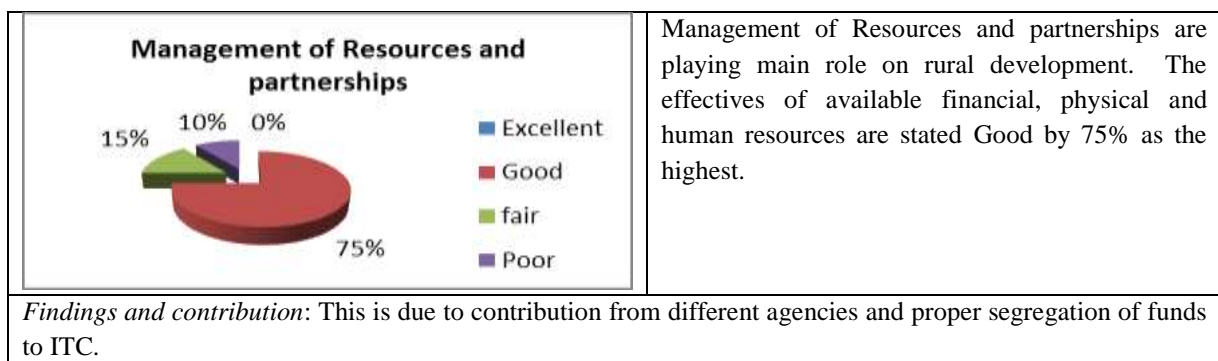
2. Satisfaction of External Stakeholders: How satisfied are the people and SMEs who visit the rural areas and the quality of its service and infrastructure?

Stakeholders and key partners believe that the quality of its service and infrastructure agreed at an average level of 5 by 60%.

Findings and contribution: This usually the subject matters experts may have more knowledge and experience on providing services to urban and rural areas. They may find out the development still have to be improved.

3. Shared values: At which level the values and beliefs of rural development? (Shared value is a management strategy focused on companies creating measurable business value by identifying and addressing social problems that intersect with their business)

Shared value is a management strategy focused on companies creating measurable business value by identifying and addressing social problems that intersect with their business. Shared value shows the level of values and beliefs of rural development at level 8 by 40% as the highest.

Findings and contribution: This increases the hope of improvement among the experts.

4. Management of Resources and partnerships: How effectively are the available financial, physical and human resources being managed?

Management of Resources and partnerships are playing main role on rural development. The effectives of available financial, physical and human resources are stated Good by 75% as the highest.

Findings and contribution: This is due to contribution from different agencies and proper segregation of funds to ITC.

5. Please state what are the current strengths and opportunities which SMEs can provide ITC, which can be leveraged so as to improve its performance?

Current strengths and opportunities which SMEs can provide ITC, which can be leveraged so as to improve its performance is contribution of money, share human efforts and enhance business structure.

Findings and contribution: Contribution of money, human efforts and adequate business structure playing a key role to rural development.

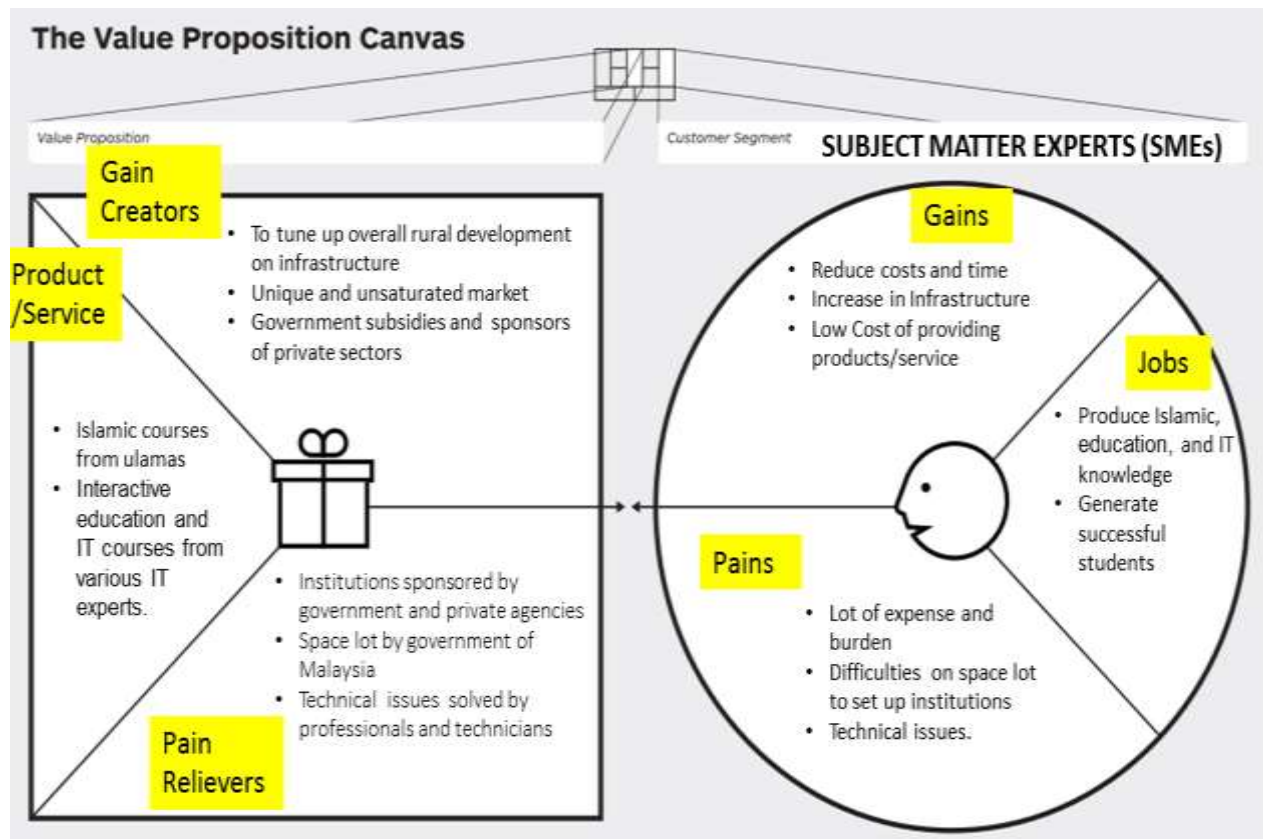- **The Value Proposition Canvas for *Rural School Subject Matter Experts (SMEs)* as follows:**

Figure 5: Value Proposition Canvas for *Subject Matter Experts (SMEs)*

V. LIMITATION

The limitation of this paper is the population of the customer segments. In order to get better results, the questionnaires should be distributed to a bigger population and bigger number of respondents such as teachers, students and subject matter experts (SMEs). Since half of the questionnaires were distributed via e-mails to respondents, there were no certainties that the email recipient is answering the questionnaire himself/herself without delegating to their assistant or other personnel. The direct involvement of these targeted groups yet to be confirmed.

VI. CONCLUSION

The commitment between the value proposition and customer segments was achieved. Through the approach of QHM and WoG collaboration, with the ITC as a platform in making the process of one-stop knowledge centre at RTC [1] more convenient and efficient for rural students by the survey result. In this study, the customer segments such as teachers, students and subject matter experts (SMEs) are the main contributors and key players that make this transformation centre as an intellectual sector. Thus, knowledge and skills of rural students yet to be improvised [1]. Other than that, this conceptual solution can improve the function of the mosque as a centre for collecting information's of the donors and professionals. Thus, the motive of this concept will be achieved as a model in demonstrating the   meaning of "Rahmatan Lil Alamin", contributing values and mercy to all mankind in all walks of life [1].

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