

Halal Cosmetics Supply Chain - A Conceptual Model

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Abstract---Increasing of Muslim population around the world will build a huge Islamic market by 2030. Since the origin of most cosmetics products are non-Muslim companies, the control of Halal quality products according of Islamic standards is a big issue for Muslims. The current research goal is to determine the controller elements of Halal quality and the effects of Halal policy on the different parts of Halal cosmetic supply chain stages and players. Use of Halal policy traceability showed that with help of this system, high halal quality cosmetics can provide and attract the consumer confidence to develop these products in Islamic markets. Therefore, Halal quality assurance by different supply chain players becomes an important subject.

Keywords--- Halal cosmetics, Halal policy, Halal cosmetics supply chain. Traceability systems, Development of Halal products, Islamic markets

1. Introduction

Halal as a Quranic term applies to allowed, legal products according to the Islamic thoughts. Halal cautious consumers have a high attention towards Halal concept, and they try to adapt their behavioral traits decision making with it [1], [2]. Halal should also take into consideration the immaterial needs of the Muslim consumers [3] and Islamic values [4]. *Halal* comprise different aspects such as animal slaughtering, storage, display, preparation, hygiene and sanitation, in addition, it includes food as well as non-food products [5].

Today's, Muslim provide one of the biggest consuming markets in the world with value of about billion dollars of foods products in Europe, North America, China and foods products in Europe, North America, China and India [6] and same consumption level of cosmetics and health care products in Middle east [48].

Since the origin of most Halal products are non-Muslim manufacturers, the Halal quality of finished products are a big issue for Muslims. Therefore Halal quality assurance or Halal quality maintenance by different supply chains

players are important factors of this study. The current research goal is to determine the controller elements of Halal quality and the effects of Halal policy on the different parts of Halal cosmetic supply chain, to find out how the product quality assurance could attain consumers' trust and raise their motivation towards the purchase of these products and help in development of the Halal products In Islamic markets.

2. Literature review

2.1 Halal cosmetics

A complete definition of cosmetic product by [7] is as follow:

[...cosmetic products refer to any substance or preparation intended to be placed in contact with various external parts of the human body (epidermis, hair system, nails, lips, and external genital organs) or with teeth and mucous membranes of the oral cavity, with a view exclusively or mainly to cleaning them, perfuming them, changing their appearance and/or correcting body odors and/or protecting them in good condition...]

In the consumption world context [4], commitment and religious beliefs direct follower's attitude towards a range of products, such as food, financial, cosmetics and pharmaceutical products [8], [9], [10]. In this regard [11], [12] identified that according to the MS 2200:2008 Islamic Consumer Goods, animals, plants and microorganisms (all on land or water), alcohol and synthetic materials are the five main sources of Halal cosmetics and personal care products.

It is [13] argued that increasing knowledge about animal and functional ingredients of non-food products such as cosmetics among the Muslims in the Middle East, US and Europe, cause the growing demand for Halal cosmetics and personal care products [13]. It seems that Halal cosmetics industry is going to be center of attention for many cosmetic companies, as [13] confirmed it by some reasons, such as increasing number of the Muslim people in the world, looking for the natural and safe products by consumers, increasing demand for Halal component products by more knowledgeable and educated consumers and finally growing of global market segment by increasing of women incomes, which all together create a

great business opportunity for more investment in the cosmetics industry. In addition, a research by World Halal Forum Secretariat, showed the amount of USD 2.3 trillion (excluding banking) for global Halal products which in details have been USD 1.4 trillion, 506 billion and 230 billion belong to the foods, pharmaceuticals and cosmetics sectors respectively [14]. The concept of Halal cosmetics, in other words, also covers all aspects of the management system and formulation and the quality of Halal cosmetic products should completely comply with the Islamic demands and the requirements of National Pharmaceutical Control Bureau (Ministry of Health Malaysia), in addition, the Halal cosmetics should be safe with high quality that can be improved by *Toyyiban* (means highest quality in the Halal concept) which should be applied by any organization and/or manufacturer [7]. Anyway, the non-food products started to capture the world Halal markets [12]. Today, many Muslim and non-Muslim people also look for Halal cosmetics and personal care products. A market research [15] shows that these products got considerable acceptance by other communities because of their safety, high quality, hygienic preparation procedures and integrity maintenance throughout the production stage.

2.2 Halal cosmetics supply chains

Any product should be allowed for consumption by Islamic thought or Shari'ah, such as meat, poultry, raw food, cosmetics, pharmaceuticals, hospitality, insurance, finance, banking, tourism, supply chain and many more [12]. In field of Halal foods, [16] argued that the current Halal standards regulate food production, preparation, handling and storage to some degree but does not guarantee the Halal quality of products at the point of consumption. He emphasized that Halal logistics has critical role on the Halal integrity of the supply chain from farm to fork [17]. Conversely due the lack of consumer's knowledge about the cross-contamination across the supply chains [48] and according the Arabian supply chain, for the maintenance of Halal food integrity, a Halal supply chain is required [18] and for keeping its integrity, the Halal policy should be applied in the supply chains. A complete definition for Halal policy provided [19] as follow:

[...the responsibility of the organization in protecting the Halal integrity along the supply chain; the scope of Halal certification; the level of consumer or customer assurance (the promise); and the method of assurance (control mechanism; covering aspects like Halal committee, Halal compliance officer and inspections).]

In the field of cosmetics supply chain, there is limited study especially in Halal arena. The basic requirements for Halal cosmetic products, based on Islamic Shariah, shall be fulfilled by the Halal cosmetic industry during all the stages of cosmetic supply chain including receiving, preparing, processing, storing, and packing, labeling, controlling, handling, transporting and distributing [20]. From Muslim point of view, the clean and hygienic products should have integrated supply chain [21]. In other hand, the existing concept of effective management

in producing Halal cosmetics products demands three successful activities including quality planning; quality assurance and quality control and improvement [22]. Development of complete Halal integrity across an integrated supply chain system with positive Halal ingredient list, procurement, certified manufacture procedure and tracking system of supply chain called HALQ, converging GMP, HACCP, Halal, and *Toyyibaan* into a single set of procedures addressed by [23].

In this study, since the Halal cosmetic consumers, as last player in the supply chain tend to receive high quality products, the maintenance of Halal quality by all involved players throughout all the stages became an important issue that can be provided by the Halal policy tracing in the supply chains. As the traceability systems currently used for the integrating of foods such as Halal meat [24] and usually the supply chains for consumables products are similar to each other; it seems that this system is also applicable to Halal cosmetics.

2.3 Traceability systems

What exactly a traceability system mean? Traceability is a simple trace back system which provides product identity and quality assurance across the supply chain [25]. These systems have two main functions of tracking and tracing, tracking means ability to follow an item from beginning of the supply chain to the end and tracing is ability to recognize the origin of an item/ items with moving backward from end to beginning [26]. In another words, the traceability systems are defined as the capability to explore a unique batch of products and its raw ingredients and tracing it across the production and/ or distribution manner to the immediate customer [27]. It can support product's origin and quality labeling [5], [28]. It is remarked that traceability is an important requirement for the strong cosmetics' supply chain at its first step because this industry relies on the source of ingredients and component and global manufacturing [29].

In food arena, traceability is the ability to trace food and its ingredients along all stages of the supply chain which includes product manufacturing, processing and distributing [30]. In cosmetics field, it is almost same, as the expert groups [31] reported that in traceability systems, all the supply chain players should be capable to trace back and track the direct supplier and the direct recipient of traceable items respectively. They added, this system can collect information from far down to upstream of the supply chain such as the retailers to the manufacturers or importers; in addition, this system is useful for the manufactured products that distribute by scheduled delivering such as childcare and cosmetics. According to ISO 9000:2000 guidance, traceability is the capability to trace the history, application or location of an item [32], [33].

An international standard system for the products traceability is GS1 systems. Implementation of traceability systems by GS1 systems is approved by academic community as an efficient global commerce facilitator that can develop recording and exchanging of traceability data between stakeholders in the supply chain [26]. According to the GS1, traceability is the identification ability of products' history in the past or now, quick determination

of defective or unsafe products' location such as foods, pharmaceuticals and cosmetics to recall them from markets and reduce the negative economic impacts on consumer's trust about the quality of products and helping validation of the presence or absence of important product attributes such as organic farming methods, Kosher foods, non-allergic cosmetics or sugar free products [51]. In this system all partners should accomplish internal and external traceability across the supply chain [29]. GS1 emphasizes that tracing implementation within a supply chain requires the involvement of all trading and non-trading partners, physical flow of traceable items and information flows of traceability data [34].

Although the advantages of traceability such as health, quality, safety and control make consumers to be confident about products [28], [35], but technically, product safety and quality is enumerated as the first intentions of product traceability [30]. The business manner tries to raise the information connectivity through the supply chain and the quality of product traceability could be affected by the degree of network transparency [35]. Storing the essential information of related inputs and outputs of the food products in the supply chain is another advantage for all the stakeholders [36] and finally according to the report of expert group, traceability is not only an important help for authorities to get required information about products and different actors of supply chains but also organized traceability of whole supply chain can be advantageous to economic players, authorities and end consumers such as identification of economic operators and physical products for effective product recalls and withdrawals from markets [31].

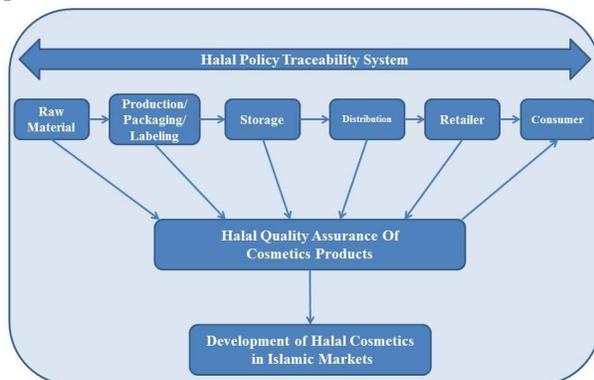


Figure 1- Research model (First conceptual model)

3. Methodology

3.1 Hypothesis and research model

According to the research model (figure1), the seven independent variables considered for this study were raw materials, production/packaging/labeling, storing, distribution, retailers, consumers and Halal quality assurance of cosmetic products. In the research model, we applied the traceability systems for tracing of Halal policy along the cosmetic supply chain to control all chain activities and partners according the Islamic standards. Since the word of Halal related to the quality and safety of products and Halal cosmetics is almost new topic in the supply chain arena, the most of the studies in field of food

or Halal food supply chains can also apply for these products, then some of this research hypothesis brought up by help of food studies.

The use of fast and reliable system for traceability along the food supply chain helps to provide high quality and safe products [26]. It is argued that the Halal cosmetics focus on some elements which one of them is Halal ingredients [37], and the main reason of low awareness of cosmetics consumers about Halal cosmetics belongs to the availability of these products in the markets [12]. They mentioned that to get Halal certified cosmetics, their raw materials should also get certified by Halal standards. In addition, in the Halal cosmetic supply chain, monitoring of ingredients before production stage seems vital because the Halal products need Halal ingredients according to the Islamic thoughts and standards. Based on Irish medicine board [38], the conditions and storage temperature for each ingredient should be controlled too, and use of some ingredients such as CMR materials (Carcinogenic, Mutagenic or toxic for Reproduction) in cosmetic can be acceptable if they confirmed by the Scientific Committee on Consumer Safety [39]. According to the above studies, two hypotheses can be brought up.

H1: Tracing Halal policy in raw material selection has a positive impact in Halal cosmetic manufacturing.

H2: Tracing Halal policy in raw material selection has a positive impact on the Halal cosmetic quality assurance.

Raising of efficient logistics procedures and tracking products flow along production stage and the supply chain by use of traceability systems argued by [40],[33]. The Halal cosmetics focus on production, manufacturing procedure and storage [37] and control of product's flow, their quality and the processing factors along production stage is a useful method to perform and avouch about safety and quality and traceability of products [36]. According to the law of FDA [46] there is a need to evaluate the food safety hazards during manufacturing, processing, packing or storing to focus on preventing contamination rather than responding to it although, packing procedures should sufficiently be checked to minimize the risk of mix-ups of Halal and non-Halal products [38]. Myo Min [41] remarked that the available information on products' label does not always direct more reliance, and then for clear data about the quality of food through the supply chain, there is a need for modern traceability system.

H3: Tracing of Halal policy in production, labeling and packing has positive impact in Halal quality assurance of cosmetic products.

H4: Tracing of Halal policy in packing has positive impact on storing quality of Halal cosmetic products.

H5: Tracing Halal policy in storing methods has positive impact on Halal quality assurance of cosmetic products.

H6: Tracing Halal policy in storing conditions, has positive impact on maintenance of the Halal cosmetic quality provided to the products distribution.

Halal products after production and storing stages are still vulnerable. It is argued that improper storage conditions (usually temperature abuse) during product distribution cause many outbreaks, and traceability systems can point to the origin of raw materials, the records of product

processing, the distribution and exactly the location of a product after delivery [41]. Generally, use of readable data such as barcodes enables data capturing from manufacturing through distribution and retail and provides better interoperability of all actors in the supply chain [31], traceability shows that the packing is considered as a unique critical point in production and distribution stages [40].

H7: Tracing of Halal policy in distribution methods has positive impact on Halal quality assurance of cosmetic products.

H8: Tracing Halal policy in distribution methods has positive impact on maintaining the Halal cosmetic quality for delivering cosmetics to the retailers

The food safety risks can happen in different stages of the supply chain, and then all actors such as producers, processors, distributors, retailers and even consumers must take responsibility [41]. This idea can also be useful for cosmetic products. Tracing became an important issue for the consumers and multiple retailers which provide the consumer needs, the retailers have found that they can achieve their commercial advantage through product approvals [42].

H9: Tracing Halal policy in Halal cosmetic products purchase by the retailers has positive impact on the Halal product consumer's satisfaction and motivation

H10: Tracing of Halal policy by retailers has positive impact on Halal quality assurance of cosmetic products.

Quality attributes can affect the consumers by product value, it can refer not only to the properties but to the ways that these properties can be obtained [43]. In other hand, traceability has been known as a safety and quality informant system to the safety development of food chain and consumer confidence [44]. It can also exist as an assurance tool for quality of products and consumer's trust to the products [41]. He stated that from consumer view, this system can help to build confidence and raise trust towards the food system. According to the author, this idea is applicable for other product categories such as cosmetics; therefore the last hypothesis developed is:

H11: Halal quality assurance has positive impact on the consumer trust in products consumption.

And finally increase in consumer confidence on Halal product quality and raising their tendency to purchase these products will lead to the development of Halal cosmetics in Islamic markets.

H12: Halal quality assurance of cosmetic products has positive impacts on development of these products in the Islamic markets.

In addition to the hypotheses, two research questions related to the purpose of the study were developed:

RQ1: What is the role of Halal policy in Halal cosmetic quality assurance?

RQ2: What is the role of using traceability system on Halal quality assurance of cosmetic products?

4. Data Analysis

This study is a kind of Correlation/Regression Analysis which involves determining the strength of the

relationship between two or more variables. The main data collection tools were the study of existing documents, interview and questionnaire. The studied documents were books, scientific articles published in journals and conferences and reputable websites. The questionnaire was divided into two parts, respondents demographic and five-point Likert-type scale about research hypotheses, the data collected from wholesalers/retailers of cosmetics-healthcare products of United Arab Emirates- Dubai as a secondary Islamic market with the majority of Muslim population where the use of Halal logo on products supplied to the market is essential. A pilot ran with 35 respondents that were excluded from the 194 useful collected questionnaires from the main centers, department and local stores. Interviews are done with expert people and informed respondents at the time of questionnaires filling. The hypotheses tested by Partial Least Square regression (PLS) and then with the help of objective observation and the results of interviews, the final model, was provided.

4.1 Demographic analysis

As mentioned above, the statistical population of this study was selected from wholesalers or retailers of cosmetics and healthcare products. The demographic data (table1) included field of respondents' activity, level of Halal knowledge, their religion and level of education. Totally about 63.4 percent of respondents were active in sales and 36.6 percent in addition to sales were active in other fields, about 64 percent of the cosmetics/ healthcare products supply centers managed by non-Muslim people, and 43.3 percent of the total respondents had low or no knowledge about Halal cosmetics, so this figures reflect the vulnerability of these products in Dubai Market. Quantitative analysis of the impact of level of Halal cosmetics knowledge and educational level of respondents on their responses to the questions are available in the appendix.

Table 1- Demographic results

Characteristics	percentage	Characteristics	percentage
<u>The field of cosmetics activity</u>		<u>Halal knowledge</u>	
Retailer	63.4	Never heard	32.5
Distribution	23.7	Low	10.8
production	12.4	Average	23.7
Packing	0.5	High	33
<u>Religion</u>		<u>Education</u>	
Christian	53.1	Bachelor and less	77.8
Muslim	35.6	Master and higher	22.2
Hindu	6.2		
Buddhist	3.1		
Others	2		

4.2 Hypotheses analysis

In first step, according the sample volume more than 30 and central limit theorem, the normal distribution used for the analysis. The chosen test value of 3 (from the 5 point Likert-type scale) and 95% of confidence interval showed that the probability of less than 0.001 and positive t-values of single-sample T-test (table2) indicate that the mean of test variables of raw materials, manufacturing/ packing/ labelling, storing, distributing, retailing and consumers have significant difference and confirmed the importance role of these variables in the population.

Table 2- The Single-sample T-test

T Test	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence	
					Lower	Upper
Raw M.	42.545	193	.000	1.32474	1.2633	1.3862
Production	31.727	193	.000	1.224227	1.14812	1.30033
Storing	20.244	193	.000	1.05052	0.9482	1.1529
Distribution	19.906	193	.000	0.94716	0.8533	1.0410
Retailers	25.239	193	.000	1.11856	1.0311	1.2060
Consumers	24.719	193	.000	1.07732	.9914	1.1633

In next step, the model run by smart PLS software and the path coefficients calculated with use of the bootstrapping technique. The number of sample was 194 and the bootstrapping steps were 500.

The calculated standard errors, sample means and P-values for the direct, indirect and total effect of path coefficients showed in table 3(next page). The direct path coefficient showed that all paths with p-value less than 0.05 were significant except the production, storage and distribution to the quality assurance, then all hypotheses except number 3, 5 and 7 can be confirmed, although the third hypothesis can also be considered significant with error level of 0.1. The all p-values for indirect and total effects were also <0.05, which means that all hypotheses with regard to the indirect effects of variables and their

Table 3- The R2 results

Variables	R ²
Distribution	0.772
Retailer	0.661
Quality	0.658
Consumer	0.615
Development	0.444
Storing	0.370
Production	0.343

For evaluating the model Goodness-of-Fit, the coefficient of determination R² and F square index were obtained. By definition, R² shows that the independent variables are strong enough to explain dependent variables, in this model, the result (table4) showed that the variable of

quality assurance could strongly explained by the all independent variables; and since F square index indicates the extent of estimation of each variable that was entered into the model by other independent variables, the F² results (table5-next page) showed that the raw material, retailer, production and distribution were important independent variables respectively to estimate the dependent variable of quality assurance in the model. For example with elimination of raw material variable, the variance of quality assurance extremely will decrease; therefore this variable has important impact on estimation of quality assurance in the model.

4.3 Final conceptual model

According to the results of quantitative analysis, all variables had positive impact on the quality assurance; and quality assurance had positive impact on the development of Halal cosmetics products; but in accordance with direct path coefficient results, the hypotheses related to the impact of production, storage and distribution on quality assurance were rejected. Since these variables are parts of supply chain then elimination of them from model is not possible. In this regard, we tried to merge these variables together by use of the direct, indirect path coefficients and F square results and also demographic results.

In connection with the lack of direct impact of three variables of production, storage and distribution on quality assurance, in the first step, **the production and raw materials merged together** according to the

- 1- the high positive direct impact of raw material on production showed by p-value of <0.001,
- 2- the positive indirect impact between production and quality assurance with p-value of <0.05 and
- 3- strong goodness-of-Fit impact between raw material and production variables with F index = 0.521 which shows that the production can estimated by the raw materials well, then a collection of these variables together may compensate the rejection of third hypothesis; therefore by this connection, the production variable-without elimination- can show its positive impact on the quality assurance. Elimination can show its positive impact on the quality assurance.

In the next step:

- 1- with the high positive direct impact of storing on distributing with p value of <0.001,
- 2- the positive indirect impact of storing on quality assurance with p-value of <0.01), and
- 3- very strong goodness-of-Fit impact between storing and distributing with F index=2.6 which shows the power of storing variable in estimation of distributing, then the sectors of **storing and distribution can also be merged together**.

This combination does not seem to be enough because according the rejection of hypotheses of 5 and 7, both of

these variables should eliminate from the model, then in

well, and demographic result which showed that 23.7 percent of total respondents were distributor and retailer at

Table 5- Direct, Indirect, Total path Coefficients of the conceptual research model

<i>Path Coefficients</i>	Standard Error	Sample Mean	P Values	<i>Indirect Effects</i>	Standard Error	Sample Mean	P Values	<i>Total Effects</i>	Standard Error	Sample Mean	P Values
Retailer to Consumer	0.107	0.483	0.000	Retailer to Consumer	0.042	0.103	0.008	Retailer to Consumer	0.096	0.585	0.000
Retailer to Quality	0.108	0.304	0.006	Retailer to Quality				Retailer to Quality	0.108	0.304	0.006
				Retailer to P. Development	0.079	0.204	0.013	Retailer to P. Development	0.079	0.204	0.013
				Raw M. to Retailer	0.040	0.258	0.000	Raw M. to Retailer	0.040	0.258	0.000
				Raw M. to Consumer	0.065	0.326	0.000	Raw M. to Consumer	0.065	0.326	0.000
Raw M. to Quality	0.129	0.362	0.003	Raw M. to Quality	0.064	0.187	0.007	Raw M. to Quality	0.086	0.549	0.000
Raw M. to Production	0.043	0.596	0.000	Raw M. to Production				Raw M. to Production	0.043	0.596	0.000
				Raw M. to P. Development	0.063	0.365	0.000	Raw M. to P. Development	0.063	0.365	0.000
				Raw M. to Distribution	0.044	0.315	0.000	Raw M. to Distribution	0.044	0.315	0.000
				Raw M. to Storing	0.048	0.370	0.000	Raw M. to Storing	0.048	0.370	0.000
Quality to Consumer	0.119	0.356	0.002	Quality to Consumer				Quality to Consumer	0.119	0.356	0.002
Quality to P. Development	0.06	0.665	0.000	Quality to P. Development				Quality to P. Development	0.060	0.665	0.000
				Production to Retailer	0.044	0.430	0.000	Production to Retailer	0.044	0.430	0.000
				Production to Consumer	0.058	0.314	0.000	Production to Consumer	0.058	0.314	0.000
Production to Quality	0.065	0.101	0.105	Production to Quality	0.072	0.210	0.008	Production to Quality	0.098	0.312	0.002
				Production to P. Development	0.074	0.210	0.007	Production to P. Development	0.074	0.210	0.007
				Production to Distribution	0.043	0.526	0.000	Production to Distribution	0.043	0.526	0.000
Production to Storing	0.044	0.618	0.000	Production to Storing				Production to Storing	0.044	0.618	0.000
Distribution to Retailer	0.029	0.817	0.000	Distribution to Retailer				Distribution to Retailer	0.029	0.817	0.000
				Distribution to Consumer	0.072	0.523	0.000	Distribution to Consumer	0.072	0.523	0.000
Distribution to Quality	0.131	0.110	0.294	Distribution to Quality	0.090	0.248	0.008	Distribution to Quality	0.137	0.358	0.006
				Distribution to P. Development	0.096	0.239	0.009	Distribution to P. Development	0.096	0.239	0.009
				Storing to Retailer	0.040	0.695	0.000	Storing to Retailer	0.040	0.695	0.000
				Storing to Consumer	0.084	0.451	0.000	Storing to Consumer	0.084	0.451	0.000
Storing to Quality	0.156	0.036	0.984	Storing to Quality	0.119	0.305	0.007	Storing to Quality	0.114	0.341	0.006
				Storing to P. Development	0.088	0.230	0.016	Storing to P. Development	0.088	0.230	0.016
Storing to Distribution	0.026	0.851	0.000	Storing to Distribution				Storing to Distribution	0.026	0.851	0.000

Table 4- The F2 index results

<i>F Square</i>	Retailer	Consumer	Raw M.	Quality	Production	P. Development	Distribution	Storing
Retailer		0.259		0.072				
Consumer								
Raw M.				0.151	0.521			
Quality		0.170				0.800		
Production				0.019				0.588
P. Development								
Distribution	1.951			0.012				
Storing				0.000				2.600

third step in accordance with:

- 1- the positive direct impact of distributing on retailing variables with p-value less than 0.001,
- 2- the positive indirect impact of distributing on quality assurance with p-value less than <0.01,
- 3- strong goodness-of-Fit impact between distributing and retailing with F index= 1.95 which shows that the retailer variable can be estimated by the distribution variable very

the same time, **the variables of distributing and retailing can merged together.**

Since the retailer has been the second important variable to predict the quality assurance variable, with help of its positive direct impact on the quality assurance can cover the both variables of storing and distribution. By this way, these variables may show their indirect positive impact on Quality assurance without elimination from the model and therefore, the final conceptual model can provide by figure 2.

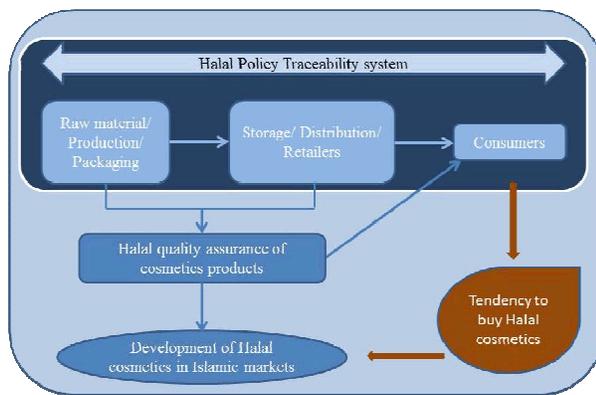


Figure 1- Final conceptual model of Halal Cosmetic Supply Chain

5. Discussion and implications

In the first place it should be stated that with reference to the interview section, due to the span of Halal products supply chain and presence of various players, there is no such term ‘complete assurance’ or ‘quality guarantee’, then it only can be declared that with use of traceability systems by all players, high Halal quality products can be manufactured and their quality can be maintained till they reach to the final consumers, which in turn can be considered as a great achievement in the Halal products development. The results demonstrated the two main factors in the Halal products development i.e. high Halal quality production and Halal quality maintenance along the supply chain. Obviously, both factors together can deliver high Halal quality products to the final consumers, get their satisfaction, raise their tendency towards Halal products consumption and in other words develop the Halal products in Islamic markets. Therefore considering the above results, the role of Halal policy in products’ manufacturing and high quality maintenance can be concluded as answer of first research question:

- Manufacturers can prevent the entrance of suspicious materials to the manufacturing department by paying great attention to the raw material selection for production and packaging e.g. checking Halal certificates and required documents according to the Halal standards and rules.
- Manufacturers’ awareness and attention should raise about the Halal standards such as the proper tooling, segregation of equipment shared by Halal and non-Halal products within the manufacturing process, and use of the trained staff about Halal standards in the production stage [19].

In response to the second research question i.e. effects of using traceability systems on Halal quality assurance of cosmetic products, according to the GS1 Standards [34], traceability systems with physical and informational flow, provide the possibility of access to information and functioning of each supply chain player with previous and next player. Also according to the DG SANCO [31],

general benefits of using traceability systems in the cosmetic supply chain returns to the market monitoring authorities and consumers. Therefore, considering these advantages and current research findings, effects of traceability system application on attaining high Halal quality of cosmetics products can be as follow:

- Early identification of cosmetic products which are contaminated with non- Halal ingredients,
- Recognition of the stage or player which decrease the Halal quality of the product,
- Matching products with the governing regulations and Halal standards,
- Verification of presence/absence of Halal products characteristics,
- Accessibility to the technical characteristics of the product and tracing the product history in case of consumer protection needs (GS1 standards),
- Effective evaluation process of the risks and modifying measures according to the reliable and complete information, assuring consumer safety with avoidance of unnecessary costs [45] for economic authorities during products recall from market,
- Product recall and removing of low Halal quality products from Islamic markets to avoid damage to consumer confidence toward Halal cosmetics according to Fabrizio [50] about Halal foods, and
- Increasing consumer confidence towards Halal cosmetics purchase through product scanning by their smartphones in non-Islamic markets [47].

In addition of the above results, use of traceability systems will increase the responsibility of the Halal tracing operators to consider the required plans to provide High quality of Halal cosmetics products such as:

- control of raw materials’ Halal certificates before manufacturing and packaging stages,
- storage implementation in accordance with the Halal policy,
- control of Halal products transportation according to Halal standards
- easy access and use of the traceability data by retailers without any special skills and
- training courses for retailers and consumers to how to use traceability data

Use of traceability systems to help with providing High Halal quality cosmetics products will not be limited to the responsibility of manufacturers and traceability systems operators; there is some more recommendation to other supply chain operators to get more advantages of this system. The author’s recommendations are:

- to the retailers for use of Halal traceability systems to check ingredients’ Halal certificates and products before Halal product purchasing or ordering,
- to the distribution companies for updating distribution staff knowledge about Halal standards,

- to the supply chain operators for updating themselves about the latest Halal standards and Halal policy to minimize human errors that may cause product contamination,
- to the packaging players to use traceability tags on products that can be scanned by consumers' smartphones to help them in choosing Halal cosmetics products without any Halal logo specially in non-Islamic markets, and
- to the store managers to install traceability tag readers in stores with simple consumer's instruction,

And finally to the Islamic governments

- to provide a comprehensive definition of Halal policy between Islamic countries to create global Halal standards for all stages of the Halal cosmetics supply chain,
- to regulate special rules and regulation for using traceability systems by the cosmetics suppliers and authorities, and
- to provide the good circumstances to increase consumer awareness about Halal cosmetics and its advantages by Islamic authorities, to raise the level of their expectation about the products quality and encourage them to use these products

6. Conclusion

Development of Halal products such as Halal cosmetics needs the co-operation and responsibility of all the supply chain players; and use of the Halal policy traceability system can help to provide high quality of Halal cosmetics by controlling of raw materials selection, production processes, storage, distribution, purchase and/or order of products by retailers; but it should be considered that the development of Halal cosmetics in Islamic markets will be achieved if consumer confidence is drawn to the advantages of these products and their tendency increase to look for these products at these markets.

6.1 Limitations and further research

This research was done from the cosmetics and health care products retailers' point of view in UAE- Dubai, as a sample of secondary Islamic market with majority of Muslim people. Unfortunately, the numbers of manufacturing companies which work exactly in field of Halal cosmetics were too low to find their opinions in this regard but similar study can be performed between responsible authorities to find effective methods to introduce and promote these products to the Muslim people. In addition, since the traceability system has significant role in providing high Halal quality products, designers of this system are expected to consider further attention to find the requirements of Halal policy tracing in the supply chains [49].

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Appendix

The educational level impact of respondents analyzed by independent sample test (table 6). Since the probability of Levene’s test is more than 0.05 then the assumption of equal variances cannot be rejected. Therefore, according to the T-test results in equal variances row, the variables of

distribution and production with probability of 0.026 0.092 and level of error of less than 0.05 and 0.1 respectively showed that there are significant difference between two groups of population with low and high educational level. The level of Halal cosmetics knowledge in four groups of respondents with high, average, low and no knowledge, first tested by the Analysis of Variance test (table 7). Since the results showed that there were significant differences between the all variables’ mean by the people with different level of Halal knowledge; therefore in next step, the ad- hoc multiple-comparison proceeded by the Benferroni test between the four groups (table 8). The result in case of raw materials for example showed that there are significant differences between people with no knowledge and the ones with low, average or high level of Halal cosmetics knowledge.

Table 6- Independent Sample Test

<i>Independent Samples Test</i>		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Difference	Difference	Interval of the	
							e	e	Lower	Upper
Raw M.	Equal variances assumed	0.810	.369	-.173	192	.863	-.01303	.07515	-.16126	.13520
	Equal variances not assumed			-.166	63.937	.869	-.01303	.07846	-.16978	.14373
Production	Equal variances assumed	1.267	.262	-1.691	192	.092	-.15636	.09245	-.33872	.02599
	Equal variances not assumed			-1.792	74.044	.077	-.15636	.08726	-.33022	.01750
Storing	Equal variances assumed	0.050	.824	-1.446	192	.150	-.18010	.12458	-.42583	.06563
	Equal variances not assumed			-1.487	70.647	.142	-.18010	.12114	-.42166	.06146
Distributio n	Equal variances assumed	0.059	.808	-2.246	192	.026	-.25462	.11338	-.47824	-.03100
	Equal variances not assumed			-2.139	63.474	.036	-.25462	.11904	-.49247	-.01677
Retailers	Equal variances assumed	0.044	.834	-1.295	192	.197	-.13793	.10651	-.34801	.07215
	Equal variances not assumed			-1.236	63.634	.221	-.13793	.11162	-.36093	.08507
Cosnumers	Equal variances assumed	1.931	.166	-1.449	192	.149	-.15164	.10463	-.35801	.05473
	Equal variances not assumed			-1.528	73.430	.131	-.15164	.09926	-.34944	.04616

Table 7- ANOVA Test results

<i>ANOVA Test</i>		Sum of Squares	df	Mean Square	F	Sig.
Raw M.	Between Groups	3.672	3	1.224	7.128	.000
	Within Groups	32.629	190	.172		
	Total	36.301	193			
Production	Between Groups	8.296	3	2.765	11.072	.000
	Within Groups	47.451	190	.250		
	Total	55.746	193			
Storing	Between Groups	14.787	3	4.929	10.885	.000
	Within Groups	86.038	190	.453		
	Total	100.825	193			
Distribution	Between Groups	20.076	3	6.692	19.653	.000
	Within Groups	64.695	190	.341		
	Total	84.771	193			
Retailers	Between Groups	7.147	3	2.382	6.817	.000
	Within Groups	66.392	190	.349		
	Total	73.539	193			
Consumers	Between Groups	7.110	3	2.370	7.035	.000
	Within Groups	64.010	190	.337		
	Total	71.120	193			

Table 8-Benferroni Test results

Bonferroni			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
Dependent Variable						Lower Bound	Upper Bound
Raw Materials	I have never heard about it	Low	0.09	0.10	1.000	0.37-	0.19
		Average	-.26384*	0.08	.007	0.48-	0.05-
		High	-.31329*	0.07	.000	0.51-	0.12-
	Low	I have never heard about it	0.09	0.10	1.000	0.19-	0.37
		Average	0.17	0.11	0.664	0.47-	0.12
		High	0.22	0.10	.195	0.50-	0.05
	Average	I have never heard about it	.26384*	0.08	.007	0.05	0.48
		Low	0.17	0.11	0.664	0.12-	0.47
		High	0.05	0.08	1.000	0.26-	0.16
High	I have never heard about it	.31329*	0.07	.000	0.12	0.51	
	Low	0.22	0.10	.195	0.05-	0.50	
	Average	0.05	0.08	1.000	0.16-	0.26	
Production	I have never heard about it	Low	0.28	0.13	.178	0.06-	0.61
		Average	0.24	0.10	.076	0.50-	0.01
		High	-.35423*	0.09	.001	0.59-	0.12-
	Low	I have never heard about it	0.28	0.13	.178	0.61-	0.06
		Average	-.51980*	0.13	.001	0.87-	0.17-
		High	-.63002*	0.13	.000	0.97-	0.29-
	Average	I have never heard about it	0.24	0.10	.076	0.01-	0.50
		Low	.51980*	0.13	.001	0.17	0.87
		High	0.11	0.10	1.000	0.37-	0.15
High	I have never heard about it	.35423*	0.09	.001	0.12	0.59	
	Low	.63002*	0.13	.000	0.29	0.97	
	Average	0.11	0.10	1.000	0.15-	0.37	
Storage	I have never heard about it	Low	0.26	0.17	0.731	0.19-	0.72
		Average	0.33	0.13	0.079	0.67-	0.02
		High	-.53398*	0.12	0.000	0.85-	0.22-
	Low	I have never heard about it	0.26	0.17	0.731	0.72-	0.19
		Average	-.59027*	0.18	.006	1.06-	0.12-
		High	-.79747*	0.17	0.000	1.25-	0.35-
	Average	I have never heard about it	0.33	0.13	0.079	0.02-	0.67
		Low	.59027*	0.18	.006	0.12	1.06
		High	0.21	0.13	0.677	0.55-	0.14
High	I have never heard about it	.53398*	0.12	0.000	0.22	0.85	
	Low	.79747*	0.17	0.000	0.35	1.25	
	Average	0.21	0.13	0.677	0.14-	0.55	
Distribution	I have never heard about it	Low	.46032*	0.15	.012	0.07	0.85
		Average	-.36370*	0.11	0.009	0.67-	0.06-
		High	-.53540*	0.10	0.000	0.81-	0.26-
	Low	I have never heard about it	-.46032*	0.15	.012	0.85-	0.07-
		Average	-.82402*	0.15	.000	1.23-	0.41-
		High	-.99572*	0.15	.000	1.39-	0.60-
	Average	I have never heard about it	.36370*	0.11	0.009	0.06	0.67
		Low	.82402*	0.15	.000	0.41	1.23
		High	0.17	0.11	.778	0.47-	0.13
High	I have never heard about it	.53540*	0.10	0.000	0.26	0.81	
	Low	.99572*	0.15	.000	0.60	1.39	
	Average	0.17	0.11	.778	0.13-	0.47	
Retailers	I have never heard about it	Low	0.13	0.15	1.000	0.27-	0.52
		Average	0.21	0.11	0.401	0.52-	0.09
		High	-.40033*	0.10	0.001	0.68-	0.12-
	Low	I have never heard about it	0.13	0.15	1.000	0.52-	0.27
		Average	0.34	0.16	.186	0.75-	0.08
		High	-.52732*	0.15	.003	0.92-	0.13-
	Average	I have never heard about it	0.21	0.11	0.401	0.09-	0.52
		Low	0.34	0.16	.186	0.08-	0.75
		High	0.19	0.11	.599	0.49-	0.12
High	I have never heard about it	.40033*	0.10	0.001	0.12	0.68	
	Low	.52732*	0.15	.003	0.13	0.92	
	Average	0.19	0.11	.599	0.12-	0.49	
Consumers	I have never heard about it	Low	0.19	0.15	1.000	0.20-	0.58
		Average	0.22	0.11	0.288	0.52-	0.08
		High	-.36682*	0.10	0.003	0.64-	0.09-
	Low	I have never heard about it	0.19	0.15	1.000	0.58-	0.20
		Average	-.41449*	0.15	.044	0.82-	0.01-
		High	-.55729*	0.15	.001	0.95-	0.17-
	Average	I have never heard about it	0.22	0.11	0.288	0.08-	0.52
		Low	.41449*	0.15	.044	0.01	0.82
		High	0.14	0.11	1.000	0.44-	0.16
High	I have never heard about it	.36682*	0.10	0.003	0.09	0.64	
	Low	.55729*	0.15	.001	0.17	0.95	
	Average	0.14	0.11	1.000	0.16-	0.44	

* The mean difference is significant at the 0.05 level.