

HALAL AND THE RISK SOCIETY

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ABSTRACT

In the process of modernization, many Muslims have come to consume industrially produced products. According to Beck, this is a process that unwittingly creates risks, and risks related to Halal are included in those risks. Discussion on Halal is about cultural risks, which arise later than environmental and health risks as Beck brought up. This is because the Muslim population entered the process of modernization later than in developed countries such as Europe and the United States in general. The base of industrial technologies related to food have been established without any awareness of Halal and have had to interpret, create regulations, build systems, and make choices for Halal. Furthermore, in the process of creating new technologies, the risk of violating Halal is further increased. Surrounded by *shubhah*, Muslims are having to assume responsibility for halal and make choices amid uncertainty in modern society. As consumers, Muslims will have to confront this situation through transnational solidarity and by joining the risks of halal with other risks also created by modernity. Science is a cog in the wheel of industrial progress. In order to address the issue of Halal in a risky society, it is essential to provide information and risk communication to Muslim consumers, in addition to providing alternative technologies suitable for Halal.

Keywords: *Halal, Risk Society, Shubhah*

1. Introduction

This paper applies the theory of risk society to the issue of Halal from the perspective of the changing social conditions in which Muslims find themselves, and the nature of technology. The risk society is a concept introduced by the German sociologist Ulrich Beck in his book of the same name to understand the characteristics of modern society (Beck 1992). Until the middle of the 20th century, it was believed that the vigorous economic activity of modern times would bring wealth and safety to mankind. Since then, in the wake of global environmental problems, there has been a growing awareness that excessive industrial production also produces risks that threaten and destroy the foundations of life. Industrial societies, thanks to the development of science and technology, have become richer in terms of goods and services, but at the same time life has become more dangerous, unstable and in some respects less comfortable. No country, no society can escape risk. As Beck said, risk cannot be escaped either in a world of dearth or in one of plenty: “poverty is hierarchical, but smog is democratic (Beck 1992).” The risk society emerges where social norms and institutions fail to achieve the promised safety. And these risks are being magnified and spread by globalization.

The global Halal industry as a whole is estimated to be worth around USD2.3 trillion (excluding Islamic finance) a year and is now one of the fastest-growing markets. Simultaneously, the global market growth is estimated to reach an annual rate of 20 percent per annum. The Halal industry is no longer confined to food and food-related products. The potential market for Halal products is the world’s Islamic population which accounts for a quarter of the world’s population and is estimated to increase in long term (Azam, M. S. E. & Abdullah M. A. 2020). Particularly in Southeast Asia, countries with large Muslim populations are undergoing rapid development, and the social structure, livelihoods and lifestyles of these countries and regions are modernizing. *Halal* practice, which is fundamentally based on the belief in Islam, must respond to the modernization and review and redefine the events here. Involving in the market economy is not only the “chance” but

also arising risks like other complexes of capitalism, industry and technology. In the following, we will discuss the practice of *Halal* in the risk society, considering the consumer's perspective. At the same time, the relationship between science and Halal will also be discussed. Risk society is one of the most important concepts to deconstruct modernity. I would like to rethink *Halal* practice in the reflexivity of risk society.

2. Risk Society

2.1 Risk in the modernity

Risk society is how modern society organizes in response to risk. The term is closely associated with several key writers on modernity, in particular Ulrich Beck (Beck U. 1992, 1994, 1998), Anthony Giddens (Giddens A. 1991) and Scott Lash (Lash S. 1990, 2014. Beck, U., Giddens, A. & Scott L. 1994). The term was coined in the 1980s and its popularity during the 1990s was both a consequence of its links to trends in thinking about wider modernity and also its links to popular discourse, in particular, the growing environmental concerns during the period Risk society is found in the second of the two stages of modernization. I make an overview of the two stages of modernization. The first modernization (mainly in the nineteenth and early twentieth centuries) is the stage in which man, through the development of science, dominates the outside of society (nature and tradition) and embeds it within it. In this stage, people's way of life is freed ('de-embedded') from class and other traditions. People are then newly embedded ('re-embedded') in the welfare state, which treats them as 'individuals with the right to self-determination. People are then forced to make their own decisions as individuals (whether they want to or not) in all situations. This forced self-determination of the individual in more and more aspects of life is what Beck calls 'individualization'. This is where the welfare state is formed, where the distribution of national wealth becomes a point of contention, and where the elimination of poverty and equality through the dissolution of classes is sought. The society at this stage (the first modern society) is therefore called by Beck a "poor society".

Then there is the second stage of modernization (mainly from the second half of the 20th century onwards) after science has completely taken over nature and tradition (in human perception) and fully incorporated them into the interior of society. At this stage, the outside of society (nature and tradition) has been completely lost. Nature has become dared socially assumed nature and dared socially disassembled nature, and tradition has become dared socially chosen tradition and dared socially discarded tradition. The gaze of science is therefore turned towards the interior of society. Within society, the dangers created by science and technology themselves are discovered anew. And these dangers came to be called by the previously used term "risks".

Bacster summarizes core propositions within the risk society thesis are that: (1) the scale and potential for catastrophe are increasing; (2) there is a loss of faith in experts and science to predict and protect people from these technological hazards; and (3) there are increasingly competing knowledge claims (erosion of expert consensus) regarding the management of technological environmental hazards. In short, the uncertainties of science have come much more into focus in society in general. As we recognize the limits of science, the social structures/systems in which decisions are made have garnered more attention. Thus, (4) our ontological security about being safe in the world has been shaken whereby institutions in society (e.g., the welfare state, personal insurance) are questioned for their ability to protect our long term (Baxter, J. 2020). Only one proposition not applicable to Halal practice is the scale and potential for catastrophe. It mentions catastrophe because risk society has mainly considered the risk to the environment and health. However, as mentioned, in the process of modernization, nature and tradition have been considered

dominated by science in the same way. The risk of nature and tradition has the same structural base that includes Halal practice. Risk anxieties can thus be inscribed not only to nature and to the human body, but also to the self-understanding of modern societies.

2.2 What is the risk?

The term "risk" means "the possibility of future damage resulting from a person's action (or failure to act). Unlike natural disasters such as earthquakes, windstorms, floods and other natural phenomena, dangers that represent damage for which one cannot be held responsible, such as unexpected accidents, and hazards that cannot be avoided by human power, risks are the result of some decision-making. For example, a huge typhoon with stormy weather is a hazard, but taking a boat out to fish on a typhoon day creates a risk.

There are some risks for which the responsible entity cannot always be identified, making it difficult to define them strictly. There is no problem when people take risks in gambling or speculative activities, when they go on adventures that no one has ever attempted before, or when they make decisions or take actions that they have control over. In the case of Halal practices, a Muslim must be responsible for the choice of food, if he or she knows it is Halal or not. However, individuals can't foresee and control the consequences of natural disasters, which should have been identified in advance and preventive measures taken by the State, but were not, or of failures in pension policy, which reduce their income and make it difficult for them to support themselves in retirement. The same is true of Halal in modern society. It is not a matter that can be controlled by individuals. The question of how to assign blame for risk responses is a vexed one for risk studies. This is not only because it is an academic issue, but also because the reading of risk as danger can lead to unjustified assignments of responsibility. The issue of decision-making and responsibility has much to do with the attitude of Muslim consumers towards Halal.

It seems that risk cannot win the race between perceived wealth and imperceptible risk. Rather, it seems there is no competition between the visible and the invisible. But paradoxically, it is precisely for this reason that invisible risks overwhelm this competition. In any case, ignoring imperceptible risks is always justified in the name of eliminating perceptible poverty. In the Third World, ignoring risks has often been justified in this way. Ignoring risk has become the cultural and political basis on which risk, denied its existence by poverty, has blossomed, grown and flourished, so to speak. Nevertheless, the fact that risk societies are invisible does not prove their unreality. On the contrary, the invisibility of the risk society is the very driving force that gives rise to it and is proof that it is real.

According to Beck, the above can be seen not only in poor developing countries but also in rich industrial countries. In other words, the priority in industrialized countries should be "stable economic development and growth". Fears of unemployment and economic failure are brought to the fore so that emission standards and monitoring systems for harmful pollutants are relaxed. Certain toxic residues in food are not pursued or investigated because of their economic usefulness. In other words, they are legally non-existent and left to their own devices. The concept of 'reflexivity' is proposed to illustrate the paradox that the activities of modern society that are beneficial to itself simultaneously undermine modern society itself.

To be clear, the 'reflexivity' of modernity and modernization that I refer to does not imply reflection on modernity, the self-relevance, or self-compliance, of modernity, or the self-justification or self-criticism of modernity in classical sociology. Rather (and above all) modernity "undermines" itself, unintentionally, unnoticed, and therefore unrelated to reflection, by the forces of autonomous modernity.

As a result of the thorough realization of industrial society, Beck says, its foundations have been compromised or destroyed, but this phenomenon itself cannot be captured by people's everyday knowledge because it occurs as an "unintended consequence". This mechanism is "structurally reflexive" because it has become embedded in the structure of modernization. The main realm of discussion on risk society has been the nature that is externalized in modernity: environment, life, disaster and so on. Risk on tradition might be a relatively new concept. But the structure of arising risk is the same as nature, particularly in the case of Halal practice that is profoundly connected with nature as a food issue.

3. Halal in the risky society

3.1 Industrial society and the risks of Halal

In an industrialized society, there is a division of labour, specialization and remoteness. The highly efficient technical division of labour and the complex and specialized social division of labour is the main characteristics of industrialized societies. Alvin Toffler described these characteristics of industrial society in terms of standardization, division of labour, synchronization, concentration, maximization and centralization. And I would like to add globalization or remoteness to these terms.

What impact have these changes in industrial society had on Halal? Let us consider the foodstuffs with which Halal is mainly concerned. Firstly, there is the question of the raw material of the food. The main raw material for food is biological resources, but industrial societies also use industrially produced materials such as feeds and fertilizers to nourish the organisms, which may contain substances classified as *haram* or *najis*. In addition, it is extremely difficult to ensure that animal products are slaughtered appropriately.

The next problem occurs in the processing and distribution stages. At these stages, the problem is the addition of substances such as additives that are inappropriate from the Halal point of view in processing and distribution facilities, the use of inappropriate substances in processes such as the cultivation of substances used in the processing stage, and the mixing, adhesion and contact with inappropriate substances in storage and transport (Abdallah, A., Rahem, M. A., Pasqualone & Pasqualone, A. 2021).

The division of labour in industrial societies can complicate the food system and create risks for each segment. Risks arise in the same way in general food hygiene issues as in Halal. However, the difference is that, as in the case of microbiological contamination of food, general food production problems can be eliminated once they have arisen in the food system, whereas in the case of Halal, once they have arisen, they are difficult to eliminate and are irreversible. Food hygiene issues are health risks when food enters the human mouth, whereas Halal is a risk in the process.

3.2 Science, technology and industrialization

In modern industry, the results of newly developed or improved science and technology are used to renew and increase the value of the product. The constant improvement of the quality of products and services has become an essential element in the cycle of industrial society, the market economy and capitalism. The important role played by science in the establishment and development of modern society is acknowledged by Beck. The background to this is the process of differentiation and establishment of each field of science. This is known as "specialization".

Scientific knowledge has been able to occupy a privileged position in modern society because it has functioned as a kind of authority. For example, by pitting modernity against

tradition and experts against laymen, and by drawing a boundary between the two, scientific scepticism became something that applied only within science. In a risk society, however, this relationship between scientific knowledge and people also changes. The risks of today's civilized life are not usually perceptible, but only in the form of chemical or physical symbols. Hence, as we have already argued, it is also difficult to perceive risks unless people are well conditioned to access and understand this specialized knowledge. Such is the nature of risk that it is not possible to speak of the problems surrounding it solely in terms of the experiences available in everyday life.

This poses two problems for practitioners of Halal. The first is that Halal Science as a discipline is not yet established. The concept of Halal science itself has probably been around since the 1990s, but there is no unified view on the subject and scope of Halal science, nor is there a global organization such as an academic society based on it. Secondly, there is the issue of risk communication with consumers. Normal risk communication is between scientific experts and consumers, but in the case of Halal practice, in addition to this, it is necessary to refer to the fatwa, which requires more complex communication between Islamic jurists, scientific experts and consumers (Burhanudin, J. 2021).

3.3 Globalization

In the pre-industrial world, people lived mainly in agrarian societies. Grains and animals were concentrated in very small areas around human dwellings, forming regions based on food supply and material cycles. Therefore, although they could lose food about nature, they had a clear knowledge of what food to eat and how to obtain it.

However, industrial societies have also shaped the world system of food production and supply, creating a division of labour in food production. As a result, the risks associated with modernization have an inherent tendency towards globalization, i.e., expansion on a global scale. The risks associated with industrial production increase on a global scale, irrespective of the location of production. For a long time now, acid rain has not only eroded sculptures and cultural heritage in Germany but has also crossed borders, dying forests in Scandinavia and killing fish in Canadian lakes. Or the food chain, which links everything on earth with everything else, so that in practice borders and boundaries become meaningless.

The problems that globalization poses for the practice of Halal are crucially important for the Southeast Asian region, which has the largest Muslim population in the world, but also has a highly diverse population and active intra- and extra-regional distribution. Because of the mixed population of non-Muslims in the region, it is very costly to develop the infrastructure for the import and export of the food system to ensure Halal, and it is still difficult to establish global traceability. And the globalization of human mobility has also raised the issue of Halal practices (e.g., tourism) that Muslims face when they go outside the areas of Islamic pre-eminence.

3.4 *Haram* and *shubhah* produced by industry

What has been the actual impact of the relationship between industrial society and Halal as we have seen so far on the practice of Halal? In a word, it is an increase in haram and *shubha*. For example, the establishment of the standard that a small amount of alcohol or GMF in foods, including traditional foods, is haram, has made haram technically visible, which was previously unknown to the average consumer. The unit of analysis, the gene, was introduced to determine haram, and the presence of a single gene in a pig is now considered haram. Or as is typical in the Ajinomoto case in Indonesia, the use of haram in some industrial production processes has been discovered.

Modern industrial society has not only increased the risks in the practice of Halal through division of labour, specialization and remoteness but has also expanded the domain of haram and made it visible by technology and control it through standardization. It is not an exaggeration to say that the subject and domain of *haram* are exploding by scientific knowledge in industrial society. Scientific knowledge stimulates novel interpretations to distinguish between halal and haram. It increases haram items.

On the other hand, there is an increase in the number of *shubhah* (doubtful items) which cannot be determined whether they are Halal or Haram. Typical examples of *shubhah* are beef and poultry that consumers cannot know Halal slaughtered, and food that may have been adulterated in storage or transport by being mixed with *haram* food. As segments of the food system become more fragmented, processes become more complex, knowledge becomes more specialized, and the process of globalization continues, the number of foods belonging to *shubhah* is likely to increase without limit. While industrialization has created commodities and wealth, it has also produced several unexpected by-products, which have hurt human beings. This is what Beck calls reflectively. The fact that the industrialized food system creates haram and expands *shubhah* is also a phenomenon that belongs to reflexivity.

4. Muslim consumers in the risk society

4.1 Halal practices of consumers

According to Toffler, in the first wave of societies, farming dominant society, the market occupied a small area and most of the production activities were for the consumption of the producers and consumers without the market. In the societies of the second wave, industrial-age society, producers and consumers were separated, and the role of production consumers became smaller. In the third wave of societies, the information age society, he argued that the remasculinization of society (the loss of uniformity), the increasing customization of products, and the emergence of services and products that assist the activities of production consumers would tend to reintegrate the separated producers and consumers and revive production consumers in a new form [Toffler, 1980]. In his book "The Future of Wealth", published in 2006, Toffler referred to a "new regime of wealth", combining the non-monetary wealth created by the unpaid work of production consumers and the wealth created by the money economy (Toffler, 2006).

The separation of producer and consumer is also increasing in the Muslim population, with an exchange economy dominated by a market with industry in between. In this context, the Muslim consumer, like any other consumer in a risky society, must take responsibility for his food risks. In the first place, there is a strong affinity between the attitude of the individual consumer in a risky society and the attitude of the individual actor in Islam towards responsibility. In the Holy Qur'an, the basic idea is that if an act that is forbidden (haram) is interpreted as having been done by the will and choice of the individual actor, then he is made to accept responsibility for it in the Hereafter. According to this, the same attitude is required of the individual actor, not only regarding haram but also regarding *shubhah*, which is to be avoided.

As far as food is concerned, the practice of Halal in an industrial society should be the responsibility of actors from all segments of the food system. However, upstream producers usually do not have to take responsibility for whether their practices are *Halal* or not, if those downstream in the industry adopt the products produced upstream. Even if upstream producers and distribution systems were bound by Halal standardization and certification, the scope and coverage could be infinite. There may be a way to create a market consisting of only Muslim industries and consumers, but this is not realistic in the current

market economy. Conclusively, the consumer, separated from the producer, bears religious responsibility for the practice of Halal. This is not just a question of religious offence and punishment but leads to insecurity as a consumer (Fischer, J. 2012). In the market economy, not only objective safety but subjective security of consumers is crucial.

There are two possible ways to reduce the insecurity of Muslim consumers. The first, and perhaps most effective, is to return to being both consumer and producer and to keep the circle of the food system as small as possible. Ideally, the risk of practising *Halal* can be minimized if people are self-sufficient, ideally on a family basis. Toffler argued that people create a great deal of wealth not only through economic activities based on the exchange through markets but also through free and hidden economic activities for their use and satisfaction in their families and communities. Also, if you want to reduce the risk in Halal practice while maintaining the industry, you can partially participate in food production. Participate in the planning of products as a consumer and always suggest improvements to make the products suitable for *Halal* practice.

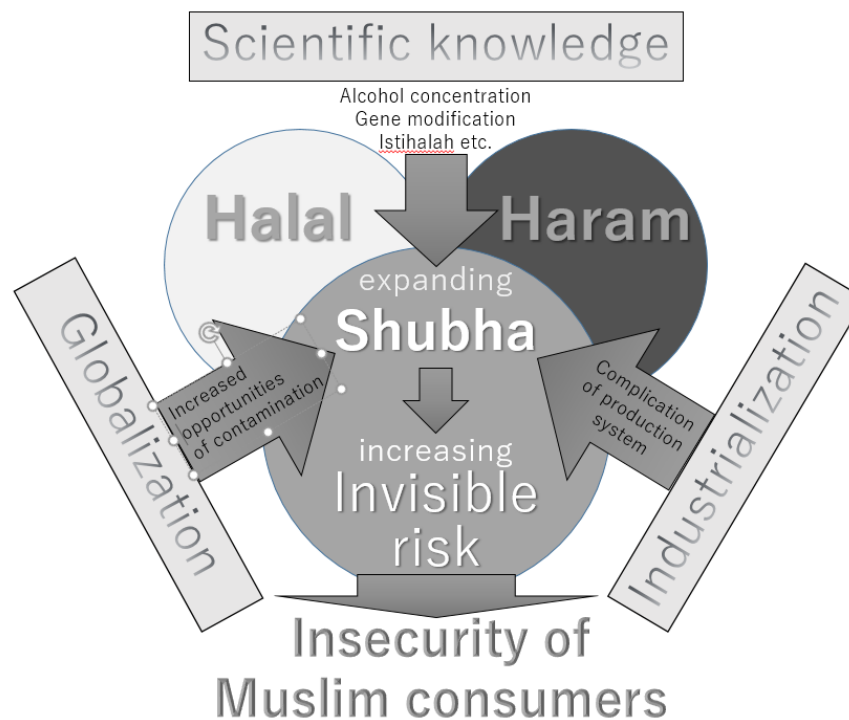
The second is to strengthen consumer surveillance. According to David Ryan, there are two aspects of surveillance: care and control, and in the age of electronic media, the former will become the dominant form of surveillance. This reflects the need for surveillance not from above, but conversely 'from below'. This surveillance from below will also be necessary for consumers who practice Halal. Because the main purpose is to reduce the insecurity of consumers themselves.

4.2 Sub-politics and Muslim solidarity

Beck proposes the idea of "solidarity through shared anxiety" and "sub-politics" to identify risks and think about how to respond to them. It seems to me that he is thinking of the possibility of a politically oriented movement led by NPOs, volunteer groups and NGOs. Furthermore, in the book *World Risk Society*, Beck focuses on the supranational nature of risk, and the need for supranational institutions and networks, multi-state cooperation, and global collaboration between sub-politics and politics (citizens and governments). In that global cooperation, the collective participation of individuals (e.g., boycotts) is decisive because individuals can directly participate in political decisions. The actions of multinational corporations and national governments become subject to the pressures of the global public. Awareness of global risks, self-criticism and reflection, and the global use of sub-politics. That, according to Beck, is the slightest possibility of political practice in a global risk society.

We believe that Muslim consumers are more likely to be able to, and need to, engage in this kind of political practice regarding Halal. This is because, whereas the current food system is globalized, Islam was originally capable of transcending the modern nation-state, and Muslims are more likely to engage in global solidarity. Although religion and religiosity can have a significant influence on Islamic consumer behaviour, they are not the exclusive factors lying behind it. The Islamic consumer is typically an identity seeker; he feels proud, happy, and pious when he/she buys something referring to Islam. In addition, to his/ her mind, Islamic goods symbolize the sense of belonging and solidarity within an imagined Islamic community (Karoui S. & Khemkhem R. 2016).

Figure 1. Increasing risk of Halal practice in the modern society



5. The relationship between science and technology and Halal

5.1 Two contributions of science and technology to Halal practice

I would like to consider what is needed in terms of involvement in the practice of Halal, science and technology. First, I believe that Halal should be treated as a strict norm and that there is no need to make a scientific evaluation of Halal itself, even if a positive evaluation is expected. This comes from a cultural relativist point of view. As already mentioned, Halal is not culpable when it is violated unwittingly by those who practice it, or when it is violated in life-threatening situations such as disasters. It is therefore highly unlikely that adherence to Halal norms would be detrimental to human welfare. Since this is the case, science doesn't have to analyze and assess the value of culture, including religion. Therefore, it is recommended that the science of Halal, as a branch of science, should be conducted from the following perspectives

The first is to contribute to Halal practice in the industry. In the production of foodstuffs, Halal should be one of the criteria used in addition to the conventional criteria (effectiveness, safety, efficiency, etc.) adopted by science and technology. This is to replace the inadequacies of production based on conventional criteria from the Halal point of view. This application of science and technology should be carried out about materials and production processes, not only for food products but also for medical and cosmetic products. In this process, it will also be necessary to feedback information from industry to Islamic jurisprudence on what constitutes Halal and to communicate and encourage the raising of new fatwas. *Istihalah* is a typical example of this kind of communication. It is defined as "changing the nature of the defiled or forbidden substance to produce a different substance in name, properties and characteristics (Jahangira, M., Mehmood, Z., Bashir, Q., Mehboob, F. & Ali, K. 2016). *Istihalah* also can be defined as a complete transformation occurred physically and chemically (Aadam, T. A., Norhaznee, M. N., Noor, A., Febrianto, K. V., Harivaindaran, & Yang, T. A. 2012). For this kind of matter, scientific understanding and interpretation are essential.

Secondly, it is a contribution to the visualization of risks to consumers. As mentioned, unlike food safety in general, the principle in Halal practice is that once a violation occurs in the process, the product can no longer be considered Halal. In the complex food system of industrial societies, it is extremely difficult to monitor and prove that no violations of Halal have occurred in all segments of the system. However, in the case of Halal, since the retribution for the violation is in the "next life" and this life, is expressed as psychological anxiety, the epidemiology of Halal violations is very limited. The role of science and technology is therefore to develop surveillance technologies (e.g., biosensors) at the request of those below, and to strengthen the surveillance system through them. Science and technology can also reduce consumer anxiety by making efforts to eliminate haram produced by industry and reduce the realm of *shubhah*.

The third is its role in risk communication with consumers. This is the most important role. Muslim consumers may perceive the increased Halal risks created by the industry as a situation in which their religious practice is inhibited and they may avoid the market economy or deliberately ignore Halal risks in industrial products. However, many consumers are interested in Halal information on products and construct practical attitudes towards them by collecting and reassembling this information themselves. Science could explain to consumers the techniques used in production, help them understand the risks associated with Halal, and alert them to the new risks that may arise.

5.2 Integration of Halal practice with other modern risks

In a risk society, risks related to Halal have been created and increased by industrialization and globalization. The food risks created by industrialization and globalization are not only related to food safety, but also to environmental degradation at production sites, labour problems, water problems, food losses, energy losses in transportation, zoonotic diseases, etc., which are the underlying problems of global risks in the world today. The difference is that these food risks are risks to human life and the environment, whereas the Halal risks violate cultural (religious) values, but all these risks are the same: they are recurrent risks of modernity. This linkage with other risks is being actively developed in the form of questioning the relevance of SDGs and Halal (Rozaidah, Pg. Siti. & Idris Pg Hj. 2022).

I believe that there is potential for consumers to take the initiative in working together to reduce risks related to Halal, while at the same time paying attention to other risks. We can see great potential in food information platforms based on blockchain technology, which has attracted much attention in recent years. It is the typical technology of surveillance that I mentioned as a possible "care" type surveillance system. Applying such a platform to the entire food supply chain would have many benefits. For example, it could significantly reduce the time needed to stop shipments and recalled products, thereby greatly reducing the potential for consumer harm if risky products were to be distributed. To make it possible to distribute information about products accurately and easily, even in complex distribution structures, thereby ensuring safe and secure food delivery to consumers. The information written on the blockchain platform cannot be tampered with, thus preventing food falsification and mislabelling, and ensuring transparency in food distribution.

The platform could include information on Halal as well as on food safety. The biggest obstacle to the implementation of this system is the burden of information input. This will require a system of automatic input using sensors and other IoT devices. In this respect, the role of science and technology will be important not only in production but also in protection. The formation of such a platform has already begun. What would be desirable is for Muslim consumers to take the initiative and encourage the inclusion of Halal in the platform, as well as paying attention to and proactively incorporating non-Halal risks. This

proactive approach by Muslim consumers will optimize the whole food system according to several important objectives. Muslim consumers, who seek the possibility of solidarity beyond nation-states and values other than the wealth production of industrial societies, may be best placed to deconstruct industrial society and reduce the risks it has created. It is necessary to develop technology and risk communication from the perspective of the overall security and well-being of Muslim consumers.

6. Conclusion

In the process of modernization, many Muslims have come to consume industrially produced products. According to Beck, this is a process that unwittingly creates risks, and risks related to Halal are included in those risks. Halal is about cultural risks, which arise later than environmental and health risks. This is because the Muslim population entered the process of modernization later than in developed countries such as Europe and the United States. Many industrial technologies related to food have been established without any awareness of Halal and have had to interpret, create regulations, build systems, and make choices for Halal. Furthermore, in the process of creating new technologies, the risk of violating Halal is further increased.

Surrounded by *shubhah*, Muslims are having to assume responsibility for halal and make choices amid uncertainty. As consumers, Muslims will have to confront this situation through transnational solidarity and by joining the risks of halal with other risks also created by modernity. Science is a cog in the wheel of industrial progress. In order to address the issue of Halal in a risk society, it is essential to provide information and risk communication to Muslim consumers, in addition to providing alternative technologies suitable for Halal.

References

- Aadam, T. A., Norhaznee, M. N., Noor, A., Febrianto, K. V., Harivaindaran, & Yang, T. A. (2012). Muslim attitude and awareness towards Istihalah, *Journal of Islamic Marketing*, 3(3): 244-254.
- Abdallah, A., Rahem, M. A., Pasqualone & Pasqualone, A. (2021). The multiplicity of Halal standards: a case study of application to slaughterhouses. *Journal of Ethnic Foods*, 8.
- Azam, M. S. E. & Abdullah M. A. (2020). Global Halal industry: realities and opportunities. *International Journal of Islamic Business Ethics*, 5(1):47-59.
- Bacster J. (2020). Health and Environmental Risk. *International Encyclopedia of Human Geography*.
- Beck, U. (1992). *Risk Society: Towards a New Modernity*. London: Sage.
- Beck, U., Giddens, A. & Scott L. (1994). *Reflexive Modernization. Politics, Tradition and Aesthetics in the Modern Social Order*. Cambridge: Polity Press.
- Beck, U. (1998). *World Risk Society*. Cambridge: Polity Press.
- Giddens, A. (1991). *Modernity and Self-identity: Self and Society in the Late Modern Age*. Cambridge: Polity Press.
- Burhanudin, J. (2021). Halal Practices at the Dawn of Southeast Asian Modernity: Some Cases of Halal Fatwa in al-Manār in the Beginning of the Twentieth Century. in *Rethinking Halal*.
- Fischer, J. (2012). The Halal Frontier: Muslim Consumers in a Globalized Market, *International Journal of Market Research*, 54(5):723.
- Jahangira, M., Mehmood, Z., Bashir, Q., Mehboob, F. & Ali, K. (2016). Halal status of ingredients after physicochemical alteration (Istihalah). *Trends in Food Science & Technology*, 47: 78-81.

- Kashim M. I. A. M., Alias M. N., Zin D. M. M., Said N. L. M., Zakaria Z., Salleh A.D. & Jamsari E.A. (2018) Istihalah and its effects on food: An islamic perspective. *International Journal of Civil Engineering and Technology* 9(1):755-762.
- Lash, S. (1990). *Sociology of Postmodernism*. Routledge.
- Lash, S. (2014). *Emergent Globalization*. Polity.
- Toffler, A. (1980) *The Third Wave: The Classic Study of Tomorrow*. Bantam Books.
- Rozaidah, Pg. Siti. & Idris Pg Hj.(2022). Halal-Tayyiban and Sustainable Development Goals: A SWOT Analysis. *International Journal of Asian Business and Information Management* 13(2):1-16.
- Yakin, A. U. & Christians, L. L., (2021). *Rethinking Halal: Genealogy, Current Trends, and New Interpretations*. Brill.