IOSR Journal of Business and Management (IOSR-JBM)
e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 22, Issue 7. Ser. V (July 2020), PP 38-44
www.iosrjournals.org

Promoting Sustainable Customer Behavior: The effects of Eco-bags use in a Lebanese Supermarket

Halima Alameddine
(Faculty of Economics and Business Administration, Lebanese University, Lebanon)

Abstract:
Confronting the global waste crisis, especially plastic waste dilemma worldwide, effort research and experiment started to focus on all pollution problems decades ago. So, many trials have been done trying to decrease the consumption of plastics generally around the world, more specifically the consumption of plastic bags. Why plastic bags are so dangerous?
A Plastic bag is manufactured in a second, used for 20 minutes and requires up to 300 years degrading in nature[1]*. To fight the plastic bag problem, the Eco- bag manifests itself. Nevertheless, the problem nowadays, societies face arises in the reuse of the eco-bag by customers.*
In this study, a practical application was organized in a Lebanese family supermarket in Lebanon to promote the use of the eco-bags instead of the plastic harmful to the nature bags. The main methodology used in this experiment was the "randomized control trial treatment[2]*" that consist of dividing the total sample size of 188 customers into equal groups. The concept of nudging was applied, the nudge is a way of sending the right message to get the right response and improve people's behaviors. Once the nudge is implemented, we could see awareness towards our environment and guide people by skewing their behavior to achieve the expected results that will contribute not only to their well-being but also to the well-being of society. The results of the research were negative, the nudge did not significantly increase the use of eco-bags, but other financial benefits have been reached.*

Key Word*: Nudge, Eco-bags, sustainable development, rationality, cognitive biases, Lebanese supermarket.*

Date of Submission: 02-07-2020 Date of Acceptance: 18-07-2020

I. Introduction

In a wave of development towards greener and more environmentally friendly systems, Lebanon suffers from a serious problem of waste management. It is not surprising to see that plastic products and plastic bags included are a major source of damage to the fauna and flora and the sustainability of the living being.

A major waste reduction strategy, in many developed countries[3], has recently implemented the use of recyclable shopping bags instead of traditional plastic bags.

It is estimated that about 500 billion to 1 trillion plastic bags are used worldwide[4]. Although utilization rates change from a country to another, there is an urgent need to highlight collective commitments to reduce the level of plastic bags usage.

In addition, Lebanon has a long-simmering waste problem that is worsening with the demographic growth and the adoption of inefficient waste treatment practices[5]. Not only, the absence of any national legislation regulating waste has made the problem more urgent; but also, basic solutions have not been well implemented such as the reuse and recycle of plastics[6].

Hence, a nudge provides a very cost-effective and non-intrusive way to alter the environment in which people make their decisions[7].

Not to mention that nowadays, people are increasingly overwhelmed by the obligations of life.

Busy life, hard work, many social responsibilities and financial worries, people are struggling to organize their lives[8]. With this in mind, one can clearly see how a simple reminder can have a huge impact[9]; it is by addressing reminders, that we can manage to show what is more important to one itself and procrastinate other competing obligations. The main objective of this experiment is to encourage more people to reuse their eco-bags.

So, the right message at the right time can not only help people remember to use bags, but also, over time, create a habit of their willingness to bring their eco-bags with them the next time they go shopping[10].

Information, however, is done through social messages, and it is seen as the first step towards reducing the use of plastic bags. SMS is considered an affordable and inexpensive way to provide information to consumers[11].

In order to test the effect of an SMS message received by the consumer and see how his behavior will be influenced or directed, a loyalty system has been implemented in the supermarket to record their reuse of Eco- bags within a theoretical framework of nudging.

In the following study, the article will be subdivided into literature review of the theoretical framework and then an exhibition of the methodology, arriving to the results of the implementation.

II. Literature review

Pollution, an international dilemma

Nowadays, if we want to deal with this dilemma of the greatest threat to human safety, we are dealing with the pollution and waste problems. The latter harms the living human being, and contributes in the death of about 600,000 children under the age of 15 years old[12]. A scientific report reveals that 91% of the world's inhabitants breathe air that is unfortunately polluted[13].

Globally, air pollution caused an average of 1.8 years of living expectancy to decrease in life expectancy in 2016, according to the research of the University of Chicago's Institute for Energy Policy (EPIC)[14].

Lebanese waste problem

Essentially the living being has a great concern with regard to its future, its survival with good health and it is a priority to preserve and make every effort to protect a continuity for the different species. It is necessary to treat this problem with a human mind to discover the radical solution or at least mitigate its effects.

In addition, like any other country on this planet, Lebanon suffers from different pollution problems.

Our country really suffers from deprivation of the necessities of normal and respectful life such as infrastructure, medical insurance, job offers, free education and any other ease of life that is valid in other countries. Adding to all its miseries, pollution has spread like an infectious disease that kills the nerves of life of this country by violating the last hope of Lebanese people[15].

Lebanon is really experiencing a waste crisis that it has never experienced before, reflected by frightening numbers. It is necessary to clarify that this country is the 5th most polluted country in Asiawith a pollution index of 87.39. According to a study by researchers at the American University of Beirut, 77% of the solid waste produced in Lebanon is either dumped in open dumps, while only 10-12%, they estimate, cannot be composted or recycled[16].

Lebanon really faces a need for a long-term waste management strategy for the country as a whole that takes into account associated environmental and health impacts, Human Right Watch said. The problem does not end with the pickup phase. At the treatment level, it is a complex technical operation that requires expert studies and quite specific work plans[17].

On the side of a Lebanese expert: "Lebanon still does not have a national policy to control the use of landfills and to promote composting and recycling through the implementation of efficient waste sorting"[18].

A need to behavioral science

The use of a plastic bag or an ecological bag is a choice that requires a study. In order to explain the hierarchization of the decision, dependent and independent factors that led to this decision, where it is essential to project ourselves towards the science that explains the behavior[19].

Behavior specifically determines our economic choices, so to explain the latter it is obvious to address the analytical issues of behavioral economics explaining the causes and psychological traits that guide us.

A scientific discipline focuses on the analysis of human behavior through observation and experimentation to explain the process of decision-making for individuals[20]. According to Richard THALER (2008) pioneer of Nudging theory, the main reason for adding humans to theories is to test the accuracy of predictions made with these theories dealing with purely human subjects[21].

There are many causes that can affect an individual's behavior, identified by psychological and social research, several cognitive biases being psychological tendencies to process information according to predictable patterns in relation to each individual and which lead to deviations in mind far from what we know as rational logical thinking[22].

Theoretical background

Economics after decades of research and contribution by economists, psychologists and analysts of economic choices and behaviors of agents, theories are brought forward to explain the traits of behavioral economics, from which we detail in the following a list of theories that contributed chronologically to the birth of the concept of Nudge[23]. In 1965 the Irrationality Theory developed by Herbert Alexander Simon[24], then the Prospect Theory detailed in 1979[25],then the Practice Theory in 1996 organized by Sherry Ortner[26]. Here, comes

the Nudge Theory that puts the humans' decisions, actions on the right track developed by Richard H. Thaler in 2008.

In this research, Nudge Theoryis used to encourage customers in the supermarket to bring back every time they visit the supermarket their Eco- bags[27]. We will serve in the implementation of the Nudge Theory which consists of providing the right information at the right time to the targeted audience. It is a **suitable technique, carefully** and skillfully **lying by the researchers who aim to affect the prioritization of choices of decision makers,** which would encourage people to change their behaviors and make choices that are in their own interest and in the public interest as well. This does not create **constraints, sanctions,** or high costs to apply[28].
This theory starts from the concept that incentives and encouragements are more fruitful than coercion.

III. Research methodology

After a theoretical observation of serious pollution problems and its projection in Lebanon by a waste crisis that does not manage to end, a field more minimized for this problem was chosen: it is a supermarket in which we noticed that the expenditure on the use of plastic bags is really huge. This supermarket is located in a region that suffers from very complicated environmental problems. The steps of the research are provided in the following diagram:

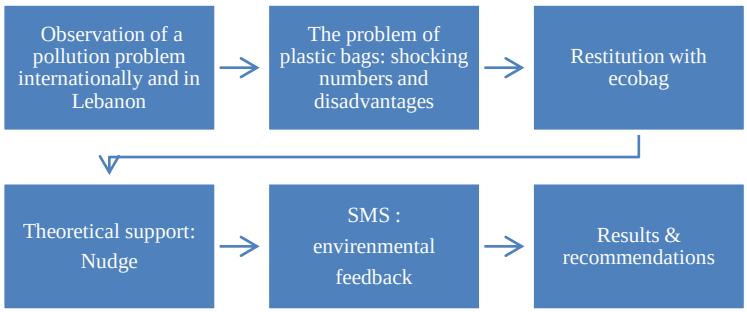

Figure no 1: Research steps

As shown in the figure no 1, a chronological sequence of spending 27 weeks at work, and that during each phase, research instruments and methodological practices are implemented to ensure harmonization between periods that are subdivided into pre-intervention preparation periods, period during intervention, and then a period of data collection after the insertion of Nudging. In the flowing table, the practice period was descripted according to a time sequence.

Table no 1: Description of the implementation time sequence

Period	Date	Description
1	Mar 1 -Apr 1	* Preparing Eco-bags: 900 Eco- bags at 3,500 LBP/unit in a period of 15 days. * Barcoding during producing * Installing the loyalty system, the strategy of counting 1,000 LBP for an item collected.
2	Apr 2-May 18	*Distribution of bags and adopting a strategy of counting 1,000 LBP for a point collected in case of reuse of Eco- bags, *189 customers *Survey to test the back plan: *55.9% believe that it is the responsibility of citizens to protect the environment *58% believe that plastic is the most harmful material for the environment
3	May 18-Jun 1	*No intervention is performed *Customers behave freely without any external intervention.
4	Jun 2 - Jul 28	*Intervention of the nudge via SMS with environmental content and feedback, on the 2nd and 16th of the months August and September by dividing the sample into 3 groups randomly Via UNOSMS1. *Division of the sample into: 63 customers don't get anything 63 customers receive environmental messages 63 customers receive feedback messages *Analysis of customer visits to send at the suitable time the message
5	Jul 29-Dec 1	*Post intervention *Periods of tracking data collected, via the loyalty system already implemented.

Based on table no 1 andafter collecting information from the supermarket, recording all the transactions of customers, who had an Eco-bag, the study proceeds to analyze how these customers used these Eco bags. Whether they had an intuitive duty to bring the bag back to each visit to the supermarket or the messages already sent to the groups were the appropriate Nudge to promote the reuse of these Eco- bags by customers during the execution of their supermarket purchase.
Therefore, the following hypothesis is tested:
H0: nudge was effective to promote the eco-bag use.
A simple linear regression test via E-Views[29], on binary variables, is conducted for a period of 27 consecutive weeks.

IV. Results and discussion

Model 1:
The analysis is based on the following model:
$Y= \beta 0 + \beta 1 treatement + \beta 2\ post + u$ (1)
Equation (1) uses a logit model in which:
The dependent variable is a dummy variable that can measure either the re-use of eco-bags or in taking in consideration if it is a treatment or a control group.
Two independent variables were selected:
Treatment: is an indicator variable that controls for any time-invariant factors that takes a value of 1 if the individual is in the treatment group and 0 if it is control group.
Post: is an indicator variable that controls for any time-invariant factors that takes a value of 0 if the individual is in the treatment group and 1 if it is in the control group.
β1: measure the effect of being in the treatment group and receiving SMS
β2: measure the effect of being in the control group and receiving SMS
A regression analysiswas conducting to find results:

Table no 2:test of linear regression

Dependent	Reuse	Coefficient	Error	T	p>t	95% confidence interval
Independent	Treatment	0.2571069	0.1836598	1.40	0.163	-0.1051919
Independent	Post	0.4241629	0.1869453	2.27	0.024	0.553829
Result	Treatment vs post	-0.3891928	0.2131684	-1.83	0.069	-0.8097022

Table no 2 reflects the results obtained according to 1682 observations and F (3,188) =2.2, Prob>f =0.0723, R-r squar:0.005, MSE = 1.7822

The following analysis was to check the effect of the intervention on receiving any of the treatments, regardless of which treatment was environment or feedback.
The results suggest that the effect of receiving any treatment was negative such that receiving the treatment decreased the frequency of bag reuse by 0.39. This result was weakly significant (p-value = 0.069).

Model 2:
The analysis of the second model is based on the following equation:
$Y= \beta 0 + \beta 1\ environment + \beta 2\ feedback + \beta 3\ post + u$
The pervious equation uses a logit model in which the dependent variable is a dummy variable that can measure either the re-use of eco-bags by taking in consideration if he is a treatment or a control group, then the treatment group was divided into environment or feedback group.
Independent variables are:
Environment: is an indicator variable that controls for any time-invariant factors that takes a value of 1 if the individual is receiving environmental SMS and 0 if it is receives feedback SMS.
Feedback: is an indicator variable that controls for any time-invariant factors, that takes a value of 1 if the individual is receiving a feedback SMS and 0 if he receives an environmental SMS.
β1: measure the effect of being in the treatment group and receiving environmental SMS
β2: measure the effect of being in the treatment group and receiving feedback SMS
β3: measure the effect of being in the control group, and do not receive any SMS

Table no 3: test of linear regression

Dependent	Reuse	Coef	Error	T	p>t	95% confidence intervals
Independent	Environment	0.2769784	0.229193	1.21	0.229	-1.753913
Independent	Feedback	0.2337978	0.2242505	1.04	0.289	-0.2085728
Independent	Post	0.4241629	0.1870568	2.27	0.024	0.0551629

Result	Post vs environment	-0.35965	0.2316948	-1.55	0.122	-0.8167058
Result	Post vs feedback	-0.4184066	0.240085	-1.74	0.083	-0.8920134

Number of observation 1682 and F (3.188) = 1.47 , Prob> f = 0.2026 and R-r square = 0.0053, MSE = 1.783

As shown in table no 3 the second model separates the treatment into environment and feedback messages. Therefore, it is important to compare the effect of the feedback or the environment message to the control group. Since the result in the first analysis encompasses the effect of both, so the researcher is not focused in.

The results suggest that the environment message decreased the reuse of bags by 0.36, while the feedback decreased the reuse by 0.42. The effect of the environment message was statistically insignificant (P-value = 0.122) implying that the effect was likely due to "chance". The effect of the feedback message was weakly significant (P-value = 0.083).

In the sum, the effects of the treatment appeared to have the opposite effect to what was expected. It would be wise to have a look at the implementation of the intervention and to identify certain bottlenecks in it. In addition, the results may also have low power, which could possibly imply a non-representative sample in each group. Also, it is an important thing for the research to do is to check if the trends are parallel. By the number of times a bag was used over time and identify if they are parallel at the baseline. If they are not parallel trends it could be a cause of biasing the result of the study.

Difference in difference study:

To explain these results, which are contradictory to what was expected, a difference in difference study was adopted. The latter collects the number of reuses of Eco- bags over the three periods of the intervention in order to analyze the parallelism of trends in the period before intervention.

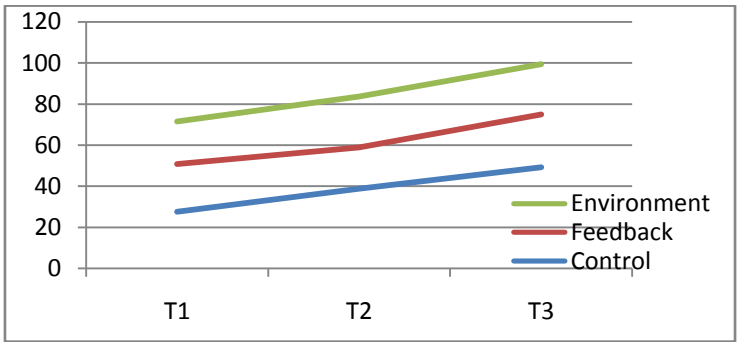

Figure no2: Variation of how each group reuses Eco- bags over time

Based on figureno**2**analysis, it is clear that during the post-intervention period the trends were parallel, which does not explain why the nudge was not effective.From an economic and financial point of view, nudge could be considered with a perfectly social purpose and human behavioral. For a company, a nudge can be approached to reduce costs or increase the company's profits[30].

First, a nudge can be dedicated to promote employees to behave in a way that contributes to increasing efficiency and employee performance, which directly increases the company's profits[31].

Second a nudge can be an effective way to reduce the costs of a company or even save the consumption of the materials used and reduce by a general view the loads on the different dimensions.

Therefore, if the study intends to project the effect of nudge in the supermarket, it concerned the nudge divided on two environmental axes and feedback to reduce the consumption of plastic bags, which occupies a significant portion of the monthly expenses of the supermarket.

However, reanalyzed the effect of this financing intervention on the supermarket, the expenditure on the purchase of the bags was collected from the monthly invoices in order to analyses whether this intervention contributed to reduce the consumption of plastic bags within the supermarket.

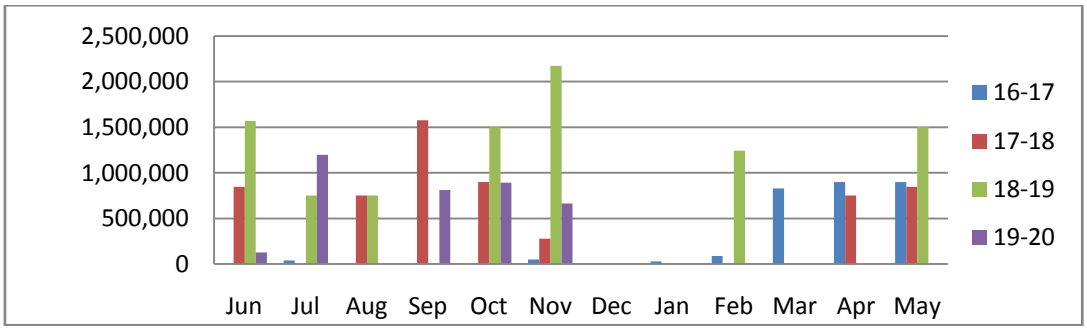

Figure no3: variation of the reuse means of each group according to years

Based on graph **no3**and abrief interview with the supermarket manager provided that buying plastic bags is a heavy burden on the supermarket monthly, and that finding an effective method to reduce this consumption will give the supermarket a chance to reduce its expenses or even invest this amount in the purchase and sale of the goods and make more profits.

Finally, even if the nudge was not effective in overall to achieve what it was dedicated for, in terms of treatment, but it helped to decrease the monthly expenses of purchase of plastic bags. And as reported by the manager of the supermarket, this intervention provides a good image and goodwill starting from the dimensions of social, ecological responsibility and the real contribution to the solution of the waste disaster in the region Minieh, in North Lebanon.

Customers have considered this intervention from different point of view. Some of them considered there are a cultural, ethical and ecological initiative that attracts them to be loyal customers to this supermarket. Others have refused this idea because they count on the multi-use of bags. Also, two opposite points of view were observed.

In the first some customers consider that caring eco-bags at each visit to the supermarket is so prestigious. in the second, others find it could be a shame to reuse the same eco-bag at each visit.

Ultimately, a psychological study deserves to be held to address the psychological biases that explain these two points of view to find the appropriate interventions to encourage them in case they are not convinced[32].

Here it was necessary to look for causes related to the implementation or even errors in fixing the durations of the messages, the promotion mechanized, the contents of the messages or the samples in each group were not representative.

Finally, it is recommended to repeat these studies with a larger sample number and other types of nudges to test their effectiveness.

V. Conclusion

Pollution, the dilemma that crosses all geographical boundaries, appears in Lebanon, a country with minimal capacity and low law enforcement. Now our country is suffering from this disaster, which devours its greenery, harms its beaches and air and as a result threatens the continuity of living beings.

So to try to reduce the use of plastic bags consumed in the supermarket, a study was conducted to test the effect of promoting customers by offering eco-bags and developing a loyalty system linked to the use of these eco-bags at each visit the supermarket via a new concept that is a simple way to guide a person's behavior[33]. This nudge was captioned by the division of the total sample into three groups, the first is a control group that received nothing, the second group received environmental messages and the third group was contacted via messages informing them of each time how many points he collected.

After analysis and interpretation, the results were negative!

Unfortunately, messages of any type decreased the frequency of reuse, which was not expected.

However, these results may be due to chance in the first place, then to the number of non-representative samples in each group or these results may be faults in the mechanism of implementation, this could also be a major factor.

This is why, for future studies, it is recommended to increase the number of samples per group. Such a study would be really valuable with the tendency of Lebanon like other countries to ban the use of plastic bags in 2021.

Moreover, approaches can be implemented such as collaboration with municipalities, conducting citizen awareness campaigns on the seriousness of plastic bags, trying to collaborate with schools to develop green culture.

References

[1]. Sandak, A., Sandak, J., &Modzelewska, I. (2019). Manufacturing fit-for-purpose paper packaging containers with controlled biodegradation rate by optimizing addition of natural fillers. Cellulose, 26(4), 2673-2688.
[2]. Vrijsen, J. N., Fischer, V. S., Müller, B. W., Scherbaum, N., Becker, E. S., Rinck, M., &Tendolkar, I. (2018). Cognitive bias modification as an add-on treatment in clinical depression: results from a placebo-controlled, single-blinded randomized control trial. Journal of affective disorders, 238, 342-350.
[3]. Fitri, L., Hatmoko, J. U. D., &Hermawan, F. (2019, November). Managing Construction Waste in Developed Countries: Lessons Learned for Indonesia. In IOP Conference Series: Earth and Environmental Science (Vol. 366, No. 1, p. 012016). IOP Publishing.
[4]. Deck, A., Lavender, H., Handy, D., Wellman, B., Gurganus, J., &Striml, G. J. (2019). excelling in engineering cradle-to-cradle design thinking: the life of a trillion plastic bags. Technology and Engineering Teacher, 78(5), 14-19.
[5]. Atwood, B. (2019). A City by the Sea: Uncovering Beirut's Media Waste. Communication Culture & Critique, 12(1), 53-71.
[6]. Hägerdal, N. (2019). Toxic waste dumping in conflict zones: Evidence from 1980s Lebanon. Mediterranean Politics, 1-21.
[7]. Maki, A. (2019). The potential cost of nudges. Nature Climate Change, 9(6), 439-439.
[8]. Baitz, M. (2019). Responsibility in life cycle assessment practice.
[9]. Sanders, M., &Kirkman, E. (2019). I've booked you a place, good luck: Applying behavioral science to improve attendance at high-impact job recruitment events. Journal of Behavioral Public Administration, 2(1).
[10]. Doan, N., Hashemi, S. A., Mambou, E. N., Tonnellier, T., & Gross, W. J. (2019, May). Neural belief propagation decoding of CRC-polar concatenated codes. In ICC 2019-2019 IEEE International Conference on Communications (ICC) (pp. 1-6). IEEE.
[11]. Baig, S. A., Noar, S. M., Gottfredson, N. C., Lazard, A. J., Ribisl, K. M., & Brewer, N. T. (2020). Incremental criterion validity of message perceptions and effects perceptions in the context of anti‐smoking messages. Journal of Behavioral Medicine.
[12]. Ha, E. (2020). Impact of Air Pollution Hazards on Human Development. In Health Impacts of Developmental Exposure to Environmental Chemicals (pp. 223-245). Springer, Singapore.
[13]. Marmett, B., Carvalho, R. B., Dorneles, G. P., Nunes, R. B., & Rhoden, C. R. (2020). Should i stay or should i go: can air pollution reduce the health benefits of physical exercise? Medical Hypotheses, 109993.
[14]. Greenstone, M., & Fan, Q. C. (2019). Indonesia's Worsening Air Quality and Its Impact on Life Expectancy.
[15]. Baayoun, A., Itani, W., El Helou, J., Halabi, L., Medlej, S., El Malki, M., ... &Mokalled, T. (2019). Emission inventory of key sources of air pollution in Lebanon. Atmospheric Environment, 215, 116871.
[16]. Hemidat, S. (2019). Feasibility Assessment of Waste Management and Treatment in Jordan (Doctoral dissertation, Universität Rostock).
[17]. Farah, J., Ghaddar, R., Nasr, E., Nasr, R., Wehbe, H., &Verdeil, É. (2019). Solid Waste Management in Lebanon: Lessons for Decentralisation.
[18]. Halwani, J., Halwani, B., Amine, H., & Kabbara, M. B. (2020). Waste Management in Lebanon—Tripoli Case Study. In Waste Management in MENA Regions (pp. 223-239). Springer, Cham.
[19]. Pozo, H., Tachizawa, T., &Akabane, G. K. (2019). Hierarchization of the decision-making process according to the economic sector. Independent Journal of Management & Production, 10(6), 1882-1907.
[20]. Ditta, A. (2019). Determinants of Indivdual's Investment Decision in Islamic Banking: A Case Study from Vehari.
[21]. Pūce, L. (2019). Criticism Of Behavioural Economics: Attacks Towards Ideology, Evidence And Practical Application. Journal of WEI Business and Economics, 8(1), 32-46.
[22]. Kahneman, D., &Tversky, A. (1996). On the reality of cognitive illusions.
[23]. Hopkins, D. J., Ingman, C., & Reynolds, B. (2003). Nudge, Nudge, Wink, Wink, Know What I Mean, Know What I Mean? A Theoretical Approach to Performance for a Post-Cinema Shakespeare. In Performing Transversally: Reimagining Shakespeare and the Critical Future (pp. 137-170). Palgrave Macmillan, New York.
[24]. Rofe, Y. (2020). Rationality Of Irrationality, The: Schizophrenia, Criminal Insanity And Neurosis. World Scientific.
[25]. Heutel, G. (2019). Prospect theory and energy efficiency. Journal of Environmental Economics and Management, 96, 236-254.
[26]. Coleman, J. F. (2020). A practice theory approach to researching local community radio production in the United Kingdom. The Routledge Companion to Local Media and Journalism, 33.
[27]. Moore, N. (2019). Nudge theory: should career development practitioners have a position?
[28]. Musarra, R. (2019). Nudge practices: a smart and cheap way to manage human resources (Doctoral dissertation).
[29]. Kozhan, R. (2019). Financial Econometrics-With E Views.
[30]. Brocklehurst, P., Tickle, M., Birch, S., McDonald, R., Walsh, T., Goodwin, T. L., ... & Fitzpatrick, S. (2020). Difference in difference. In Impact of changing provider remuneration on NHS general dental practitioner services in Northern Ireland: a mixed-methods study. NIHR Journals Library.
[31]. Huang, L., Lei, W., Xu, F., Liu, H., Yu, L., Shi, F., & Wang, L. (2020). Maxims nudge equitable or efficient choices in a Trade-Off Game. PloS one, 15(6), e0235443.
[32]. Houweling, T. (2019). Fighting Pollution with Nudges. Student Undergraduate Research E-journal!, 5, 1-5.
[33]. Verbruggen, F., Aron, A. R., Band, G. P., Beste, C., Bissett, P. G., Brockett, A. T., ... &Colzato, L. S. (2019). A consensus guide to capturing the ability to inhibit actions and impulsive behaviors in the stop-signal task. Elife, 8, e46323.

Halima Alameddine. "Promoting Sustainable Customer Behavior: The effects of Eco-bags use in a Lebanese Supermarket." *IOSR Journal of Business and Management (IOSR-JBM)*, 22(7), 2020, pp. 38-44.