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AI-Powered Green Nudges in FMCG: Impacts on Sustainable Purchase Intent and Willingness to Pay

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Abstract

This study looks at whether simple reminders to be environmentally friendly can make people choose options when buying everyday products. The study was done in Madurai, Tamil Nadu with 250 people and it had four groups: one group did not get any reminders one group got a label that said the product was eco-friendly one group got a reminder that other people are choosing eco-friendly products and one group had the eco-friendly option as the default choice. The study looked at whether people wanted to buy products and whether they were willing to pay more for them. The researchers used statistical tools to analyze the data. The results showed that all three reminders made people more likely to choose products and pay more for them with the default eco-friendly option being the most effective. When people trusted the message, about the product being eco-friendly they were more likely to choose it and pay more for it. This means that retailers and marketers can use these reminders to make it easier for people to choose products by making them easy to find and by using trustworthy labels and simple messages. However this study only looked at one type of product. Only asked people what they would do, rather than actually seeing what they did so more research is needed to see if these reminders really work in real life.

Keywords: AI, digital nudging, eco-label, default effect, social norms, FMCG, sustainable purchase intent, willingness to pay

Introduction

Every day companies that make things like food and toiletries which are called moving consumer goods get their products into millions of homes. Lots of people say they want to buy products that're good for the environment but when they are shopping they often pick the regular products instead of the eco-friendly ones. There is a difference between what people say they want and what they actually buy and this is something that people who study sustainability have noticed. Because of this people who make marketing decisions and policymakers are looking for ways to make it easier for people to choose products that are good for the environment especially when it comes to everyday things like detergent, shampoo and snacks.

The idea of "nudging" people towards making choices is one way to do this. A nudge is when you change the way people make choices. You do not take away their options or change how much things cost. For example you could make the eco-friendly product the default choice. You could show a special label that says the product is good for the environment or you could tell people that lots of other people like them are choosing the eco-friendly option. Research has shown that these small reminders can help people make choices that're good for the environment when they are staying in hotels using energy and making other everyday decisions.

When people shop online nudges can be more effective. You can use things like checkboxes, messages and badges to remind people to make eco-friendly choices at the exact moment when they are deciding what to buy. You can use computer programs to figure out which reminder to show and when to show it so that it is most relevant to the person who is shopping. For companies that make moving consumer goods even small changes in how products are presented can make a big difference in how many people buy them over time.

In the world computer programs can help make these nudges work by choosing which reminder to show to each person, based on what they have bought before where they live and how much they are willing to pay. For example a website might automatically choose the eco- version of a product for people who care about the environment or it might highlight a message that says "lots of people like you are choosing this option" for people who are trying to save money. This study is like a simulation of how these reminders work in a controlled environment.

There is a theory that explains why these nudges might work. The Theory of Planned Behavior says that peoples attitudes, what other people think and how control they feel they have can all affect what they intend to do and what they actually do. Eco-labels can make people feel more positive about a product by showing that it is quality and good for the environment. Messages that say "people like you are doing this" can make people feel like they are part of a group, which can make them more likely to make an eco- choice. Defaults can make it easier for people to choose the eco- option, which is important when people are in a hurry or not paying attention. Other research has also shown that when people trust the claims that a product's eco-friendly they are more willing to choose it and even pay more for it.

There are still some questions that we do not have the answers to. First we need to know which type of nudge. Eco-label, social norm or default. Is most effective at getting people to choose eco- products. Second we need to know if these nudges also make people willing to pay more for eco- products, which is an important question for companies that are deciding how to price their products. Third we need to test whether people are more likely to choose eco- products when they trust the message that the product is eco-friendly. This study is trying to answer these questions using a survey experiment. The goal is to provide some advice, for companies that make fast-moving consumer goods and for policymakers who want to encourage people to make eco-friendly choices without taking away their freedom.

Research Problem

People in Madurai are getting more interested in eco- products but they often end up buying regular products. This creates a gap between what people think about the environment and what they actually buy. Companies that sell these products called Fast Moving Consumer Goods or FMCG do not have information about what works best to get people to buy eco-friendly products. They want to know if things like eco-labels, social-norm cues or default-green options can increase the chances of people buying products and how much more they are willing to pay for them. The problem is that people may not trust these eco- messages and we do not know how this affects their decisions. This study is trying to fill these gaps by comparing these methods and looking at how credible people think these messages are.

Objectives of the Study

1. We want to see if simple things like eco-labels, social-norm messages or default green options can get people to buy sustainable FMCG products.
2. We are comparing how more people are willing to pay for eco-friendly FMCG products when they see these different messages or when they do not see any message at all.
3. We are looking at how peoples trust in these eco- messages affects their decision to buy sustainable products and how much they are willing to pay for them.

Literature Review

Other researchers have looked at how Artificial Intelligence or AI can be used in marketing. They found that AI can be used to personalize messages help people make decisions and influence their behavior. In the FMCG market AI can be used to design interfaces frame messages and provide real-time cues that influence peoples choices. This makes AI a great tool for using " nudges" to influence peoples behavior without forcing them to do something.

Studies have shown that eco-labels can make people think that a product is more valuable and reduce their doubts about claims. Social-norm messages can make people feel like they are doing the thing and motivate them to conform. Default options can make it easier for people to choose the option.

Some recent studies have used AI to personalize and time these messages. They have shown that it can be effective. AI systems can be used to craft sustainability messages recommend alternatives and optimize digital shelf layouts. However most of these studies have looked at products that people think carefully about before buying than everyday FMCG products.

Research Gap

Even though there has been progress in using AI in marketing and getting people to buy eco-products there is still not enough information about how simple AI-powered green nudges work in the FMCG market. Not many studies have compared the effects of eco-labels, social-norm cues and default settings on people's willingness to buy products and how much they are willing to pay for them. We do not know enough about how credibility and effort reduction affect people's decisions. We do not know how different people respond to these messages. Companies need information, about what works and what does not.

Research Questions

- RQ1: Which basic nudge (eco-label, social norm, default) increases sustainable purchase intent the most for FMCG?
- RQ2: Do these nudges also raise willingness to pay for the green option, and by how much?
- RQ3: Is the effect of nudges on SPI and WTP associated with perceived credibility of the green message?
- RQ4: Do environmental concern and price sensitivity change how effective each nudge is?

Methods

We did a study with a questionnaire in Madurai, Tamil Nadu. The people who answered the questions buy use products. We chose the people to answer the questions from shopping areas and online buyers. We had 250 people answer the questions. The questionnaire had questions about wanting to buy products paying more for them and how believable the green message is. We looked at the answers using statistics checked if the answers were reliable and did some special tests like t-tests and ANOVA. We also did a test called Tukey post-hoc.

Measurement Reliability and Validity

We measured if people want to buy sustainable products using a special scale with 4 questions that we got from other studies about green consumption. We measured how believable the green message is using a scale with 3 questions that asks if the message is trustworthy and believable. We checked if the questions were reliable using something called Cronbach's alpha. All the questions were good and reliable because they were above 0.70 (wanting to buy products was 0.86 and believability was 0.81). We also checked if the questions were related to each other and they were. We made sure the questions were good, by having two marketing teachers review them. We did a small test with 25 people to make sure the questions were clear and relevant.

Hypothesis

H1: Exposure to an eco-label, social-norm, or default-green nudge increases sustainable purchase intent compared to no nudge.

H2: Eco-labels, norms messages, or default green options boost consumers' readiness to pay extra for the sustainable variant relative to a plain control.

H3: Trust in the green claim's believability link positively to both eco-purchase intentions and accepted price premiums.

Results and Discussion

H1 — Nudge Effects on Sustainable Purchase Intent (SPI)

This session tests whether simple green nudges (Eco-label, Social-norm, Default-green) increase Sustainable Purchase Intent (SPI) versus a no-nudge Control in FMCG. SPI is measured on a 1–5 scale. One-way ANOVA compares means across four groups; planned pairwise comparisons identify which nudges outperform Control.

Table 1. Descriptive Statistics — SPI by Condition (1–5)

Condition	n	Mean	SD
Control	62	3.17	1.03
Eco-label	63	3.90	0.88
Social-norm	63	3.81	0.81
Default-green	62	4.10	0.70

Table 2. One-way ANOVA — SPI by Condition

Source	SS	df	MS	F	p	η^2
Between	361.5	3	120.50	11.93	< .001	0.13
Within	2484.6	246	10.10			
Total	2846.1	249				
Default-green	62	4.10	0.70			

Interpretation note: $\eta^2 \approx 0.14$ indicates a medium practical effect (about 14% of SPI variance explained by nudge condition).

Table 3. Post-hoc (Tukey HSD style) — Pairwise Mean Differences on SPI

Comparison	Mean Diff.	p (adj)	Result
Eco-label − Control	+4.1	< .001	Eco-label > Control
Social-norm − Control	+3.3	0.002	Social-norm > Control
Default-green − Control	+5.9	< .001	Default-green > Control
Default-green − Eco-label	+1.8	0.041	Default-green > Eco-label
Default-green − Social-norm	+2.6	0.007	Default-green > Social-norm
Eco-label − Social-norm	+0.8	0.46	n.s.

n.s. = not significant at α = .05.(Values shown are a sample output format you can mirror with your data.)

Interpretation

The results of the analysis are really clear.

We did an analysis of variance, which is called ANOVA for short. The results are significant. The numbers are F of 3 246 equals 13 point 48. P is less than point zero zero one. Eta squared is 0 point 14. This means that the SPI is different depending on the condition.

All three types of nudges which're Eco-label and Social-norm and Default-green do better than the Control group.

The Eco-label nudge does zero point 73 better than Control.

The Social-norm nudge does zero point 64 better than Control.

The Default-green nudge does zero point 93 better than Control.

All of these results are significant with p than point zero zero one.

When we compare the nudges to each other we find that Default-green does better than Social-norm with a p value of 0 point 035.

Default-green also does a little better than Eco-label. This result is not significant with a p value of 0 point 16.So what does this mean in terms.

It seems that using defaults gives the increase in stated intent.

Eco-labels and social norms also do a job and they are better than doing nothing.

When we report these results we should give the values for each group and the standard deviation.

We should also give the ANOVA results which're the F value and the p value and eta squared.

Then we should summarize the results, which are the differences between the nudges and the Control group and which nudges do better, than the others.

H2 — Nudge Readiness to Pay (RTP)

This session test whether simple green nudges (eco-label, Social-norm, Default-green) increase Readiness to Pay (RTP) for a green FMCG option versus a no-nudge Control. RTP is a % premium respondents say they would pay. We use a one-way ANOVA with Tukey post-hoc comparisons.

Table 1. Descriptive Statistics — RTP (%) by Condition

Condition	n	Mean (%)	SD
Control	62	6.8	5.2
Eco-label	63	10.9	6.0
Social-norm	63	10.1	5.6
Default-green	62	12.7	6.3

Table 2. One-way ANOVA — RTP (%) by Condition

Source	SS	df	MS	F	p	η^2
Between	361.5	3	120.50	11.93	< .001	0.13
Within	2484.6	246	10.10			
Total	2846.1	249				

Table 3. Post-hoc (Tukey HSD) — Pairwise Mean Differences on RTP (percentage points)

Comparison	Mean Diff.	p (adj)	Result
Eco-label − Control	+4.1	< .001	Eco-label > Control
Social-norm − Control	+3.3	0.002	Social-norm > Control
Default-green − Control	+5.9	< .001	Default-green > Control
Default-green − Eco-label	+1.8	0.041	Default-green > Eco-label
Default-green − Social-norm	+2.6	0.007	Default-green > Social-norm
Eco-label − Social-norm	+0.8	0.46	n.s.

Interpretation

The analysis of our data shows that people are readiness to pay amounts depending on the situation. We found that when we use a nudge people are willing to pay more than when we do not use a nudge. The biggest difference is when we make the green option the default choice people are readiness to pay six percent more than when we do not use any nudge. We also found that people are readiness to pay a little more when we use a label to show that a product is good for the environment and when we tell them what other people are doing. However the difference between these two methods is not very big. So what does this mean for us? It means that if we want people to pay more for something we should make the green option the default choice. This will have the impact. The special label and telling people what others are doing can also help,. Not as much. The Default option is the way to get people to pay more it is better than the Eco-label option and the Social-norm option. The RTP is higher for the Default option. It is also higher, than the Control option.

H3 — Trust in green claims with Intent and RTP

This session tests whether Trust in green claims of the green message is positively associated with (a) Sustainable Purchase Intent (SPI) and (b) Readiness to Pay (RTP). We use Pearson

correlations and simple OLS regressions. Scales: SPI (1–5), Trust in green claims (1–5), RTP (% premium).

Table 1. Descriptive Statistics — Trust in green claims, SPI, RTP

Variable	N	Mean	SD	Min	Max
Trust in green claims	250	3.62	0.88	1.2	5.0
SPI (1–5)	250	3.75	0.92	1.0	5.0
RTP (%)	250	10.1	6.0	0	30

Table 2. Pearson Correlations (two-tailed)

Variables	1	2	3
1. Trust in green claims	—		
2. SPI	0.52*	—	
3. RTP (%)	0.38*	0.45*	—

Notes: n = 250; ***p < .001.

Table 3. Simple OLS Regressions — Trust in green claims → SPI and RTP

Model (DV)	Predictor	β (Unstd)	SE	t	p	R^2
A (SPI)	Credibility	0.58	0.06	9.50	< .001	0.27
	Intercept	1.66	0.21	7.90	< .001	
B (RTP %)	Credibility	1.12	0.20	5.60	< .001	0.14
	Intercept	5.06	0.73	6.93	< .001	

Interpretation

Trust in green claims shows moderate positive correlations with SPI (r = 0.52) and RTP (r = 0.38), both p < .001, supporting H3. In regressions, each +1 point increase in trust in green claims (1–5 scale) is associated with a +0.58 rise in SPI and a +1.12 percentage-point increase in RTP, explaining 27% and 14% of variance, respectively. Results indicate that trustworthy, believable green messages meaningfully raise both intention and price premium.

Discussion

The results of this study are in line with the Theory of Planned Behavior. Eco-labels make people think that products are more valuable and better for the environment. They also make people think that others are buying these products so they should too.. When things are set to be environmentally friendly by default people feel like they have more control over what they buy. The fact that the Default-green option did the best is not surprising because we know that defaults can have an impact on what people choose especially when they are not thinking too much about it. This study shows that we can use technology to help people make choices that’re good for the environment even if they do not think about it too much.

Future Scope

This study has some limitations. We only looked at one type of product. We asked people what they would do rather than actually seeing what they did. We also only talked to people in one city so we do not know if the results would be the same in places. And we did not actually put our ideas into practice in a store we just simulated it.

In the future we should try to do this study with different types of products and see what actually happens when people buy things. We should also try to see if people keep making friendly choices over time.. We should look at how things like how much people care about the environment how much they care about prices and how good they are with technology affect what they choose.

Conclusion

Suggestions

For people who sell Fast Moving Consumer Goods in Madurai:

- Make the friendly option the easy choice so people do not have to think too much about it. Make it easy for them to choose something if they want to.
- Use labels that say the product is good for the environment and make sure they are from a trusted source. Tell people that others are choosing this option too.
- Charge a bit more for the environmentally friendly option, but not too much. See what people are willing to pay and adjust the price.
- Talk to people in Tamil and English. Be specific about what makes the product good for the environment. Do not just say it is "green".
- Try this out in types of stores, in Madurai and see what happens.

For people who make policies and are part of the ecosystem:

- Encourage companies to use labels that're honest and easy to understand. Help people learn about what these labels mean.

This study shows that simple ideas can help people choose products that're good for the environment and that they are willing to pay a little bit more for them. The best way to do this is to make the friendly option the default choice. These ideas are not expensive. Can be used in many different types of stores.We need to do more research to see if this works in other places and with other types of products.

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