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Product Innovation and Consumer Preference for Feminine Hygiene Products: A Moderated Model with Product Deprivation

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ABSTRACT

The study aimed to analyze the impact of product innovation on consumer preferences for feminine hygiene products. The study also investigated the mediated and moderated influence of deprivation on the adoption of the product. Following the analytical research design and deductive approach, the study has been conducted by adopting a multistage sampling method among the females dwelling in Kathmandu, economically active in different sectors, and with active menstrual cycles. The structured questionnaire prepared by adapting validated variables was used to collect the data from 385 respondents working in 50 organizations. Descriptive and inferential analysis was done using Process Macro for mediation and moderation effects using Hayes (2017) models. The study concludes that product innovation significantly impacts consumer preference, with a positive interactive moderation effect of deprivation with product innovation for consumer preference in feminine hygiene product adoption.

1. INTRODUCTION

Access to the right feminine hygiene products and a supportive and inclusive workplace culture can greatly enhance a woman's confidence and performance at work. Probable discomforts and stigma could be the primary reasons for the poor job performance of females during the menstrual period. To solve this problem, varieties of feminine hygiene products are available to satisfy consumers' preferences as they choose such products based on comfort (Zazueta, 2010), absorbency (Spencer & Brennan, 2002), price (Kim, 2018), convenience (Foxman, 2002), and environment (Lewis, & Lewis, 2019). Producers should focus on product innovation along with deprivation to improve product quality and product information level to influence the consumers' product preference.

Feminine hygiene products have a good market and contribute to the psychological well-being of a larger population globally. The menstrual cycle in females is a naturally occurring physiological phenomenon after they reach, on average, age 13 years and continue to age 50. The females go through the natural phenomenon 451.3 times (median

number of their lifetimes), corresponding to 34.7 years of menstrual activity if considering an average of 13 cycles per year (MacGregor et al., 2008). The demand of females for effective feminine hygiene products is in a surge with the increase in the number of working women and changing socio-economic standards. Such fact provides evidence of a significantly large market in feminine hygiene products; the global female hygiene products market was valued at $38.9 billion in 2020 and further projected to reach $ 68.7 billion by 2030, registering a Compound Annual Growth Rate (CAGR) of 6.1 % from 2021 to 2030 (Priya, 2022). The rise in the female consumer choices in the female hygiene products market and the increasing concern for menstrual health care are not limited to fundamental factors like price, but rather they are based on factors that are more personal and associated with comfort (Zazueta, 2010). Manufacturers need to invest in product development and innovation to cope with such a challenging but large business opportunity.

Product innovation refers to the introduction of goods or services that are new or significantly improved concerning their characteristics or intended uses, including significant improvements in technical specifications, components, and materials, incorporated software, user-friendliness, or other functional elements (OECD/Eurostat, 2005). The upgrades and alterations brought in the menstrual product to simplify usage and consumption are one of the functions of product innovation in menstrual products. In recent years, there has been significant innovation in the field of feminine hygiene products in various dimensions, e.g., reusable menstrual products (Lewis & Lewis, 2019), smart menstrual products (Hsu, 2018), organic and natural products (Alkon, 2012), innovations in tampons (Breuner, & Smith, 2013). Besides the innovative feminine hygiene products, some limitations are imposed due to cultural norms, and some are set by oneself, which limits the confidence and performance of women at work (Patel, 2019).

Though there is a prevalence of menstrual exile (known as "chaupadi" as a tradition of untouchability) in Nepal (Amatya et al., 2018), it is observed that there has been a continuous and progressive success in the ban of such practices. Menstruation health management (MHM) is forefronted along with many development initiatives across Nepal. The female hygiene industry in Nepal is showing signs of aspiration. The estimate of the number of small and large-scale sanitary pad industries operating in Nepal ranges from 35 to 40. Over 900 million units of sanitary pads are estimated to produce with an investment of Rs. 6 billion to fulfill the growing national demand (Republica, 2022). To fulfill the demand, national products are insufficient in terms of production capacity and quality to compete with imported products. It is necessary to investigate the needs and quality expectations of the new generation of consumers who are economically active and implement changes in production policy.

There are disposable napkins in various sizes, reusable napkins, tampons, and menstruation cups, and many may use the reusable products available in the Kathmandu market. Despite the market size and product availability, a gap of studies can be observed to link the female consumer preferences to adopt only certain products for their menstrual cycle. The study attempts to analyze the effect of product innovation on customer preference for feminine hygiene products in Kathmandu Valley. It also examines the mediating role of deprivation in predicting product innovation.

2. LITERATURE REVIEW

Product preference is the desire to seek out a particular product (Krithika & Alex, 2019). Customers' preferences are analyzed by the customer's expectations, likes, dislikes, and propensity to buy a particular product. Customers generally prefer products that assure a new experience in terms of design, comfort, aesthetics, cost-effectiveness, and continued high product quality, which are the consequences of product innovation (Rayi

& Aras, 2021; Pokhrel et al., 2021). Consumers often observe social norms, values, and social influence and keep knowledge of products' overall utilities and personal comforts before their preferences, i.e., the cognitive process. Relying on the assumption that people's behavior is a consequence of environmental and social influence, this study is based on social cognitive theory, which provides the framework for behavioral change (Green & Peil, 2009; Pavlov, 2010).

Product innovation and consumer preference

Product innovation refers to creating and introducing new or improved products into the market (West & Bogers, 2014). It involves the development of new ideas, designs, technology, and processes that bring value to customers and help businesses stay ahead of the competition.

Product innovation is the predominant framework for incremental changes and improvements to processes, products, and services (Rainey, 2005). It comprises the development of novel ideas, design, development, validation, and commercialization of new products for customers and markets in concert with the prevailing conditions and trends. Product innovation aims to enhance the quality, performance, and functionality of existing products or create entirely new products to enhance a company's competitiveness (Hitt, Ireland, & Hoskisson, 2017). Through product innovation, organizations develop their creative responses and solutions for meeting the needs and expectations of customers and markets, the driving forces in the business environment, and the strategic requirements of the organization (Rainey, 2005). The products innovation in feminine products by manufacturing companies include sizes, disposable ability, reusable facility, tampons, and cups. Product innovation can be measured from the dimension of new product attributes in menstrual care products.

The new product attributes are the aesthetic and technical features that make the product innovative. These characteristics include relative advantage, compatibility, and observability (Jacob & Yadav, 2014). Product innovation can significantly shape consumer preferences and behaviors (Awan & Zuriat-ul-Zahra, 2014; Kapferer, 2012). By introducing new or improved products, consumers are presented with new options and features to enhance their experience and satisfaction (Cabral & Margues, 2020; Daragahi, 2017). This can result in increased brand loyalty and repeat purchases as consumers seek products that meet their evolving needs and expectations. Product innovation can also lead to the creation of new market segments and the expansion of existing ones, attracting new customers and increasing market share (Ginting & Sembiring, 2018). Product innovation motivates people to purchase (Rayi & Aras, 2021) and increases the chances of product adaptation (Jacob & Yadav, 2014; Lee & Johnson, 2016). Product innovation has a significant relationship with consumer buying behavior (Zaoui et al., 2021). Based on this empirical evidence, the following hypothesis was developed.

H1: Product innovation has a significant positive impact on consumer preference for feminine hygiene products.

Product Deprivation and Consumer Preference

Product deprivation in terms of economic or physical accessibility, facility or psychosocial or knowledge impediment (Jacob & Yadav, 2014). Deprivations refer to a situation in which a consumer cannot obtain the product they desire for various reasons, such as lack of availability, unaffordability, or unavailability in their region. Product deprivation occurs when individuals cannot obtain the desired goods (Solomon, Marshall, & Stuart, 2009). Mainly, there can be assumed two deprivation for the study. The physical deprivation of any facility or basic need, and the other deprivation of knowledge (product awareness). Knowledge deprivation is the lack of proficiency, knowledge, and aptitude toward product innovation. Most female consumers in low- and middle-income countries

are unaware of the existence (Global Public Health (2018); Patel, Panda, Sahoo, Saxena, Chouhan, Singh, Ghosh, & Panda, 2022) of alternative products to traditional products. Due to this, even a seemingly simple task like reading a product label, calculating a sales price, or figuring out an instruction can prove frustrating and embarrassing (Capon & Burke, 1980). Customer knowledge of innovation also influences recommendation intentions (Zhang, Zhang, & Lin, 2020).

There is a substantial relative deprivation-related predictive effect (Ma, 2013) on consumer preference. There was the identification of the significant impact of customer knowledge about product innovation on customer intentions (Zhang, Zhang, & Lin, 2020; Nakata & Weidner, 2011; Pokhrel et al., 2021). Based on the review, the following hypotheses were developed.

H_2: *Product innovation has a significant positive impact on deprivation in feminine hygiene products.*

H_3: *Deprivation has a significant positive impact on consumer preference for feminine hygiene products.*

H_4: *There is a significant mediating relationship between deprivation with product innovation and customer preference for feminine hygiene products.*

3. RESEARCH METHODS

An analytical research design was used in conjunction with the study objectives. The study followed a deductive research approach applying established theory in the study context. The female population in Kathmandu is 14 lakh which is 51 percent (of all age groups) of the total population in Kathmandu (Central Bureau of Statistics, 2021). The sample for the study consisted of 385 female respondents of active menstrual cycle age and economically active living in Kathmandu from banking and financial institutions, family-owned businesses, education consultancy firms, audit firms, engineering consultants, medical institutions, and educational institutions. 385 is the adequate sample size for generalizing the study findings (Cochran, 1965) of this population size following the multistage sampling.

The study used the primary source as the basic data source to conduct the study. A structured questionnaire with the 5-point Likert scale items was used to collect the data. Items for product innovation were adapted from (Hurt, Joseph, & Cook, 1977). The items for new product attributes and consumer preferences have been adapted from Janet (1993). Similarly, the items developed for the deprivation were inspired by Nakata and Weidner (2011) and contextualized. The questionnaire consisted of basic information, descriptive information, and Likert scale items for variables of interest. The Likert scale was used as 1 strongly disagree (SDA), 2 disagree (DA), 3 neutral (N), 4 agree (A), and 5 strongly agree (SA). Before the data collection, a pilot study was carried out among 15 females to represent a picture of the female consumers' preferences and profile sorting. Descriptive statistics with percentage, mean, and ranking analysis was used for descriptive information, while correlation and regression were used for inferential analysis. For this purpose, Hayes (2017) model 4 (mediating model) was examined (which was refuted), but finally, Hayes (2017) model 1 (moderated model) was presented as the final model.

4. RESULTS

Demographic information of the respondents

Most of the respondents belonged to the age group 18-35 years, accounting for 93 percent (see Table 1). Similarly, a majority of 73.51 percent of the respondents were full-time workers.

Table 1
Demographics of the Respondents

Age	Frequency	Percent
18-35	27	7
Above 35	358	93
Occupational Status		
Full-time job	283	73.51
Part-timer (including student)	102	26.49
Total	385	100

Respondents were asked about their preferences for types of feminine hygiene products and the brand they used to be at work (Table 2).

Table 2
Types of feminine hygiene products and brand preference at work

	Responses	
Products preference during menstruation periods at work	n	%
Disposable pads(including eco-friendly)	288	66.21
Tampons	12	2.76
Menstrual cups	93	21.38
Cloths (traditional)	42	9.66
Brand preference of the product		
Whisper	309	43.40
Stayfree	190	26.69
Sofy	130	18.26
Fem	19	2.67
Pee Safe	9	1.26
Everteen	3	0.42
Not fixed	52	7.30

Most respondents (66.21%) prefer disposable pads, followed by menstrual cups (21.38 %). 9.66 % of respondents reported using traditional clothes, while only 2.76% preferred tampons. Mostly preferred brand is found to be Whisper (43.4%) among the respondents, followed by Stayfree (26.69%), Sofy (18.26%), and Fem (2.67%).

The first-time recommendation and purchasing agents

Table 3 presents the person who recommended feminine products first-time and the person who purchased them.

Table 3
First-Time Introduction of the Feminine Hygiene Product and Purchasing Agents

	Responses	
First-time introduction of the product	n.	%
Mother	223	57.92
Sister	58	15.06
Friends(females)	79	20.52
Others	25	6.49
Products purchasing agents		
Self-purchase	347	60.45
Mother/sister	150	26.13
Father/brother/husband	77	13.41

It is revealed that the mothers' role (57.92%) is vital in recommending feminine products for the first time, followed by female friends (20.52%) and sisters (15.06%). Regarding the purchasing agent, the majority (60.45%) of respondents used to purchase feminine hygiene

products on their own. In comparison, their mothers or sisters (26.13%) and fathers, brothers, or husband (13.41%) also used to buy products for them.

Preferred features of feminine hygiene products

Table 4 summarizes the various product features of feminine hygiene products that can influence users. The preferred features are presented in rank order.

Table 4

Preferred Product Feature to the Users

Features	Rank
Ability to absorb and odor control	1
Safe and suitable for menstrual health	2
Easy procedure to adopt for usage	3
Durable and reusable(eco-friendly)	4
Different variations in colors and packaging	5

The results revealed that the respondents prefer feminine products having a strong ability to absorb and odor control, followed by safe and suitable for menstrual health, are easy procedure to adopt for usage, are durable and reusable (i.e., eco-friendly), and have different variations in colors and packaging.

Test of association between test variables

The predicting variable, i.e., product innovation based on consumers' preference, was measured in terms of weighted average satisfaction in statements sorted for each variable. Five items in each variable, i.e., product innovation, deprivation, and preferences, were used to examine the hypotheses. Respondents rated each of the statements based on their practices. Table 5 provides evidence of descriptive information on each of the variables.

Table 5

Descriptive Statistics of Variables

Statistics/Variables	Product innovation	Deprivation	Consumer preference
N	385	385	385
Mean	3.38	3.23	3.36
Median	3.60	3.20	3.60
Mode	3.60	3.60	3.60
Std. deviation	0.79	0.74	0.79
Cronbach alpha	0.73	0.71	0.73
No. of items	5	5	5

Cronbach's alpha was also used as a reliability test (see Table 5). The alpha coefficient is the average of all potential split-half coefficients due to various ways of dividing scale items. The value is in the 0-1 range, a commonly accepted rule of thumb for describing internal consistency. Generally, an alpha value of 0.60 is considered to be satisfactory, 0.70 is considered adequate, and 0.80 is considered an excellent scale (George & Mallery, 2003). Cronbach's alpha value for each of the variables was found to be higher than 0.7; this evidence varies that the instruments used in the study are reliable. The correlation between the variables was used to examine the association between product innovation, product deprivation, and consumer preference (see Table 6).

Table 6

Association of Consumer Preference with Product Innovation and Deprivation

Variables	Product innovation	Deprivation	Consumer preference
Product innovation	1		
Deprivation	.145**		
Consumer preference	.966**	.152**	1

Note. ** Correlation is significant at the 0.01 level (2-tailed).

The results revealed significant positive association between product innovation, deprivation, and consumer preference at a 99 % confidence level (p-value<0.01). These results provide evidence that improving satisfaction from product innovation and increasing product knowledge influences product preferences.

Test of hypotheses and impact analysis on consumer preference

The proposed mediating model was examined using Hayes (2017) model 4, incorporating product innovation as a predicting variable, consumer preference as a predicted variable, and deprivation as the mediating variable using Process Macro (see Table 7).

Table 7

Results of the Examination of Mediating Model

Outcome Variable: CP						
Model Summary						
R	R-sq	MSE	F(HC2)	df1	df2	p
0.983	0.966	0.047	1013.242	2	383	0.000
Model Estimates						
	coeff	Se(HC2)	t	p	LLCI	ULCI
constant	-0.271	-0.185	-1.467	0.143	-0.634	0.092
PI	1.011	0.028	36.272	0.000	0.956	1.066
Dp	0.066	0.034	1.917	0.056	**-0.002**	**0.134**
Total Effect Model						
Model Summary						
R	R-sq	MSE	F(HC2)	df1	df2	p
0.981	0.963	0.051	337.415	1	384	0.000
Model Estimates						
	coeff	Se(HC2)	t	p	LLCI	ULCI
constant	-0.187	0.19	-0.985	0.325	-0.562	0.187
PI	1.05	0.057	18.369	0.000	0.938	1.162

The proposed mediating model for predicting consumer preference has been refuted as the deprivation failed to predict consumer preference (p=0.056>0.05, LLCI = -0.002, ULCI = 0.134) with a zero in lower limit and upper limit interval. The direct model, i.e., predicting consumer preference by product innovation, is significant (p<0.01, LLCI = 0.956, ULCI = 1.066). These findings support accepting H1 but refute H2 and H3.

It then examined a moderated model with the moderating effect of deprivation in the relationship between product innovation and consumer preference. *Table 8* provides the total, direct, and interaction effects.

Table 8

Moderated Model Predicting Consumer Preference

Outcome Variable: CP						
Model Summary						
R	R-sq	MSE	F(HC2)	df1	df2	p
0.983	0.966	0.043	29397.09	3	383	0.000
Model Estimates						
	coeff	Se(HC2)	t	p	LLCI	ULCI
constant	3.397	0.011	322.428	0.000	3.376	3.418
PI	0.970	0.013	74.934	0.000	0.944	0.995
Dp	0.014	0.017	0.800	0.424	**-0.020**	**0.048**
Int_1	0.009	0.001	9.460	0.000	**0.008**	**0.011**

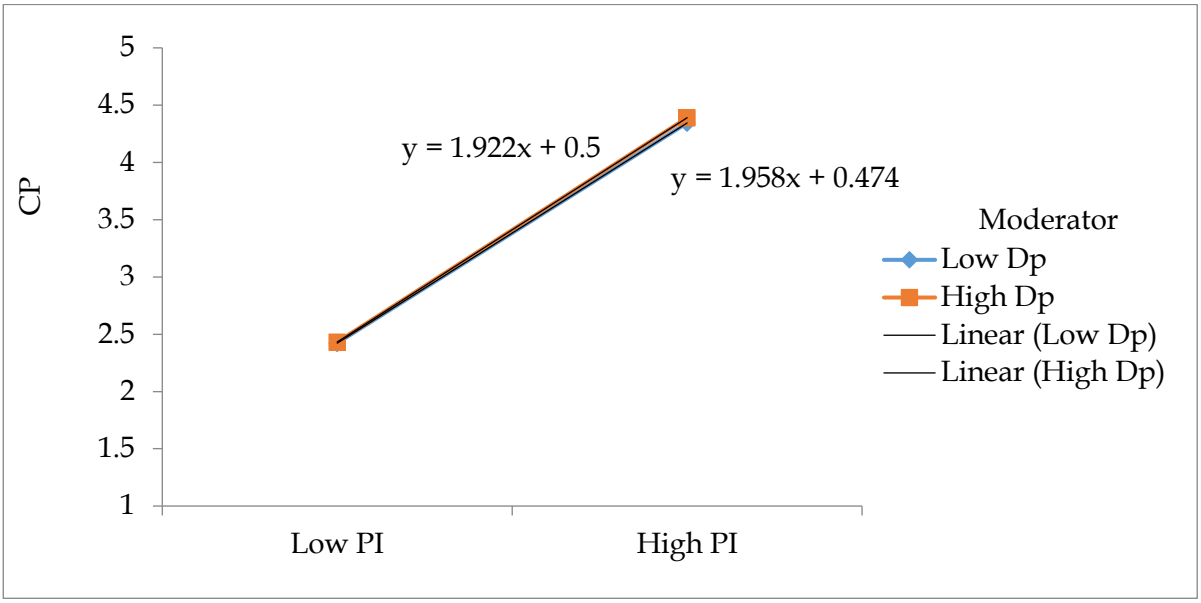
Continued …

Product term key						
Int_1 : PI x Dp						
Test(s) of highest order unconditional interaction(s):						
	R2-chng	F(HC2)	df1	df2	**p**	
X*W	0.003	89.498	1	382	**0.000**	
Conditional effects of the focal predictor at values of the moderator(s):						
Dp	Effect	se(HC2)	t	p	LLCI	ULCI
-1.108	0.959	0.013	72.436	0.000	0.933	0.985
0.000	0.97	0.013	74.934	0.000	0.944	0.995
1.108	0.98	0.013	77.004	0.000	0.955	1.005

Table 8 provided statistical evidence that product innovation is a predictor of consumer preference ($p<0.01$, LLCI = 3.376, ULCI = 3.418). Product deprivation is found to be an insignificant predictor of consumer preferences ($p>0.01$, LLCI = -0.020, ULCI = 0.048). Still, the interaction effect of product deprivation with product innovation is found to be significant ($p<0.05$, LLCI = 0.008, ULCI = 0.011). This result provides evidence for a significant positive moderation effect of deprivation with product innovation to predict consumer preference. This means that consumer preference gets more positive with increasing deprivation, i.e., product knowledge. The moderation effect of product deprivation (Dp) in the relationship between product innovation (PI) and consumer preference (CP) can be shown in figure 1, showing no statistically significant transition points within the observed range of the moderator found using the Johnson-Neyman method.

Figure 1

Moderation Effect of Product Deprivation in Predicting Consumer Preference



5. DISCUSSION

The study was intended to analyze the impact of product innovation in predicting consumer preference for feminine hygiene products in Kathmandu using a deductive approach. This study also examined the mediation model (which was later dropped because it was an insignificant), and finally, an improved moderated model was suggested. The study was focused on an educated and economically active population dwelling in the capital city of Nepal. Female consumers mostly preferred eco-friendly disposable pads followed by menstrual cups as their premium products during their menstruation cycle. The study also revealed that the females were mostly recommended the products by their mothers and

female friends. Whisper, Stayfree, and Sofy were found to be the most popular brands preferred by the respondents in Kathmandu. This study revealed that different usage patterns were found to be dependent on the time and place of use, consistent with the findings of Jacob and Yadav (2014). Most respondents preferred products that gave them confidence that there would be no leakage or odors when they purchased them.

The results revealed that the product innovation had a statistically significant positive impact on consumer preference for feminine hygiene products. This result is consistent with the findings of Ginting and Sembiring (2018), supporting the significant positive effect of product innovation on purchasing decisions. This finding is also consistent with the conclusion of Lee and Johnson (2016), which concluded with a consistently positive impact of innovativeness on purchase intentions among consumers, supporting the findings of Krithika and Alex (2019).

This result, to the contrary the findings of Jacob and Yadav (2014), resulted in an insignificant impact of product deprivation on the consumer preference for feminine hygiene products. This helps to conclude that consumers make the purchase decision even with no knowledge of product innovation, as supported by the findings of Pokhrel et al. (2021), who suggested that despite the existence of deprivation in physical resources, there can be acceptability and feasibility of the preference for menstrual cups. This result differs findings of Nakata and Weidner (2011) as they revealed that deprivation has a negative impact on the adoption of innovation. The working females generally were bankers, CAs, engineers, architects, businesswomen, consultants, and such. The access to the restroom facilities and work-loads limit them to frequent washroom visits. The study also provided a statistically significant interactive moderation effect of product deprivation with product innovation on consumer preference. This study suggests manufacturers and traders provide product knowledge and innovation information to excel in the consumers' preferences.

6. CONCLUSION

The study concludes that product innovation is a significant positive predictor of consumer preference for female hygiene products. The economically active female prefers innovative products assuring no leakage and controlling order for a long time. This suggests that manufacturing companies need to work to innovate such products to attract economically active female consumers.

The study also concludes that the positive interaction impact of product deprivation with product innovation for consumer preference in the female hygiene segment. This provided the concluding evidence that product deprivation strengthens the positive relationship between product innovation and consumer preferences.

7. IMPLICATIONS

The study can be helpful for manufacturers of female hygiene products to have quality investments for the potential long-run effect of innovation-related products on consumers' preferences. In addition, results suggest that they need to provide adequate product information to current and potential consumers to impact preferences positively. Furthermore, the results have theoretical implications for developing economies. The findings of the study provide assistance to the entrepreneurs engaged in the menstrual product industry for providing a zest of the market. The study assists the entrepreneurs in understanding the female consumers' preference towards the products currently placed in the market. The entrepreneurs can study the behaviors and plan accordingly to scale up as per the demand.

The study's findings obtained the attention of the local level government to the poor women-friendly sanitation facilities for working women at different local levels during

working hours. The study can further provide reference to the level of increasing awareness of feminine hygiene products and their convenience to every female along with the working one.

8. LIMITATIONS AND FUTURE SCOPE

The study focused on the economically active female who may be self-aware of the pros and cons of product attributes. Therefore, the deprivation may be insignificant in predicting consumer preference. Researchers, in the future can incorporate economically inactive consumers in the study. Similarly, other variables like price, market availability, and celebrity endorsement in public awareness and in advertisement can be incorporated. In addition, the study can be more rigorous with mixed methods.

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We also declare the absence of conflict of interest of any person and institution.

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