Research article

Milk packaging innovation: Consumer perception and willingness to pay

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Abstract: Currently the cow milk market is characterised by a decrease in consumption and sales, for both fresh and long-life products. In addition to the negative consumer perception towards milk, linked to, for example, its potential perceived negative effects on human health, at Italian level, this product is overlooked on the market in terms of communication strategies and innovation, increasingly rendering this product an undifferentiated commodity. As product packaging represents a key factor to improve and develop products on the market, the aim of this research is to analyse consumer preferences and attitudes towards different innovative strategies of milk packaging. A consumer sample from North-West Italy was involved in the experiment, to investigate their purchasing habits and preference towards cow's milk. An ordered logit model was implemented, in order to determine consumer willingness to pay for milk packaging innovation (11 packaging indicators), in addition to establishing the best strategies for product improvement, in recognition of the emerging needs of consumers. We found that consumers express a high level of interest towards the packaging attributes associated with environmental sustainability, especially regarding the choice of packaging materials and their recyclable features (from 3.369 to 3.645 of mean preference score of the 5-points Likert scale). Furthermore, consumers declared a willingness to pay a premium price, up to 20% more, for innovative milk packaging, demonstrating the potential for general applicability in the relevant market.

Keywords: consumer preference; innovative perspectives; milk packaging; ordered logistic regression; willingness to pay

1. Introduction

Since ancient times, man has transported food products from one place to another for

convenience, trade and preservation purposes. To this end, it was necessary to design, develop and use appropriate containers. Currently, beyond the function of protection, at different life product stages, product packaging has been developed to serve several functions, one being the important role it plays to convey information to consumers. During the purchasing process, consumers first observe and evaluate product packaging and successively their decisions are directly affected by the information represented on it [1–3].

The packaging characteristics can be classified as visual and verbal elements. The former are related to the packaging colour, transparency, design, images, material and size. For example, material transparency can potentially influence purchasing intention, both positively and negatively, since the product is in direct sight through the packaging. This aspect can also enhance the creation of the trust relationship in the consumer's mind [4,5]. Images facilitate the identification of the products on the shelves [5], while verbal elements refer to product nutrition information and slogans [6]. In previous literature, it has been highlighted how the effect of verbal or visual communication of product characteristics and packaging is perceived very differently in the mind of the consumer, proving how images better convey information than verbal indications [7,8]. Additionally, images remain in a clearer and long-lasting way in consumer memorie, which is also linked to the fact that verbal descriptions are more likely to generate different connotations, when compared to the corresponding graphical presentation of the same product [9].

In general, several product aspects influence consumer purchasing processes: the attributes that define product packaging have evolved together with consumer needs, leading to the introduction of design innovations to increase efficiency (intelligent and active packaging to increase product storage and shelf-life) [10,11], convenience (opening system, convenient storage and use) [12–14], in addition to social, economic and environmental sustainability. In relation to product packaging assessment, purchasing decision makers selectively evaluate the attributes of choice, especially related to environmental sustainability [15], manifesting a growing interest towards green packaging due to its re-use and recycling properties.

Focusing on cow's milk, this product has experienced a declining market for a prolonged period, both in terms of consumption and retail. Although Italy has a significant position within the European dairy sector, being the largest producer of PDO cheeses, both the production and consumption of drinking milk are experiencing negative trends. In particular, milk production at national level in 2019 decreased by 5% compared to the previous year, confirming, however, the fifth place for production in the European context [16]. In addition, the cow milk market in Italy is characterised by a large share of imported milk, which, however, decreased in the national scenario from 2014 to the present, while maintaining the position of Germany and France as top exporters, respectively. Export data also show negative signs, highlighting a 25% drop in packaged milk exported from 2018 to 2019 from Italy to the European countries [16]. At the same time, the critical scenario is also highlighted by analysing cow milk consumption trend showing a decrease of fresh milk consumption of 2.1% and of the UHT product of 1.7% from 2018 to 2019 [17].

A shift in consumption and life styles, linked to research related to health aspects of foodstuffs, has led to the exclusion of milk, both fresh and UHT, from diets, in favour of alternative drinks (such as vegetal drinks). This negative market trend is heightened by the lack of marketing and strategies targeting the re-evaluation of this product by consumers. Packaging is the most direct element of product marketing. Foreign markets have been using new strategies for product distinction for some time, based on innovation and product attraction properties. One of the latest options proposed by

Tetra Pak and represented by Tetra Rex® Bio-based, is a packaging in plastic obtained exclusively from sugar cane processing, combined with cardboard, so it is fully-renewable [18]. Among other innovation criteria, aseptic cardboard has been introduced providing a minor environmental impact, compared to plastic containers (both in HDPE and PET) [19]. On the contrary, the Italian market shows a low level of differentiation of milk, and its packaging, which emphasises the role it plays as a commodity. Generally, laminated composite material and PET plastic are the materials used for packaging; whereas glass is used in limited amounts, mainly by some trademarks, which are basically related to the territory and to traditions [20], and only for fresh milk.

Based on the aforementioned aspects, the aim of this research was to analyse the consumer preferences and behaviour when purchasing cow's milk in the metropolitan area of Turin (North-West Italy). More specifically, the survey aimed to study the preferences expressed by one sample of milk purchasing decision makers, with reference to 13 milk attributes and 11 product packaging indicators alike. A statistical analysis using an ordered logit regression model was implemented to determine the extent of consumer willingness to pay (WTP) for packaging innovation and to define which attributes of the packaging itself could innovation strategies and improvement be effected in order to satisfy consumers' emerging needs. This latter method was chose as the most appropriate approach in studying these issues, as suggested by other authors [21–23].

2. Materials and methods

In order to analyse consumer preferences towards different attributes of milk packaging, a choice experiment was carried out using a specifically designed questionnaire submitted directly to a sample of individuals, at 4 retail stores of large-scale distribution in the metropolitan area of Turin (North-West Italy). During the survey, both hyper and supermarkets were considered; face-to-face interviews were carried out by organising the data collection phase from March to April 2019, from Monday to Sunday, alternating two time slots (9 a.m. to 1 p.m. and 4 p.m. to 8 p.m.) in order to differentiate as much as possible the target of consumers intercepted at the points of sale. In the same questionnaire, respondents had to answer questions organised in sequence in three different sections, as described in the conceptual framework of the questionnaire structure in Figure 1. The time taken to fill in the individual questionnaire ranged from 3 to 5 minutes.

As shown in Figure 1, the first part of the questionnaire surveyed consumer preferences towards cow's milk, by means of a 5-point Likert scale (LIKERT#1). The respondents were required to assign a score, from 1 (unimportant) to 5 (extremely important), for each attribute listed in Table 1. The same table also reported the description of each attribute (not reported in the Likert-scale) used by the interviewer in some cases for explanations to the consumer during the filling out of the questionnaire and the referred literature references. In addition, purchasing habits regarding milk were also investigated in the first section of the questionnaire.

The second part of the questionnaire involves a second 5-point Likert scale (LIKERT#2), developed to investigate consumer preferences towards 11 descriptive attributes of milk packaging (Table 2). Again, LIKERT#2 listed only the attributes for scoring, while Table 2 also shows the description of each attribute and the references. In this case also, consumers were asked to assign scores for each single attribute, from 1 (unimportant) to 5 (extremely important).

Table 1. Milk attributes employed in the LIKERT#1 in the first section of the questionnaire. The description and related literature references for each milk attributes are also reported.

Milk attributes	Description	References
Organic certification	Organic certification is usually associated with a safe, health-beneficial, sustainable product, linked to greater animal welfare and quality. Additionally, in the case of milk, a connection is made between the biological and eco-friendly features of the product, in particular, by specific consumer profiles.	[24–26]
High quality certification	To be classified as a high quality product, milk must comply with the quality standards required by mandatory laws: a bacterial content at 30 ℃ of less than 100,000 CFU/ml (not exceeding 300,000 CFU/ml), absence of pathogens, somatic cells count at less than 300,000/ml (not exceeding 400,000/ml) in raw milk. (Note: CFU=colony forming unit).	[27,28]
Expiry date	The milk expiry date depends on the thermal processes performed. UHT milk has the characteristic of a prolonged unrefrigerated shelf-life. This is based on the severe heat treatment it undergoes, that some consumers perceive as reduction in organoleptic or nutritional quality. Conversely, fresh milk has a reduced shelf-life and only when conserved at low temperatures, guaranteeing the highest nutritional level. However, the choice of the categories strictly depends on the type of consumer tastes and on lifestyle.	[23,29]
Taste	The taste of milk, together with its organoleptic quality and its price is one of the most important characteristics for milk consumers. Conversely, consumers are often led to believe that the product is tasty only when its unhealthy, that is, it does not provide benefits to health. Indeed, the taste of milk taste is closely related to its fat content.	[29,30]
Label information	The mandatory information on the milk label is able to attract consumer attention and to influence their choices. During purchasing, it allows a conscious choice to be made besides the price justification. Consumers claim to control this information, especially when buying an alternative product instead of the usual one.	[6,29–34]
Milk produced by pasture-based animal husbandry (mountain pasture, grass, outdoor)	The system of pasture-based animal husbandry is associated with healthier animal feeds by consumers, linked to territorial resources, that directly influence the inherent product quality. Moreover, this system of husbandry is linked to a greater standards of animal welfare, environmental biodiversity and environmental sustainability.	[24,35–39]
Trademark (brand)	Consumers associate well-defined characteristics with the brand and its values contribute to the product choice. As regards milk, and not only, the brand is considered a vector of food safety. The brand image has a decisive impact on buying behaviour.	[9]

Milk attributes	Description	References
Nation of origin	The indication of the nation of origin is only compulsory for fresh milk. Regarding UHT milk, following the approval of the Italian decree law DM 7/12/2016 [27], the indication of nation of origin is voluntary, replaced by the obligation of the indication of the area of origin (e.g.: EU). The national origin of milk (Italian) is synonymous with safety, quality and the traceability of the product.	[26,29,40,41]
Local origin	Until recently there has been no a unique definition of the term "local". Milk produced locally is associated by the consumers with benefits of economic and environmental sustainability. From studies in literature, it emerges that the local origin is one of the first three choice drivers of the purchasing process, preceded by the expiry date and the food safety.	[24,29,40,42,43]
Price	The product price contributes to the creation of the product idea in the consumers' mind, and is also used as an quality evaluation criterion. Generally, it is an important factor during the purchase of milk.	[24,32,40,44,45]
Fat content (full-cream, semi-skimmed and skimmed milk).	Currently, the general consumer trend, in search of a healthier lifestyle, is towards the choice of a low-fat milk, produced to the detriment of full-cream milk. However, full-cream milk is preferred for its taste and density.	[24,46–49]
Type of packaging	Milk packaging is characterised by the use of limited alternative materials (in particular, plastic, glass and laminated composite material) and some characteristic formats (0,5 and 1 litre). From the analysis of literature, it emerges that during the choice of a milk product, the most highly pondered factors are conservation of quality and of freshness, besides the related product identification and possible affordability. The colour, material, design and text related to the packaging help consumers to choose a product.	[32,50,51]
Nutritional values (vitamins, minerals, calories)	The nutritional values of milk considered by the consumer are mainly the value of protein, the amount of calcium, mineral salts and vitamins.	[31,49,52,53]

Table 2. Packaging attributes employed in the LIKERT#2 in the second section of the questionnaire. The description and related literature references for each attributes are also reported.

Packaging attributes	Description	References
Packaging colour	Colour plays a key role during the packaging evaluation in order to attract consumer attention and to encourage the identification in retail stores. Regarding milk, there are some common colours like green, blue and red that enable a categorisation regarding the kind of milk and the fat content, together with a rapid brand identification.	[6,32,54,55]

| Packaging attributes	Description	References
Shape (handle/bottle/carton)	Shapes of milk containers have evolved in order to satisfy consumer needs for convenience. The practicality of use, due to the presence of a simple and resealable opening mechanism, and/or easily recyclable container, is able to create an additional value to the product. The presence of handles makes its use easier, in particular, with large formats (e.g. 3 litre).	[32,56,57]
Images/illustrations/photos	The images presented on milk containers can increase the interest of consumers in this product, good graphics are related in a positive way to buying behaviour. Furthermore, images allow consumers to identify their favourite products on shop shelves.	[5,6,32,54]
Material (glass/plastic/laminated composite material)	Glass is preferred by some consumers as traditional, however its drawbacks are its weight and fragility. The laminated composite material, on the contrary, is considered a good material for milk containers, even if it lacks the internal view of contents. Plastic, despite its practical use and transportation, is associated with low environmental sustainability and naturalness.	[6,57–59]
Material recycling possibility	Recycling container materials has always been a subject of great interest, acquiring the capacity to influence purchase decisions of the product contained within. Consumers express a readiness to pay more for recyclable materials. However, sustainable packaging will only be chosen when there are no other important contrasting properties, such as a very high price.	[60,61]
Domestic re-use	As regards milk, potential domestic re-use refers to glass bottles. Contrary to glass bottles, plastic containers and laminated composite material are single-use and must be disposed of after their usage.	[62]
Convenience of the opening system (cap/cut)	There is a positive correlation between consumer orientation towards capped milk containers and their practicality. On the contrary, the correlation is negative between containers that need to be cut open and buying behaviour. This negative correlation is caused by the reduced convenience of use and domestic storage.	[6,61,63]
Slogan/message/descriptive text	In addition to the mandatory information provided on the label, voluntary information is often included to disseminate key concepts, positioned to encourage reading. The messages transmitted are usually of a health-related nature, seeking the interest of the consumer. Attributes such as pasture farming, local or organic milk are often highlighted.	[24,31,33]
Environmental sustainability (recyclable materials)	Due to green packaging policies and a greater awareness of consumers, currently, recycled paper is often preferred over plastic. Over the last few years, a purchasing trend of environmentally sustainable products has been recorded, especially in developed countries (also for economic factors).	[64,65]
Social sustainability (production ethics, animal welfare, employment)	Animal welfare and the ethics of production are deemed two very important topics. However, they are frequently in opposition to convenience and product price. Even though consumers show an interest in animal wellbeing, this precludes the purchase of some products and affects the willingness to pay.	[35,66,67]
Container transparency	The transparency of containers enables consumers to judge foodstuffs as more trustworthy, also determining a greater willingness to buy. Although with regards to milk, consumers do not express the need to view the internal contents, because the colour and consistency of milk is common knowledge.	[5,68,69]
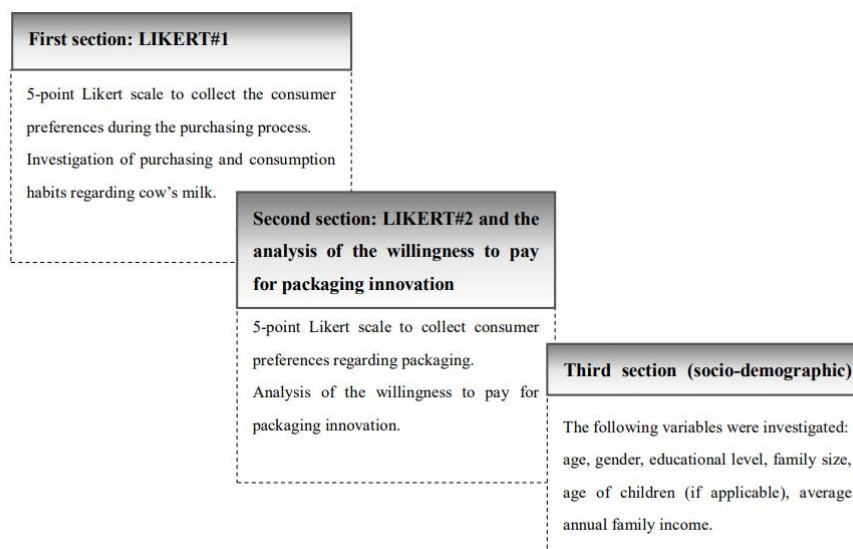
Figure 1. Conceptual framework of the questionnaire.

The third and final section of the questionnaire was dedicated to the survey of the socio-demographic characteristics of the individuals involved in the study. In particular, distinctions were recorded by family type and size, the presence of children in the paediatric age range (0–14 years), the average annual income of the family unit and the level of education (low, middle, high). The educational level attained was characterised as low, if schooling consisted of 8 years of study, middle —13 years, and high—not less than 16 years. The interviewees were asked to indicate their age, these ranges were subsequently categorised as Generation-Y, which included the respondents born between 1984 and 2001, approximately in accordance with Junaid and Nassreen (2012), the next as Generation-X, including people born between 1964 and 1983 [70] and the final one is denominated as the baby-boomers, including people born before 1964 [71].

2.1. Ordered logit regression

The econometric analysis was performed on the sample interviews collected through a direct survey, based on socio-economic characteristics, purchasing habits and preferences with regard to innovative milk packaging. This type of data is well suited to the use of econometric instruments for correct interpretation. Econometrics in fact allows a comparison between an economic model and empirical evidence such as the one under study, in fact the model allows to investigate the relationship between variables. In the survey carried out the questionnaire also included an additional premium price (WTP), on an ordinal scale of discrete alternatives [72] for packaging with innovative characteristics. The WTP variable, or dependent variable, employed in the study had six levels, increasing from +0% to +50%.

In order to investigate the form of a multiple response, an ordered logistic econometric model was applied. This choice was made considering that the ordered logistic model allows a dependent variable to be modelled (Table 3), in this case the WTP, which is presented in ordered categories, as a sequence of latent variables WTP* through six increasing levels [73].

Table 3. List of explanatory variables used in the ordered logit regression.

Variables	Scale
Milk type (fresh-UHT)	1, fresh
	0, UHT
Frequency of purchase	1 if 1–2 times/month
	2 if less than once a week
	3 if 1–2 times/week
	4 if 3–4 times/week
	5 if 5 or more times a week
Age	18–84
Family size	1–6
Children in paediatric age range (between 0–14 years)	1 if Yes
	0 if No
Educational level	1 low
	2 medium
	3 high
Household Annual Average income	1 if ≤ €20,000
	2 if €20,001 ÷ 40,000
	3 if €40,001 ÷ 60,000
	4 if ≥ €60,001
How important are the following attributes in milk choice?	
Convenience of the opening system	1–5
Packaging colour	1–5
Shape	1–5
Images/illustrations/photos	1–5
Material	1–5
Recycling possibility	1–5
Domestic re-use	1–5
Slogan/message/descriptive text	1–5
Environmental sustainability	1–5
Social sustainability	1–5
Container transparency	1–5

$$WTP_i^* = x_i'\beta + \varepsilon_i \tag{1}$$

Where the estimated WTP* is continuous, ranging from $-\infty$ to $+\infty$; x_i' is the vector of the socioeconomic characteristics, purchasing habits and the choice of packaging innovation; β is the coefficient term associated to the covariates and ε is the residual term, for all the *i* observations.

In the model, a set of cut-points, that represent the threshold value from the lowest to the highest category of the observed variable WTP distribution, was estimated as specified below:

$$WTP_i = j \ \text{if} \ \alpha_{j-1} < WTP_i' \le \alpha_j, \ j = 1, \dots, m \tag{2}$$

where $\alpha_0 = -\infty$ and $\alpha_m = +\infty$.

Subsequently the following formula was used to estimate the probability (Pr) that WTP_i^* lies in

one threshold or another:

$$\Pr(\mathrm{WTP}_i = j) = \Pr\left(\alpha_{j-1} < WTP_i^* \leq \alpha_j\right) \tag{3}$$

$$= \Pr(\alpha_{j-1} < x_i'\beta + \varepsilon_i \leq \alpha_j)$$

$$= \Pr(\alpha_{j-1} - x_i'\beta < \beta_i \leq \alpha_j - x_i'\beta)$$

$$= F(\alpha_j - x_i'\beta) - F(\alpha_{j-1} - x_i'\beta)$$

where F is the cumulative logistic distribution function of ε.

The results of the model were described as odds ratio (OR) with 95% confidence intervals, *p-values* and predicted probabilities. The OR represents the measure of the probability variation of the dependent variable following a change in the independent variable. An OR below 1, when the *p-value* < 0.05, denotes a negative effect of the explanatory variable on the dependent variable, whereas an OR above 1 (and *p-value* < 0.05), denotes a positive effect [74]. Finally, the predicted probabilities allow the estimation of the probability of a consumer willing to pay, or not, a premium price for innovative packaging. The econometric analysis was performed by using the statistical software STATA/IC (version 15.1).

3. Results

3.1. Sample description

During the survey 559 people were interviewed: 379 women and 180 men. All the intercepted consumers who consented to the completion of the questionnaire filled it in completely and correctly. The breakdown of the socio-demographic characteristics of the consumer sample was performed and reported in Table 4. The sample was mainly formed by individuals with a mid-level education (87%) and with a mid-low average annual income of their family (72% of the sample less than €40,000). The age of the respondents mainly falls into the Generation-Y (41%) and X (35%) categories.
Of the sample, 82% stated that they did not have children in the paediatric age range (between 0–14 ages), the remainder of the sample includes those who are childfree or with children over 14. In addition, 66% of the respondents were members of family units composed of 3 or 4 individuals, whereas only 4% were single.

3.2. Purchasing behaviour and milk preferences

From the analysis of the results related to milk purchasing behaviour, it emerged that 91% of the respondents buy milk for consumption within the family. As regards the type of milk purchased, a preference for long-life UHT milk (52%) emerged, to the detriment of fresh milk. Subsequently, the average degree of preference for each attribute by the consumer was expressed, in the purchase of cow milk (Table 5). More specifically, from the analysis results of a 5-point LIKERT#1 scale, it emerged that the most important attribute was the expiry date, followed by the nation of origin and by the local origin of the product.

Conversely, it is to be noted that nutritional value, type of packaging and the brand emerged as

less relevant for consumers in milk purchasing decisions.

Table 4. Socio-demographic features of respondents based on their milk purchasing habits.

Characteristic	Category	%
Gender	Male	32%
	Female	68%
Age category	Generation-Y	41%
	Generation-X	35%
	Baby-boomer	24%
Presence of children in paediatric age range (0–14 years) in the family	Yes	18%
	No	82%
Family size	1 component	4%
	2 components	23%
	3 components	34%
	4 components	32%
	5 components	7%
Educational background	Low education	10%
	Medium education	77%
	High education	13%
Average annual household income (€)	<20,000€	27%
	20,000–40,000€	45%
	40,000–60,000€	21%
	>60,000€	7%

Table 5. Average importance, standard deviation and relative range of consumer preferences with regard to cow milk attributes.

Milk attributes	Medium	St. Dev.
Expiry date	4.120	0.944
Nation of origin	3.959	1.071
Local origin	3.761	1.145
Taste	3.730	1.048
High quality certification	3.567	0.993
Fat content	3.451	1.017
Label information	3.334	1.103
Milk produced by pasture-based animal husbandry	3.116	1.217
Price	3.031	1.076
Organic certification	3.006	1.103
Trademark (brand)	2.994	1.120
Type of packaging	2.883	1.111
Nutritional value	2.843	1.118

3.3. Milk packaging preferences

The average preference degree for a single attribute of milk packaging (LIKERT#2) by the sample respondents is reported in Table 6.

Table 6. Medium importance, standard deviation and relative range of consumer preferences with regard to cow milk packaging attributes.

Milk packaging attributes	Medium	St. Dev.
Material recycling possibility	3.645	1.091
Environmental sustainability	3.569	1.082
Material	3.369	1.045
Convenience of the opening system	3.242	1.099
Social sustainability	3.234	1.163
Domestic re-use	2.478	1.286
Container transparency	2.282	1.235
Shape	2.157	1.047
Packaging colour	2.008	1.045
Images/illustrations/photos	1.880	0.891
Slogan/message/descriptive text	1.755	0.840

Consumers expressed a greater degree of preference towards the environmental and social sustainability attributes and, in particular, to the possibility to recycle materials, environmental sustainability and the types of materials. The aspects related to the attributes of use, such as the opening mechanism and the possibility of domestic re-use, were secondary. Furthermore, the interviewees expressed a low preference evaluation for the attributes related to the emotional sphere, such as packaging colour, illustrations and slogans.

3.4. Ordered logit regression results

As reported in Table 7, only 8 explanatory variables from a total of 18, resulted to be statistically significant. Other covariates were eliminated by the stepwise selection criterion. Further to the coefficient, the standard deviation and the calculated *p-value* in Table 7, 5 cut-point categories are also reported. The results indicate that the willingness to pay for innovative packaging (WTP) is influenced in a positive way by the opening mechanism of the container (cut/cap), by the possibility of domestic re-use and by the frequency of milk purchase. On the contrary, WTP is negatively related to the age of the respondents, the shape of packaging, the images presented on the packaging and the presence of children in the paediatric age range (0–14 years). Finally, environmental sustainability also has a negative effect on willingness to pay.

Since the direct interpretation of the relationships between the variables and the willingness to pay a premium price referring to a specific product, could result ambiguous [72,75], the analysis was extended to estimate the expected probability and the marginal effects of a single variable on the propensity of the willingness to pay of individuals. In the pricing model, the value of pseudo-R^2 (equal to 0.07), used for the evaluation of the features of the measurement itself, is reasonable for the data cross-selection, in accordance with Mc Fadden (1973) [76].

Table 7. Ordered logit model results.

Variable	Coefficient	Std. error	p-value	95% Confidence interval
Convenience of the opening system	0.358	0.081	***	0.200 to 0.516
Age	−0.023	0.005	***	−0.033 to −0.014
Shape	−0.334	0.103	***	−0.535 to −0.133
Images/illustrations/photos	−0.445	0.118	***	−0.676 to −0.215
Presence of children in paediatric age range (0–14)	−0.393	0.217	+	−0.818 to 0.032
Environmental sustainability	−0.174	0.083	*	−0.338 to −0.011
Domestic re-use	0.186	0.078	*	0.033 to 0.338
Frequency of purchase	0.199	0.079	**	0.045 to 0.354
Cut-point 1	−1.719	0.301		−2.309 to −1.129
Cut-point 2	0.425	0.292		−0.146 to 0.997
Cut-point 3	1.963	0.327		1.321 to 2.604
Cut-point 4	2.996	0.412		2.189 to 3.803
Cut-point 5	3.697	0.519		2.680 to 4.715
Chi-square				89.26
p-Value				0.0000
Variable	Odds ratio	Std. error	p-value §	95% Confidence interval
Convenience of the opening system	1.431	0.115	***	1.221 to 1.676
Age	0.977	0.005	***	0.968 to 0.986
Shape	0.716	0.073	**	0.586 to 0.875
Images/illustrations/photos	0.641	0.075	***	0.509 to 0.807
Presence of children in paediatric age range (0-14)	0.675	0.147	+	0.441 to 1.033
Environmental sustainability	0.840	0.070	*	0.714 to 0.989
Domestic re-use	1.201	0.094	*	1.034 to 1.403
Frequency of purchase	1.221	0.096	*	1.046 to 1.425

Note: § p-value is the level of statistical significance: *** < 0.001, ** < 0.01, * < 0.05, + < 0.1.

The test carried out indicates that cut-points are statistically significantly different. Otherwise, the categories would appear indistinguishable and would be combined with each other [77].

Some variables of milk packaging such as the convenience of the opening system (to a greater extent) and the possibility of domestic re-use, showed a greater probability of influence on the willingness to pay for milk packaging innovation, contrary to other variables, such as the presence of images or photos on the container and its shape. Regarding to the socio-demographic variables classified as independent variables, the presence of children in the paediatric age range did not represent an element with a high possibility of influencing an increase of the willingness to pay to obtain innovative packaging. However, from the analysis, it emerges how young consumers may be more willing to accept milk packaging innovation. Thanks to the results of the regression (Table 7), it was possible to obtain the probability of the willingness to pay (or lack thereof), expressed by consumers. This estimate has been calculated by taking into consideration all the variables and their

middle values. Table 8 reports how 41% of the sample were not willing to pay a premium price for milk packaging innovation. On the contrary, 54% of consumers interviewed were ready to pay between 10% and 20% more for innovative packaging. Finally, an extremely low probability of the willingness to pay more than 20% emerged.

Table 8. Predicted probabilities from the estimated ordered logit model (at the sample mean for the data).

	Not WTP more	WTP 10% more	WTP 20% more	WTP 30% more	WTP 40% more	WTP 50% more
Predicted probability	0.414	0.412	0.127	0.029	0.009	0.009

4. Discussion

This research allowed the definition of consumer preferences towards some attributes of cow's milk, in addition to product packaging characteristics. Generally, despite a significant decrease in milk consumption, not only at national level, our survey highlights the interest for milk consumption by family units. The sample involved in the research was described highlighting an heterogeneity in the gender proportion, confirming the general attitude that sees mainly women as purchasing responsible in Italian households [45,78]. These individuals stated preferences equally distributed between the two main types of cow's milk available on the market: long-life UHT milk (52%) and fresh milk (48%). This orientation of consumption is in contrast with national trends [6,31,79], both in quantitative and qualitative terms, highlighting how the sample, involved in the research, appreciates the organoleptic and nutritional aspects guaranteed by a fresh product, and not only by the convenience of UHT milk [53,80–83]. This trend of milk consumption is confirmed by the analysis of the Likert (LIKERT#1) scale results of the survey submitted to the interviewees regarding milk attribute preferences. In particular, it emerges that the expiry date, the origin and local provenance are the three attributes deemed by consumers to be the most important in milk purchasing decisions. These findings are in line with a conscious choice linked to the territorial origin of this product [84], and also probably to the choice of a fresh product, attributing to a high importance to the expiry date, such as products with a short shelf-life in refrigerated environments [25]. These results are confirmed by other studies, illustrating that consumers are increasingly attentive towards the territorial origin of milk, with a view of gaining greater safety, health benefits and product traceability [40,83,85]. Furthermore, the territorial origin of the product, within the area involved in the research, is highly acknowledged, not only by consumers [45], but also by manufacturers in the Piedmont region, who have recently adhered to and adopted a collective trademark, increasingly widespread within large-scale distribution, created to enhance and guarantee a high quality regional product [86].

On the contrary, consumers did not express any interest in organic certification [87] and in nutritional values. This latter result is in line with a study conducted on milk consumers in Poland, that showed little interest of the interviewees towards this attribute [88]. This trend can be explained considering two interpretative avenues: the first one is related to the lack of interest in this type of information, probably linked to a low level of awareness [88], the second one is related to non-

consideration of such aspects because they are perceived as a product pre-requisite. The survey on consumers meat choices described in Merlino et al. in 2018 [45] showed that individuals were interested in certified local products with guaranteed organoleptic and nutritional aspects. Such knowledge and awareness of product characteristics, guaranteed by the brand, probably places the valuation characteristics in second place, considering the prerequisites of the product itself [25]. Moreover, this last affirmation could justify the low level of interest attributed by the sample in question and to the product brand. This result emphasises the importance attributed by the sample to the connection between a product and a local brand, evidencing a probable association of the same local provenance of the product to the brand.

The type of packaging did not emerge as an important attribute for the choice of milk by consumers. This result can be justified by the fact that on the shelves of large-scale retail stores in Italy, cow's milk packaging is extremely standardised and almost devoid of elements of differentiation. More than likely, these aspects do not facilitate its recognition in the eyes of consumers, who, in fact, do not consider it to be a discriminant in milk choice.

The analysis of the answers related to consumer preferences in relation to milk packaging illustrated a decision orientation that favours product affordability, convenience of use and environmental sustainability, correlated directly to the search for recyclable materials. This trend is confirmed by different studies on consumers [60,89] and also includes cow's milk consumers. However, besides sustainability, consumers do not give up the convenience of use and a cap opening system of milk packaging. Therefore, it is possible to generally state that the majority of the consumers involved in this research do not refuse milk, choosing instead a product that is easy to use and store, locally produced and that guarantees, in addition, environmental protection through the use of recyclable materials for its packaging. This individual profile deviates, at least partially, from the typical profiles of milk consumers described in literature, whereby they were associated with the search for nutritional value and milk shelf-life [25,90], as well as to health benefits [91], finding similarities, instead, with an emerging target of consumers linked to other milk types of animal origin, such as sheep and goat milk [92].

The econometric model was implemented to determine consumers' willingness to pay for packaging innovation, as well as to define on which attributes of packaging itself could the strategies of innovation and improvement be established to satisfy consumers emerging needs. The convenience of the opening system and environmental sustainability showed a greater probability of influence on the willingness to pay for the purchase of milk packaging innovation, confirming the preferences expressed by the sample in the first part of the questionnaire. On the contrary, the variables, such as the presence of images on packaging and the shape of containers, do not result significantly important in the determination of willingness to pay for the innovation. Therefore, the intrinsic attributes of the packaging itself, directly related to its communicative ability towards consumers, do not influence the WTP, unlike the characteristics linked to the convenience and the sustainability of the product. In parallel, the frequency of milk purchase and the possibility of domestic re-use of containers are able to condition, in a significant way, the probability of increasing the willingness to pay. This result is connected to the prospects of improvement requested, especially, by regular consumers of the product, who focus on the possible re-use of the container after consumption. On the contrary, among the socio- demographic variables, a relation emerges between the WTP and age, highlighting how younger consumers are more likely to accept packaging innovation, in comparison to the older age group. This propensity of the younger age bracket towards

modified packaging does not only provide room for improvement of materials, in relation to their environmental sustainability, but also provides a greater communicative power to the packaging itself, in terms of its naturalness, connection to production methods and product quality [93, 94]. Finally, 41% of the sample was not willing to pay a premium price for milk packaging innovation; in fact, although most respondents wanted an increase in packaging sustainability, this evolution of packaging is probably interpreted as a prerequisite and a necessary evolution of packaging itself, that should not correspond to an increase in the product price on the market [58,95,96].

5. Conclusions

This research shows that recent trends in sustainable consumption are influencing the market for cow's milk, a product to which consumers are still linked. In addition, it also emerges how consumers do not pay attention to the product packaging during milk products choose and purchase. However, they are still willing to pay more in view of its innovative advancement, linked to both environmental sustainability, re-use and convenient use. Since the information presented on packaging and included in its design is a key source of the knowledge of the product and its advantages, it is essential to strengthen a tool such as packaging, especially of a product in crisis, like cow's milk, which could be undertaken as a strategy of the product re-launch. In this respect, these results could have an important impact on the dairy sector, as well as on the guidelines for marketing choices even of small producers in order to better orient a product relaunch strategy in accordance with consumer preferences.

This research has illustrated and identified the points to be addressed, in order to create a competitive advantage and to encourage consumer purchasing, allowing milk producers to regain their market share. For example, the consumer's interest in the origin of the product could be a cue to enhance the value of national milk and re-launch the Italian production self-sufficiency. In fact, a communication strategy based on the impact factors for the consumer, such as the sustainability of the product, could be an opportunity to relaunch local and regional producers. However, among the limitations of this research, the limited geographic area of the data collection certainly represents a key issue, which may be further investigated in future studies, taking into consideration diversified areas, in order to better evaluate and describe the direction of improvements in packaging and their acceptability by consumers.

Conflict of interest

The authors declared no conflict of interest.

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