**25-03-2020**

# New product development activity during the Covid-19 pandemic in the UK

Cesar Revoredo-Giha and Carlo Russo[1]

## Abstract

The introduction of new products is a permanent and important part of the functioning of food supply chains and their companies. Companies introduce new products at an increasing rate to enhance their competitive posture or even to survive. The new products that are launched at a point in time can be considered as representing firms' expectations of what consumers want in terms of different product attributes such as: health, environment, flavours. The Covid-19 pandemic disrupted the operation of supply chains, and the purpose of this paper is to explore what was the reaction of firms (if any) due to the pandemic regarding the introduction of new products. This was done using Mintel's Global New Product Development (GNPD) data for the UK, for the period 2018-20 and considering 155 food and drink categories. Each category was described in terms of the attributes (i.e., marketing claims) of its products. Same groups in different years were compared using measures of similarity between profiles (the profile being represented by the attributes that were present in a category). The results indicate that the most popular attributes within the products launched after March 2020 were those related to health and nutrition; however, comparison with previous trends indicate that firms may not have change their path when launching new products.

**Keywords**: New product development, Covid-19, UK

## I. Introduction

The introduction of new products is a permanent and important part of the functioning of food supply chains and their companies. Companies introduce new products at an increasing rate to enhance their competitive posture or even to survive (Fuller, 2004).

The new products that are launched at a point in time can be considered as representing firms' expectations of what consumers want in terms of different products and their attributes such as: health, environment, flavours.

[1] Revoredo-Giha is with the Rural Economy, Environment and Society Department, Scotland's Rural College (SRUC); e-mail: cesar.revoredo@sruc.ac.uk and Russo is with the University of Cassino and Southern Lazio, Department of Economics and Law); e-mail: carlo.russo@unicas.it. This work was supported as part of the Strategic Research Programme of the Scottish Government Rural and Environment Science and Analytical Services (RESAS) division, Theme 3: Food and Health (Work packages 3.1 and 3.3).

As it is documented in the literature, the Covid-19 pandemic disrupted the operation of supply chains in different ways such as sudden changes in the demand or affecting the labour force (Costa-Font and Revoredo-Giha, 2020). Most of the literature in developed countries focused on highlighting changes in consumption patterns and the efforts of supply chains to continue producing. However, it may also provide opportunities for firms to introduce products and take advantage of the anomalous situation that households, e.g., contraction of their demand for eating out, staying significantly more time at home as part of the lockdown periods. Thus, firms had the possibility to take advantage of different consumer trends in order to capture an increasing share of the market. On the one hand, they could have, for instance, launched or modified existing products to make them more sustainable or healthier. On the other hand, they could have possibly launched products with similar attributes (e.g., just modifying flavours) aiming just to please consumers.

The purpose of this paper is to explore what the reaction of firms (if any) was due to the pandemic when launching of new products. Of particular interest is whether they focused on launching products with improved health and nutritional characteristics as well as towards sustainability.

The structure of the paper is as follows: it starts with a brief literature review focused on the topic of launching of new food products during the COVID-19 period. It is followed by the methodology of the paper, which describes the data and the statistical methods of the analyses. Next, the results are presented and finally the conclusions of the analysis are reported.

## II. Literature review

According to Rudder (2003) food manufacturers [including not only those providing own brands but also producing retailers' private labels] strive to meet the changing needs of food consumers who are increasingly demanding new and better products. It is not longer possible for a company to rely solely on its existing products. If a company will not provide new product developments (NPDs) there are plenty of competitors that will do their best to fill the gap (p. 460).

The period associated with the lockdown in the UK (which in this paper is assumed from March 2020 onwards) has been one with significant changes for both, food supply chains and consumers. The period has been characterised by movement restrictions and spontaneous reduction of social interaction determined the substitution of food services (such as restaurants and catering) with at-home consumption.

Uncertainty regarding grocery shortages triggered stockpiling behaviour (Wang et al., 2020; Costa-Font and Revoredo-Giha, 2020). Nicola et al. (2020) reported that "panic-buying has resulted in an increase of £1bn worth of food in UK homes". The combination of different effects (e.g., stockpiling) might explain the surge in home consumption during the outbreak period, and the declining trends thereafter. During the lockdown period the stockpiling effect faded, as home stocks were full and the perceived risk of food supply disruption declined, but movement restriction sustained home consumption as a substitute for away-from-home meals. In the post-lockdown periods, only the voluntary reduction of social interaction remained, and consumption trends slowly were reverting to pre-emergency levels (Revoredo-Giha and Russo, 2021).

Revoredo-Giha et al. (2022) analysed fruit and vegetable purchases (fresh and processed) by type of outlet using the Impact-Reaction framework (OECD, 1993). According to it reaction to psychological pressure triggered changes in consumer mood and attitude, resulting in new purchasing behaviour. In the early stages of the pandemic, even before the national emergency was declared, UK consumers displayed panic buying, and stockpiling behaviour (e.g., Naeem, 2020; Chronopoulos, Lukas, & Wilson, 2020), which may be interpreted as a precautionary response to the fear of future scarcity and restrictive measures on mobility.

Concerns about future food availability, leading to hoarding and stockpiling behaviour (Naeem, 2020; Yuen et al., 2020), may result in a relative preference toward non-perishables processed fruit and vegetables over fresh ones. O'Connell, De Paula, and Smith (2021) analysed a balanced panel data of 17,093 UK households from January 1, 2019, to August 9, 2020, and found that, there was a spike in household purchases prior to the first nationwide lockdown in March 23, 2020. The authors observed sharp increase in staples (including canned products) purchases relative to perishable products (including fresh fruit and vegetables) which showed a moderate increase only.

Psychological pressure can affect dietary choices in other ways as well. On the one hand, health concerns may result in a relative preference toward fresh fruit and vegetables due to a focus on healthy nutritional balance, hoping to boost human immune system and possibly the resistance to contagion (Muscogiuri et al., 2020, Jayawardena, & Misra, 2020; Aman & Masood, 2020). On the other hand, anxiety and fear may lead to an increase in consumption of comfort food such as snacks, confectionery, sweets, alcohol (Salazar-Fernandez et al., 2021) to the possible detriment of fruit and vegetables.

Based on the literature, it is possible to conclude that changes in consumer mood and attitude due to psychological pressure may drive consumption of fruit and vegetables into different directions and the net effect depends on which component prevails.

Reactions to the COVID-19 impact include adopting a stay-home lifestyle. Due to fear of contagion, restrictive measure, at-home working or involuntary unemployment, UK consumers spent more time at home than they did before the pandemics. The obvious consequence was a sharp decrease in the number of times consumer ate out and an increase in the budget expenditure for grocery product. Studies about the effect of stay-home lifestyle on dietary habits found conflicting results (Bennet et al., 2021). On the one hand, it was associated with healthy eating due to home cooking (e.g., Flanagan et al., 2021). On the other hand, confinement was found to lead to increase in consumption of comfort food, less exercise and more TV (Ruiz-Roso et al., 2020). The net effect of the two trends is an empirical question to be addressed. Furthermore, it must be noted that changes in employment status may affect consumer reaction deeply.

Revoredo-Giha et al. (2022) also found that UK consumers reacted to the impact of COVID-19 by adjusting their shopping behaviour, that is the way they purchased food. Online purchases increased during the pandemics both from de-specialized retailers (such as Amazon) and specialised food retailers developing online services along their traditional “brick and mortar” stores (such as Tesco online) (e.g., Sheth, 2020; Dannenberg et al., 2020). Consumers optimized shopping frequency and store choice given the new sets of constraints to mobility and accounting for the possibility of contagion (e.g., Janssen et al., 2021). The emerging shopping behaviour is expected to affect consumption in two main ways. Firstly, changing food source (for examples, from far, large supermarket to local stores or to online), consumers are exposed to different assortments, and this may result in an adjustment in purchases. Secondly, the objective of reducing shopping frequency may lead to a preference for non-perishable goods in order to avoid waste and extend the time before a new trip to the store is needed.

To our knowledge there have been no attempt to explore the behaviour of NPD on the food sector in the UK. Given the number of consumer reactions to the COVID related situations, it would be interesting how the launching of products was adapted to try to capture changes in consumers’ preferences. This is the purpose of the paper.

## III. Methodology

### III.1 Data

The analysis was carried out using Mintel’s Global New Product Development (GNPD), which is a database that records the launching of new products at the retail level (Solis, 2016).

The data include information about the firm launching the product, the sector and subsector, the type of launching (e.g., it was a new product, a re-launching, new packaging). In this sense, the products launched by firms include not just those that are new products but also those with new packaging, reformulated, relaunched, etc. This is the same approach suggested by Fuller (2003).

The data used was for the UK, for the period 2018-20 and considered 155 food and drink categories and 95 attributes (i.e., marketing claims). Each food category was described in terms of the attributes of its products (i.e., the profile of the category). Two measures where considered: (1) for each food and drink category the percentage of products containing a particular attribute was computed (relative) and (2) the number of products with a particular attribute within a category.

## III.2 Statistical methods

Two statistical analyses were carried out: first, the same categories in different years were compared using measures of similarity between profiles (the profile being represented by the attributes that were present in a category).

The indicators used were correlation indicators such as those use in psychology to compare the characteristics of two individuals (Abdel-Aty, 1960). Due to its straightforward implementation and interpretation the intraclass Fisher correlation was estimated to compare the profiles between categories in two years. The correlation coefficient is defined as:

$$r_{in} = \frac{\sum_{j=1}^{p}(x_{1j} - \bar{x})(x_{2j} - \bar{x})}{0.5\sum_{i=1}^{2}\sum_{j=1}^{p}(x_{ij} - \bar{x})^2}$$

Where $x_{1j}$ and $x_{2j}$ are two profiles for a food and drink categories in two years, for j=1 to p (attributes). $\bar{x}$ is the mean of the two sets of scores (both years) and the denominator of the expression is the average of the variances.

The second analysis consisted of the following simple panel data model where $y_{it}$ is either the proportion of products launched on food product category in 2019 and 2020 or the total number of products launched within a food category with a particular attribute. Hence, there are two observations for each food category. The following regression were then estimated:

$$y_{it}=\beta_0+\beta_1 d_{20}$$

Where $d_{20}$ is a dummy that takes the value of 1 is the observation is of 2020 and 0 otherwise. In addition, in other to identify particular categories where a particular attribute was introduced or significantly increased the following regression was estimated, where $d_j$ is a dummy that takes the value of 1 for the category j and 0 otherwise.

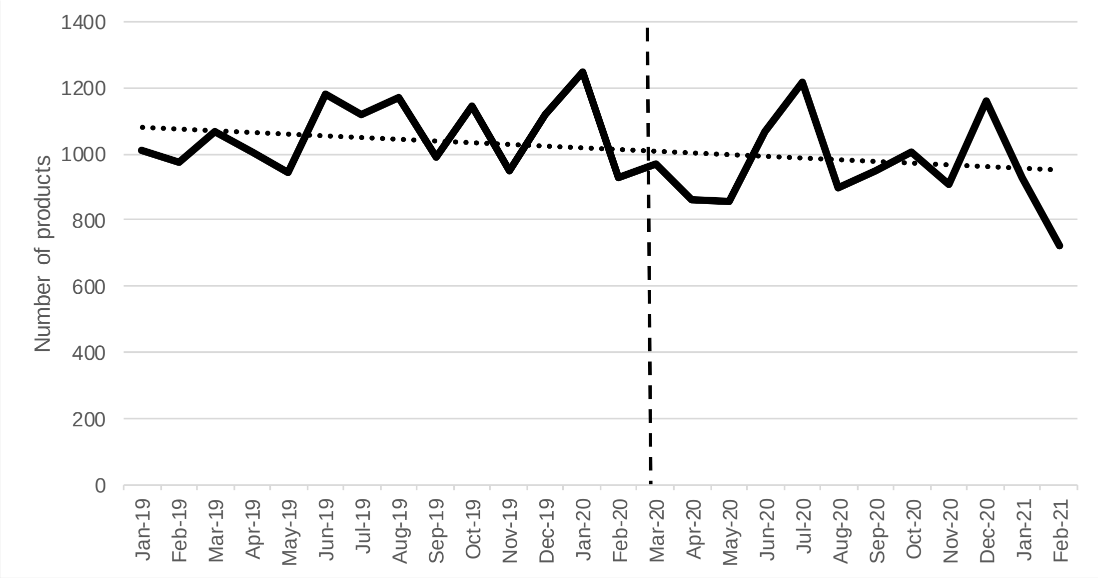
$$y_{it} = \beta_0 + \beta_1 d_{20} + \beta_2 d_{20} \cdot d_j$$

$\beta_2$ that is positive and statistically significant indicates that in 2020 an increasing share or number of products containing the attribute was present for the category.

## IV. Results

The first step is to show the trend of the number of products launched in 2019 and 2020. Figure 1 shows that despite the disruption created by the lockdown due to COVID-19 the launching of product continued although with a decreasing trend.

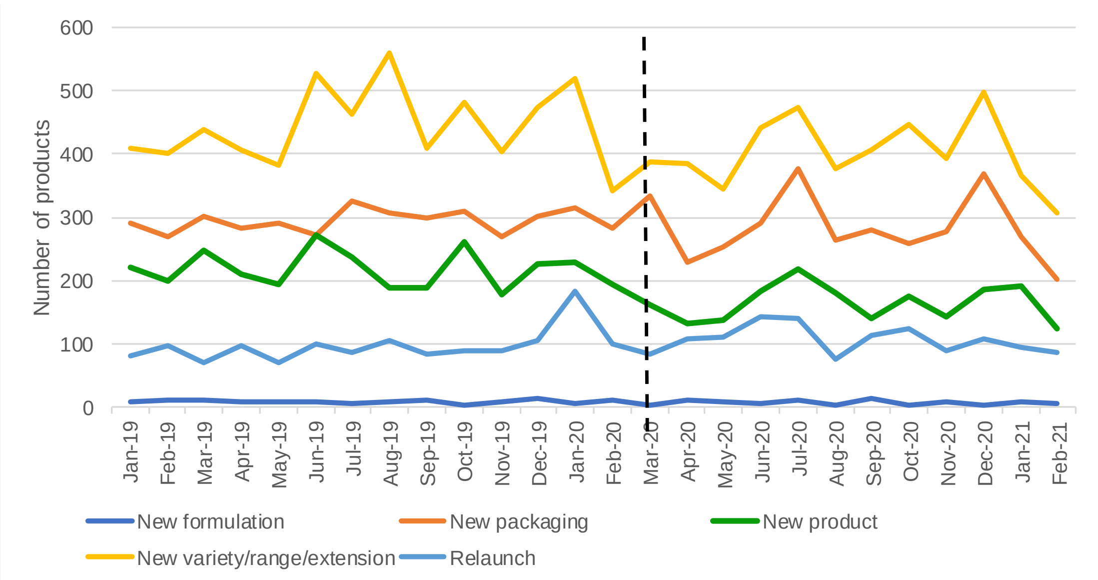
Figure 1: Monthly evolution of launched products




Source: Mintel's GNPD data.
Note: Dotted line indicates the approximate data of the lockdown in the UK.

Figure 2 shows that the trend by launch category has continued similar in 2020 with respect to the levels of 2019. The total number of products launched by food category are presented in Table A.1 in the Annex.

Figure 2: Monthly evolution of launched products by type of launching




Source: Mintel's GNPD data.
Note: Dotted line indicates the approximate data of the lockdown in the UK.

Figure 3, which uses the correlation coefficients, shows that the attributes that about 50 per cent of the food and drink categories have high correlation on the profiles (i.e., comparing the 2018-19 and 2019-20 coefficients).

Figure 3: Distribution of food and drink categories according to correlation coefficient

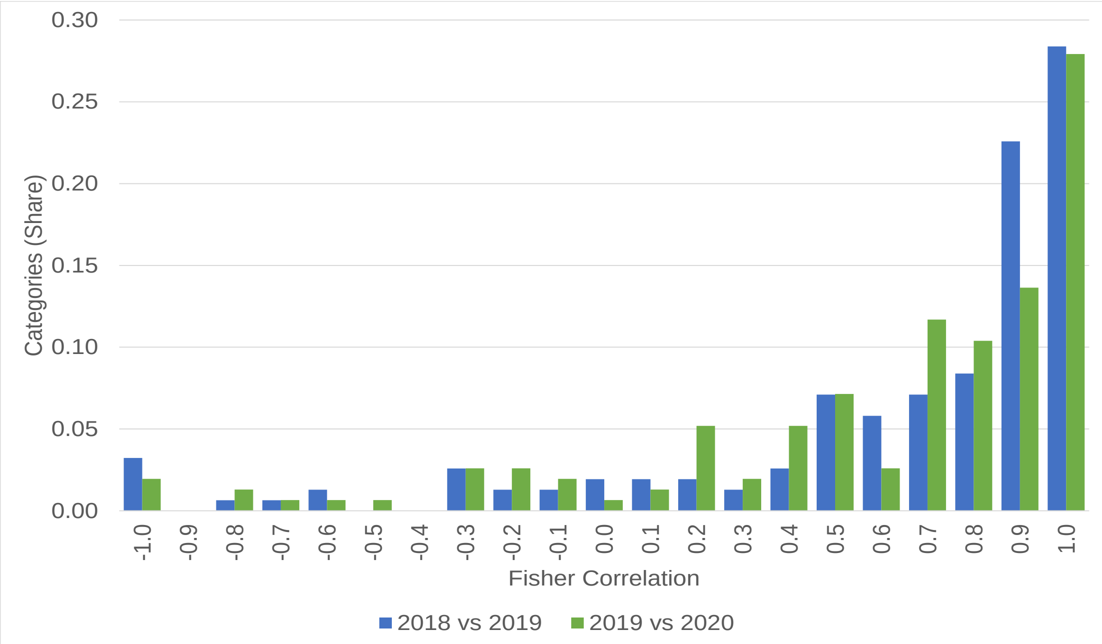



Figure 4 shows the information of Figure 3 in an XY graph trying to identify patterns. Clearly the high degree of similarity is given by the number of product categories on the diagonal. Table 1 shows an analysis of those attributes by product category that shown an increase in the share or products in 2020 with respect to 2019. As shown in the table there is high heterogeneity in the results and the attributes shown by analysing shares not necessarily match with the analysis by products.

Figure 4: Food and drink categories according to correlation coefficient 2018-19 and 2020-21.

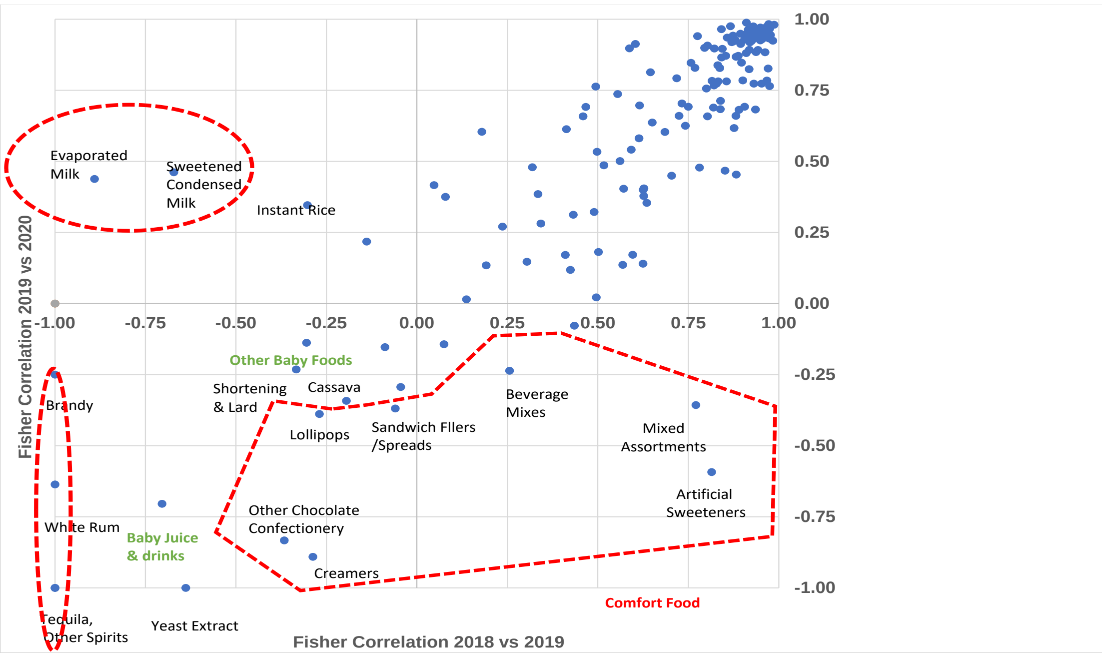


Table 1: Increased attributes in 2020 with respect to 2021 by product category

| Based on shares | Based on number of products |
|---|---|
| **All the products** | |
| Economy | Economy |
| Limited Edition | |
| **Baby Biscuits & Rusks** | |
| Ethical - Environmentally Friendly Package | |
| Ethical - Recycling | |
| Ethical - Sustainable (Habitat/Resources) | |
| **Baby Cereals** | |
| Carbon Neutral | Babies & Toddlers (0-4) |
| | Carbon Neutral |
| | Vitamin/Mineral Fortified |
| **Baby Formula (0-6 months)** | |
| Carbon Neutral | Babies & Toddlers (0-4) |
| Ethical - Animal | Carbon Neutral |
| Functional - Eye Health | Functional - Eye Health |
| Palm Oil Free | |
| **Baby Formula (6-12 months)** | |
| Added Calcium | Added Calcium |
| Ethical - Toxins Free | Babies & Toddlers (0-4) |
| Functional - Bone Health | Functional - Bone Health |
| Functional - Eye Health | Functional - Eye Health |
| Functional - Immune System | Functional - Immune System |
| Functional - Other | |
| Palm Oil Free | |
| **Baby Fruit Products, Desserts & Yogurts** | |
| | Babies & Toddlers (0-4) |
| **Baby Savoury Meals & Dishes** | |
| Microwaveable | Babies & Toddlers (0-4) |
| **Baby Snacks** | |
| Functional - Other | Babies & Toddlers (0-4) |
| **Bean-Based Snacks** | |
| Ethical - Charity | |
| Female | |
| Male | |
| Palm Oil Free | |
| **Beverage Concentrates** | |
| Economy | |
| **Beverage Mixes** | |
| Functional - Bone Health | |
| Limited Edition | |
| Vitamin/Mineral Fortified | |
| **Brandy** | |
| Limited Edition | |
| Premium | |
| **Bread & Bread Products** | |
| | Economy |
| | Functional - Bone Health |
| | Prebiotic |
| **Cakes, Pastries & Sweet Goods** | |
| | Ethical - Environmentally Friendly Package |
| | Ethical - Recycling |
| | Limited Edition |
| **Cassava & Other Root-Based Snacks** | |
| Carbon Neutral | Carbon Neutral |
| Ethical - Charity | |

Table 1: Increased attributes in 2020 with respect to 2021 by product category (cont.)

| Based on shares | Based on number of products |
|---|---|
| **Chilled Desserts** | |
| | Ethical - Environmentally Friendly Package |
| | Ethical - Recycling |
| **Coffee** | |
| Ethical - Sustainable (Habitat/Resources) | Carbon Neutral |
| | Limited Edition |
| **Cold Cereals** | |
| Female | Functional - Bone Health |
| Male | Functional - Cardiovascular |
| | Functional - Immune System |
| | Functional - Other |
| | Prebiotic |
| | Vitamin/Mineral Fortified |
| **Confiture & Fruit Spreads** | |
| | Diabetic |
| **Curd & Quark** | |
| Economy | |
| **Dairy Based Ice Cream & Frozen Yogurt** | |
| | Limited Edition |
| **Drinking Yogurt & Liquid Cultured Milk** | |
| Functional - Immune System | Functional - Immune System |
| | Prebiotic |
| **Dry Soup** | |
| Economy | |
| **Eggs & Egg Products** | |
| Ethical - Animal | Ethical - Animal |
| **Energy Drinks** | |
| | Vitamin/Mineral Fortified |
| **Evaporated Milk** | |
| Economy | |
| Ethical - Environmentally Friendly Package | |
| Ethical - Recycling | |
| **Fish Products** | |
| Ethical - Sustainable (Habitat/Resources) | Economy |
| | Ethical - Animal |
| | Ethical - Environmentally Friendly Package |
| | Ethical - Recycling |
| | Functional - Eye Health |
| **Flavoured Milk** | |
| Functional - Bone Health | Functional - Bone Health |
| Vitamin/Mineral Fortified | |
| **Flavoured Water** | |
| Carbon Neutral | Carbon Neutral |
| Ethical - Charity | |
| Functional - Skin | |
| Nails & Hair | |
| **Frozen Desserts** | |
| Limited Edition | Limited Edition |
| Premium | |
| **Fruit Snacks** | |
| Convenient Packaging | Refill/Refillable |
| Refill/Refillable | |
| **Fruit/Flavoured Still Drinks** | |
| Functional - Immune System | Functional - Immune System |
| Functional - Skin | |
| Nails & Hair | |
| Vitamin/Mineral Fortified | |

Table 1: Increased attributes in 2020 with respect to 2021 by product category (cont.)

| Based on shares | Based on number of products |
|---|---|
| **Gin** | |
| Premium | Limited Edition |
| **Growing Up Milk (1-4 years)** | |
| Added Calcium | Added Calcium |
| Carbon Neutral | Babies & Toddlers (0-4) |
| Functional - Bone Health | Functional - Bone Health |
| Functional - Eye Health | Functional - Eye Health |
| Functional - Immune System | Functional - Immune System |
| Functional - Other | Functional - Other |
| Palm Oil Free | Vitamin/Mineral Fortified |
| **Gum** | |
| Anti-Bacterial | Anti-Bacterial |
| Economy | Whitening |
| Functional - Bone Health | |
| Whitening | |
| **Hard Cheese & Semi-Hard Cheese** | |
| | Economy |
| **Hot Cereals** | |
| Microwaveable | |
| **Individually Wrapped Chocolate Pieces** | |
| Ethical - Sustainable (Habitat/Resources) | |
| Limited Edition | |
| **Instant Noodles** | |
| Low/No/Reduced Saturated Fat | |
| **Instant Pasta** | |
| Microwaveable | |
| **Instant Rice** | |
| Ethical - Environmentally Friendly Package | |
| Ethical - Recycling | |
| **Juice** | |
| Functional - Immune System | Carbon Neutral |
| Functional - Skin | Economy |
| Nails & Hair | Functional - Bone Health |
| | Functional - Cardiovascular |
| | Functional - Immune System |
| | Functional - Other |
| | Functional - Skin |
| | Nails & Hair |
| | Vitamin/Mineral Fortified |
| **Liqueur** | |
| Limited Edition | Limited Edition |
| **Margarine & Other Blends** | |
| Ethical - Sustainable (Habitat/Resources) | |
| Low/No/Reduced Lactose | |
| Low/No/Reduced Saturated Fat | |
| Plant Based | |
| Stanols/Sterols | |
| **Mayonnaise** | |
| Ethical - Animal | |
| **Meal Kits** | |
| Low/No/Reduced Saturated Fat | |

Table 1: Increased attributes in 2020 with respect to 2021 by product category (cont.)

| Based on shares | Based on number of products |
|---|---|
| **Meat Products** | |
| Ethical - Animal | Diabetic |
| Premium | Economy |
| | Ethical - Animal |
| | Ethical - Environmentally Friendly Package |
| | Ethical - Recycling |
| | Limited Edition |
| **Meat Snacks** | |
| Ethical - Animal | |
| **Meat Substitutes** | |
| Low/No/Reduced Saturated Fat | |
| **Medicated Confectionery** | |
| Functional - Other | |
| Low/No/Reduced Lactose | |
| **Mixed Assortments** | |
| Ethical - Environmentally Friendly Package | |
| Ethical - Recycling | |
| **Nectars** | |
| Functional - Skin | Functional - Immune System |
| Nails & Hair | |
| **Non-Individually Wrapped Chocolate Pieces** | |
| Innovative Ingredient | Innovative Ingredient |
| **Nut Spreads** | |
| Ethical - Toxins Free | |
| **Nutritional & Meal Replacement Drinks** | |
| Female | Functional - Bone Health |
| Functional - Other | Functional - Skin |
| Functional - Skin | Innovative Ingredient |
| Innovative Ingredient | Limited Edition |
| Male | Nails & Hair |
| Nails & Hair | Vitamin/Mineral Fortified |
| **Nuts** | |
| | Diabetic |
| **Oils** | |
| | Diabetic |
| **Other Baby Food** | |
| Ethical - Charity | |
| Ethical - Sustainable (Habitat/Resources) | |
| Microwaveable | |
| Vitamin/Mineral Fortified | |
| **Other Natural Sweeteners** | |
| Convenient Packaging | |
| **Other Snacks** | |
| Low/No/Reduced Lactose | |
| **Pasta** | |
| | Economy |
| | Ethical - Animal |
| **Pastilles, Gums, Jellies & Chews** | |
| Refill/Refillable | Refill/Refillable |
| **Plant Based Drinks (Dairy Alternatives)** | |
| Added Calcium | Added Calcium |
| Ethical - Sustainable (Habitat/Resources) | Functional - Bone Health |
| Functional - Eye Health | Functional - Cardiovascular |
| Low/No/Reduced Lactose | Functional - Eye Health |
| Stanols/Sterols | Functional - Immune System |
| | Vitamin/Mineral Fortified |

Table 1: Increased attributes in 2020 with respect to 2021 by product category (cont.)

| Based on shares | Based on number of products |
|---|---|
| **Plant Based Ice Cream & Frozen Yogurt (Dairy Alternatives)** | |
| Ethical - Charity | |
| **Plant Based Spoonable Yogurts (Dairy Alternatives)** | |
| Added Calcium | |
| Low/No/Reduced Lactose | |
| **Potato Snacks** | |
| Premium | |
| **Poultry Products** | |
| Ethical - Animal | Economy |
| | Ethical - Animal |
| | Ethical - Environmentally Friendly Package |
| | Ethical - Recycling |
| | Limited Edition |
| **Prepared Meals** | |
| Low/No/Reduced Saturated Fat | Ethical - Animal |
| | Ethical - Environmentally Friendly Package |
| | Ethical - Recycling |
| | Functional - Bone Health |
| | Functional - Cardiovascular |
| | Limited Edition |
| | Premium |
| **Processed Cheese** | |
| Convenient Packaging | |
| Low/No/Reduced Lactose | |
| **Rice** | |
| Convenient Packaging | |
| **Salads** | |
| Functional - Skin | |
| Nails & Hair | |
| **Sandwich Fillers/Spreads** | |
| Ethical - Animal | |
| **Seasonal Chocolate** | |
| | Ethical - Environmentally Friendly Package |
| | Ethical - Recycling |
| | Refill/Refillable |
| **Shortening & Lard** | |
| Economy | |
| Ethical - Animal | |
| **Snack/Cereal/Energy Bars** | |
| | Vitamin/Mineral Fortified |
| **Soft Cheese Desserts** | |
| Added Calcium | Functional - Bone Health |
| Functional - Bone Health | |
| Vitamin/Mineral Fortified | |
| **Spoonable Yogurt** | |
| | Functional - Bone Health |
| | Limited Edition |
| | Premium |
| **Sports Drinks** | |
| Functional - Other | Functional - Other |
| Vitamin/Mineral Fortified | |

Table 1: Increased attributes in 2020 with respect to 2021 by product category (cont.)

| Based on shares | Based on number of products |
|---|---|
| **Stuffing, Polenta & Other Side Dishes** | |
| | Functional - Eye Health |
| **Sweet Biscuits/Cookies** | |
| | Economy<br>Ethical - Environmentally Friendly Package<br>Ethical - Recycling<br>Premium |
| **Sweetened Condensed Milk** | |
| Economy<br>Low/No/Reduced Saturated Fat | |
| **Syrups** | |
| Female<br>Low/No/Reduced Lactose<br>Male | |
| **Table Sauces** | |
| | Economy |
| **Tea** | |
| | Diabetic<br>Ethical - Environmentally Friendly Package |
| **Tequila** | |
| Premium | |
| **Toffees, Caramels & Nougat** | |
| Refill/Refillable | Refill/Refillable |
| **Vegetables** | |
| Functional - Skin<br>Microwaveable<br>Nails & Hair | Economy<br>Ethical - Environmentally Friendly Package<br>Ethical - Recycling<br>Functional - Eye Health<br>Functional - Skin<br>Nails & Hair |
| **Vodka** | |
| Limited Edition | Limited Edition |
| **Water** | |
| Carbon Neutral<br>Economy | Carbon Neutral |
| **Wet Soup** | |
| Functional - Weight & Muscle Gain<br>Low/No/Reduced Saturated Fat | Functional - Bone Health<br>Functional - Cardiovascular |
| **Wheat & Other Grain-Based Snacks** | |
| Ethical - Charity | |
| **White Milk** | |
| Ethical - Animal<br>Ethical - Environmentally Friendly Package<br>Ethical - Recycling<br>Ethical - Sustainable (Habitat/Resources)<br>Functional - Bone Health<br>Functional - Weight & Muscle Gain<br>Low/No/Reduced Lactose | Functional - Bone Health |
| **White Rum** | |
| Limited Edition | |

Table 1 shows that several categories reinforced in 2020 the number of products both including different ethical dimensions (e.g., animal products carried animal welfare attributes). The health attributes were also present in the form of functional attributes. These were particularly important on baby products.

## V. Discussion

In order to explore a bit more the results, Tables 2 to 6 show a selection of product categories namely: cakes, pastries and sweet goods, chilled desserts, frozen desserts, potato snacks and prepared meals. The number in parenthesis is the correlation coefficient between 2019 and 2020 profiles. The choice of categories was due to their importance on the discussion of improving nutritionally products that are high in sugar, salt and saturated fats. The tables compare those attributes present in the period 2018 and 2019 with those that were significantly increased in 2020 with particularly attributes.

Cakes, pastries and sweet goods shows a correlation coefficient of 0.98, which indicates a profile in 2020 very similar to 2019. In 2018-19 the number of attributes in their products were 60 including several ethical and health improving ones. However, in 2020 the firms significantly only increase products with two ethical attributes (one of them related to packaging).

The chilled desserts category showed a lower correlation that the previous case equal to 0.76. The firms used 44 attributes in 2018-19. Similar to the cakes, pastries and sweet goods products with two ethical attributes where increased in 2020 (again packaging).

The frozen dessert category showed a higher correlation (0.94) but they had less attributes in 2020 (32 attributes). None of the increment of products in 2020 brought a significant health or ethical attributes. The situation with potato snacks was similar to chilled desserts.

Prepared meals had a correlation of 0.94 and far more attributes as this is a more heterogeneous category. In terms of the products with attributes increase in 2020, it has several functional and ethical attributes.

## Table 2 – Cakes, pastries and sweet goods (0.98)

| Cakes, Pastries & Sweet Goods | | | | | |
|---|---|---|---|---|---|
| **Claims present 2018-19** | | | | | |
| All Natural Product | Children (5-12) | Cobranded | Convenient Packaging | Dairy Free | Ease of Use |
| Economy | Ethical - Animal | Ethical - Biodegradable | Ethical - Environmentally Friendly Package | Ethical - Environmentally Friendly Product | Ethical - Human |
| Ethical - Recycling | Ethical - Sustainable (Habitat/Resources) | Event Merchandising | Female | Free from Added/Artificial Additives | Free from Added/Artificial Colourings |
| Free from Added/Artificial Flavourings | Free from Added/Artificial Preservatives | Functional - Digestive | Functional - Energy | Functional - Slimming | Gluten Free |
| GMO Free | Halal | High/Added Fibre | High/Added Protein | Kosher | Limited Edition |
| Low/No/Reduced Allergen | Low/No/Reduced Fat | Low/No/Reduced Lactose | Low/No/Reduced Saturated Fat | Low/No/Reduced Transfat | Low/Reduced Sugar |
| Male | Microwaveable | No Added Sugar | No Additives/Preservatives | On-the-Go | Organic |
| Palm Oil Free | Plant Based | Prebiotic | Premium | Seasonal | Social Media |
| Time/Speed | Vegan/No Animal Ingredients | Vegetarian | Wholegrain | Diet/Light | Ethical - Charity |
| High Satiety | Interesting Packaging | Low/No/Reduced Calorie | Low/No/Reduced Glycemic | Portionability | Sugar Free |
| **Claims increased after COVID** | | | | | |
| **Using shares** | **Using products** | | | | |
| | Ethical - Environmentally Friendly Package | | | | |
| | Ethical - Recycling | | | | |
| | Limited Edition | | | | |

## Table 3 – Chilled desserts (0.76)

| Chilled Desserts | | | | | |
|---|---|---|---|---|---|
| **Claims present 2018-19** | | | | | |
| All Natural Product | Cobranded | Dairy Free | Diet/Light | Ease of Use | Economy |
| Ethical - Biodegradable | Ethical - Charity | Ethical - Environmentally Friendly Package | Ethical - Environmentally Friendly Product | Ethical - Human | Ethical - Recycling |
| Ethical - Sustainable (Habitat/Resources) | Event Merchandising | Free from Added/Artificial Additives | Free from Added/Artificial Colourings | Free from Added/Artificial Flavourings | Free from Added/Artificial Preservatives |
| Functional - Energy | Gluten Free | GMO Free | Kosher | Limited Edition | Low/No/Reduced Allergen |
| Low/No/Reduced Fat | Low/No/Reduced Lactose | Low/No/Reduced Transfat | Low/Reduced Sugar | Microwaveable | No Additives/Preservatives |
| Organic | Plant Based | Premium | Seasonal | Social Media | Vegan/No Animal Ingredients |
| Vegetarian | Wholegrain | Ethical - Animal | Functional - Cardiovascular | High/Added Protein | Low/No/Reduced Calorie |
| No Added Sugar | On-the-Go | | | | |
| **Claims increased after COVID** | | | | | |
| **Using shares** | **Using products** | | | | |
| | Ethical - Environmentally Friendly Package | | | | |
| | Ethical - Recycling | | | | |

## Table 4 – Frozen desserts (0.94)

| Frozen Desserts | | | | | |
|---|---|---|---|---|---|
| **Claims present 2018-19** | | | | | |
| Diet/Light | Ease of Use | Ethical - Environmentally Friendly Package | Ethical - Recycling | Ethical - Sustainable (Habitat/Resources) | Free from Added/Artificial Colourings |
| Free from Added/Artificial Flavourings | Free from Added/Artificial Preservatives | Gluten Free | Low/No/Reduced Allergen | Low/No/Reduced Fat | Low/No/Reduced Transfat |
| Microwaveable | No Additives/Preservatives | Palm Oil Free | Premium | Seasonal | Social Media |
| Time/Speed | Vegan/No Animal Ingredients | Vegetarian | Children (5-12) | Dairy Free | Ethical - Animal |
| Ethical - Environmentally Friendly Product | Ethical - Human | Event Merchandising | Female | GMO Free | Limited Edition |
| Low/No/Reduced Cholesterol | Male | | | | |
| **Claims increased after COVID** | | | | | |
| **Using shares** | **Using products** | | | | |
| Limited Edition | Limited Edition | | | | |
| Premium | | | | | |

## Table 5 – Potato snacks (0.88)

| Potato Snacks | | | | | |
|---|---|---|---|---|---|
| **Claims present 2018-19** | | | | | |
| All Natural Product | Ethical - Environmentally Friendly Package | Convenient Packaging | Diet/Light | Economy | Cobranded |
| Ethical - Human | Ethical - Environmentally Friendly Product | Ethical - Recycling | Ethical - Sustainable (Habitat/Resources) | Event Merchandising | Free from Added/Artificial Additives |
| Free from Added/Artificial Colourings | Free from Added/Artificial Flavourings | Free from Added/Artificial Preservatives | Gluten Free | GMO Free | Kosher |
| Limited Edition | Low/No/Reduced Allergen | Low/No/Reduced Cholesterol | Low/No/Reduced Fat | Low/No/Reduced Lactose | Low/No/Reduced Saturated Fat |
| Low/No/Reduced Sodium | Low/No/Reduced Transfat | No Added Sugar | No Additives/Preservatives | Palm Oil Free | Premium |
| Seasonal | Social Media | Vegan/No Animal Ingredients | Vegetarian | Children (5-12) | Dairy Free |
| Ease of Use | Ethical - Animal | Ethical - Biodegradable | Ethical - Charity | Halal | Low/No/Reduced Calorie |
| On-the-Go | Portionability | | | | |
| **Claims increased after COVID** | | | | | |
| **Using shares** | **Using products** | | | | |
| Premium | | | | | |

Table 6 – Prepared meals (0.94)

| **Prepared Meals** | | | | | |
|---|---|---|---|---|---|
| **Claims present 2018-19** | | | | | |
| All Natural Product | Carbon Neutral | Children (5-12) | Cobranded | Convenient Packaging | Dairy Free |
| Diet/Light | Ease of Use | Economy | Ethical - Animal | Ethical - Biodegradable | Ethical - Charity |
| Ethical - Environmentally Friendly Package | Ethical - Environmentally Friendly Product | Ethical - Human | Ethical - Recycling | Ethical - Sustainable (Habitat/Resources) | Ethical - Toxins Free |
| Free from Added/Artificial Additives | Free from Added/Artificial Colourings | Free from Added/Artificial Flavourings | Free from Added/Artificial Preservatives | Functional - Bone Health | Functional - Brain & Nervous System |
| Functional - Cardiovascular | Functional - Digestive | Functional - Energy | Functional - Immune System | Functional - Other | Functional - Slimming |
| Functional - Weight & Muscle Gain | Gluten Free | GMO Free | Halal | High Satiety | High/Added Fibre |
| High/Added Protein | Hormone Free | Kosher | Low/No/Reduced Allergen | Low/No/Reduced Calorie | Low/No/Reduced Fat |
| Low/No/Reduced Saturated Fat | Low/No/Reduced Sodium | Low/No/Reduced Transfat | Low/Reduced Sugar | Microwaveable | No Added Sugar |
| No Additives/Preservatives | On-the-Go | Organic | Palm Oil Free | Plant Based | Premium |
| Seasonal | Social Media | Time/Speed | Vegan/No Animal Ingredients | Vegetarian | Vitamin/Mineral Fortified |
| Wholegrain | Antioxidant | Babies & Toddlers (0-4) | Female | Functional - Eye Health | Limited Edition |
| Low/No/Reduced Glycemic | Male | | | | |
| **Claims increased after COVID** | | | | | |
| **Using shares** | **Using products** | | | | |
| Low/No/Reduced Saturated Fat | Ethical - Animal | | | | |
| | Ethical - Environmentally Friendly Package | | | | |
| | Ethical - Recycling | | | | |
| | Functional - Bone Health | | | | |
| | Functional - Cardiovascular | | | | |
| | Limited Edition | | | | |
| | Premium | | | | |

## VI. Conclusions

The new product development continued during the lockdown with firms trying to capture the attention of consumers. The preliminary results show that for about 70 per cent of the product categories the similarities of the profiles in 2019 and 2020 were very high (e.g., correlation coefficients above 90 per cent).

The analysis of the dynamics of attributes indicated that when comparing 2019 and 2020 (considering the period March to December), health and nutrition attributes where the ones with the higher movements (attributes that left, remain and new), followed by ethical products (e.g., environmental packaging).

The results indicate that the new product launched during the COVID-19 period lockdown in 2020 kept growing as firms were trying to capture the attention of consumers; this happened despite the disruptions on food supply chains due to the pandemic.

The most popular attributes within the products launched after March 2020 were the health and nutrition attributes (functionals), showing that firms may have been reacting to consumers interest during the lockdown. However, it should be noted that this trend was a continuation from previous paths and not a change due to the pandemic.

## VII. References

Abdel-Aty, S.H., 1960. Techniques of testing similarity between profiles. ETS Research Bulletin Series, 1960(2), pp.i-26.

Costa-Font, M. and Revoredo-Giha, C. (2020). Covid-19: the underlying issues affecting the UK's food supply chains. London School of Economics blog, LSE Business Review, March 25th, Available online at: https://blogs.lse.ac.uk/businessreview/2020/03/25/covid-19-the-underlying-issues-affecting-the-uks-food-supply-chains/

Chronopoulos DK, Lukas M, Wilson JO. Consumer spending responses to the COVID-19 pandemic: An assessment of Great Britain. Q19 (2020). doi: 10.2139/ssrn.3586723

Fuller, G.W., 2004. New food product development: from concept to marketplace. CRC Press.

Lucas, S., Soler, L.-G. & Revoredo-Giha, C. 2021. Trend analysis of sustainability claims: The European fisheries and aquaculture markets case. Food Policy, 104, 102141.

Keane M, Neal T. Consumer panic in the COVID-19 pandemic. J Econom. (2021) 220:86–105. doi: 10.1016/j.jeconom.2020.07.045

Naeem M. The role of social media to generate social proof as engaged society for stockpiling behaviour of customers during Covid-19 pandemic. Q Market Res. (2020) 24:281–301. doi: 10.1108/QMR-04-2020-0050

O'Connell M, De Paula Á, Smith K. Preparing for a pandemic: spending dynamics and panic buying during the COVID-19 first wave. Fisc Stud. (2021) 42:249–64. doi: 10.1111/1475-5890.12271

Palma, M. A., Ribera, I. A. & Knutson, R. D. 2016. The era of the functional consumer. Journal of Food Products Marketing, 22, 555-570.

Rees, W., Tremma, O. & Manning, l. 2019. Sustainability cues on packaging: The influence of recognition on purchasing behavior. Journal of Cleaner Production, 235, 841-853.

Revoredo-Giha, C. and Russo, C., 2021. Purchases of meats and fish in Great Britain during the Covid-19 lockdown period. Frontiers in Nutrition, 8.

Revoredo-Giha, C., Russo, C., and Twum, E. K. 2021. Purchases of Fruit and Vegetables for at Home Consumption During COVID-19 in the UK: Trends and Determinants. Frontiers in Nutrition (accepted for publication).

Rex, E. & Baumann, H. 2007. Beyond ecolabels: what green marketing can learn from conventional marketing. Journal of Cleaner Production, 15, 567-576.

Siró, I., Kápolna, E., Kápolna, B. and Lugasi, A., 2008. Functional food. Product development, marketing and consumer acceptance—A review. Appetite, 51(3), pp.456-467.

Solis, E. 2016. Mintel global new products database (GNPD). Journal of Business & Finance Librarianship, 21, 79-82.

Yang, W., Renwick, A., Tantiwat, W., Revoredo-Giha, C. & Wu, D. 2021. Food product launch and positioning in China—Do claims of credence attributes matter? Agribusiness, 37, 683-926.

Yuen KF, Wang X, Ma F, Li KX. The psychological causes of panic buying following a health crisis. Int J Environ Res Public Health. (2020) 17:3513. doi: 10.3390/ijerph17103513

## Annex

### Table A1: Number of launched products by sub-category 2019-21

| | New formulation | New packaging | New product | New variety range extension | Relaunch | Total |
|---|---|---|---|---|---|---|
| Cakes. Pastries & Sweet Goods | 4 | 284 | 112 | 502 | 100 | 1002 |
| Prepared Meals | 22 | 143 | 180 | 384 | 130 | 859 |
| Meat Products | 9 | 223 | 90 | 350 | 83 | 755 |
| Sweet Biscuits/Cookies | 3 | 228 | 121 | 300 | 70 | 722 |
| Snack/Cereal/Energy Bars | 10 | 156 | 221 | 266 | 59 | 712 |
| Fish Products | 1 | 177 | 52 | 311 | 94 | 635 |
| Seasonal Chocolate | 1 | 194 | 52 | 348 | 30 | 625 |
| Poultry Products | 6 | 134 | 54 | 323 | 83 | 600 |
| Vegetables | 0 | 174 | 56 | 271 | 78 | 579 |
| Bread & Bread Products | 14 | 161 | 78 | 257 | 67 | 577 |
| Seasonings | 1 | 169 | 75 | 280 | 47 | 572 |
| Beer | 0 | 280 | 93 | 146 | 29 | 548 |
| Baking Ingredients & Mixes | 4 | 132 | 96 | 240 | 40 | 512 |
| Coffee | 3 | 138 | 68 | 241 | 53 | 503 |
| Wine | 0 | 43 | 248 | 179 | 0 | 470 |
| Nutritional & Meal Replacement Drinks | 16 | 56 | 201 | 142 | 36 | 451 |
| Tea | 0 | 127 | 97 | 190 | 36 | 450 |
| Hard Cheese & Semi-Hard Cheese | 2 | 190 | 31 | 157 | 44 | 424 |
| Pasta | 0 | 92 | 66 | 206 | 48 | 412 |
| Chocolate Tablets | 0 | 111 | 82 | 199 | 14 | 406 |
| Table Sauces | 1 | 99 | 91 | 147 | 23 | 361 |
| Chilled Desserts | 4 | 114 | 43 | 146 | 50 | 357 |
| Cold Cereals | 3 | 113 | 63 | 142 | 36 | 357 |
| Spoonable Yogurt | 4 | 105 | 47 | 129 | 66 | 351 |
| Carbonated Soft Drinks | 3 | 159 | 58 | 110 | 19 | 349 |
| Pickled Condiments | 4 | 72 | 66 | 176 | 26 | 344 |
| Hors d oeuvres & canapes | 4 | 56 | 64 | 161 | 54 | 339 |
| Non-Individually Wrapped Chocolate Pieces | 1 | 89 | 79 | 148 | 14 | 331 |
| Nuts | 0 | 109 | 55 | 133 | 34 | 331 |
| Meat Substitutes | 3 | 38 | 105 | 152 | 29 | 327 |
| Cooking Sauces | 6 | 81 | 60 | 148 | 28 | 323 |
| Pastilles, Gums, Jellies & Chews | 2 | 135 | 36 | 110 | 22 | 305 |
| Pizzas | 5 | 93 | 47 | 119 | 40 | 304 |
| Dairy Based Ice Cream & Frozen Yogurt | 5 | 59 | 37 | 158 | 26 | 285 |
| Potato Snacks | 0 | 114 | 31 | 108 | 26 | 279 |
| Pastry Dishes | 2 | 59 | 26 | 126 | 46 | 259 |
| Juice | 1 | 110 | 24 | 94 | 28 | 257 |
| Rice | 0 | 94 | 35 | 89 | 33 | 251 |
| Stuffing, Polenta & Other Side Dishes | 2 | 60 | 54 | 98 | 37 | 251 |
| Wet Soup | 3 | 60 | 35 | 113 | 40 | 251 |
| Potato Products | 3 | 104 | 34 | 72 | 33 | 246 |
| Savoury Biscuits/Crackers | 2 | 60 | 42 | 108 | 33 | 245 |
| Fruit | 0 | 57 | 24 | 122 | 25 | 228 |
| Pasta Sauces | 1 | 76 | 35 | 80 | 24 | 216 |
| Fruit Snacks | 1 | 70 | 31 | 86 | 21 | 209 |
| Dressings & Vinegar | 3 | 46 | 43 | 87 | 27 | 206 |
| Oils | 0 | 64 | 45 | 73 | 17 | 199 |
| Sandwiches/Wraps | 3 | 27 | 27 | 101 | 34 | 192 |
| Soft Cheese & Semi-Soft Cheese | 0 | 65 | 35 | 76 | 16 | 192 |
| Flavoured Alcoholic Beverages | 0 | 44 | 65 | 68 | 8 | 185 |
| Plant Based Drinks (Dairy Alternatives) | 0 | 61 | 45 | 56 | 15 | 177 |
| Confiture & Fruit Spreads | 1 | 42 | 34 | 79 | 19 | 175 |
| Corn-Based Snacks | 0 | 65 | 24 | 61 | 12 | 162 |
| Gin | 0 | 11 | 59 | 74 | 5 | 149 |
| Snack Mixes | 0 | 26 | 37 | 73 | 8 | 144 |
| Eggs & Egg Products | 2 | 66 | 26 | 28 | 18 | 140 |
| Honey | 0 | 46 | 25 | 54 | 13 | 138 |
| Dips | 0 | 34 | 20 | 58 | 21 | 133 |
| Hot Cereals | 1 | 37 | 26 | 57 | 12 | 133 |
| Flavoured Water | 0 | 38 | 42 | 43 | 9 | 132 |
| Meal Kits | 0 | 31 | 32 | 60 | 8 | 131 |
| Shelf-Stable Desserts | 0 | 52 | 18 | 40 | 15 | 125 |
| Salads | 2 | 21 | 24 | 58 | 17 | 122 |
| Nut Spreads | 0 | 42 | 29 | 36 | 10 | 117 |
| Chocolate Countlines | 0 | 72 | 8 | 33 | 3 | 116 |
| Wheat & Other Grain-Based Snacks | 1 | 22 | 31 | 53 | 5 | 112 |
| Frozen Desserts | 0 | 17 | 14 | 75 | 4 | 110 |
| Cider | 0 | 46 | 13 | 39 | 7 | 105 |
| Individually Wrapped Chocolate Pieces | 0 | 38 | 21 | 38 | 6 | 103 |
| Instant Noodles | 0 | 36 | 31 | 28 | 8 | 103 |

Table A1: Number of launched products by sub-category (cont.)

| | New formulation | New packaging | New product | New variety range extension | Relaunch | Total |
|---|---|---|---|---|---|---|
| Meat Snacks | 0 | 18 | 28 | 49 | 8 | 103 |
| Mayonnaise | 1 | 31 | 29 | 36 | 5 | 102 |
| Beverage Concentrates | 0 | 32 | 21 | 36 | 11 | 100 |
| Fruit/Flavoured Still Drinks | 0 | 51 | 17 | 19 | 12 | 99 |
| Malt & Other Hot Beverages | 0 | 34 | 29 | 28 | 6 | 97 |
| Processed Cheese | 0 | 22 | 21 | 45 | 5 | 93 |
| Baby Savoury Meals & Dishes | 0 | 6 | 3 | 79 | 4 | 92 |
| Kombucha & Other Fermented Drinks | 0 | 14 | 40 | 33 | 3 | 90 |
| Water | 0 | 70 | 10 | 4 | 6 | 90 |
| Liqueur | 0 | 14 | 37 | 36 | 1 | 88 |
| Vegetable Snacks | 0 | 17 | 34 | 32 | 4 | 87 |
| Energy Drinks | 0 | 29 | 31 | 22 | 4 | 86 |
| Nectars | 1 | 31 | 17 | 23 | 12 | 84 |
| Stocks | 2 | 29 | 9 | 29 | 12 | 81 |
| Toffees, Caramels & Nougat | 0 | 18 | 20 | 39 | 4 | 81 |
| Popcorn | 2 | 30 | 20 | 19 | 9 | 80 |
| Drinking Yogurt & Liquid Cultured Milk | 1 | 16 | 21 | 21 | 14 | 73 |
| RTD (Iced) Coffee | 0 | 29 | 20 | 19 | 2 | 70 |
| Marshmallows | 0 | 19 | 18 | 26 | 1 | 64 |
| Meat Pastes & Pates | 0 | 12 | 15 | 24 | 13 | 64 |
| Noodles | 0 | 17 | 15 | 20 | 11 | 63 |
| Bean-Based Snacks | 2 | 6 | 24 | 16 | 14 | 62 |
| Sports Drinks | 0 | 10 | 31 | 17 | 2 | 60 |
| Baby Snacks | 0 | 11 | 11 | 35 | 2 | 59 |
| Rice Snacks | 0 | 19 | 17 | 21 | 2 | 59 |
| White Milk | 0 | 31 | 4 | 15 | 9 | 59 |
| Other Sauces & Seasonings | 0 | 12 | 20 | 17 | 8 | 57 |
| Chocolate Spreads | 2 | 9 | 26 | 17 | 1 | 55 |
| Water Based Ice Lollies, Pops & Sorbets | 0 | 6 | 14 | 31 | 4 | 55 |
| Flavoured Milk | 0 | 20 | 7 | 23 | 3 | 53 |
| Baby Fruit Products, Desserts & Yogurts | 1 | 2 | 6 | 38 | 3 | 50 |
| Butter | 0 | 27 | 8 | 8 | 7 | 50 |
| Margarine & Other Blends | 1 | 23 | 8 | 8 | 10 | 50 |
| Vodka | 0 | 17 | 13 | 19 | 1 | 50 |
| Cream | 0 | 21 | 5 | 18 | 4 | 48 |
| Syrups | 0 | 14 | 13 | 15 | 4 | 46 |
| Fresh Cheese & Cream Cheese | 0 | 21 | 10 | 11 | 3 | 45 |
| Plant Based Ice Cream & Frozen Yogurt (Dairy Alternatives) | 0 | 6 | 15 | 23 | 1 | 45 |
| Plant Based Spoonable Yogurts (Dairy Alternatives) | 0 | 9 | 17 | 13 | 5 | 44 |
| Boiled Sweets | 0 | 8 | 11 | 19 | 4 | 42 |
| Instant Pasta | 0 | 11 | 19 | 10 | 2 | 42 |
| Baby Formula (0-6 months) | 4 | 10 | 5 | 2 | 18 | 39 |
| Dry Soup | 1 | 8 | 2 | 13 | 15 | 39 |
| Standard & Power Mints | 0 | 20 | 7 | 8 | 4 | 39 |
| Savoury Vegetable Pastes/Spreads | 1 | 7 | 14 | 14 | 2 | 38 |
| Baby Cereals | 0 | 18 | 3 | 9 | 7 | 37 |
| Other Sugar Confectionery | 0 | 10 | 14 | 9 | 3 | 36 |
| Fortified & Other Wines | 0 | 9 | 9 | 14 | 0 | 32 |
| Whisky | 0 | 11 | 8 | 12 | 1 | 32 |
| Dark Rum | 0 | 2 | 16 | 9 | 2 | 29 |
| Sucrose | 0 | 13 | 4 | 9 | 3 | 29 |
| Baby Formula (6-12 months) | 3 | 8 | 5 | 2 | 10 | 28 |
| Sandwich Fillers/Spreads | 1 | 11 | 2 | 6 | 8 | 28 |
| Dessert Toppings | 1 | 5 | 6 | 11 | 4 | 27 |
| Gum | 0 | 15 | 9 | 2 | 1 | 27 |
| Soft Cheese Desserts | 0 | 5 | 8 | 12 | 1 | 26 |
| Growing Up Milk (1-4 years) | 1 | 11 | 4 | 0 | 7 | 23 |
| Other Natural Sweeteners | 0 | 6 | 8 | 6 | 1 | 21 |
| Curd & Quark | 0 | 9 | 3 | 4 | 4 | 20 |
| Beverage Mixes | 0 | 2 | 6 | 7 | 3 | 18 |
| Liquorice | 0 | 7 | 5 | 2 | 4 | 18 |
| Medicated Confectionery | 0 | 5 | 5 | 8 | 0 | 18 |
| Other Snacks | 0 | 1 | 7 | 9 | 1 | 18 |
| RTD (Iced) Tea | 0 | 4 | 6 | 8 | 0 | 18 |
| Cassava & Other Root-Based Snacks | 0 | 3 | 8 | 4 | 2 | 17 |
| Caramel & Cream Spreads | 0 | 2 | 6 | 6 | 0 | 14 |
| Artificial Sweeteners | 0 | 11 | 1 | 1 | 0 | 13 |
| Instant Rice | 0 | 1 | 6 | 4 | 1 | 12 |
| Other Baby Food | 0 | 3 | 7 | 2 | 0 | 12 |
| Baby Biscuits & Rusks | 0 | 0 | 0 | 4 | 7 | 11 |

Table A1: Number of launched products by sub-category (cont.)

| | New formulation | New packaging | New product | New variety range extension | Relaunch | Total |
|---|---|---|---|---|---|---|
| Other Spirits | 0 | 1 | 8 | 1 | 0 | 10 |
| Shortening & Lard | 0 | 5 | 1 | 1 | 2 | 9 |
| Sticks, Liquids & Sprays | 0 | 3 | 3 | 3 | 0 | 9 |
| Mixed Assortments | 0 | 3 | 1 | 2 | 2 | 8 |
| Other Chocolate Confectionery | 0 | 1 | 2 | 5 | 0 | 8 |
| Sweetened Condensed Milk | 0 | 4 | 0 | 1 | 3 | 8 |
| White Rum | 0 | 3 | 4 | 1 | 0 | 8 |
| Tequila | 0 | 1 | 4 | 2 | 0 | 7 |
| Evaporated Milk | 0 | 2 | 0 | 0 | 4 | 6 |
| Lollipops | 0 | 0 | 3 | 3 | 0 | 6 |
| Baby Juices & Drinks | 0 | 1 | 3 | 0 | 0 | 4 |
| Brandy | 0 | 1 | 1 | 2 | 0 | 4 |
| Creamers | 0 | 2 | 1 | 1 | 0 | 4 |
| Yeast Extracts | 0 | 3 | 0 | 0 | 1 | 4 |
| Liquid Dairy Other | 0 | 0 | 0 | 0 | 0 | 0 |

Source: Own elaboration based Mintel's GNPD data

## Table A2: Comparison of attribute profiles by year and product sub-category

| | Fisher correlation | | |
|---|---|---|---|
| | 2018 and 2019 | 2018 and 2020 | 2019 and 2020 |
| Coffee | 0.91 | 0.92 | 0.99 |
| Pastry Dishes | 0.97 | 0.97 | 0.98 |
| Cakes, Pastries & Sweet Goods | 0.99 | 0.98 | 0.98 |
| Pastilles, Gums, Jellies & Chews | 0.87 | 0.89 | 0.98 |
| Hors d oeuvres & canapes | 0.93 | 0.88 | 0.97 |
| Hard Cheese & Semi-Hard Cheese | 0.97 | 0.96 | 0.97 |
| Bread & Bread Products | 0.95 | 0.91 | 0.97 |
| Seasonal Chocolate | 0.98 | 0.98 | 0.97 |
| Pizzas | 0.94 | 0.97 | 0.97 |
| Soft Cheese & Semi-Soft Cheese | 0.84 | 0.81 | 0.96 |
| Tea | 0.97 | 0.95 | 0.96 |
| Dips | 0.92 | 0.91 | 0.96 |
| Chocolate Tablets | 0.93 | 0.92 | 0.96 |
| Sweet Biscuits/Cookies | 0.97 | 0.95 | 0.96 |
| Poultry Products | 0.96 | 0.89 | 0.95 |
| Dressings & Vinegar | 0.95 | 0.90 | 0.95 |
| Individually Wrapped Chocolate Pieces | 0.91 | 0.90 | 0.95 |
| Nutritional & Meal Replacement Drinks | 0.91 | 0.91 | 0.95 |
| Pickled Condiments | 0.89 | 0.85 | 0.95 |
| Rice | 0.94 | 0.95 | 0.95 |
| White Milk | 0.92 | 0.91 | 0.95 |
| Prepared Meals | 0.98 | 0.98 | 0.94 |
| Vegetables | 0.92 | 0.90 | 0.94 |
| Confiture & Fruit Spreads | 0.87 | 0.90 | 0.94 |
| Table Sauces | 0.78 | 0.77 | 0.94 |
| Fish Products | 0.97 | 0.87 | 0.94 |
| Frozen Desserts | 0.86 | 0.91 | 0.94 |
| Gin | 0.87 | 0.88 | 0.93 |
| Wet Soup | 0.97 | 0.94 | 0.93 |
| Eggs & Egg Products | 0.93 | 0.95 | 0.93 |
| Cold Cereals | 0.95 | 0.93 | 0.93 |
| Meat Products | 0.95 | 0.98 | 0.93 |
| Pasta | 0.91 | 0.82 | 0.93 |
| Salads | 0.88 | 0.92 | 0.93 |
| Sandwiches/Wraps | 0.95 | 0.96 | 0.93 |
| Beer | 0.98 | 0.87 | 0.92 |
| Potato Products | 0.92 | 0.92 | 0.92 |
| Carbonated Soft Drinks | 0.88 | 0.97 | 0.92 |
| Pasta Sauces | 0.87 | 0.92 | 0.92 |
| Fruit | 0.92 | 0.93 | 0.92 |
| Cider | 0.89 | 0.80 | 0.91 |
| Flavoured Alcoholic Beverages | 0.60 | 0.60 | 0.91 |
| Stuffing, Polenta & Other Side Dishes | 0.80 | 0.87 | 0.91 |
| Snack Mixes | 0.79 | 0.88 | 0.90 |
| Meat Substitutes | 0.59 | 0.76 | 0.90 |
| Wine | 0.82 | 0.66 | 0.90 |
| Flavoured Water | 0.84 | 0.89 | 0.90 |
| Hot Cereals | 0.92 | 0.91 | 0.89 |
| Cooking Sauces | 0.94 | 0.96 | 0.89 |
| Potato Snacks | 0.94 | 0.90 | 0.88 |
| Spoonable Yogurt | 0.96 | 0.89 | 0.88 |
| Processed Cheese | 0.91 | 0.91 | 0.88 |
| Fruit/Flavoured Still Drinks | 0.89 | 0.81 | 0.87 |
| Baby Snacks | 0.85 | 0.87 | 0.87 |
| Nut Spreads | 0.88 | 0.80 | 0.87 |
| Nuts | 0.84 | 0.77 | 0.87 |
| Water | 0.90 | 0.92 | 0.85 |
| Popcorn | 0.76 | 0.60 | 0.85 |
| Cream | 0.83 | 0.66 | 0.84 |
| Water Based Ice Lollies, Pops & Sorbets | 0.77 | 0.85 | 0.83 |
| Mayonnaise | 0.84 | 0.71 | 0.83 |
| Baking Ingredients & Mixes | 0.97 | 0.83 | 0.83 |
| Juice | 0.92 | 0.90 | 0.82 |
| Butter | 0.65 | 0.80 | 0.81 |
| Instant Noodles | 0.72 | 0.84 | 0.79 |
| Honey | 0.90 | 0.79 | 0.78 |
| Corn-Based Snacks | 0.97 | 0.79 | 0.78 |
| Drinking Yogurt & Liquid Cultured Milk | 0.82 | 0.74 | 0.78 |
| Chocolate Countlines | 0.86 | 0.52 | 0.78 |
| Plant Based Drinks (Dairy Alternatives) | 0.83 | 0.93 | 0.78 |
| Oils | 0.95 | 0.81 | 0.77 |
| Snack/Cereal/Energy Bars | 0.83 | 0.91 | 0.77 |
| Non-Individually Wrapped Chocolate Pieces | 0.93 | 0.77 | 0.77 |
| Plant Based Spoonable Yogurts | 0.82 | 0.76 | 0.77 |
| Chilled Desserts | 0.97 | 0.72 | 0.76 |
| Marshmallows | 0.49 | 0.58 | 0.76 |
| Plant Based Ice Cream & Frozen Yogurt | 0.80 | 0.75 | 0.76 |
| Margarine & Other Blends | 0.55 | 0.65 | 0.74 |

| | Fisher correlation | | |
|---|---|---|---|
| | 2018 and 2019 | 2018 and 2020 | 2019 and 2020 |
| Beverage Concentrates | 0.84 | 0.57 | 0.71 |
| Nectars | 0.73 | 0.88 | 0.70 |
| Curd & Quark | 0.62 | 0.42 | 0.70 |
| Dairy Based Ice Cream & Frozen Yogurt | 0.91 | 0.77 | 0.69 |
| Savoury Biscuits/Crackers | 0.75 | 0.92 | 0.69 |
| Kombucha & Other Fermented Drinks | 0.47 | 0.43 | 0.69 |
| Seasonings | 0.82 | 0.44 | 0.69 |
| Malt & Other Hot Beverages | 0.84 | 0.39 | 0.68 |
| Toffees, Caramels & Nougat | 0.94 | 0.78 | 0.68 |
| Energy Drinks | 0.89 | 0.79 | 0.68 |
| Meal Kits | 0.88 | 0.81 | 0.66 |
| Baby Savoury Meals & Dishes | 0.72 | 0.86 | 0.66 |
| Fruit Snacks | 0.80 | 0.75 | 0.66 |
| Stocks | 0.46 | 0.78 | 0.66 |
| Fresh Cheese & Cream Cheese | 0.65 | 0.61 | 0.64 |
| Shelf-Stable Desserts | 0.74 | 0.86 | 0.62 |
| Flavoured Milk | 0.88 | 0.64 | 0.62 |
| Dry Soup | 0.41 | 0.74 | 0.61 |
| Liquorice | 0.18 | 0.06 | 0.60 |
| Sports Drinks | 0.69 | 0.34 | 0.60 |
| RTD (Iced) Coffee | 0.61 | 0.86 | 0.58 |
| Baby Fruit Products, Desserts & Yogurts | 0.59 | 0.94 | 0.54 |
| Chocolate Spreads | 0.50 | 0.91 | 0.53 |
| Meat Pastes & Pates | 0.56 | 0.72 | 0.50 |
| Liqueur | 0.52 | 0.93 | 0.49 |
| Syrups | 0.32 | 0.39 | 0.48 |
| Rice Snacks | 0.78 | 0.36 | 0.48 |
| Wheat & Other Grain-Based Snacks | 0.85 | 0.67 | 0.47 |
| Sweetened Condensed Milk | -0.67 | -0.80 | 0.46 |
| Bean-Based Snacks | 0.88 | 0.55 | 0.45 |
| Other Natural Sweeteners | 0.70 | 0.35 | 0.45 |
| Evaporated Milk | -0.89 | -0.82 | 0.44 |
| Caramel & Cream Spreads | 0.05 | 0.50 | 0.42 |
| Meat Snacks | 0.63 | 0.76 | 0.40 |
| Dessert Toppings | 0.57 | 0.54 | 0.40 |
| Baby Cereals | 0.63 | 0.65 | 0.40 |
| Gum | 0.33 | 0.75 | 0.38 |
| Vegetable Snacks | 0.63 | 0.50 | 0.38 |
| Other Snacks | 0.08 | -0.06 | 0.38 |
| Standard & Power Mints | 0.64 | 0.70 | 0.35 |
| Instant Rice | -0.30 | 0.11 | 0.35 |
| Vodka | 0.49 | 0.36 | 0.32 |
| Other Sugar Confectionery | 0.43 | 0.34 | 0.31 |
| Medicated Confectionery | 0.34 | 0.21 | 0.28 |
| Sucrose | 0.24 | 0.11 | 0.27 |
| Other Sauces & Seasonings | -0.14 | 0.41 | 0.22 |
| Noodles | 0.50 | 0.36 | 0.18 |
| Instant Pasta | 0.60 | 0.68 | 0.17 |
| Soft Cheese Desserts | 0.41 | 0.16 | 0.17 |
| Dark Rum | 0.30 | -0.11 | 0.15 |
| Baby Formula (6-12 months) | 0.63 | 0.50 | 0.14 |
| Baby Formula (0-6 months) | 0.57 | 0.45 | 0.14 |
| Boiled Sweets | 0.19 | 0.20 | 0.13 |
| Savoury Vegetable Pastes/Spreads | 0.42 | 0.56 | 0.12 |
| Growing Up Milk (1-4 years) | 0.50 | 0.34 | 0.02 |
| Baby Biscuits & Rusks | 0.14 | 0.23 | 0.01 |
| RTD (Iced) Tea | 0.44 | -0.24 | -0.08 |
| Other Baby Food | -0.30 | -0.18 | -0.14 |
| Fortified & Other Wines | 0.07 | 0.45 | -0.14 |
| Whisky | -0.09 | -0.18 | -0.15 |
| Shortening & Lard | -0.33 | -0.30 | -0.23 |
| Beverage Mixes | 0.26 | -0.48 | -0.24 |
| Brandy | -1.00 | -1.00 | -0.25 |
| Sticks, Liquids & Sprays | -0.04 | -0.60 | -0.29 |
| Cassava & Other Root-Based Snacks | -0.19 | -0.05 | -0.34 |
| Mixed Assortments | 0.77 | -0.18 | -0.36 |
| Sandwich Fillers/Spreads | -0.06 | 0.13 | -0.37 |
| Lollipops | -0.27 | -0.24 | -0.39 |
| Artificial Sweeteners | 0.81 | -0.43 | -0.59 |
| White Rum | -1.00 | -0.67 | -0.64 |
| Baby Juices & Drinks | -0.70 | | -0.70 |
| Other Chocolate Confectionery | -0.37 | -0.60 | -0.83 |
| Creamers | -0.29 | -1.00 | -0.89 |
| Other Spirits | -1.00 | | -1.00 |
| Tequila | -1.00 | -0.43 | -1.00 |
| Yeast Extracts | -0.64 | -1.00 | -1.00 |
| Liquid Dairy Other | -1.00 | -1.00 | |

Source: Own elaboration based Mintel’s GNPD data