

New product development during inflationary times: the case of ready meals

Abstract

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New product development (NPD) is one of the most important activities on the operation of food supply chains and their constituting firms. Food companies introduce new products to enhance their competitive position or even to survive. The purpose of this work is to explore NPD behaviour in the context of the inflationary pressures of the period of 2021 to 2023. The focus is on the ready meals category, one of the most dynamic food categories in developed countries and also negatively associated with ultra-processed foods. The analysis used Mintel's Global New Product Development (GNPD) UK dataset covering the period 2001 to 2023. Two aspects were analysed: (1) the distribution of introductory prices; and (2) the attributes highlighted by the firms in their products. To gain deeper understanding, the information was broken down by private label and branded products. The results indicate that the distribution of prices per 100 grams in 2021-23 was slightly different than 2016-19 and there was a positive growth on products with the economy attribute. Nevertheless, neither the product prices nor the attributes changed much with respect to the pre-inflationary period.

Keywords: New food product development, ready meals, food inflation, UK.

I. Introduction

New product development (NPD) is one of the most important activities on the functioning of food supply chains; however, it has received relatively little attention by food economists (some exceptions are: Van Camp, de Souza Monteiro, Hooker, 2012; Yang et al., 2021; Lucas, Soler, Revoredo-Giha, 2021). More attention has been given by marketeers on their interest to improve the success rate of the launching of food products (e.g., Siró et al. 2008, Horvat et al., 2019) or macroeconomists on topics such as the product entry and exit as one of the key mechanism through which product innovation translates into economic growth (e.g., Aghion and Howitt, 1992; Argente, Lee and Moreira, 2018) or on the impact that new products (i.e., their entry and exit) have on the bias of consumer price index (e.g., Broda and Weinstein, 2010; Argente and Lee, 2021).

There are several reasons why NPD should be of interest to food economists: one of these is the fact that it is an expensive activity for companies due to the process of developing products and marketing them. Despite this investment, the rate of success (i.e., consumers' uptake of new products) is very low. According to Horvat et al. (2019) Nielsen reported that between 2011 and 2013, 76 per cent of the launched consumer goods did not survive one year on the market, while 45 per cent remained on the market for less than half a year. This is an activity where both retailers and

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manufacturers participate; in fact, in the UK retailers have an important role on the launching of food products (including not only new products but also existing products with new characteristics such as new packaging or flavour variants). NPD is at the core of the market economy and the competition of firms or supply chains; therefore, understanding competition requires considering the role of NPD.

Another reason to be interested on the new products launched by suppliers (i.e., retailers and manufacturers), which is closer to the topic of this paper, is that observing what products are introduced provides an idea, of both, what suppliers are introducing to the market and what consumers are interested (Van der Grijp et al., 2005; Dawson, 2013). This may answer questions whether there are trends to make the available supply to consumers more sustainable or nutritionally healthier (e.g., Lucas, Soler and Revoredo-Giha, 2021). However, since the choice of products and their varieties depends on an analysis of what consumers are uptaking (e.g., Fuller, 2004; Grunert, 2011; Palma, Ribera and Knutson, 2016; Rees, Tremma, and Manning, 2019; Horvat et al. 2019) an observation of NPD trends also provides information of what consumers seem to be interested.

Given the number of food categories, this work focuses on the trends behind the ready meals category, one of the most dynamic food categories regarding NPD, concentrating on the launching of product during the inflationary period of 2021 to 2023 -which was the results of a combination of the Russia-Ukrainian situation, disruptions of supply chains due to the UK exiting the European Union and the effect of COVID-19 on labour- and whether food firms adapted in any way their supply to the challenging environment.

Another reason to study ready meals is their relationship with the so-called ultra-processed foods, which usually contain ingredients (e.g., chemicals, colourings, sweeteners and preservatives) (Fiolet et al., 2018). According to a BBC food article reviewing the evidence on ultra-processed foods in the UK, it indicated that the pre-packaged meals, one of those foods, contributed with 7.7 per cent of the calories eaten in a typical UK diet in parenthesis (BBC, 2024).

The structure of the paper is as follows: it starts presenting the methodology, where the data used is briefly described. Next, the applied methods are introduced. The next section presents the results. Finally, conclusions are stated.

II. Methodology

This section starts introducing the data and next presents how the two aspects of interest, namely: (1) the distribution of introductory prices; and (2) the attributes highlighted by the firms in their marketing claims were computed.

II.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. 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) (Solis, 2016). In addition, the dataset provides information about

introductory prices in local currency, marketing claims (these are also called attributes) used in the products.

The data used for the UK comprised the periods 2001 to 2023 and considered three major sub-categories: (1) meals and meal centres (14,440 products); (2) processed fish, meat and egg products (15,800 products); and (3) soups (2,534 products) with a total of product of 32,774 products. Table 1 shows the number of launched products by category and broken down by private label (i.e., launched by retailers' own label) and branded (launched by manufacturers). The products were groups into six periods: 2001-05, 2006-10, 2011-15, 2016-19, 2020 and 2021-23. 2020 was kept separate due to isolate the effects of the COVID-19 pandemic. The number of launched products per year in 2021-23 was lower than in 2016-19 (1,740 and 2,316, respectively).

Table 1 – Number of products by category

Period	Meals & Meal Centers	Processed Fish, Meat & Egg Products	Soups	All ready Meals
All firms				
2001-05	2,468	1,643	189	4,300
2006-10	1,805	1,418	372	3,595
2011-15	3,615	3,877	830	8,322
2016-19	3,779	4,836	647	9,262
2020	774	1,173	129	2,076
2021-23	1,999	2,853	367	5,219
Private labels				
2001-05	1,948	1,206	101	3,255
2006-10	1,301	1,019	211	2,531
2011-15	2,255	2,293	399	4,947
2016-19	2,391	2,970	275	5,636
2020	524	780	82	1,386
2021-23	1,214	1,824	174	3,212
Branded				
2001-05	520	437	88	1,045
2006-10	504	399	161	1,064
2011-15	1,360	1,584	431	3,375
2016-19	1,388	1,866	372	3,626
2020	250	393	47	690
2021-23	785	1,029	193	2,007

Source: Own elaboration based on Mintel's GNPD.

II.2 Distribution of introductory prices

For each one of the categories and periods descriptive statistics for the introductory prices (£/100 grams) were computed. These included (not all of these are presented here but are available from the authors upon request): mean, standard deviation, coefficient of variation, minimum, maximum, percentiles, and the empirical distribution of the prices.

To answer the question whether the distribution of prices changed in the most recent inflationary period (i.e., 2021-23), the two-sample Kolmogorov-Smirnov (KS) test was computed to compare the most recent distribution with the ones of the other periods

(Keeping, 1995). The null hypothesis of this non-parametric test is that both samples come from the same distribution. The statistic is given by (1):

$$D_{m,n} = \max_x |F(x) - G(x)| \quad (1)$$

Where m and n are the number of observations of the two samples, $F(x)$ and $G(x)$ are the empirical cumulative distributions. For m and n sufficiently large (about more than 50 observations), the critical value for the test ($D_{m,n,\alpha}$) is given by (2):

$$D_{m,n,\alpha} = c(\alpha) \sqrt{\frac{m+n}{m \cdot n}} \quad (2)$$

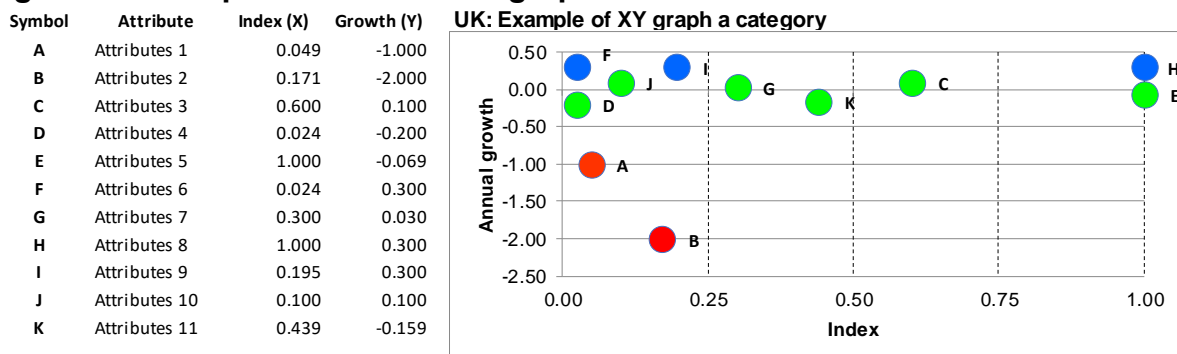
where $c(\alpha)$ is the inverse Kolmogorov distribution evaluated at the significance level α . The hypothesis is rejected is $D_{m,n} > D_{m,n,\alpha}$. To gain deeper understanding the information was broken down by private label (i.e., retailers) and branded products and category of ready meals.

II.3 Attributes

There are two dimensions of the attributes that are of interest to understand whether there was any change during the inflationary period. One is the growth in the number of products with a particular attribute (i.e., rate of annual growth not expressed as a percentage), and the other is the importance of the attribute measured as the proportion (i.e., share) of launched products with the attribute with respect of the total number of products in the category during a period (e.g., 2016-19). As typically none of the proportion of products are greater than 25 per cent, to improve the interpretation, they were transformed into indices by dividing each share by the maximum share, thus, the most important attribute(s) in the ready meal category received a value of 1.

Graphs were produced to compare 2016-19 and 2021-23 for the three ready meal sub-category. In addition, to different rates of growth, the dots in blue indicate significant positive growth (with an arbitrary level set as 0.01 in absolute value), green means insignificant change and red means significant negative growth. An example is presented in Figure 1.

Figure1 – Example of the used XY graph



The total number of attributes identified in GNPD is 96. They are shown in Table 2. To improve the readability of the figures each one of the attributes were added with a symbol.

Table 2 – Total list of product attributes

Symbol	Attribute	Symbol	Attribute	Symbol	Attribute	Symbol	Attribute
A	Added Calcium	Y	Ethical - Recycling	AW	Halal	BU	No Added Sugar
B	All Natural Product	Z	Ethical - Sustainable (Habitat/Resources)	AX	High Satiety	BV	No Additives/Preservatives
C	Anti-Ageing	AA	Ethical - Toxins Free	AY	High/Added Fibre	BW	Not Pasteurised
D	Anti-Bacterial	AB	Event Merchandising	AZ	High/Added Protein	BX	Novel
E	Antioxidant	AC	Female	BA	Hormone Free	BY	On-the-Go
F	Babies & Toddlers (0-4)	AD	Free from Added/Artificial Additives	BB	Innovative Ingredient	BZ	Organic
G	Botanical/Herbal	AE	Free from Added/Artificial Colourings	BC	Interesting Packaging	CA	Palm Oil Free
H	Breath-Freshening	AF	Free from Added/Artificial Flavourings	BD	Kosher	CB	Plant Based
I	Caffeine Free	AG	Free from Added/Artificial Preservatives	BE	Limited Edition	CC	Portionability
J	Carbon Neutral	AH	Functional - Beauty Benefits	BF	Low/No/Reduced Allergen	CD	Prebiotic
K	Children (5-12)	AI	Functional - Bone Health	BG	Low/No/Reduced Calorie	CE	Premium
L	Cobranded	AJ	Functional - Brain & Nervous System	BH	Low/No/Reduced Carb	CF	Probiotic
M	Convenient Packaging	AK	Functional - Cardiovascular	BI	Low/No/Reduced Cholesterol	CG	Refill/Refillable
N	Dairy Free	AL	Functional - Digestive	BJ	Low/No/Reduced Fat	CH	Seasonal
O	Diabetic	AM	Functional - Energy	BK	Low/No/Reduced Glycemic	CI	Seniors (aged 55+)
P	Diet/Light	AN	Functional - Eye Health	BL	Low/No/Reduced Lactose	CJ	Social Media
Q	Ease of Use	AO	Functional - Immune System	BM	Low/No/Reduced Saturated Fat	CK	Stanols/Sterols
R	Economy	AP	Functional - Other	BN	Low/No/Reduced Sodium	CL	Sugar Free
S	Ethical - Animal	AQ	Functional - Skin	BO	Low/No/Reduced Transfat	CM	Time/Speed
T	Ethical - Biodegradable	AR	Functional - Slimming	BP	Low/Reduced Sugar	CN	Vegan/No Animal Ingredients
U	Ethical - Charity	AS	Functional - Stress & Sleep	BQ	Male	CO	Vegetarian
V	Ethical - Environmentally Friendly Package	AT	Functional - Weight & Muscle Gain	BR	Maternal	CP	Vitamin/Mineral Fortified
W	Ethical - Environmentally Friendly Product	AU	Gluten Free	BS	Microwaveable	CQ	Whitening
X	Ethical - Human	AV	GMO Free	BT	Nails & Hair	CR	Wholegrain

Source: Mintel's GNPD.

As shown in Table 2, the attributes are diverse including categories such as ethical (e.g., environmentally friendly package), nutritional (e.g., low/reduced sugar), functional (e.g., favourable to bone health). Although all attributes are interesting, a particular one for the purpose of this work, i.e., in the inflationary context, is whether the attribute 'economy' (symbol: R) becomes more important.

III. Results

The results indicate that a total of 36,046 products were introduced since 2001, of which 62.4 per cent were launched by eleven retailers. 'Meals and meals centres' and 'processed fish, meat and egg products', accounted for most of the products, representing each one about 46 per cent and the remaining being products within the 'soup' category.

III.1 Distribution of introductory prices

Table 3 presents the descriptive statistics (mean and standard deviation) of the introductory prices. The mean values indicate an increase over time, although in 2020, the introductory price of meal and meal centres and soups decreased slightly with respect to 2016-19. 2021-23 prices are much higher than the previous periods due to the inflationary period.

Table 3 - Summary of introductory prices by category and period (£/100 grams)

Period	Meals and meal centres		Processed fish, meat and egg products		Soup		All ready meals	
	Mean	St. dev	Mean	St. dev	Mean	St. dev	Mean	St. dev
All firms								
2001-05	0.63	0.36	0.97	0.74	0.47	0.71	0.75	0.58
2006-10	0.70	0.42	1.02	0.82	0.42	0.58	0.80	0.65
2011-15	0.75	0.47	1.08	0.88	0.59	0.76	0.89	0.74
2016-19	0.87	0.59	1.24	1.01	0.62	0.81	1.04	0.87
2020	0.84	0.59	1.27	1.15	0.47	0.46	1.06	0.98
2021-23	1.00	0.55	1.45	1.27	0.66	0.89	1.22	1.06
Private labels								
2001-05	0.64	0.37	1.01	0.79	0.34	0.22	0.77	0.60
2006-10	0.70	0.42	1.03	0.74	0.33	0.22	0.80	0.60
2011-15	0.68	0.38	1.06	0.90	0.41	0.32	0.83	0.70
2016-19	0.77	0.46	1.10	0.79	0.33	0.24	0.92	0.68
2020	0.73	0.52	1.11	0.74	0.34	0.29	0.92	0.68
2021-23	0.87	0.41	1.35	1.12	0.35	0.22	1.12	0.93
Branded								
2001-05	0.62	0.31	0.85	0.52	0.62	0.99	0.72	0.51
2006-10	0.71	0.43	0.99	0.99	0.54	0.83	0.79	0.77
2011-15	0.86	0.57	1.11	0.85	0.76	0.98	0.97	0.78
2016-19	1.06	0.71	1.45	1.25	0.83	1.00	1.24	1.07
2020	1.07	0.68	1.59	1.65	0.70	0.59	1.34	1.35
2021-23	1.19	0.68	1.63	1.49	0.95	1.14	1.39	1.23

Source: Own elaboration based on Mintel's GNPD.

It should be noted that there is significant dispersion around the average prices, with the coefficient of variation (i.e., ratio standard deviation to the mean) being above 50 per cent.

Table 4 compares the distribution of the 2021-23 introductory prices with the previous periods. The results indicate that there are differences with respect to some of the distributions; however, these differences although they are statistically significant at 0.05 are not economic meaningful, whether histogram graphs are compared (note that the histograms are not presented due to limitations in terms of space, but they are available from the authors upon request).

Table 4 - Comparison of price distribution of launched products

Period	Meals and meal centres	Processed fish, meat and egg products	Soups	All ready meals
Comparison of 2021-23 distribution - all firms				
2001-05 distribution	0.000	0.010 *	0.000	0.000
2006-10 distribution	0.000	0.000	0.000	0.000
2011-15 distribution	0.005 *	0.007 *	0.000	0.002 *
2016-19 distribution	0.005 *	0.001 *	0.000	0.000
2020 distribution	0.000	0.003 *	0.000	0.000
Comparison of 2021-23 distribution - private label				
2001-05 distribution	0.015 *	0.003 *	0.007	0.000
2006-10 distribution	0.000	0.000	0.024 *	0.000
2011-15 distribution	0.012 *	0.000	0.018 *	0.003 *
2016-19 distribution	0.000	0.010 *	0.003	0.009 *
2020 distribution	0.009 *	0.007 *	0.011	0.000
Comparison of 2021-23 distribution - branded				
2001-05 distribution	0.016 *	0.000	0.013	0.001
2006-10 distribution	0.000	0.000	0.015	0.005 *
2011-15 distribution	0.002	0.000	0.006	0.003 *
2016-19 distribution	0.000	0.000	0.002	0.003 *
2020 distribution	0.002	0.000	0.000	0.000

Source: Own elaboration based on Mintel's GNPD.

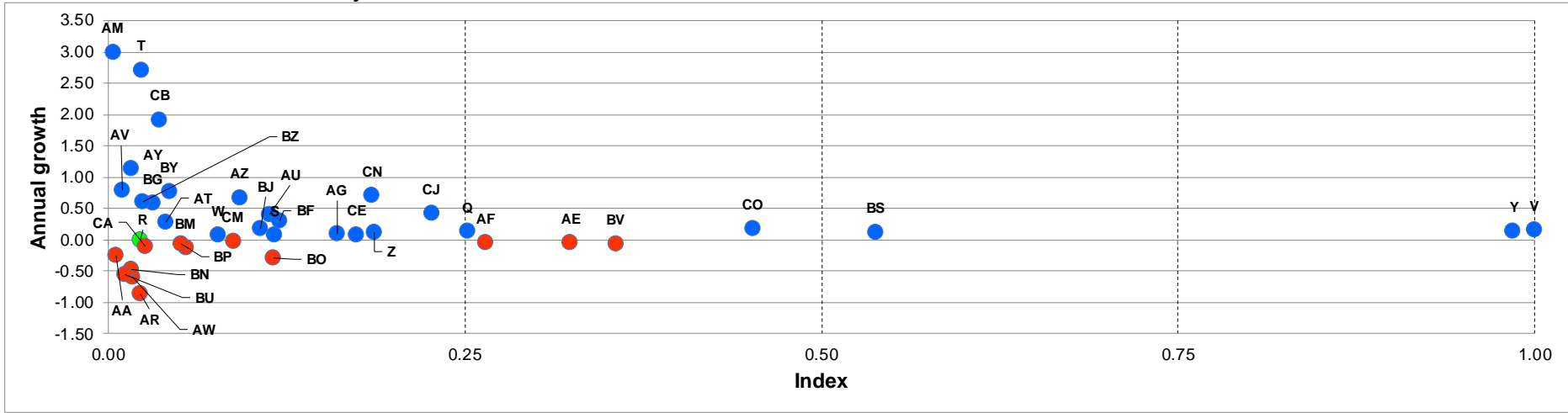
Note: * indicates that the null hypothesis that both distributions are equal is rejected.

III.2 Attributes

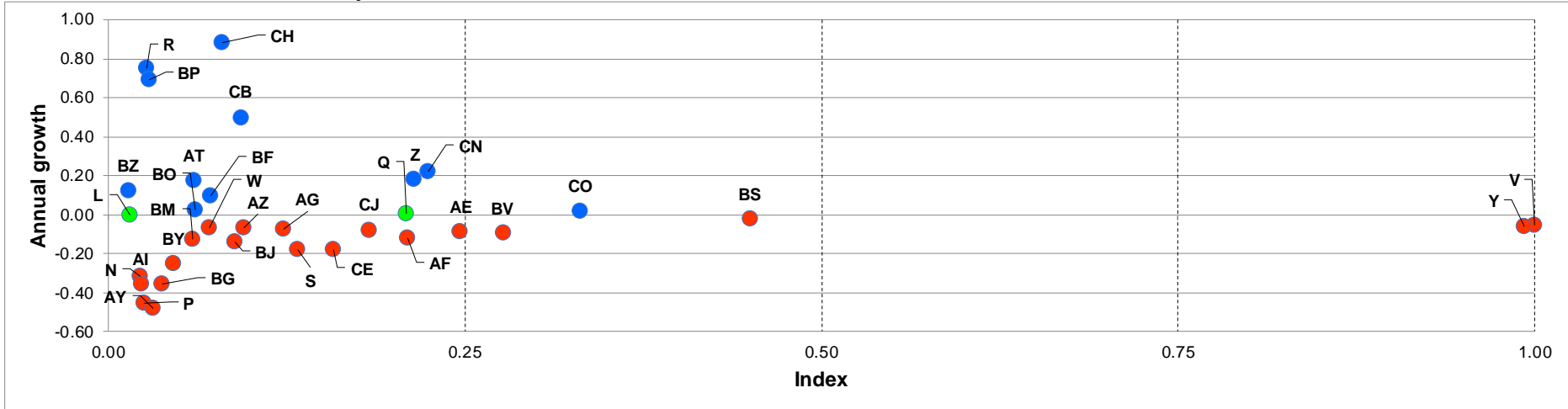
Figures 2, 3 and 4 compare the launched products with particular attributes for the three ready meal sub-categories, namely: meal and meal centres, processed fish, meat and egg products, and soups for two periods: 2016-19 and 2021-23 (recall that 2020 was not considered due to the disruptions due to COVID-19 pandemic).

Figure 2 – Meals and meal centres

Panel A - Growth and index by attribute 2016-2019



Panel B - Growth and index by attribute 2021-2023

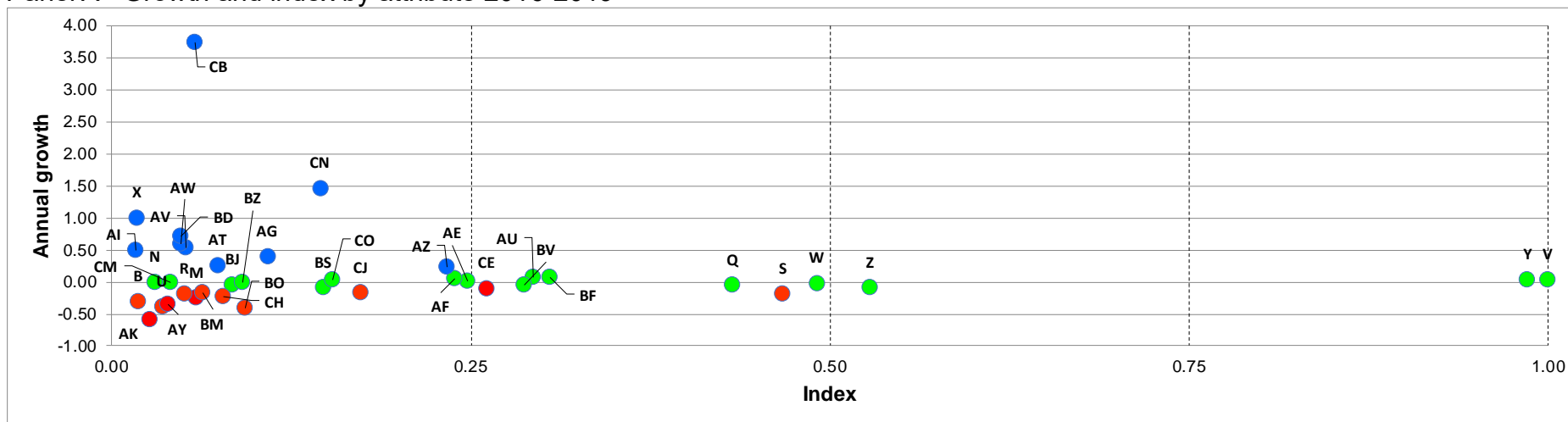


Source: Own elaboration based on Mintel's GNPD information. Table 2 provides the attribute symbols.

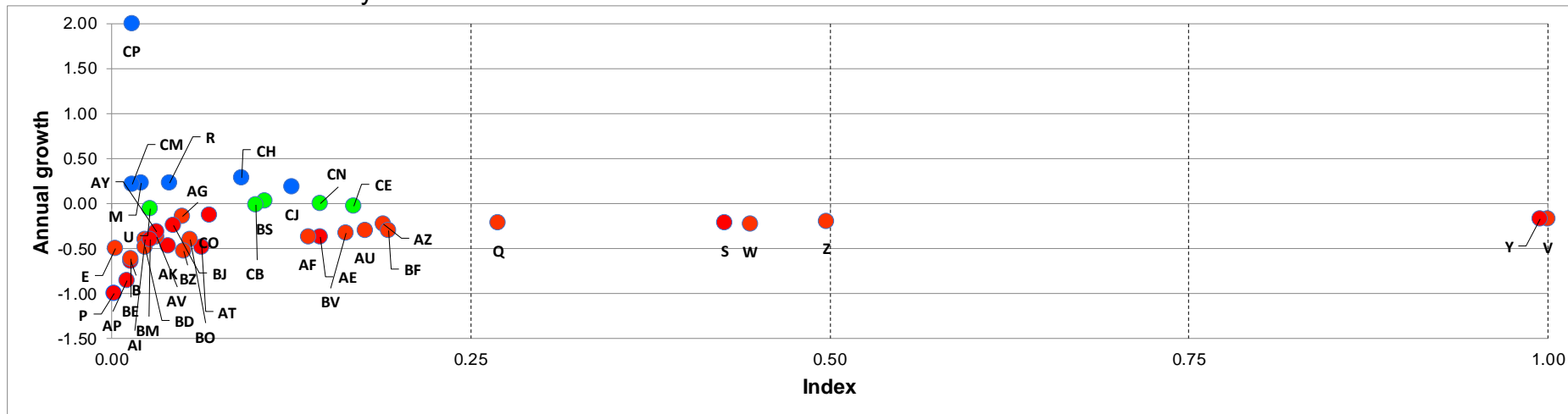
Note: The Figures above only consider only most important attributes. The complete list and their statistics are in annex Table A.1.

Figure 3 – Processed fish, meat and egg products

Panel A - Growth and index by attribute 2016-2019



Panel B - Growth and index by attribute 2021-2023

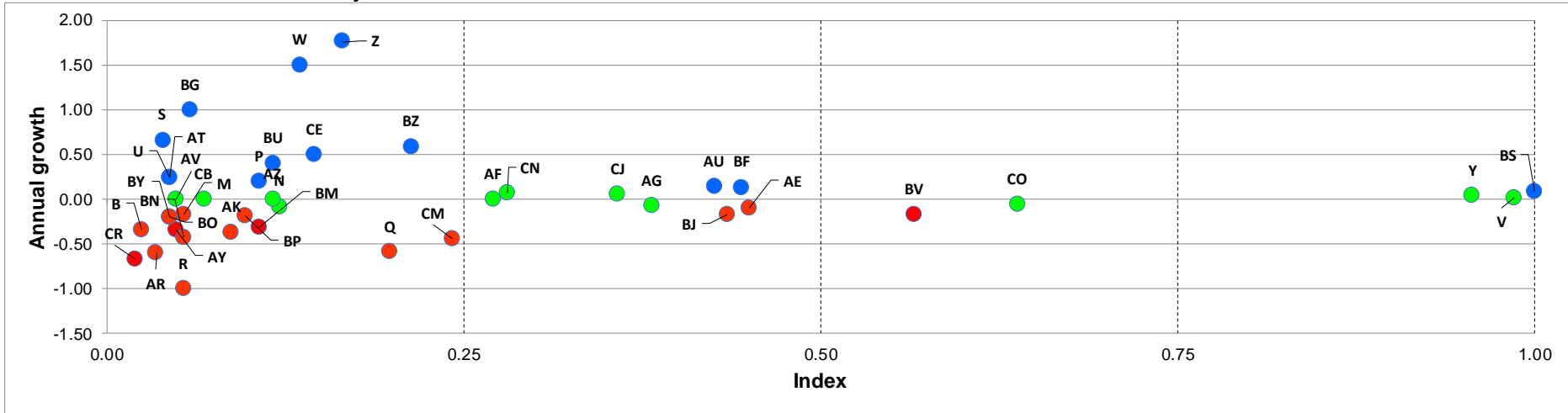


Source: Own elaboration based on Mintel's GNPD information. Table 2 provides the attribute symbols.

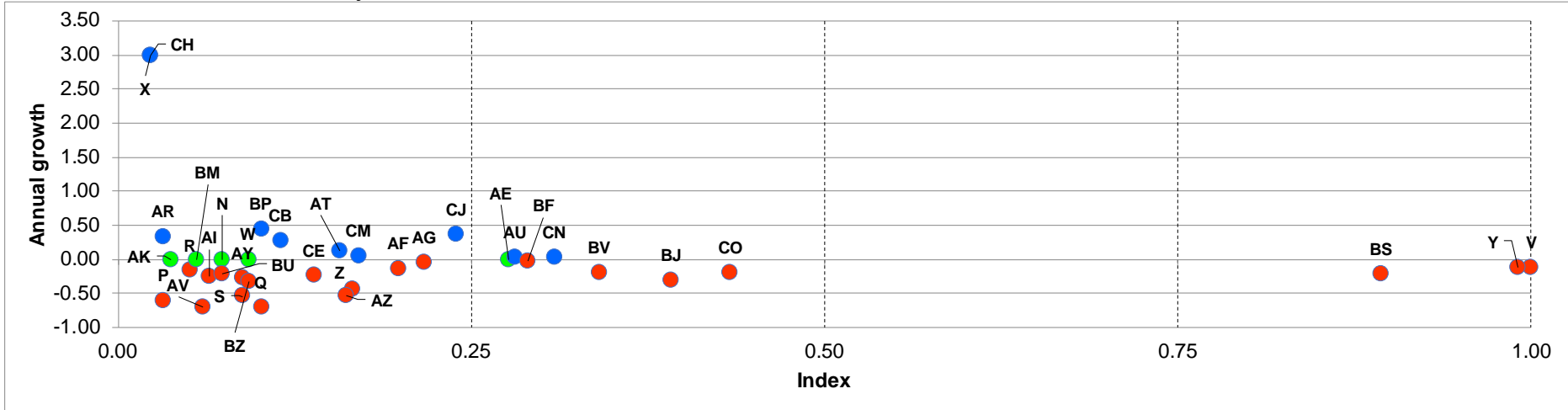
Note: The Figures above only consider only most important attributes. The complete list and their statistics are in annex Table A.2.

Figure 4 – Soups

Panel A - Growth and index by attribute 2016-2019



Panel B - Growth and index by attribute 2021-2023



Source: Own elaboration based on Mintel's GNPD information. Table 2 provides the attribute symbols.

Note: The Figures above only consider only most important attributes. The complete list and their statistics are in annex Table A.3.

Overall, the shape of the figures is very similar with many attributes concentrated under the 0.25 index and relatively few with more importance. Moreover, it is interesting the presence of ethical the attributes regarding to recycling (Y) and environmentally friendly package (V) as leading attributes, although the number of products with them are not growing (most of them have colours red and green). This also reflects the importance of packaging for suppliers' sustainability in comparison with other sustainability attributes as 'carbon neutral' (J).

Regarding the attribute 'economy', as shown in Panel A and B of Figure 2 - Meals and meal centres, it only has a green dot (i.e., insignificant or no change) in period 2016-19 became significant growth in 2021-23 (blue dot) with a low annual growth rate of 0.75. Figure 3 - Processed fish, meat and egg products shows that the launched number of products goes from a negative annual growth during the period (a rate of -0.18) to a positive growth rate in the most recent period (0.24). For Figure 4 – Soups, in contrast, the number of products launched with the attribute decreased in both periods. However, something that is common on all the categories is that the importance of products launched with the economy attribute during the two periods is very modest. This indicates that the attribute is not really a focus for the industry. This could be because ready meal with the 'economy' attribute are already part of the available stock of products for consumers and there is no interest to increase them or because the interest of suppliers is to launch products with attributes that indicate premium quality.

IV. Conclusions

The launching of food products as part of the new product development activity of supplier provides information about the expectations of firms of what consumers may want to purchase and also consumers' interests.

The purpose of this paper has been to explore empirically the reaction of suppliers of ready meal products to the new product to the inflationary situation that affected the UK during the period 2021 to 2023 due to disruptions of food supply chains from the COVID-19 pandemic, Brexit and the increase of costs brought by the Russia-Ukraine conflict.

The number of products launched per year in 2021-23 was lower than the period 2016-19. Except for 2020, the mean prices show an increase in all the categories. Regarding their distribution, there was some statistical differences regarding the distributions of previous periods although the shape of the distributions was not too different to be of economic importance. The differences in the distributions by private label and branded was also very similar.

In reference to changes on the number of launched products with the 'economy' attribute. The results indicate some growth in the 2021-23 period but the importance as the number of launched products was still very small. In addition, the characteristics of the NPD activity did not change much with respect to the pre-inflationary period.

Notably, sustainable attributes regarding recyclability and environmentally friendly packaging showed being the leading attributes in the launched products. Whilst this

may reflect consumers interest on environmental attributes, it may also show suppliers aim to respond to some of the environmental regulations regarding their businesses.

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Annex – Statistics behind Figures 2, 3 and 4

Table A.1 – Meals and meal centre

2016-2019			2021-2023		
Symbol	Attribute	IndexGrowth	Symbol	Attribute	IndexGrowth
B	All Natural Product	0.024 0.267	B	All Natural Product	0.017 -0.385
E	Antioxidant	0.004 -0.333	E	Antioxidant	0.000 0.000
F	Babies & Toddlers (0-4)	0.004 0.000	F	Babies & Toddlers (0-4)	0.001 -1.000
J	Carbon Neutral	0.004 -0.333	J	Carbon Neutral	0.001 0.000
K	Children (5-12)	0.025 -0.478	K	Children (5-12)	0.008 -0.333
L	Cobranded	0.016 -0.231	L	Cobranded	0.015 0.000
M	Convenient Packaging	0.005 -0.250	M	Convenient Packaging	0.002 0.000
N	Dairy Free	0.034 0.042	N	Dairy Free	0.022 -0.313
P	Diet/Light	0.044 1.000	P	Diet/Light	0.025 -0.450
Q	Ease of Use	0.252 0.137	Q	Ease of Use	0.209 0.008
R	Economy	0.022 0.000	R	Economy	0.027 0.750
S	Ethical - Animal	0.116 0.075	S	Ethical - Animal	0.132 -0.178
T	Ethical - Biodegradable	0.023 2.714	T	Ethical - Biodegradable	0.017 0.625
U	Ethical - Charity	0.015 -0.385	U	Ethical - Charity	0.014 -0.583
V	Ethical – Env. Friendly Package	1.000 0.151	V	Ethical – Env. Friendly Package	1.000 -0.056
W	Ethical – Env. Friendly Product	0.077 0.075	W	Ethical – Env. Friendly Product	0.070 -0.067
X	Ethical - Human	0.005 -0.833	X	Ethical - Human	0.010 0.400
Y	Ethical - Recycling	0.985 0.145	Y	Ethical - Recycling	0.993 -0.058
Z	Ethical – Sust. (Habitat/Resources)	0.187 0.111	Z	Ethical – Sust. (Habitat/Resources)	0.215 0.180
AA	Ethical - Toxins Free	0.005 -0.250	AA	Ethical - Toxins Free	0.001 0.000
AB	Event Merchandising	0.001 -1.000	AB	Event Merchandising	0.002 1.000
AC	Female	0.001 0.000	AC	Female	0.000 0.000
AD	Free from Added/Artificial Additives	0.006 0.250	AD	Free from Added/Artificial Additives	0.010 0.167
AE	Free from Added/Artificial Colourings	0.324 -0.042	AE	Free from Added/Artificial Colourings	0.247 -0.088
AF	Free from Added/Artificial Flavourings	0.264 -0.047	AF	Free from Added/Artificial Flavourings	0.210 -0.116
AG	Free from Added/Artificial Preserv.	0.160 0.092	AG	Free from Added/Artificial Preserv.	0.123 -0.076
AI	Functional - Bone Health	0.013 0.000	AI	Functional - Bone Health	0.023 -0.353
AJ	Functional - Brain & Nervous System	0.003 2.000	AJ	Functional - Brain & Nervous System	0.004 -0.333
AK	Functional - Cardiovascular	0.021 -0.421	AK	Functional - Cardiovascular	0.016 -0.333
AL	Functional - Digestive	0.001 -1.000	AL	Functional - Digestive	0.000 0.000
AM	Functional - Energy	0.004 3.000	AM	Functional - Energy	0.005 4.000
AN	Functional - Eye Health	0.001 0.000	AN	Functional - Eye Health	0.000 0.000
AO	Functional - Immune System	0.003 0.000	AO	Functional - Immune System	0.002 0.000
AP	Functional - Other	0.006 2.000	AP	Functional - Other	0.010 0.000
AQ	Functional - Skin	0.001 0.000	AQ	Functional - Skin	0.001 -1.000
AR	Functional - Slimming	0.022 -0.857	AR	Functional - Slimming	0.006 0.667
AT	Functional - Weight & Muscle Gain	0.040 0.280	AT	Functional - Weight & Muscle Gain	0.060 0.176
AU	Gluten Free	0.113 0.403	AU	Gluten Free	0.060 0.000
AV	GMO Free	0.010 0.800	AV	GMO Free	0.014 -0.786
AW	Halal	0.017 -0.588	AW	Halal	0.009 0.200
AX	High Satiety	0.003 2.000	AX	High Satiety	0.006 -0.250
AY	High/Added Fibre	0.015 1.143	AY	High/Added Fibre	0.031 -0.480
AZ	High/Added Protein	0.092 0.673	AZ	High/Added Protein	0.095 -0.066
BA	Hormone Free	0.002 -1.000	BA	Hormone Free	0.000 0.000
BC	Interesting Packaging	0.001 0.000	BC	Interesting Packaging	0.000 0.000
BD	Kosher	0.007 -0.333	BD	Kosher	0.003 -1.000
BE	Limited Edition	0.022 0.133	BE	Limited Edition	0.032 0.000
BF	Low/No/Reduced Allergen	0.120 0.311	BF	Low/No/Reduced Allergen	0.071 0.095
BG	Low/No/Reduced Calorie	0.031 0.588	BG	Low/No/Reduced Calorie	0.037 -0.357
BH	Low/No/Reduced Carb	0.004 -0.750	BH	Low/No/Reduced Carb	0.001 -1.000
BJ	Low/No/Reduced Fat	0.107 0.171	BJ	Low/No/Reduced Fat	0.089 -0.136
BK	Low/No/Reduced Glycemic	0.001 0.000	BK	Low/No/Reduced Glycemic	0.000 0.000
BL	Low/No/Reduced Lactose	0.003 2.000	BL	Low/No/Reduced Lactose	0.005 4.000
BM	Low/No/Reduced Saturated Fat	0.054 -0.122	BM	Low/No/Reduced Saturated Fat	0.059 -0.128

BN	Low/No/Reduced Sodium	0.016	-0.467	BN	Low/No/Reduced Sodium	0.003	-0.667
BO	Low/No/Reduced Transfat	0.116	-0.281	BO	Low/No/Reduced Transfat	0.060	0.027
BP	Low/Reduced Sugar	0.050	-0.054	BP	Low/Reduced Sugar	0.028	0.692
BQ	Male	0.005	-0.833	BQ	Male	0.000	0.000
BS	Microwaveable	0.538	0.125	BS	Microwaveable	0.450	-0.021
BT	Nails & Hair	0.001	0.000	BT	Nails & Hair	0.001	-1.000
BU	No Added Sugar	0.011	-0.545	BU	No Added Sugar	0.006	1.500
BV	No Additives/Preservatives	0.356	-0.057	BV	No Additives/Preservatives	0.277	-0.094
BX	Novel	0.000	0.000	BX	Novel	0.002	-1.000
BY	On-the-Go	0.043	0.773	BY	On-the-Go	0.045	-0.250
BZ	Organic	0.024	0.615	BZ	Organic	0.014	0.125
CA	Palm Oil Free	0.025	-0.105	CA	Palm Oil Free	0.003	0.000
CB	Plant Based	0.036	1.923	CB	Plant Based	0.093	0.500
CC	Portionability	0.000	0.000	CC	Portionability	0.006	1.500
CD	Prebiotic	0.001	-1.000	CD	Prebiotic	0.000	0.000
CE	Premium	0.174	0.084	CE	Premium	0.157	-0.178
CH	Seasonal	0.029	0.158	CH	Seasonal	0.079	0.882
CJ	Social Media	0.227	0.429	CJ	Social Media	0.183	-0.076
CM	Time/Speed	0.088	-0.016	CM	Time/Speed	0.076	0.000
CN	Vegan/No Animal Ingredients	0.184	0.711	CN	Vegan/No Animal Ingredients	0.224	0.224
CO	Vegetarian	0.452	0.190	CO	Vegetarian	0.331	0.020
CP	Vitamin/Mineral Fortified	0.006	0.000	CP	Vitamin/Mineral Fortified	0.005	4.000
CR	Wholegrain	0.031	0.095	CR	Wholegrain	0.039	0.000

Source: Own elaboration based on Mintel's GNPD.

Table A.2 – Processed fish, meat and egg products

2016-2019			2021-2023		
Symbol	Attribute	IndexGrowth	Symbol	Attribute	IndexGrowth
A	Added Calcium	0.000 0.000	A	Added Calcium	0.001 0.000
B	All Natural Product	0.019 -0.308	B	All Natural Product	0.013 -0.643
E	Antioxidant	0.001 -1.000	E	Antioxidant	0.002 -0.500
F	Babies & Toddlers (0-4)	0.000 0.000	F	Babies & Toddlers (0-4)	0.001 0.000
J	Carbon Neutral	0.001 -1.000	J	Carbon Neutral	0.004 1.000
K	Children (5-12)	0.010 0.000	K	Children (5-12)	0.004 3.000
L	Cobranded	0.005 -0.800	L	Cobranded	0.004 -0.500
M	Convenient Packaging	0.059 -0.250	M	Convenient Packaging	0.021 0.231
N	Dairy Free	0.030 0.000	N	Dairy Free	0.017 0.000
O	Diabetic	0.000 0.000	O	Diabetic	0.000 0.000
P	Diet/Light	0.009 -0.429	P	Diet/Light	0.001 -1.000
Q	Ease of Use	0.432 -0.053	Q	Ease of Use	0.269 -0.216
R	Economy	0.050 -0.182	R	Economy	0.040 0.240
S	Ethical - Animal	0.468 -0.189	S	Ethical - Animal	0.427 -0.216
T	Ethical - Biodegradable	0.007 -0.400	T	Ethical - Biodegradable	0.006 0.250
U	Ethical - Charity	0.035 -0.385	U	Ethical - Charity	0.026 -0.053
V	Ethical – Env. Friendly Package	1.000 0.032	V	Ethical – Env. Friendly Package	1.000 -0.173
W	Ethical – Env. Friendly Product	0.491 -0.020	W	Ethical – Env. Product	0.445 -0.221
X	Ethical - Human	0.018 1.000	X	Ethical - Human	0.006 0.250
Y	Ethical - Recycling	0.986 0.035	Y	Ethical - Recycling	0.994 -0.172
Z	Ethical – Sust. Habitat/Resources)	0.528 -0.097	Z	Ethical – Sust. (Habitat/Resources)	0.498 -0.188
AA	Ethical - Toxins Free	0.007 0.667	AA	Ethical - Toxins Free	0.003 -0.667
AB	Event Merchandising	0.002 0.000	AB	Event Merchandising	0.001 -1.000
AD	Free from Added/Artificial Additives	0.010 -0.286	AD	Free from Added/Artificial Additives	0.003 0.000
AE	Free from Added/Artificial Colourings	0.248 0.021	AE	Free from Added/Artificial Colourings	0.145 -0.373
AF	Free from Added/Artificial Flavourings	0.239 0.043	AF	Free from Added/Artificial Flavourings	0.137 -0.364
AG	Free from Added/Artificial Preserv.	0.108 0.389	AG	Free from Added/Artificial Preserv.	0.049 -0.135
AI	Functional - Bone Health	0.017 0.500	AI	Functional - Bone Health	0.023 -0.400
AJ	Functional - Brain & Nervous System	0.008 -0.889	AJ	Functional - Brain & Nervous System	0.006 0.250
AK	Functional - Cardiovascular	0.026 -0.591	AK	Functional - Cardiovascular	0.039 -0.472
AL	Functional - Digestive	0.000 0.000	AL	Functional - Digestive	0.000 0.000
AM	Functional - Energy	0.002 0.000	AM	Functional - Energy	0.001 0.000
AN	Functional - Eye Health	0.004 -0.333	AN	Functional - Eye Health	0.004 0.000
AO	Functional - Immune System	0.006 -0.600	AO	Functional - Immune System	0.008 0.200
AP	Functional - Other	0.008 -0.571	AP	Functional - Other	0.011 -0.846
AQ	Functional - Skin	0.000 0.000	AQ	Functional - Skin	0.001 -1.000
AR	Functional - Slimming	0.005 -0.500	AR	Functional - Slimming	0.001 0.000
AT	Functional - Weight & Muscle Gain	0.074 0.256	AT	Functional - Weight & Muscle Gain	0.062 -0.483
AU	Gluten Free	0.294 0.065	AU	Gluten Free	0.176 -0.295
AV	GMO Free	0.051 0.542	AV	GMO Free	0.031 -0.370
AW	Halal	0.048 0.591	AW	Halal	0.016 -0.533
AX	High Satiety	0.001 -1.000	AX	High Satiety	0.001 0.000
AY	High/Added Fibre	0.039 -0.357	AY	High/Added Fibre	0.031 -0.308
AZ	High/Added Protein	0.234 0.242	AZ	High/Added Protein	0.189 -0.220
BA	Hormone Free	0.001 0.000	BA	Hormone Free	0.001 -1.000
BB	Innovative Ingredient	0.000 0.000	BB	Innovative Ingredient	0.001 -1.000
BD	Kosher	0.048 0.714	BD	Kosher	0.023 -0.476
BE	Limited Edition	0.006 -0.600	BE	Limited Edition	0.013 -0.615
BF	Low/No/Reduced Allergen	0.305 0.063	BF	Low/No/Reduced Allergen	0.193 -0.289
BG	Low/No/Reduced Calorie	0.003 -0.667	BG	Low/No/Reduced Calorie	0.003 0.000
BH	Low/No/Reduced Carb	0.001 -1.000	BH	Low/No/Reduced Carb	0.000 0.000
BI	Low/No/Reduced Cholesterol	0.003 2.000	BI	Low/No/Reduced Cholesterol	0.001 0.000
BJ	Low/No/Reduced Fat	0.084 -0.039	BJ	Low/No/Reduced Fat	0.042 -0.235
BL	Low/No/Reduced Lactose	0.011 -0.143	BL	Low/No/Reduced Lactose	0.004 0.000
BM	Low/No/Reduced Saturated Fat	0.063 -0.171	BM	Low/No/Reduced Saturated Fat	0.026 -0.391
BN	Low/No/Reduced Sodium	0.008 -0.714	BN	Low/No/Reduced Sodium	0.004 -1.000
BO	Low/No/Reduced Transfat	0.093 -0.406	BO	Low/No/Reduced Transfat	0.055 -0.396
BP	Low/Reduced Sugar	0.009 -0.625	BP	Low/Reduced Sugar	0.004 -1.000

BQ	Male	0.002	0.000	BQ	Male	0.000	0.000
BR	Maternal	0.000	0.000	BR	Maternal	0.001	-1.000
BS	Microwaveable	0.147	-0.098	BS	Microwaveable	0.106	0.027
BT	Nails & Hair	0.000	0.000	BT	Nails & Hair	0.001	-1.000
BU	No Added Sugar	0.006	-0.600	BU	No Added Sugar	0.002	-1.000
BV	No Additives/Preservatives	0.287	-0.051	BV	No Additives/Preservatives	0.163	-0.321
BX	Novel	0.001	0.000	BX	Novel	0.001	-1.000
BY	On-the-Go	0.010	0.000	BY	On-the-Go	0.004	-0.800
BZ	Organic	0.091	0.000	BZ	Organic	0.050	-0.521
CA	Palm Oil Free	0.009	1.667	CA	Palm Oil Free	0.006	-0.500
CB	Plant Based	0.058	3.750	CB	Plant Based	0.100	-0.014
CC	Portionability	0.001	-1.000	CC	Portionability	0.000	0.000
CE	Premium	0.261	-0.098	CE	Premium	0.169	-0.017
CF	Probiotic	0.002	0.000	CF	Probiotic	0.000	0.000
CH	Seasonal	0.077	-0.231	CH	Seasonal	0.091	0.286
CJ	Social Media	0.173	-0.177	CJ	Social Media	0.125	0.185
CL	Sugar Free	0.002	0.000	CL	Sugar Free	0.000	0.000
CM	Time/Speed	0.040	0.000	CM	Time/Speed	0.014	0.222
CN	Vegan/No Animal Ingredients	0.146	1.460	CN	Vegan/No Animal Ingredients	0.145	0.010
CO	Vegetarian	0.154	0.033	CO	Vegetarian	0.068	-0.118
CP	Vitamin/Mineral Fortified	0.008	8.000	CP	Vitamin/Mineral Fortified	0.014	2.000
CR	Wholegrain	0.004	0.500	CR	Wholegrain	0.006	-0.857

Table A.3 – Soups

2016-2019			2021-2023		
Symbol	Attribute	IndexGrowth	Symbol	Attribute	IndexGrowth
B	All Natural Product	0.024 -0.333	B	All Natural Product	0.000 0.000
E	Antioxidant	0.005 -1.000	E	Antioxidant	0.000 0.000
L	Cobranded	0.010 -1.000	L	Cobranded	0.005 -1.000
M	Convenient Packaging	0.053 -0.167	M	Convenient Packaging	0.005 -1.000
N	Dairy Free	0.121 -0.077	N	Dairy Free	0.074 0.000
P	Diet/Light	0.106 0.200	P	Diet/Light	0.032 -0.600
Q	Ease of Use	0.198 -0.586	Q	Ease of Use	0.101 -0.706
R	Economy	0.053 -1.000	R	Economy	0.051 -0.167
S	Ethical - Animal	0.039 0.667	S	Ethical - Animal	0.088 -0.538
T	Ethical - Biodegradable	0.000 0.000	T	Ethical - Biodegradable	0.005 0.000
U	Ethical - Charity	0.043 0.250	U	Ethical - Charity	0.018 -1.000
V	Ethical – Env. Friendly Package	0.986 0.020	V	Ethical – Env. Friendly Package	1.000 -0.113
W	Ethical – Env. Friendly Product	0.135 1.500	W	Ethical – Env. Friendly Product	0.092 0.000
X	Ethical - Human	0.010 -1.000	X	Ethical - Human	0.023 3.000
Y	Ethical - Recycling	0.957 0.041	Y	Ethical - Recycling	0.991 -0.114
Z	Ethical – Sust. (Habitat/Resources)	0.164 1.778	Z	Ethical – Sust. (Habitat/Resources)	0.166 -0.435
AA	Ethical - Toxins Free	0.029 -0.500	AA	Ethical - Toxins Free	0.000 0.000
AD	Free from Added/Artificial Additives	0.024 3.000	AD	Free from Added/Artificial Additives	0.018 -1.000
AE	Free from Added/Artificial Colourings	0.449 -0.102	AE	Free from Added/Artificial Colourings	0.276 0.000
AF	Free from Added/Artificial Flavourings	0.271 0.000	AF	Free from Added/Artificial Flavourings	0.198 -0.130
AG	Free from Added/Artificial Preservatives	0.382 -0.073	AG	Free from Added/Artificial Preservatives	0.217 -0.042
AI	Functional - Bone Health	0.014 1.000	AI	Functional - Bone Health	0.065 -0.250
AJ	Functional - Brain & Nervous System	0.005 0.000	AJ	Functional - Brain & Nervous System	0.023 -0.333
AK	Functional - Cardiovascular	0.087 -0.364	AK	Functional - Cardiovascular	0.037 0.000
AL	Functional - Digestive	0.014 -0.500	AL	Functional - Digestive	0.000 0.000
AM	Functional - Energy	0.010 0.000	AM	Functional - Energy	0.014 -1.000
AN	Functional - Eye Health	0.000 0.000	AN	Functional - Eye Health	0.005 0.000
AO	Functional - Immune System	0.024 0.500	AO	Functional - Immune System	0.014 0.000
AP	Functional - Other	0.024 -0.750	AP	Functional - Other	0.018 2.000
AR	Functional - Slimming	0.034 -0.600	AR	Functional - Slimming	0.032 0.333
AS	Functional - Stress & Sleep	0.010 0.000	AS	Functional - Stress & Sleep	0.000 0.000
AT	Functional - Weight & Muscle Gain	0.043 0.250	AT	Functional - Weight & Muscle Gain	0.157 0.125
AU	Gluten Free	0.425 0.146	AU	Gluten Free	0.281 0.033
AV	GMO Free	0.048 0.000	AV	GMO Free	0.060 -0.700
AW	Halal	0.000 0.000	AW	Halal	0.005 -1.000
AX	High Satiety	0.000 0.000	AX	High Satiety	0.009 0.000
AY	High/Added Fibre	0.048 -0.333	AY	High/Added Fibre	0.088 -0.273
AZ	High/Added Protein	0.116 0.000	AZ	High/Added Protein	0.161 -0.542
BD	Kosher	0.024 -0.750	BD	Kosher	0.028 -0.800
BE	Limited Edition	0.019 -0.667	BE	Limited Edition	0.014 -0.500
BF	Low/No/Reduced Allergen	0.444 0.140	BF	Low/No/Reduced Allergen	0.290 -0.031
BG	Low/No/Reduced Calorie	0.058 1.000	BG	Low/No/Reduced Calorie	0.005 -1.000
BH	Low/No/Reduced Carb	0.014 -0.500	BH	Low/No/Reduced Carb	0.005 0.000
BI	Low/No/Reduced Cholesterol	0.005 -1.000	BI	Low/No/Reduced Cholesterol	0.000 0.000
BJ	Low/No/Reduced Fat	0.435 -0.163	BJ	Low/No/Reduced Fat	0.392 -0.300
BK	Low/No/Reduced Glycemic	0.005 -1.000	BK	Low/No/Reduced Glycemic	0.000 0.000
BL	Low/No/Reduced Lactose	0.000 0.000	BL	Low/No/Reduced Lactose	0.005 0.000
BM	Low/No/Reduced Saturated Fat	0.106 -0.308	BM	Low/No/Reduced Saturated Fat	0.055 0.000
BN	Low/No/Reduced Sodium	0.053 -0.429	BN	Low/No/Reduced Sodium	0.018 0.000
BO	Low/No/Reduced Transfat	0.043 -0.200	BO	Low/No/Reduced Transfat	0.023 0.500
BP	Low/Reduced Sugar	0.097 -0.182	BP	Low/Reduced Sugar	0.101 0.444
BS	Microwaveable	1.000 0.091	BS	Microwaveable	0.894 -0.220
BU	No Added Sugar	0.116 0.400	BU	No Added Sugar	0.074 -0.222
BV	No Additives/Preservatives	0.565 -0.172	BV	No Additives/Preservatives	0.341 -0.195
BY	On-the-Go	0.043 -0.200	BY	On-the-Go	0.018 0.000
BZ	Organic	0.213 0.588	BZ	Organic	0.092 -0.333
CA	Palm Oil Free	0.005 0.000	CA	Palm Oil Free	0.005 0.000
CB	Plant Based	0.068 0.000	CB	Plant Based	0.115 0.273

CC	Portionability	0.000	0.000	CC	Portionability	0.009	0.000
CE	Premium	0.145	0.500	CE	Premium	0.138	-0.235
CH	Seasonal	0.019	0.000	CH	Seasonal	0.023	3.000
CJ	Social Media	0.357	0.056	CJ	Social Media	0.240	0.364
CL	Sugar Free	0.024	-0.750	CL	Sugar Free	0.000	0.000
CM	Time/Speed	0.242	-0.438	CM	Time/Speed	0.171	0.056
CN	Vegan/No Animal Ingredients	0.280	0.071	CN	Vegan/No Animal Ingredients	0.309	0.030
CO	Vegetarian	0.638	-0.059	CO	Vegetarian	0.433	-0.192
CP	Vitamin/Mineral Fortified	0.000	0.000	CP	Vitamin/Mineral Fortified	0.009	0.000
CR	Wholegrain	0.019	-0.667	CR	Wholegrain	0.014	1.000
