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42 **Meat Consumption: Trends and Quality Matters**

43

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51

52 **Abstract**

53 The purpose of this paper is to use quality theory to identify opportunities for the meat sector
54 that are consistent with current and future trends in meat consumption. Meat consumption
55 has increased in the past and is likely to continue into the future. Growth is largely driven by
56 white meats, with poultry in particular of increasing importance globally. The influence of
57 factors such as income and price is likely decline over time due to slowing income growth
58 rates and saturation in consumption rates in some markets so that other factors, such as
59 quality, will become more important. Quality is a complex attribute and consumers' quality
60 expectations may not align with experienced quality due to misconception of certain intrinsic
61 cues which undermines their confidence, increases uncertainty and can result in
62 dissatisfaction. The establishment of relevant and effective cues, based on extrinsic and
63 credence attributes, could offer advantage on the marketplace. The use of extrinsic cues can
64 help convey quality characteristics for eating quality, but also for more abstract attributes that
65 reflect individual consumer concerns e.g. health/nutrition, and collective concerns, e.g.

66 sustainability. However, it is important to recognise that attributes are not of equal value to
67 all consumers and therefore, the marketing of differentiated products to different consumer
68 segments is the reasonable way to go.

69

70 **Keywords:** meat consumption, sustainability, credence attributes, meat quality

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74 **1. Introduction**

75 This paper explores trends in meat consumption globally and examines the influence of
76 consumers' perceptions of quality on meat consumption, with a particular focus on credence
77 quality attributes. It draws on secondary data to examine consumption trends, and uses the
78 theoretical and empirical contributions on quality theory from the literature to identify quality
79 aspects that are likely to be of increasing importance to the meat industry in the future.
80 Ultimately, this paper aims to help the meat sector identify areas of focus to ensure consumer
81 confidence in the quality of meat and meat products is maintained and enhanced in light of
82 current and projected consumption patterns.

83

84 **2. Global Trends in Overall Meat Consumption**

85 Food balance sheets offer a blunt but, nonetheless, useful indicator of food consumption
86 trends. While likely to overestimate per capita consumption of meats, these data have been
87 widely used to guide agricultural and food policy due to the availability of data on a global
88 basis, across a wide range of food commodities, over a significant time period. From analysis
89 of the Food and Agricultural Organisation of the United Nations (FAO) Food Balance Sheet
90 data, it is clear that there has been a significant increase in global meat consumption over
91 time (see Table 1). Aggregate meat consumption increased by almost 60% between 1990 and
92 2009, from 175,665 thousand tonnes to 278,863 thousand tonnes, driven in part by a growing
93 world population (Delgado, 2003). However, per capita consumption also increased by

94 almost 25% from 33.7 to 41.9 kg per capita (see Table 2). This indicates that factors in
95 addition to population growth are influencing demand.

96 Most noteworthy of these factors is rising incomes in developing countries (Cranfield, Hertel,
97 Eales and Preckel, 1998; Meade and Rosen, 2013). Delgado (2003) found that the amount of
98 meat consumed in developing countries grew three times as much as it did in developed
99 countries between the early 1970s to mid-1990s, reflecting differential rates of income
100 growth. Declining prices (in real terms) (Palmer, 2011), trade liberalisation, globalisation of
101 food systems and urbanisation (Delgado, 2003) have been identified as other influential
102 factors.

103 The terms “nutrition transition” describes the major transitions in population-level dietary
104 patterns associated with economic developmentⁱ. These transitions are driven by a range of
105 culturally specific factors including the complex effects of urbanisation (Hawkesworth et al,
106 2010). Amongst other changes, the transition to pattern 4 in most low and middle-income
107 countries is associated with a trend towards increased consumption of fat, sugar, processed
108 food and animal proteins. This transformation in dietary patterns, and related changes in
109 disease patterns, is highlighted in nutrition and public health literature and is coming
110 increasingly to the fore with global policy makers (e.g. WHO, 2008).

111 Notwithstanding an upward trend in aggregate per-capita meat consumption, differences are
112 evident when examined by meat category. The overall trend was upward for white meats and
113 downwards for red meats. Between 1990 and 2009, bovine meat consumption per capita
114 decreased by approximately 8% while pigmeat consumption increased by approximately 20%
115 and poultry by 75% (sheep and goatmeat consumption increased by 11.8% equivalent
116 however to only 0.2 kg/capita) (see Table 2). The relative price of different types of meat

117 explains some of this variation (Palmer, 2011), with the real price of beef being higher than
118 poultry and pigmeat in most countriesⁱⁱ.

119

120 ***2.1 Future Meat Consumption***

121 Against a backdrop of a generally favourable global economic situation, and growing world
122 population, the future for meat consumption overall is likely to be positive. Indeed world
123 meat consumption growth is expected to be second only to vegetable oil in terms of growth
124 rates of the major agricultural commodities (1.7% per annum for meat vs. 2% for vegetable
125 oil by 2021 (OECD FAO, 2013)). On a geographic basis, most growth is expected from
126 Asia, Latin America and the Middle East, and from developing countries in line. According
127 to Rosegrant, Paiser, Meijer and Witcover (2001) diet upgrades, made possible by income
128 growth, are expected to double the quantity of meat demanded by consumers in developing
129 countries by the year 2020 (using 1997 as the base year). In contrast, a contraction in
130 consumption is expected in some developed countries as a result of lower rates of income
131 growth and declining populations (European Commission, 2012). Furthermore, meat
132 consumption per capita appears saturated in these countries (OECD-FAO, 2013) and aging
133 populations, changing demographics as well as increased health and dietary awareness is
134 likely to result in a pattern of slowing consumption growth.

135 However, a standard pattern is not evident for all meat types. Figures 1 and 2 present
136 projected changes in meat consumption from 2013 to 2022 based on OECD data for the
137 world and Europe, respectively. Figure 1 shows while quantity consumed for all meats is
138 projected to continue to increase, all meats, except poultry are expected to account for a
139 declining share of total meat consumption. Furthermore, sheepmeat's share is projected to
140 decline at a faster rate than pigmeat, which in turn is projected to decline at a faster rate than

141 beef. The further domination of poultry meat is quite evident when the size of the current
142 share of consumption (as depicted by the size of the bubble in Figure 1) is considered. Thus
143 while growth in aggregate meat consumption is projected to be driven for the most part by
144 increases in poultry and pigmeat, poultry is expected to overtake pigmeat as the most
145 consumed meat in the world by 2022 (European Commission, 2012).

146 Figure 2 shows a slightly different pattern for Europe. Consumption per capita is projected to
147 increase for all meats, except sheepmeat. However beef and lamb are projected to account
148 for a declining share of total meat consumption. Poultry is projected to continue to account
149 for an increased share of consumption, pigmeat is projected to be largely unchanged but beef,
150 and particularly sheepmeat, is projected to account for a declining share of consumption.
151 Thus, while white meat is projected to substitute for red meat in Europe as well as globally,
152 pigmeat is projected to be a more significant component of white meat in Europe than in the
153 global situation.

154 Amongst the countries that will drive increased consumption, price is expected to be a big
155 factor. For example, price is expected to be a factor in China and elsewhere in Asia as price
156 elasticity becomes a more influential factor than income elasticity, resulting in poultry being
157 favoured, followed by pigmeat and beef. (Income elasticity is more influential when incomes
158 are lower, i.e. as incomes rise changes in incomes have less of an impact (OECD-FAO,
159 2013)). Price will also be influential in more developed markets, e.g. the EU where “firm”
160 meat prices, are expected to continue to slow the demand for meat overall, despite an
161 improved economic context (European Commission, 2012).

162 Growth in meat consumption in developing countries is likely to continue in response to
163 growing populations and increased incomes. For the meat industry, there will, however, be a
164 challenge in maintaining market share in developed countries and the challenge will be more

165 pronounced for those selling red meats rather than white meats. Consumers in developed
166 countries, with already high levels of per capita consumption, and aging populations are not
167 expected to significantly increase their intake of animal proteins. Furthermore, consumers in
168 developed countries are becoming more interested in meat production systems, animal
169 welfare, food safety and other quality- related matters (OECD, 2013). These issues, which
170 are related to pattern 5 of the nutrition transition (behaviour change), are likely to have an
171 increased effect on their meat consumption patterns in the future. It will be essential for the
172 meat industry to fully understand how consumers perceive quality and how such perceptions
173 influence their choices, and to determine the most important quality attributes they need to
174 maintain and enhance in existing and new meat products (Troy and Kerry, 2010).

175

176 **3. Perceived quality as an explanation of consumer choices**

177 Trends in meat consumption suggest that the influence of factors such as income and price
178 will decline over time and that saturation in meat consumption may have been reached in
179 many markets. Thus other factors, such as quality, will become more significant in
180 influencing consumer choice. While and many and varied definitions of quality are evident
181 in the literature, ranging from degrees of excellence through to fitness to purpose, when
182 examining quality from a consumer perspective, one has to be concerned with perceptions
183 and one has to be concerned with the emotional and functional dimensions of quality. In this
184 section, the concept of quality from a consumer perspective is dissected and the process by
185 which consumers form quality expectations and evaluate perceived quality is elaborated.

186 Consumers in all markets demand enjoyable, safe and healthy food products that are of high
187 quality (Trienekens, Wognum, Beulens and van der Vorst, 2012; Verbeke, Pérez-Cueto,
188 and Barcellos, 2010). However quality from a consumer's perspective is subjective and thus

189 assessments of meat quality can vary across individuals, societies and cultures. Therefore,
190 not surprisingly, exploring quality is complex due its broad and all-encompassing concept
191 character. Luning, Marcelis and Jongen, (2002), for example, suggest that quality represents
192 the features/properties of a product that result in satisfying consumer physiological and/or
193 psychological needs. In making judgements about quality consumers form quality
194 expectations based on their (unique) past experiences and the information presented in the
195 purchase location (Steenkamp, 1990). As evident from Luning et al.'s definition, consumer's
196 motives (needs) guide what is sought from a product and influence how different stimuli in
197 the environment are perceived (Grunert, Bredahl and Brunso, 2004) with, for example, some
198 being perceived as more relevant than others. Ironically, a number of incongruities have been
199 observed in consumer use of and interpretation of quality information. Particularly
200 noteworthy is that: 1) quality inferences made by consumers may not be good indicators of
201 actual quality and; 2) expressed demand for certain information may not translate into use of
202 this information (Grunert, 2006). This confounds efforts of marketers as, due to the misuse
203 of information, quality expectations may not align with experienced quality. There is
204 increased complexity in that quality expectations formed by one consumer in a given
205 situation may be very different to another consumer. These observations draw attention to
206 three basic types of quality attributes discussed in consumer literature; search, experience and
207 credence.

208

209 **Search attributes**

210 Search attributes, often referred to as “quality cues”, are normally used at point-of-purchase
211 to evaluate choice alternative (Steenkamp, 1990). Point-of-purchase information represents a
212 significant communication opportunity, where salient quality cues can be leveraged to
213 support positive inferences regarding quality. These quality cues can be drawn from two

214 types, intrinsic and extrinsic. Intrinsic cues, described as inherent visible characteristics of
215 the product, are significant in determining quality expectation in many fresh food categories.
216 (Extrinsic cues represent information related to the product but that is not physically part of
217 the product (Steenkamp, 1990), that can be modified externally). Indeed evidence suggests
218 that at least two characteristics of appearance are normally used by consumers (Ngapo et al.
219 2004 in Dransfield, 2005) in making quality judgments on meat. This is particularly the case
220 for beef where cut type, colour, fat structure/type (marbling/rim fat) and fat levels (Grunert et
221 al. 2004) have been observed as influential in shaping quality expectations. However,
222 research evidence indicates that the use of some intrinsic cues to infer quality may be
223 dysfunctional with Grunert et al. (2004) illustrating that as little as 24% of experience eating
224 quality for pork could be explained by expected quality. Bello Acebron and Calvo Dopico
225 (2000) however argue that expected quality accounted for up to 63% of experienced quality
226 for beef.

227 These findings, among others, suggest a discord between expected and experienced quality
228 due to misconception of certain intrinsic cues. This undermines consumer's confidence in the
229 sector, increases their uncertainty regarding quality expectations and can result in
230 dissatisfaction. Grunert (2006) argues that this misplaced reliance on intrinsic quality cues,
231 could be as a result of relatively few extrinsic cues available to support consumer evaluations.
232 This is supported by Bernués, Olaizola and Corcoran's (2003) observation on the absence of
233 certain extrinsic cues that could support quality evaluations.

234 Commonly cited extrinsic cues for meat include: use by dates, quality labels (including
235 brands and quality assured symbols), place-of-purchase, packaging, price, and information
236 related to origin, animal feed, production and processing. Origin and place of purchase have
237 been noted as the two most significant extrinsic cues for meat (Grunert, 2006). Typically in

238 European markets, home produced (domestic) meat is believed to be of better quality than
239 imports and independent butchers are believed by consumers to offer better quality meat than
240 supermarkets (Becker, Benner and Glitsch, 2000; Bernués et al., 2003; Grunert, 2006).
241 Indeed Verbeke and Roosen (2009) observed that region-of-origin-labelled meat has strong
242 appeal for health orientated consumers. Animal feed has also been noted as important in
243 inferring safety/health quality (Henson and Northen 2000; Bernués et al., 2003). Price,
244 referred to by some as an extrinsic cue (e.g. Bello Acebron and Calvo Dopico, 2000) and
245 others as a cost cue (e.g. Grunert et al. 2004), represents an indicator of quality and also the
246 exchange/trade-off made for perceived quality. For some, price is the main determinant of
247 choice, for example, Realini et al. (2014) identified a price oriented segment among Spanish
248 beef consumers. However, it is noted that many consumers routinely buy products without
249 knowing price and it appears that as a person gains more experience within the product
250 category this cue plays a lessor role, with deliberations on price in repeated situations
251 substituted with habitual behaviours (Grunert, 2005). Cues such as a brands and label images
252 can help convey quality characteristics for more abstract affective benefits such as feelings of
253 luxury and self-fulfilment. Through buying local produce, for example, a person may feel
254 they are contributing to the well-being of the community and thus gain a sense of belonging.
255 Equally a brand may infer indulgence or connection (Grunert, 2006).

256 Extrinsic cues offer considerable potential in supporting consumer quality evaluations in light
257 of evolving purchasing motives linked to changing demographics, lifestyles and knowledge,
258 and rising concerns on safety, health, and ethical factors (Bernués et al., 2003; Grunert,
259 2006). Furthermore, Verbeke et al. (2010) suggest that there is an appetite for an eating
260 quality guarantee as a means of addressing failings in current quality evaluations.

261

262 The establishment of relevant cues that support effective quality evaluations could offer
263 advantage on the marketplace. However, a significant challenge when communicating on a
264 new quality attribute is garnering consumer attention to its existence and value. Even in the
265 case of existing relevant cues, exposure to and use of cues are affected by the situation
266 specific features relating to the location and the individual (Grunert et al., 2004). Consumers
267 select cues to infer quality based on the predictive validity of the cue and perceived
268 familiarity and ability to make quality inferences from the cue (Dick, Chakravarti and Biehal,
269 1990; Grunert, 2006). These points present a strong argument for the creation of overarching
270 cues that support quality evaluations across a gamut of purchase motives – i.e. creating cues
271 that display strong predictive validity. This also speaks to the observation made by Hocquette
272 et al. (2012) that designation of origin and geographical indication could bestow specific
273 quality characteristics on foods based on production/processing approaches taken within a
274 natural, regional environment. These could span a range of purchase motives. Furthermore,
275 extrinsic cues, such as label information can add a positive halo to a food. In this case the
276 label, for example, that, communicates a health benefit or production approach may also be
277 more positively evaluated on experience quality (Wansink, van Ittersum and Painter, 2004).
278 However, as always, it is the translation of these cues into quality expectations that will
279 determine choice.

280

281 **Experience Attributes**

282 This brings us to consider the two other elements of consumer quality: experience and
283 credence quality. These benefit-generating product elements cannot be assessed prior to
284 consumption (Oude Ophuis and Van Trijp, 1995). Steenkamp, (1990) defines experience
285 quality as the aspect of product quality that can be experienced/detected during consumption.
286 The most significant of these for meat is eating quality which is normally evaluated based on

287 quality attributes such as taste, tenderness and juiciness. Expectations are either affirmed or
288 refuted upon experience (Bello Acebron and Calvo Dopico, 2000) and are expressed based on
289 levels of consumer satisfaction. As mentioned earlier, historically in meat and beef
290 categories, consumers rely considerably on intrinsic cues to make inference on experience
291 eating quality with rather limited success evident in their evaluations. However modern
292 consumers expect experience quality to match their expectation and as a result are becoming
293 more open to the use of extrinsic cues to support such evaluations (Verbeke et al., 2010).

294 By also including all post-purchase pre-consumption consumer experiences with a product,
295 we can identify the second significant dimension of experience quality as convenience. This
296 is affirmed or refuted based on factors such as time and effort necessary to transform the
297 product into a meal. Given changing lifestyles convenience, as a quality attribute, is gaining
298 in importance for certain consumer segments. However, convenience attributes can be
299 associated with higher levels of processing which many view as less natural and less healthy.
300 This may therefore result in an internal negotiation where the individual trades-off perceived
301 health for convenience.

302

303 **Credence Attributes**

304 Credence quality refers to those product dimensions that cannot be assessed even on
305 consumption. For health and process benefits (that may satisfy moral and ethical needs) a
306 consumer cannot with any degree of certainty assess/confirm their existence. Figure 3 draws
307 attention to generic categories of expected quality associated with meat. Moving from
308 experience through to credence is associated with a shift from personal ability to assess
309 quality at point-of-consumption to trusting others that purchase motives have truly been
310 fulfilled. Verbeke et al. (2010) illustrate that while credence attributes such as safety were
311 generally assessed using extrinsic cues, such as use-by-date and independently certified

312 quality labels and brands, healthiness quality evaluations involved an amalgam of intrinsic
313 and extrinsic uses. Importantly they note the significance of confidence and trust in the use of
314 extrinsic cues and draw attention to the value placed on independent institutions'
315 certification.

316 The discussion above clearly highlights an interface between the supplier and consumer
317 where the supplier seeks to convey significant product characteristics that will align to
318 consumer values and motives (Figure 4). As is evident from this discussion perceived quality
319 has been conceptualised as multidimensional, and in the case of meats these are associated
320 with sensory (eating enjoyment), safety, healthiness and convenience (Grunert, 2006; Grunert
321 et al., 2004; Steenkamp et al., 1990). In addition to these there is an increasing emphasis on
322 process characteristics like organic production, animal welfare and environmental
323 sustainability based on moral and ethical motivations. When purchasing consumers draw
324 inferences based on the information available. It is this information that represents the
325 interface between both groups and where consumer self-knowledge and product-knowledge
326 combine to guide choice.

327 From a supply chain vantage point Hocquette et al. (2012) considered how to construct four
328 quality indices for the purposes of assessing overall meat quality across four of the key
329 quality dimensions: sensory, nutritional/healthiness, safety and convenience. The
330 development of such indices offers opportunities for communication with customers through
331 the use of extrinsic cues which according to Grunert (2006) have considerable potential to
332 sway how consumer perceive meat quality. This suggestion is made based on the premise that
333 consumers want more of this type of information; that the backdrop story for products is
334 becoming increasingly important (making a connection with place, time, environment and

335 people) and the halo effect of process quality can enhance the overall evaluation of the food
336 (Grunert, 2006).

337

338 **4. *Augmentation or Creation of New Quality Attributes: the Matter of Consumer***
339 ***Evaluation and Acceptance.***

340 In seeking to leverage the wide range of quality attributes that influence consumer choice, or
341 create new quality attributes, the influence of external forces on the process by which
342 consumers form quality expectations needs to be understood. Historical, social and cultural
343 factors need to be taken into account when considering how quality attributes, as delivered by
344 supplier, are translated into a bundle of need satisfying benefits by consumers. York and
345 Gossard (2004) observed that meat consumption patterns differ across cultures and Kanerva
346 (2013) further illustrated these cultural differences in the varying significance of
347 demographic factors such as age, gender, employment status, and education on demand for
348 meat across European countries. These observations strongly support the concept that quality
349 attributes may hold different meanings across cultures and it cannot be assumed that
350 consumers will uniformly translate meat quality attributes into bundles of benefits. Indeed, as
351 inferred from earlier discussion, market segmentation is a necessary requirement to ensure
352 that meaningful links can be created between products and consumers thus taking account of
353 consumers lived experiences and positioning of products within their food lives. A range of
354 market opportunities exist for meat, ranging from differentiation based on experience
355 attributes (sensory and/or convenience) and/or credence attributes. The potential market
356 positioning approaches are many and varied, (indeed the emergence of breed as an extrinsic
357 cue to convey higher eating quality is just one example of this), and the implications for
358 stages within the supply chain need to be considered.

359 Future market opportunities are likely to be based in extrinsic (beyond origin and place of
360 purchase) and credence attributes (Verbeke et al. 2010). Extrinsic cues will most likely play
361 a greater role in forming expectations of experience quality, due to the aforementioned
362 shortcoming of intrinsic cues. Furthermore with an increasing consumer emphasis on health
363 and the environment it is likely that meat products that can credibly deliver these credence
364 attributes will meet with some market favour. Credibility of product offering places
365 particular demands on the production system. Indeed Meat and Livestock Australia (MLA)
366 (2005, cited in Pethick, Ball, Banks and Hocquette, 2011, p13) emphasise the importance of
367 the production system in meeting consumer needs in the red meat category. They argue that
368 such production systems “*must be ethical from an animal welfare and environmental aspect*
369 *(ethical),[ensure] the products are safe and there is integrity within supply chains to justify*
370 *claims relating to quality and health-promoting features (food safety and traceability)*” and
371 “*that production systems throughout the supply chain should be efficient from a cost of*
372 *production perspective such that consumers perceive the product as ‘good value for money’ –*
373 *i.e. quality and price are perceived to match*”. The potential of using aspects of the
374 production system as an extrinsic cue to deliver on credence quality is illustrated by Grunert
375 et al. (2011) who found that information about beef production (pasture-reared animals) was
376 a major contributor for acceptance in comparison with other credence attributes studied.

377 When considering the future for meat, sensory aspects cannot be ignored as consistent eating
378 quality represent one of the most important determinants of choice (Miller, Carr, Ramsey,
379 Crockett and Hoover, 2001). Due to the dysfunctional link between some intrinsic cues and
380 quality there is potential to use extrinsic cues to infer eating quality. To this end some supply
381 chain systems have been developed that identify and control production and processing
382 factors that affect palatability, for example, the PACCP system is designed to accurately
383 predict the quality of the final product (Polkinghorne et al., 1999; Tatum, Belk, George and

384 Smith, 1999). Quality labels associated with these systems have the potential ability to
385 replace traditionally used intrinsic cues and better align consumer expectations and
386 experiences. The PACCP system also leaves scope for the improvement of meat quality
387 rather than prevention of poor meat quality alone. Further development of this system, for
388 example through linking with modelling approaches based on muscle biochemistry, is
389 identified as a potentially fruitful area of research for improving the prediction of beef quality
390 (Hocquette et al, 2014). Furthermore, advances in understanding of the molecular or
391 biological components of meat quality, through genomics, proteomics etc., is also expected to
392 be beneficial in terms of defining and optimising quality management systems and providing
393 quality assurance (Mullen, Stapleton, Corcoran, Hamill and White (2006). Such
394 developments may lead to an increased production of premium quality meat which could be
395 consistently labelled as such.

396 In principle, credence attributes related to sustainability may offer another opportunity in the
397 medium to long term. The increasing recognition of the impact of food choices, eating habits
398 and food consumption patterns on climate change, biodiversity, and the use of natural
399 resources (Steinfeld et al., 2006; Dagevos and Voordouw, 2013) is putting pressure on policy
400 makers, amongst other, to seek to influence consumer behaviour and achieve more
401 sustainable consumption. Indeed the FAO deliberately entitled their report “*Livestock’s long*
402 *shadow, environmental issues and options*” to help raise the attention of “*the general public*
403 *to the very substantial contribution of animal agriculture to climate change and air pollution,*
404 *to land, soil and water degradation and to the reduction of biodiversity*” with a view to not
405 simply laying blame but to “*encourage decisive measures at the technical and political levels*
406 *for mitigating such damage*” (Steinfeld et al., 2006, p.iii). Meat, and particularly beef due to
407 enteric fermentation in the rumen, is recognised to have a significant impact in terms of

408 greenhouse gas emission. Indeed meat products have been described as “*the most energy-*
409 *intensive and ecologically burdensome foods*” (Dagevos and Voordouw, 2013, p61).

410 Consumer concerns relating to environmental sustainability tend to be collective rather than
411 individual (this is in contrast to concerns relating to safety, health and organoleptic properties
412 which tend to be individual) (Dranfield, 2005). Thus it is not yet clear whether there is a
413 strong direct market opportunity for industry in addressing consumers’ environmental
414 concerns, i.e. environmental externalities associated with meat consumption could end up
415 being paid for by the citizen rather than the consumer if government policies seek to reduce
416 production (e.g. through compensation for producers) and/or consumption of meat (e.g.
417 through publicly-funded campaigns to reduce consumption) to reduce the environmental
418 impact of livestock production. Such policies could result in higher prices for red meat
419 directly (e.g. through various taxes) or indirectly (through reduced supply). Thus, beef in
420 particular may become an even more premium product. Sustainability credentials are,
421 however, believed to be important from a supply chain perspective. The Origin Green
422 programmeⁱⁱⁱ promoted by Bord Bia, the Irish Food Board is leveraging this trend and is using
423 sustainability credentials, which have been independently verified, to position Irish beef
424 companies as the supplier of choice for key European retail accounts. Bord Bia has however
425 not yet targeted consumers directly with Origin Green due to a perceived lack of willingness
426 by consumers currently to pay for the benefits of such a programme.

427 Market opportunities and threats linked to health should be further explored as continually
428 evolving research on the impact of diet on health is influencing food choice and behaviour as
429 well as public policy (e.g. new regulations relation to labelling of nutritional content). MLA
430 (2005) identified red meats as “*health enhancing such that they are good sources of lean*
431 *high-quality protein and nutrients (fatty acid species, minerals and vitamins) that are*
432 *consistent with a healthy diet (human health attributes)*”. However, while historically

433 intentional influences were generally designed to increase meat consumption more recently,
434 certain governmental dietary guidelines are designed to decrease meat consumption
435 (Kanerva, 2013), with many experts promoting a low-meat diet over a high-meat diet. This is
436 likely to evolve further in developed countries in particular due to overconsumption of many
437 nutrients, including protein (Westhoek et al., 2011). Furthermore, recent media attention
438 suggesting a link between red meat consumption and certain illness, such as cancer and
439 cardiovascular disease (Westhoek et al., 2011), is cause for concern by the industry even
440 though these relationships are questioned by some researchers (see for example Sinatra,
441 Teter, Bowden, Houston and Martinez-Gonzalez, 2014). While some early evidence suggests
442 that negative publicity of the potential health risks of red meat did not decrease overall meat
443 consumption (Schroeter and Foster, 2004) one can expect a negative impact from this in the
444 longer term. Nonetheless, with any threat comes opportunity and the opportunity lies in
445 developing healthier meat alternatives that do not compromise on taste. These developments
446 may involve the application of novel production/process technologies, which may also have
447 sustainability advantages. The potential for healthier alternatives was illustrated by Grunert et
448 al. (2011) when they observed that meat products promoting a health benefit were more
449 positively evaluated than produces without a health claim. Interestingly products with an
450 explicit food safety benefit were evaluated more negatively in this research due to consumer
451 scepticism. This draws attention to consumer risk benefit evaluations when considering new
452 attributes and the technologies applied to create these.

453 Processing technologies (e.g. nanotechnology, thermal processing, high pressure processing)
454 may augment key, or indeed create new, credence quality attributes and result in
455 differentiated meat products for consumers. The technology itself, rather than the benefit
456 conferred, can be a focal point in consumer quality evaluations. In some cases due to socially
457 constructed and strongly embedded existing beliefs the technology is judged negatively,

458 indeed may be perceived as increasing health/safety risks, or resulting only in benefits for the
459 industry rather than consumers, and as a result the augmented/differentiated product is
460 rejected. Van Wezemael, Verbeke, Kugler, de Barcellos and Grunert (2010) illustrated with
461 their observation that rejection likelihood increased for ‘safer beef’ with awareness of the
462 technologies applied to achieve the augmentation. Greehy, McCarthy, Henschion, Dillon and
463 McCarthy (2013) suggest that an array of influences intersect in consumer evaluative
464 processes for technologies. Personal characteristics (including beliefs and values), relevance
465 of benefits and perceived power/control are all significant. Lower trust and confidence results
466 in increased concern however this is offset against the relevance and perceived necessity of
467 benefits offered to a person’s everyday life. In other words high perceived benefits and
468 relevance of a new product must be sufficient to offset any concerns about the technology.
469 Credibility of information and trust in information sources are key issues (Verbeke, 2005;
470 Gellynck, Verbeke and Vermeire, 2006) and this becomes critical to the acceptance of a new
471 credence based attribute. This, again, bring us back to the challenge of consumers paying
472 attention to and assimilating new information and the necessity for understanding the
473 motives, attitudes and beliefs of various population segments. It is only through
474 understanding consumers (i.e. consumer insight) that products and information can be
475 designed and delivered in a meaningful manner to target groups. This should result in a true
476 alignment of consumers’ motives and the bundle of benefits that is the supplier’s product.

477

478 **5. Conclusions**

479 Aggregate consumption of meat has been on a continuing upward trajectory, driven by
480 population and income increases in particular. However the pattern for individual meat types
481 has not been homogenous. Differences in relative prices have driven a trend whereby red
482 meat has gradually been substituted by white meats. Furthermore, there is evidence that

483 growth rates in consumption are declining in response to slowing income growth rates and
484 changing consumer preferences. Saturation levels are being reached in some markets in terms
485 of per capita consumption and external factors such as climate change, obesity, technology
486 advancements and changing consumer lifestyles are starting to influence policy initiatives
487 and/or consumer behaviour. The meat industry needs to leverage all the tools at its disposal to
488 ensure consumer satisfaction in an environmental sustainable manner. Lamb and beef at least
489 cannot compete on price alone, due to the less intensive nature of production (Pethink et al.,
490 2011). However there are new opportunities; ten years ago Grunert et al. (2004) concluded
491 that there is ample room for the development of differentiated meat products and this should
492 be consumer led. These opportunities still exist and indeed in the intervening years more
493 opportunities have emerged.

494 Understanding the personal and context specific influences on consumer quality perceptions
495 is important in ensuring the meat industry designs and develops products that fit with a range
496 changing market needs and are produced to standards demanded by consumers and policy
497 makers. It is through adopting a consumer-orientated approach and applying high standards
498 of practice across the supply chain that a range of meats, offering imaginative combinations
499 of experience and credence attributes, will be judged as fulfilling purchase motives. Within
500 this context it is important to recognise that attributes are not of equal importance/value to all
501 consumers and the bundle of benefits sought when purchasing meats varies across the
502 population. Thus target marketing of differentiated products is an important step in the
503 development of meaningful connection with customers.

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650 reference no:11/SF/311

ⁱ See Popkin (2002, revised 2006): Pattern 1: Palaeolithic man/hunter gathers; Pattern 2: Settlements begin/monoculture period/famine emerges; Pattern 3: Industrialisation/receding famine; Pattern 4: Non communicable disease; Pattern 5: Desired societal/behavioural change.

ⁱⁱ The real price for beef, pigmeat and poultry in 2009 was USD\$2,700, \$1,151 and \$944 respectively (cwe or rtc). Source: OECD-FAO Agricultural Outlook 2011, retrieved 15/5/2014.

ⁱⁱⁱ www.origingreen.ie

Table 1. Global Meat Consumption, 1990-2009, '000 tonnes.

	1990	2009	% change
Bovine Meat	54,065	63,835	18.1
Mutton and Goat Meat	9,100	12,763	40.2
Pigmeat	68,692	105,503	53.6
Poultry Meat	40,173	90,664	125.7
Meat Other	3,634	6,098	67.8
Aggregate	175,665	278,863	58.7

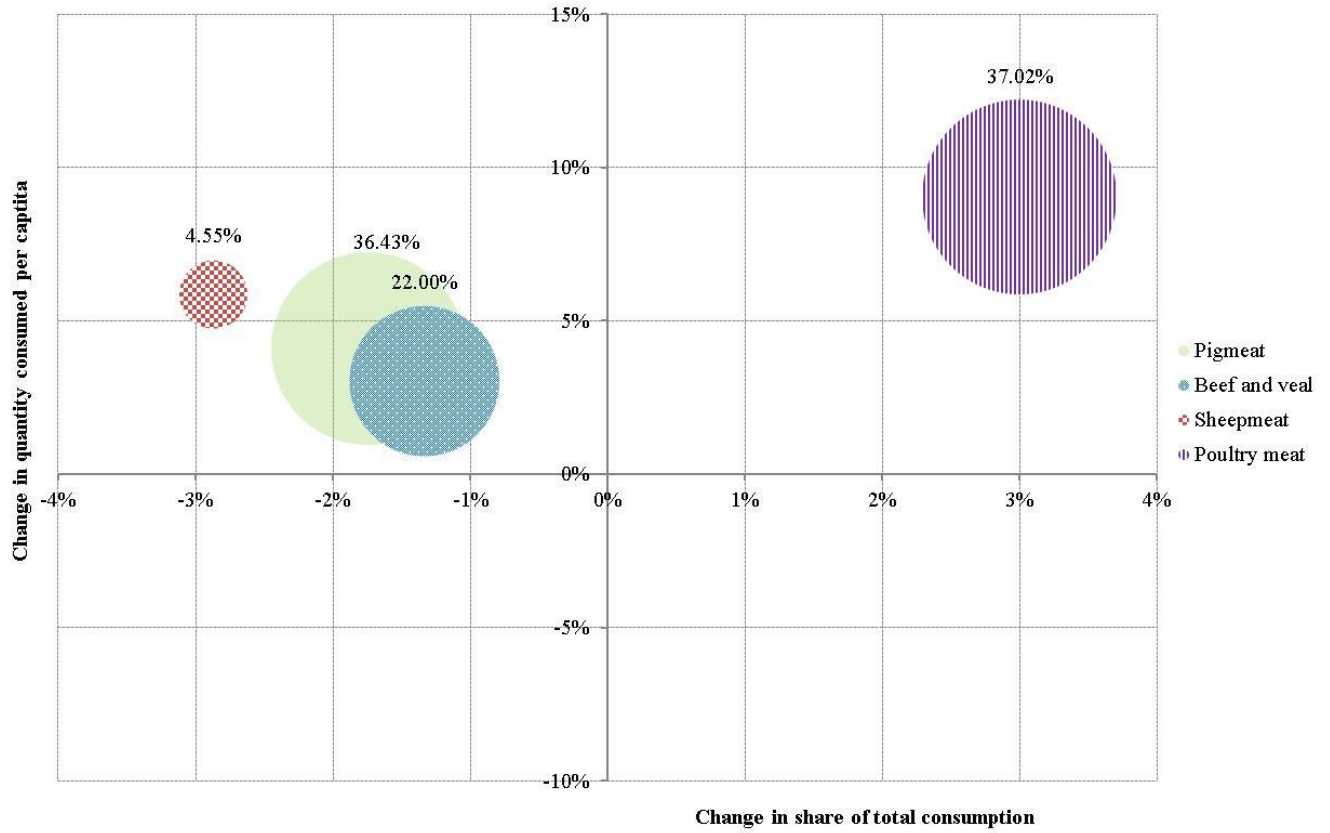
Source: Authors' analysis based on FAO (2014)

Table 2 Global Meat Consumption, 1990-2009, kg/capita

	1990	2009	% change
Bovine Meat	10.4	9.6	-7.7
Mutton and Goat Meat	1.7	1.9	11.8
Pigmeat	13.2	15.8	19.7
Poultry Meat	7.7	13.6	76.6
Meat Other	0.7	0.9	28.6
Aggregate	33.7	41.9	24.3

Source: Authors' analysis based on FAO (2014)

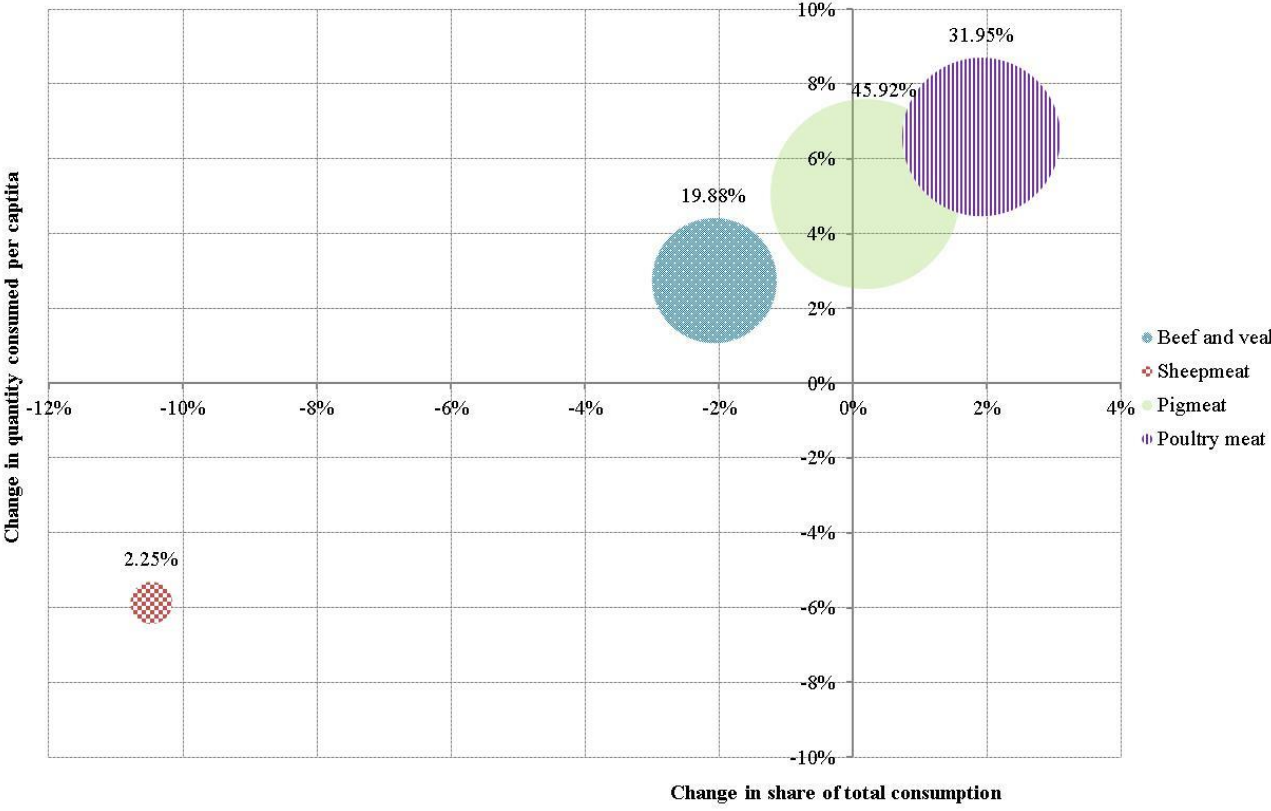
Figure 1. Projected World Meat Consumption in 2022 Compared to 2013.



The size of the bubble represents the share on total meat consumption in 2022

Source: Authors' analysis based on OECD-FAO (2014)

Figure 2. Projected Meat Consumption in Europe in 2022 compared to 2013.



The size of the bubble represents the share on total meat consumption in 2022.

Source: Authors’ analysis based on OECD-FAO (2014).

Figure 3. Quality evaluation: the role of trust in others and confidence in self

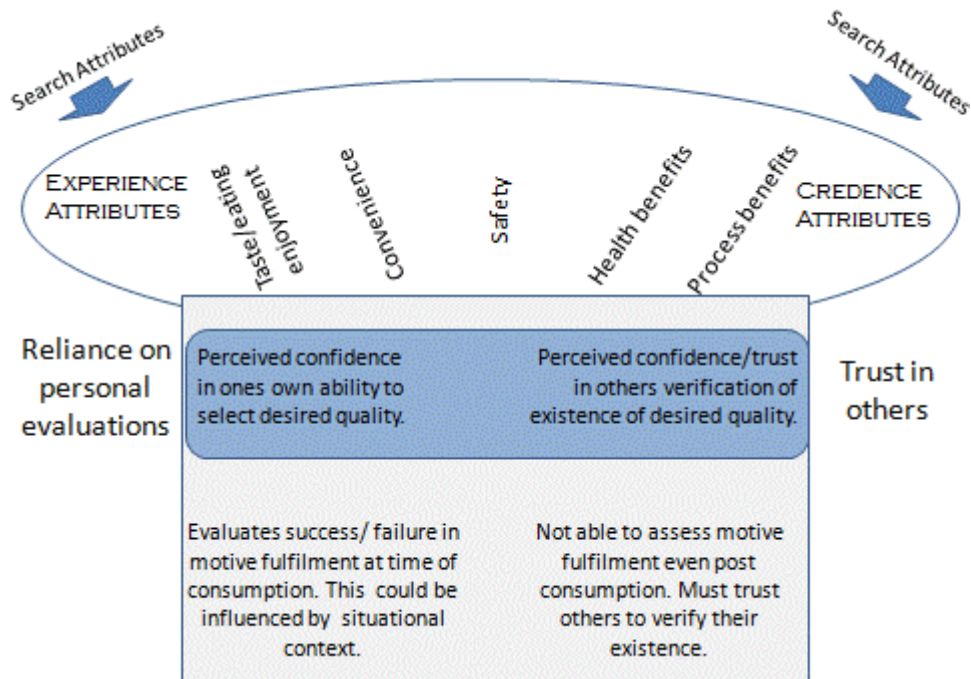


Figure 4. Search Attributes: The Supplier-Consumer Interface

