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Antagonistic/synergistic behavior of antioxidants in BHT/BHA mixture

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The widespread use of antioxidants in food processing industries, especially oil and oil based ones, has great economic advantages. Butylated hydroxyanisole (BHA, E 320) and butylated hydroxytoluene (BHT, E 321) are widely used exogenous antioxidants in foods, often as a mixture. Studying the antioxidant properties of the two components individually and in mixture by ABTS, DPPH, β -carotene, FRAP and CUPRAC assays, the antagonistic antioxidant effect of BHT/BHA mixture on scavenging process of free radicals is observed in all the applied methods. However, the greatest difference in experimental and expected antioxidant activity is found by β -carotene bleaching assay, whereas the lowest one by DPPH, FRAP and CUPRAC. The observed antagonism can result from the change of the dissociation degree of one antioxidant by another (BHA acts synergistically on dissociation of BHT) and/or from rebuilding of BHT by BHA (BHA depolymerizes BHT dimers to give BHT radicals). According to the presented results, BHA increases the antioxidant properties of BHT, a stronger and poisons mutagen than BHA. In the face of the presented results and discussion, the necessity of applying of BHT/BHA mixture in food preservation seems strongly disputable, the more so that their cumulative mutagenic effect is still unknown.

Modelling the impact of environmental and organizational determinants on green supply chain innovation and performance

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ABSTRACT

Both customers and suppliers are becoming increasingly concerned about environmental issues in modern food chains. A firm's decision to implement green supply chain management is based on the social objectives of the firm, its desire to pursue corporate social responsibility (CSR), its relationships with channel partners and environmental determinants such as government legislation. The speed at which green supply chain management (GSCM) is implemented within organisation depends upon its agility and its ability to facilitate innovation. Innovation may take the form of new product development (NPD) or new process developments including the introduction of environmental management systems (EMS), and total quality management (TQM) in both production and purchasing. This paper presents a conceptual model to explain how the various theoretical constructs are related and how innovation effects green supply chain management and performance.

Key words: innovation, agility, corporate social responsibility

INTRODUCTION

Currently there is an increasing worldwide demand for sustainable food production, more environmentally friendly products and waste reduction practices to improve efficiency and productivity (Burlingame and Dernini, 2010). Although much attention has been directed towards environmental issues by company managers in Australia, there has been little practical change in this area (Schaper, 2002; Zhu and Cote, 2004). The main reason for the reluctance is that many managers believe costs will increase if they apply green supply chain principles. Applying green supply chain management (GSCM) can improve product image and goodwill in the form of customers and society, and thereby improve market share (Eltayeb et al., 2011).

While previous studies have addressed environmental and organizational determinants in green supply chains, this paper will focus on the relationship between organizational determinants (agility, corporate social responsibility and the relational elements) and the environmental determinants (buyers, suppliers and government) in green supply chains. The main purpose of this paper is to present a conceptual framework to examine how environmental determinants impact on organisational determinants in green supply chain management to improve performance.

GREEN SUPPLY CHAIN MANAGEMENT

Supply chain management integrates suppliers, manufacturers and distributors to meet consumer demands in an efficient and effective manner (Cox, 1999). Under this definition, supply chain management encapsulates all those activities from raw material supply to final product delivery (Beamon, 1999).

Green supply chain management (GSCM) is defined by Beamon (1999) as an "extension of traditional supply chains to include activities that aim to minimize the environmental impacts of a product throughout its entire life cycle, such as green design, resource saving, harmful material reduction and product recycle or reuse" (p.p 339-340). Hence, the main purpose of GSCM is to reduce undesirable environmental impacts such as air, water and land pollution, and to reduce the waste of resources such as energy, materials and products in the distribution process (Rao and Holt 2005; Eltayeb et al., 2011).

GSCM contributes to increased sustainability within food supply chains by increasing the efficiency of production, processing and distribution, protecting the quality and safety of food, promoting fair and transparent distribution, and increasing consumer access to healthy food at affordable prices (Lazarides, 2011). The main benefits of GSCM are environmental (reduced emission of greenhouse gases), technological (a platform for technological advancement by finding areas of high impact to decrease environmental degradation), economic (reduced disposal costs from decreased waste) and social (a safer workplace and clean working environment)(Emmett and Sood, 2010).

The implementation of green supply chain practices can provide valuable opportunities to improve firm performance (Zhu and Sarkis, 2004). Azevedo et al. (2011), Linton et al. (2007), Green et al. (2012) and Rao and Holt (2005) demonstrate the importance of integrating environmental management practices into the supply chain to achieve better economic performance and enhance competitive advantage. Florida and Davison (2001), Geffen and Rothenberg (2000), Handfield et al. (2002), Green et al. (2012), Hervani et al. (2005), Zhu, Sarkis and Geng (2005), Azevedo et al. (2011), Large and Thomsen (2011), Chiou et al. (2006) and Chen et al. (2011) also discuss the relationship between GSCM practices and firm performance.

In what is a saturated market, if firms are to differentiate themselves from their competitors, they must develop innovative ways to address the environmental concerns of customers and to decrease the negative impact of their activities on the environment (Rao and Holt, 2005). Innovations such as decreasing pollution, reducing dangerous waste and responding quickly to customers' demands can position the firm more favourably in the market (Chiou et al., 2011). On the other hand, environmental pressures for GSCM **can force companies to be innovative.**

Although, environmental determinants can be categorized in various ways, the primary variables include **government legislation (Hippel, 2009; Eyestone, 1977), suppliers (Rao, 2002; Shrivastava, 1995) and buyers (Schiele, 2006).**

PERFORMANCE

Performance is measured using a number of multiple outcomes including economic, environment and operational. Environmental outcomes will include a reduction in the amount of waste (Bowen et al., 2001; Rao, 2002; Zhu and Sarkis, 2004; Zhu et al., 2007), economic outcomes will include the profitability of sales and market share (Rao and Holt, 2005; Zhu and Sarkis, 2004), costs (Aramyan 2007) and operational outcomes will include cost reductions and quality (Rao and Holt, 2005; Vachon and Klassen, 2006), inventory levels, throughput time, responsiveness and the reliability of delivery (Aramyan, 2007). Within the supply chain, performance indicators will include product availability, quality, responsiveness, the reliability of delivery and total supply chain costs (Aramyan, 2007). Maximising one or more of these outcomes is expected to lead to some conflict as maximising one (environmental performance) may be detrimental to another (economic performance).

A CONCEPTUAL MODEL OF GREEN SUPPLY INNOVATION

GSCM Innovation

Cohen and Levinthal (1990), Teece and Pisano (1994) and Hervani et al. (2005) describe how companies vary in their organizational resources and procedures, which consequently affects their ability to respond to organizational and environmental challenges.

Organizational capabilities include factors such as: organizational resources, organizational innovativeness and organizational monitoring systems. Constraints may include the lack of financial resources, organizational structure, organisational resistance to change, a lack of training (del Brio and Junquera, 2003) and the inability to access technologies and markets (Hervani et al., 2005).

Knowledge processes increase environmental innovations (Smirnova et al., 2011). The availability of substantial bodies of organizational expertise within firms is an important resource for improving environmental performance. Organizational sources of knowledge are important for both product and process innovations (Smirnova et al., 2011).

Innovation includes new product development (NPD) and new process development (Klassen and Whybank, 1999; Porter and Van der Linde, 1995; Chen et al., 2006; Chen, 2008), which, in the context of GSCM, includes **the implementation of environmental management systems (EMS) (Wagner, 2007), total quality management (TQM)(Prajogo and Sohal, 2003; Chandra, 1993) and purchasing (Murray, 2000; Schiele, 2006)**. Significant capabilities to facilitate the process of innovation include management's obligation to improve the firm's environmental impact and regularly scrutinize the firm's use of natural resources (Darnall et al., 2008), agility (Goldman et al., 1995) and the methods that the firm employs to manage its relationships with channel partners.

New product development

New product development (NPD) can be defined along two dimensions including newness to the firm and newness to markets. It also covers a wide range of dimensions from low to high, including new product development, additions to existing product lines, new product lines and new markets (Booz, Allen and Hamilton, 1982 cited in Ilori et al., 2000).

Innovation is an essential part of corporate strategy if firms are to offer products which meet consumers changing demands. Changing lifestyles lead to the need for greater convenience (Trienekens et al., 2008; Karantininis et al., 2010), improved product safety and food quality (Batt and Noonan, 2009; Lazarides, 2011; Pereira and Vicente, 2010), packaging and technology (Mahalik and Nambiara, 2010).

Environment management systems

An environmental management system (EMS) is described as a strategic management approach that shows how firms address their impact on the environment. Organizations employ EMS because they can increase environmental performance and profitability (Bansal and Hunter, 2003; Darnall et al., 2008). Implementing EMS standards such as ISO 14001 can enhance environmental innovation by encouraging firms to establish environmental goals that lead to improved environmental performance (Clapp, 1998; Zhu et al., 2012).

An EMS is a collection of organizational policies, assessments, plans and actions for implementation (Coglianese and Nash, 2001; Krut and Gleckman, 1998) that may have a significant impact on the firm and its relationships with its environment. There is a complementary relationship among EMS and GSCM because they both seek to provide a more comprehensive means of establishing sustainability among business networks (Darnall et al.,

2008). Both EMS and GSCM rely on constant improvement (Darnall et al., 2008). While EMS can assist firms to decrease their impact on the environment (Darnall and Edwards, 2006), GSCM leads to constant improvements in processes which decrease the impact of suppliers inputs on production (Preuss, 2005).

Green purchasing

There is a significant link between green purchasing, innovation and performance (Håkansson and Eriksson, 1993; Schiele, 2006). Selecting appropriate suppliers who are able to support and contribute to innovation is a key task for purchasing. However, while green purchasing can improve the speed at which a firm is able to respond to changing customer needs (Meier et al., 1998), it can result in increased material costs and the firm may experience greater difficulty in identifying a qualified supplier base (Min and Galle, 1997).

Green purchasing is defined as the combination of purchasing actions to an environmental issue, which may lead to improved performance (Large and Thomsen, 2011 p.177). Green purchasing can decrease the amount of material that is harmful to the environment; reduce the use of hazardous material by purchasing recyclable material and force suppliers to use more returnable packaging material. Conversely, the important factors that can limit the effectiveness of green purchasing include the high cost of environmental programs, the inability to recycle and reuse, the lack of management commitment, a lack of buyer and supplier awareness, the absence of environmental standards, and auditing and regulation (Rao and Holt, 2005; Min and Gale, 1997).

Total quality management

Total quality management is an integrated management attitude and set of practices that emphasize continuous improvement, meeting customers' requirements, long-range thinking, greater employee participation, motivating process redesign, competitive benchmarking, problem-solving groups and closer relationships with customers and suppliers (Ross, 1993). TQM covers many aspects of the firm's activities including quality, customers, employees, production and management to create significant changes (Hackman and Wageman, 1995), to innovate to meet customer requirements (Ehigie and McAndrew, 2005) and to reduce costs (Henson and Reardon, 2005). Cross-functional management, which is facilitated by TQM, is necessary to execute GSCM.

However, TQM can also stifle innovation. The main reason for this position is that managing innovation is different from managing quality (Prajogo and Sohal, 2003). Firms should choose between quality and innovation to enhance performance (Flynn, 1994; McAdam et al., 1998). Conversely, TQM can be seen as an innovation (Cooper, 1998; Westphal et al., 1997; Yamin et al., 1997), because the successful implementation of TQM will have a number of significant and positive impacts on performance in the long term (Prajogo and Sohal, 2003). Product stewardship is related to organizational capabilities and pressures to employ GSCM. In this regard, up to date information plays an important role in achieving successful TQM (Hervani et al., 2005). **Each of these arguments lead to the following propositions:**

Proposition 1: Innovation in GSCM will have a direct impact on financial performance

Proposition 2: Innovation in GSCM will have a direct impact on the operational performance

Proposition 3: Innovation in GSCM will have a direct impact on the environmental performance

(Figure 1).

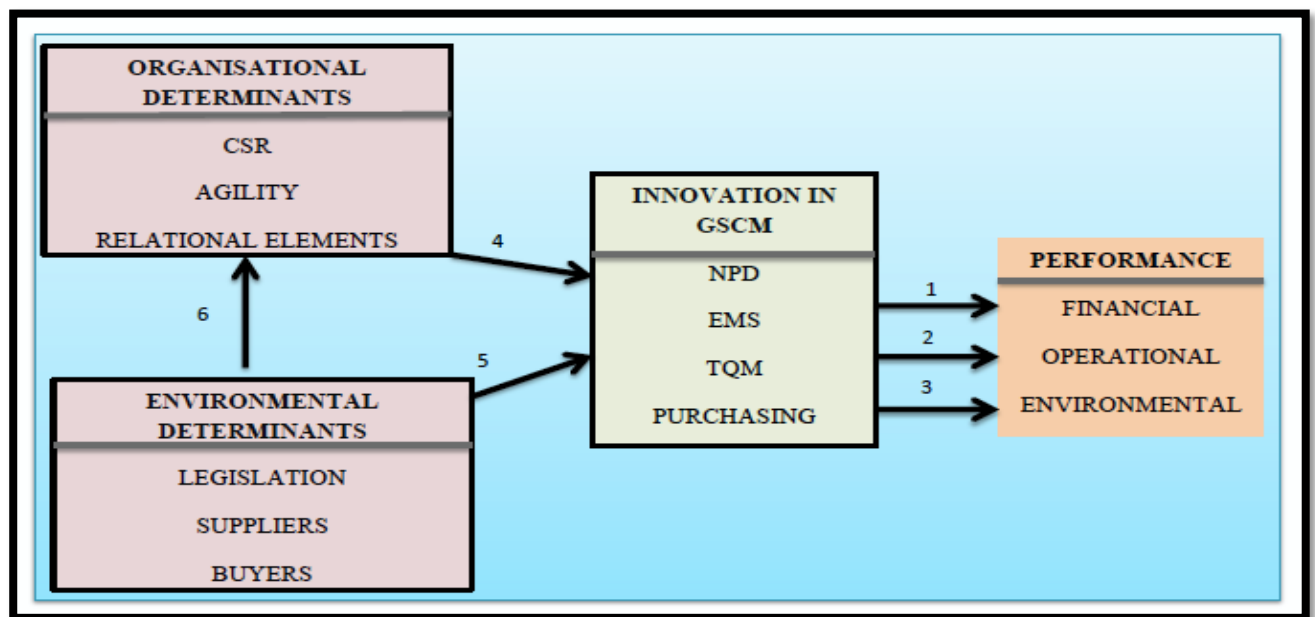


FIGURE 1 Research framework

ORGANIZATIONAL DETERMINANTS

Agility

Goldman et al. (1995) define an agile company as active, context-specific, change-embracing and growth-oriented (p.p 59-60). It is dynamic because the manner in which an organization achieves agility today may not be effective tomorrow. It is context-specific because

the market environment can affect the level of required agility.

Agility can facilitate innovation in GSCM. Agility is related to the organization's ability to re-conceive its vision, renew its strategies and redevelop its methods (Hamel and Prahalad, 1994 cited in Swafford et al., 2006). A dynamic market with fast changing customer demand requires an agile supply chain to shorten the time required to respond to customers' demands (Goldman et al., 1994). Agile supply chains require business partners to collaborate to enable new competencies to develop in response to rapidly changing, continually fragmenting markets (Baramichai et al., 2007).

Corporate social responsibility

Corporate social responsibility (CSR) is the decision making and implementation process that guides all firm activities in the protection and promotion of international human rights, labour and environmental standards and compliance with legal requirements within its operations and in its relationships with society and the communities within which it operates (Emmett and Sood, 2010).

CSR has a strong connection with GSCM. Sustainable design requires re-engineering the design process to meet human requirements without destroying the environment. The aim of sustainability is to decrease the consumption of non renewable resources, reduce waste and sustain healthy environments (Emmett and Sood, 2010). According to Murphy and Poist (2002), supply chain practitioners have been slow to adopt CSR (Batterman and Amann, 1991).

CSR can increase shareholder value through innovation (Husted and Allen, 2007). Social responsibility includes various areas such as environmentally friendly products, pollution control products, product safety and innovation (Tang et al., 2012).

CSR implies that firms carry out social programs to add profits to their organization (Weisenfeld, 2012). CSR assumes that firms believe they are responsible in some way to contribute to society (Wood, 1991). Moreover, it is important to consider that firms do not always focus on increasing the firm's economic performance, but may also consider environmental clean-up programs, community development programs and employee welfare programs (Bansal and Hunter, 2003). Nevertheless, firms should consider CSR to increase their profitability (McWilliams and Siegel, 2001). With the increasing attention towards green supply chains, legal requirements and market preferences enhance the responsibilities of suppliers, manufacturers and distributors (Bloemhof-Ruwaard et al., 1995).

Relational elements

Relationships in the supply chain play a significant role in increasing innovation because of the connections between resources and actors, the complementary nature of the activity structures and the bonds established between individual actors (Ford et al., 1998).

Greater collaboration among the members of a supply chain fosters the development of improved environmental management systems through innovation (Geffen and Rothenberg, 2000). Collaboration between buyers and suppliers also reduces the cost of NPD, impacting favourably on new product design, process design and reducing new product development times to improve firm performance (Chen, 2008; Chiou et al., 2011; Terpend et al., 2008).

A key dimension of relational coordination is cooperation (Hakansson and Snehota, 1995), which requires mutual effort and collaboration between exchange partners. Cooperation can be defined as “similar or complementary coordinated actions taken by firms in interdependent relationships to achieve mutual outcomes or singular outcomes with expected reciprocation over time” (Anderson and Narus 1990, p. 45). The extent to which firms cooperate is influenced by: (1) the degree to which the parties believe that they can simultaneously achieve their goals; (2) the existence of mutual agreement between the parties concerning their actions in achieving individual goals; (3) the prevalence of perceptual clarity in the information processed by the interacting parties; (4) the establishment of mutually accepted norms based on the achievement of individual goals; and (5) the acceptance of norms of exchange, which protect from opportunistic and self-centred behaviour (Leonidou, 2004).

Cooperation is influenced by commitment and trust (Ford et al., 1998). Commitment is an essential aspect of a long-term relationship (Hakansson and Snehota, 1995). Commitment “captures the perceived continuity or growth in the relationship between two firms” (Anderson et al., 1994, p.10). It includes “a desire to develop a stable relationship, a willingness to make short term sacrifices to maintain the relationship and a confidence in the stability of the relationship” (Anderson and Weitz, 1992 p 19]

To achieve commitment, trust is a critical factor (Moorman et al., 1992; Morgan and Hunt, 1994; Walter et al., 2000). Trust describes a belief that one relationship partner will act in the best interests of the other partner (Wilson, 1995). Trust creates value, which increases the desire to commit to the relationship (Hrebiniak, 1974). Trust will increase when: (1) the other party has a reputation for being fair and is concerned about achieving mutual welfare; (2) past outcomes from the working relationship have been satisfactory; and (3) the two parties have successfully resolved critical problems in the relationship (Ganesan, 1994; Leonidou, 2004).

Trust promotes well-timed communication (Morgan and Hunt, 1994). Communication can be defined as “the formal as well as informal sharing of meaningful and timely information

between firms” (Anderson and Narus 1990, p. 44). Communication behaviour includes communication quality, the extent of information sharing, and the level of participation and input into joint concerns (Mohr and Spekman, 1994). Communication considers the extent to which the exchange of information is frequent, formal, bidirectional (to include positive and negative feedback) and non-coercive (Mohr et al., 1999).

The balance of power and the degree of dependence or interdependence in a relationship will influence the process of coordination through trust and commitment (Kothandaraman and Wilson, 2000; Kumar et al., 1995). As power is rarely distributed equally in an inter-firm relationship, power is directly related to the perceived degree that one exchange partner feels it is more or less dependent on its exchange partner (Wilson, 1995). That firm which holds the majority of the power will generally influence the behaviour of others. Kaplinski and Morris (2001) describe how activities, actors, roles and functions are coordinated through power asymmetry. More powerful actors in the supply chain assume responsibility for the inter-firm division of labour, monitoring outcomes, linking the discrete activities between actors, establishing and managing relationships between the various actors and organizing logistics. However, coordination does not require a single firm to engage in these roles: indeed, there may be a multitude of firms coordinating the flow of product and activities along the chain. Ogbonna and Wilkinson (1998) argue that the power to control is not only dependent on the possession of power, but also the extent to which other exchange partners have countervailing market power. The presence of countervailing power forces exchange partners to differentiate between the possession of power and its use.

While the power to coordinate is the prerogative of the dominant firm (Achrol, 1997), it is the subsequent use of that power which will influence on the exchange partner’s perception of relationalism (Brown et al., 1995). Numerous reward and coercive powers and legitimate authority have been used by channel leaders to cajole cooperation between channel members. However, the frequent use of mediated power is likely to damage relational norms, cooperation and accommodation between channel partners (Brown et al., 1995). Overt attempts to directly influence weaker parties through the use of mediated power are generally viewed with considerable disfavour. Not only will this lead to conflict, but the relative attractiveness of alternative exchange partners will increase. Conversely, the use of non-mediated power inevitably builds social bonds and close relationships. It is widely accepted that expert power, once expended, is lost (Achrol, 1997; Batt, 2004). Expertise is therefore something that has to be continually redeveloped, promoted and communicated. These arguments lead to the proposition that:

Proposition 4: Organizational determinants will have a direct impact on innovation

ENVIRONMENTAL DETERMINANTS

Legislation and policy

Environmental regulations are a strong and powerful determinant to implement innovations in green supply chains (Carter and Dresner, 2001; Lee, 2008). Although firms often advertise how much attention they give to environment issues, in reality, they seldom make changes in practice (Diabat and Govindan, 2011; Fineman, 1997; Min and Galle, 2001). Regulation can enhance innovation to reduce the environmental impact and provide a means to motivate people to be part of the project (Carter and Dresner, 2001; Walker et al., 2008).

In neo-classical economics, regulation can reduce productivity and competitiveness because it increases costs (Ambec et al., 2011). Conversely, environmental regulation and the imposition of compliance costs can lead to innovation and improve resource efficiency use (Ambec et al., 2011). How well the firm can adapt to environmental pressure will differ from firm to firm depending on its size and market structure.

Environmental legislation and regulation have been identified as drivers for the adoption of GSCM practices (Preuss, 2005). Although there is no clear consensus of the impact of environmental legislation on firm competitiveness, Jorgensen and Wilcoxon (1990) quantify the impact of the costs of pollution controls on the US economy. While they estimate that pollution abatement may account for as much as 10% of the total costs of some goods and services, they do not assess the benefits associated with cleaner production.

Suppliers

According to Vachon and Klassen (2006) and Walker et al. (2008), cooperation between suppliers can increase a firm's capability to implement environmental issues more effectively. Green suppliers can increase innovation in green supply chains (Rao, 2002; Shrivastava, 1995), leading to improved environmental performance. In green supply chains, collaboration activities may include cross-functional communication and the sharing of financial, human and technical resources (Lee, 2008); supplier education such as informing the suppliers about the benefits of green practices (Hu and Hsu, 2010; Rao, 2002); visiting suppliers sites to provide technical assistance (Walton et al., 1998) and joint ventures to collectively develop green innovations (Eltayeb et al., 2011; Hu and Hsu, 2010, Vachon and Klassen, 2006).

Buyers

Buyers are often the key driver of GSCM as changes in their procurement practices can encourage suppliers to become more innovative to improve environmental performance (Lee, 2008). However, such efforts can increase the cost (Min and Galle, 1997). These arguments lead to the two propositions:

Proposition 5: Environmental determinants will have a direct impact on innovation.

Proposition 6: Environmental determinants will have a direct impact on innovation through the organizational determinants.

CONCLUSION

This paper has developed a conceptual model to investigate how organisational and environmental determinants influence innovation in green supply chains leading to improved organisational performance. To empirically test the model, data will be collected from selected food companies in the Western Australian food industry: fresh produce, bread and seafood. Face-to-face interviews, guided by a semi-structured questionnaire, will be administered to marketing managers, research and development (R&D) managers, purchasing managers, **chief executive officers** (CEO) and chief financial officers (CFO) within the selected food companies and their various upstream suppliers and downstream customers. To evaluate how the individual firms in the focal supply chains facilitate innovation in response to changes in the organisational and environmental determinants, it will be necessary to move “backwards and forwards” (Dubois and Gadde, 2002).

REFERENCES

- Achrol, R.S. (1997). Changes in the theory of interorganisational relations in marketing: toward a network paradigm. *Journal of the Academy of Marketing Science*, 25(1), 56-71.
- Anderson, J.C., Hakansson, H. and Johanson, J. (1994). Dyadic business relationships within a business network context. *Journal of Marketing*, 58(4), 1-15
- Anderson, J.C. and Narus, J.A. (1990). A model of distributor firm and manufacturing firm working relationships. *Journal of Marketing*, 54(1), 42-58.

- Anderson, E. and Weitz, B.A. (1992). The use of pledges to build and sustain commitment in distribution channels. *Journal of Marketing Research*, 29, 18-34.
- Aramyan, L.H. (2007). *Measuring supply chain performance in the agri-food sector*. PhD thesis Wageningen University, ISBN: 978-90-8504-667-7
- Azevedo, S.G., Carvalho, H. and Machado, V.C. (2011). The Influence of Green Practices on Supply Chain Performance: A Case Study Approach. *Transportation Research Part E: Logistics and Transportation Review*, 47(6), 850-871.
- Bansal, P. and Hunter, T. (2003). Strategic Explanations for the Early Adoption of Iso 14001. *Journal OF Business Ethics*, 46(3), 289-99.
- Baramichai, M., Zimmers, E.W. and Marangos, C.S.A. (2007). Agile Supply Chain Transformation Matrix: An Integrated Tool for Creating an Agile Enterprise. *Supply Chain Management: An International Journal*, 12(5), 334-48.
- Batt, P.J. (2004). Power-dependence in agricultural supply chains: Fact or fallacy? *Proceedings of 20th Annual Conference of the Industrial Marketing and Purchasing Group*. Copenhagen
- Batt, P.J. and Noonan, J. (2009). Global trends in food quality: An exploratory study in fresh produce supply chains. *Acta Hort.* 831, 95-104.
- Batterman, S.A. and Amann, M. (1991). Targeted acid rain strategies including uncertainty. *Journal of Environmental Management*, 32(1), 57-72.
- Beamon, B.M. (1999). Designing the Green Supply Chain. *Logistics Information Management*, 12(4), 332-342.
- Burlingame, B. and Dernini, S. (2011). Sustainable diets: the Mediterranean diet as an example. *Public Health Nutrition*, 14 (Special Issue 12A), 2285-2287.
- Bloemhof-Ruwaard, J.M., Beek, P.V. and Hordijk, L.N.V. (1995). Interactions between Operational Research and Environmental Management. *European Journal of Operational Research*, 85(2), 229-243.
- Bowen, F.E., Cousins, P.D., Lamming, R.C. and Farukt, A.C. (2001). The role of supply management capabilities in green supply. *Production and Operations Management*, 10(2), 174-189.
- Brown, J.R., Lusch, R.F. and Nicholson, C.Y. (1995). Power and relationship commitment: their impact on marketing channel member performance. *Journal of Retailing*, 71(4), 363-392.
- Carter, C.R. and Dresner, M. (2001). Purchasing's Role in Environmental Management: Cross-Functional Development of Grounded Theory. *Journal of Supply Chain Management*, 37(3), 12-26.
- Chandra, M. (1993). Total Quality Management in Management Development. *Journal of Management Development*, 12(7), 19-31.

- Chen, Y.S., Lai, S.B. and Wen, C.T. (2006). The Influence of Green Innovation Performance on Corporate Advantage in Taiwan. *Journal of Business Ethics*, 67, 331–339.
- Chen, Y. (2008). The Driver of Green Innovation and Green Image – Green Core Competence. *Journal of Business Ethics*, 81(3), 531-43.
- Chiou, T.Y., Chan, H.K., Lettice, F. and Chung, S. (2011). The Influence of Greening the Suppliers and Green Innovation on Environmental Performance and Competitive Advantage in Taiwan. *Transportation Research Part E: Logistics and Transportation Review*, 47(6), 822-36.
- Clapp, J. (1998). The Privatization of Global Environmental Governance: ISO 14000 and the Developing World. *Global Governance*, 4(3), 295-316.
- Coglianesi, C. and Nash, J. (2001). *Regulating from the inside: Can environmental management systems achieve policy goals?* Washington, DC: Resources for the Future.
- Cohen, W.M. and Levinthal, D.A. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly*, 35(1), 128-152.
- Cooper, J.R. (1998). A multidimensional approach to the adoption of innovation. *Management Decision*, 38(8), 493-502.
- Cox, A. (1999). Power, Value and Supply Chain Management. *An International Journal*, 4(4), 167-175.
- Darnall, N. and Edwards, D. (2006). Predicting the cost of environmental management system adoption: the role of capabilities, resources and ownership structure. *Strategic Management Journal*, 27(4), 301-320.
- Darnall, N., Jolley, G.J. and Handfield, R. (2008). Environmental Management Systems and Green Supply Chain Management: Complements for Sustainability? *Business Strategy and the Environment*, 17(1), 30-45.
- Del Brío, J.Á. and Junquera, B. (2003). A Review of the Literature on Environmental Innovation Management in Smes: Implications for Public Policies. *Technovation*, 23(12), 939-948.
- Diabat, A. and Govindan, K. (2011). An Analysis of the Drivers Affecting the Implementation of Green Supply Chain Management. *Resources, Conservation and Recycling*, 55(6), 659-667.
- Dubois, A. and Gadde, L.E. (2002). Systematic combining: an abductive approach to case research. *Journal of Business Research*, 55(7), 553-560.
- Ehigie, B.O. and McAndrew, E.B. (2005). Innovation, Diffusion and Adoption of Total Quality Management (Tqm). *Management Decision*, 43(6), 925-940.
- Eltayeb, T.K., Zailani, S. and Ramayah, T. (2011). Green Supply Chain Initiatives among Certified Companies in Malaysia and Environmental Sustainability: Investigating the Outcomes. *Resources, Conservation and Recycling*, 55(5), 495-506.

- Emmett, S. and Sood, V. (2010), *Green Supply Chains: An Action Manifesto*. University of Salford.
- Eyestone, R. (1977). Confusion, Diffusion, and Innovation. *The American Political Science Review*, 71(2), 441-447.
- Fineman, S. (1997). Constructing the Green Manager. *British Journal of Management*, 8, 31-38.
- Florida, R. and Davison, D. (2001). Gaining from green management: environmental management systems inside and outside the factory. *California Management Review*, 43(3), 64-84.
- Flynn, B.B., Schroeder, R.G. and Sakakibara, S. (1994). A framework for quality management research and an associated measurement instrument. *Journal of Operations Management*, 11(4), 339-66.
- Ford D., Gadde, E, Hakansson, H., Lundgren, A., Snehota, I., Turnbull, P. and Wilson, D. (1998), “*Managing Business Relationships*”, John Wiley & Sons Ltd, England.
- Ganesan, S. (1994). Determinants of long-term orientation in buyer-seller relationships. *Journal of Marketing*, 58, 1-19.
- Geffen, C. and Rothenberg, S. (2000). Sustainable development across firm boundaries: the critical role of suppliers in environmental innovation. *International Journal of Operations & Production Management*, 20(2), 166-186.
- Goldman, S.L., Nagel, R.N. and Preiss, K. (1995). *Agile Competitors and Virtual Organizations: Strategies for Enriching the Customer*. New York: Van Nostrand Reinhold, 3-15.
- Green, K.W., Zelbst, P.J., Meacham, J. and Bhadauria, V.S. (2012). Green Supply Chain Management Practices: Impact on Performance. *Supply Chain Management*, 17(3), 290-305.
- Hackman, J.R. and Wageman, R. (1995). Total Quality Management: Empirical, Conceptual, and Practical Issues. *Administrative Science Quarterly*, 40(2), 309-342
- Hakansson, H. and Erikssona, A.K. (1993). Getting Innovations Out of the Supplier Networks. *Business-to-Business Marketing*, 1(3), 3-34.
- Hakansson, H. and Snehota, I. (1995). *Developing Relationships in Business Networks*, International Thomson Business Press, London.
- Handfield, R., Walton, S.V, Sroufe, R. and Melnyk, S.A. (2002). Applying environmental criteria to supplier assessment: A study in the application of the Analytical Hierarchy Process. *European Journal of Operational Research*, 141(1), 70-87.
- Henson, S. and Reardon, T. (2005). Private agri-food standards: Implications for food policy and the agri-food system. *Food Policy* 30(3), 241-253.

- Hervani, A., Helms, M.M. and Sarkis, J. (2005). Performance measurement for green supply chain management. *Benchmarking: An International Journal of Business Research*, 12(4), 330-353.
- Hippel, E.V. (2009). Democratizing Innovation: The Evolving Phenomenon of User Innovation. *International Journal of Innovation Science*, 1(1), 29-40.
- Hrebiniak, L.G. (1974). Effects of job level and participation on employee attitudes and perceptions of influence. *Academy of Management Journal*, 17, 649-462.
- Hu, A.H. and Hsu, C.W. (2010). Critical Factors for implementing Green Supply Chain Management Practice: An Empirical Study of Electrical and Electronics Industries in Taiwan. *Management Research Review*, 33(6), 586-608.
- Husted, B.W. and Allen, D.B. (2007). Strategic Corporate Social Responsibility and Value Creation among Large Firms: Lessons from the Spanish Experience. *Long Range Planning*, 40(6), 594-610.
- Jorgenson, D.W. and Wilcoxon, P.J. (1990). Environmental Regulation and U.S. Economic Growth. *The RAND Journal of Economics*, 21(2), 314-340.
- Ilori, M.O., Oke, J.S. and Sanni, S.A. (2000). Management of New Product Development in Selected Food Companies in Nigeria. *Technovation*, 20(6), 333-42.
- Jorgenson, D.W. and Wilcoxon, P.J. (1990). Environmental Regulation and U.S. Economic Growth. *The RAND Journal of Economics*, 21(2), 314-40.
- Kaplinsky, R. and Morris, M. (2000). *A Handbook for Value Chain Research*. IDS, University of Sussex.
- Karantininis, K., Sauer, J. and Furtan, W.H. (2010). Innovation and integration in the agri-food industry. *Food Policy*, 35(2), 112-120.
- Klassen, R.D, and Whybark, D.C. (1999). The impact of environmental technologies on manufacturing performance. *Academy of Management Journal*, 42(6), 599-615.
- Kothandaraman, P. and Wilson, K. (2000). *Implementing Relationship Strategy*, ISBM Report 1-2000, Institute for the Study of Business Markets, Pennsylvania.
- Krut, R. and Gleckman, H. (1998). *ISO 14001 : a missed opportunity for sustainable global industrial development"*. London: Earthscan. *Research in Corporate Social Performance and Policy Supplement 1*, 99-126.
- Kumar, N., Scheer, L.K. and Steenkamp, J. (1995). The effects of perceived interdependence on dealer attitudes. *Journal of Marketing Research*, 32, 348-356.
- Large, R. and Thomsen, C.G. (2011). Drivers of Green Supply Management Performance: Evidence from Germany. *Journal of Purchasing and Supply Management*, 17(3), 176-84.

- Lazaridesa, H.N. (2011). Food Processing Technology in a Sustainable Food Supply Chain. *Procedia Food Science*, 1, 1918-1923.
- Lee, S.Y. (2008). Drivers for the participation of small and medium-sized suppliers in green supply chain initiatives. *Supply Chain Management: An International Journal*, 13(3), 185-198.
- Leonidou, L. (2004). Industrial manufacturer-customer relationships: the discriminating role of the buying situation. *Industrial Marketing Management*, 33(8), 731-742.
- Linton, J.D., Klassen, R. and Jayaraman, V. (2007). Sustainable Supply Chains: An Introduction. *Journal of Operations Management*, 25(6), 1075-1082.
- Mahalik, N.P. and Nambiar, A. (2010). Trends in food packaging and manufacturing systems and technology. *Trends in Food Science; Technology*, 21(3), 117-128.
- McAdam, R., Armstrong, G. and Kelly, B. (1998). Investigation of the relationship between total quality and innovation: a research study involving small organisations. *Innovation Management* 1(3), 139-147.
- McWilliams, A. and Siegel, D. (2001). Corporate social responsibility: a theory of the firm perspective. *Academy of Management Review*, 26(1), 117-127.
- Meier, R.L., Humphreys, M.A. and Williams, M.R. (1998). The Role of Purchasing in the Agile Enterprise. *Journal of Supply Chain Management*, 34(4), 39-45
- Min, H. and Galle, W.P. (1997). Green Purchasing Strategies: Trends and Implications. *Journal of Supply Chain Management*, 33(3), 10-17.
- Min, H. and Galle, W.P. (2001). Green Purchasing Practices of Us Firms. *International Journal of Operations & Production Management*, 21(9), 1222-1238.
- Mohr, J. and Spekman, R. (1994). Characteristics of partnership success: partnership attributes, communication behaviour and conflict resolution techniques. *Strategic Management Journal*, 15, 135-152.
- Mohr, J.J., Fisher, R.J. and Nevin, J.R. (1999). Communicating for better channel relationships. *Marketing Management*, 8(2), 38-45.
- Morgan, R.M. and Hunt, S.D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing*, 58, 20-38.
- Moorman, C., Zaltman, G. and Deshpande, R. (1992). Relationships between providers and users: the dynamics of trust within and between organisations. *Journal of Marketing Research*, 29, 314-328.
- Murray, J.G. (2000). Effects of a green purchasing strategy: the case of Belfast City Council. *Supply Chain Management: An International Journal*, 5(1), 37-44.
- Murphy, P.R. and Poist, R.F. (2002). Socially Responsible Logistics: An Exploratory Study. *Transportation Journal*, 41(4), 23-35.

- Ogbonna, E. and Wilkinson, B. (1998). Power relations in the UK grocery supply chain: Developments in the 1990s. *Journal of Retailing and Consumer Services*, 5(2), 77-786.
- Pereira, R.N. and Vicente, A.A. (2010). Environmental impact of novel thermal and non-thermal technologies in food processing. *Food Research International*, 43(7), 1936-1943.
- Porter, M.E. and Linde, C.V.D (1995). *Green and Competitive. Ending the Stalemate*. Harvard Business Review, September–October, 120-134.
- Prajogo, D.I. and Sohal, A.S. (2003). The relationship between TQM practices, quality performance, and innovation performance: An empirical examination. *International Journal of Quality & Reliability Management*, 20(8), 901-918.
- Preuss, L. (2005). Rhetoric and reality of corporate greening: a view from the supply chain management function. *Business Strategy and the Environment*, 14, 123-139.
- Rao, P. (2002). Greening the Supply Chain: A New Initiative in South East Asia. *International Journal of Operations & Production Management*. 22(6), 632-655.
- Rao, P. and Holt, D. (2005). Do Green Supply Chains Lead to Competitiveness and Economic Performance? *International Journal of Operations & Production Management*, 25(9), 898-916.
- Ratnayake, R. (1998). Do stringent environmental regulations reduce international. Competitiveness? Evidence from an Inter-industry Analysis. *International Journal of the Economics of Business*, 5(1), 77-96.
- Ross, J. (1993). *Total Quality Management: Text, Cases and Readings*. St. Lucie Press, Delray Beach, FL.
- Schaper, M. (2002). Small Firms and Environmental Management: Predictors of Green Purchasing in Western Australian Pharmacies. *International Small Business Journal*, 20(3), 235-51.
- Schiele, H. (2006). How to distinguish innovative suppliers? Identifying innovative suppliers as new task for purchasing. *Industrial Marketing Management*, 35(8), 925-935.
- Shrivastava, P. (1995). Industrial/Environmental Crises and Corporate Social Responsibility. *Journal of Socio-Economics*, 24(1), 211-255.
- Smirnova, M., Henneberg, S.C., Ashnai, B., Naudé, P. and Mouzas, S. (2011). Understanding the role of marketing–purchasing collaboration in industrial markets: The case of Russia. *Industrial Marketing Management*, 40(1), 54-64.
- Stuart, E. and Sood, V. (2010). *Green Supply Chain an action Manifesto*. John Wiley. United Kingdom.
- Swafford, P.M., Ghosh, S. and Murthy, N.N. (2006). A Framework for Assessing Value Chain Agility. *International Journal of Operations & Production Management*, 26 (2), 118–40.

- Tang, Z., Hull, C.E. and Rothenberg, S. (2012). How Corporate Social Responsibility Engagement Strategy Moderates the Csr–Financial Performance Relationship. *Journal of Management Studies*, 49(7), 1274-1303.
- Teece, D. and Pisano, G. (1994). The dynamic capabilities of firms: An introduction. *Industrial and Corporate Change*, 3(3), 537-556.
- Terpend, R., Tyler, B.B., Krause, D.R. and Handfield, R. B. (2008). Buyer–Supplier Relationships: Derived Value over Two Decades. *Journal of Supply Chain Management*, 44(2), 28-55.
- Trienekens, J., Uffelen, R.V., Debaire, J. and Omta, O. (2008). Assessment of innovation and performance in the fruit chain: The innovation-performance matrix. *British Food Journal*, 110(1), 98-127.
- Vachon, S. and Klassen, R.D. (2006). Extending Green Practices across the Supply Chain: The Impact of Upstream and Downstream Integration. *International Journal of Operations & Production Management*, 26(7), 795-821.
- Wagner, M. (2007). On the relationship between environmental management, environmental innovation and patenting: Evidence from German manufacturing firms. *Research Policy*, 36(10), 1587-1602.
- Walker, H., Sisto, D.L. and McBain, D. (2008). Drivers and Barriers to Environmental Supply Chain Management Practices: Lessons from the Public and Private Sectors. *Journal of Purchasing and Supply Management*, 14(1), 69-85.
- Walter, A., Mueller, T.A. and Helfert, G. (2000). The impact of satisfaction, trust and relationship value on commitment: Theoretical considerations and empirical results. 16th IMP Conference Proceedings.
- Walton, S.V., Handfield, R.B and Melnyk, S.A. (1998). The green supply chain: integrating suppliers into environmental management processes. *International Journal of Purchasing & Materials Management*, 34(2), 2-11.
- Westphal, J.D., Gulati, R. and Shortell, S.M. (1997). Customization or Conformity? An Institutional and Network Perspective on the Content and Consequences of TQM Adoption. *Administrative Science Quarterly*, 42(2), 366-394.
- Weisenfeld, U. (2012). Corporate Social Responsibility in Innovation: Insights from two Cases of Syngenta's Activities in Genetically Modified Organisms. *Creativity and Innovation Management*, 21(2), 199-211.
- Wilson, D.T. (1995). An integrated model of buyer-seller relationships. *Journal of the Academy of Marketing Science*, 23(4), 335-345.

- Wood, D.J. (1991). Corporate Social Performance Revisited. *The Academy of Management Review*, 16(4), 691-718.
- Yamin, S., Mavondo, F., Gunasekaran, A. and Sarros, J. (1997). A study of competitive strategy, organizational innovation and organizational performance among Australian manufacturing companies. *International Journal of Production Economics*, 52(1/2), 161-72.
- Zhu, Q. and Sarkis, J. (2004). Relationships between Operational Practices and Performance among Early Adopters of Green Supply Chain Management Practices in Chinese Manufacturing Enterprises. *Journal of Operations Management*, 22(3), 265-89.
- Zhu, Q. and Cote, R.P. (2004). Integrating green supply chain management into an embryonic eco-industrial development: a case study of the Guitang Group. *Journal of Cleaner Production*, 12(8–10), 1025-1035.
- Zhu, Q., Sarkis, J. and Geng, Y. (2005). Green supply chain management in China: Pressures, practices and performance. *International Journal of Operations and Production Management*, 25(5), 449-468.
- Zhu, Q., Sarkis, J. and Lai, K.H. (2012). Green supply chain management innovation diffusion and its relationship to organizational improvement: An ecological modernization perspective. *Journal of Engineering and Technology Management*, 29(1), 168-185.

What a Waste?
- A study of food wastage behavior in Singapore

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It is estimated that one third of food produced every year in the world is wasted. This can happen at one or more of the different stages starting from agricultural production, post harvesting, handling, warehousing, processing, distribution, warehousing and final consumption. Engaging in food consumption behavior that is beneficial to the society is a prerogative for governing bodies, businesses and consumers. For a marketer, embracing Corporate Social Responsibility in this direction could result in a competitive advantage. This study focuses on analyzing food wastage behavior of consumers in Singapore and their attitudes.

Both, qualitative and quantitative research were carried out to collect and analyze insights. In-depth interviews with experts from food waste management organizations, and restaurant/service operators were conducted. A survey was carried out both online and offline.

Qualitative insights indicated the key reasons for food wastage to be: food spoilage, risk of hurting the service provider's brand by serving sub-standard food, lack of appropriate methods for sorting food, lack of reverse logistics necessary for proper waste collection/disposal and lack of appropriate recycling facilities. High costs of waste disposal, lack of government incentives or regulations governing the service providers and lack of awareness among consumers also contributed to rising levels of solid food waste in Singapore.

Consumers were asked to state their habits with regard to planning food purchases, food wastage while cooking and wastage during consumption of cooked, canned and read-to-eat products. Their attitudes towards throwing food away, understanding cost implications of wastage and their concern about impact of food wastage on environment were recorded.

A step-wise Multiple Discriminant Analysis was done on a key categorical variable-how much effort do you take to minimize amount of uneaten food you throw away? Based on the consciousness levels of respondents that varied between "a great deal" and "not at all"; two groups evolved which differed significantly along several attitudinal/behavioral dimensions.

Profiles of the two groups were also analyzed to understand differences with respect to their shopping, engagement in purchasing (offline/ online), food preparation, consumption, storage and disposal behavior. Demographic profiles of the two groups were also identified to help food marketers, restaurants/food service operators, waste management agencies, logistics companies, government and regulatory bodies to locate and reach out such people for influencing their consumption/wastage behavior.

The conclusions have major implications for many different stakeholders including those who oversee food waste collection and recycling. Although this study has been conducted in an advanced economy like Singapore (which is predominantly dependent on imports for their food requirements); its findings hold relevance for evolving public policy in any country, be it small or large, developed or developing, whether food is produced domestically or imported.

Food wastage no matter where, is a luxury no individual, company or country can afford to live with as it severely hampers the lives of the many individuals and the planet in the long run.

**Assessing crossmodal correspondences for food products:
Implications for product packaging and brand naming.**

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A crossmodal correspondence refers to the tendency of a sensory perception to be matched with an expectation for another sense (Spence, 2012). For example, consuming hot chocolate in a cup with a dark-cream color (i.e. visual perception), influences the perceived sweet taste and intensity of aroma of the hot chocolate (Piqueras-Fiszman and Spence, 2012). In terms of product packaging and brand naming consistent crossmodal correspondences have been found with regards to sound symbolism (e.g. participants expect a more creamy, richer and smoother ice cream when that ice cream is named “Frosh” than when it is named “Frisch”; Yorkston and Menon, 2004) as well as shape symbolism (e.g. the match between organic abstract shapes and still water versus the match of angular abstract shapes and sparkling water; Ngo et al., 2012). However, crossmodal correspondences have not been mapped for a significant number of food products.

In our research we aimed to map a more detailed set of crossmodal correspondences for five food product categories with three variations within each category. The crossmodal correspondences were assessed by presenting a visual stimulus of the respective food item to the participants which they had to rate on visual analogue scales (VAS). The VAS scales consisted of 19 pairs of nonsense words and figures referring to angularity versus roundness (e.g. bouba versus kiki) or of pairs of adjectives referring to a particular abstract attribute (e.g. loud versus quiet).

The contribution of this study is twofold. First, we aimed to add to the robustness of the preliminary findings that there is a crossmodal aspect for food products that needs to be considered in order to obtain an optimal multisensory customer experience. Secondly, the specific crossmodal correspondences themselves have practical implications for the design of product packaging as well as for brand naming of the products investigated. Hence, practitioners who are considering a certain packaging or brand name will have a broader knowledge and understanding of the different aspects of multisensory expectation and experience for that particular product or product category.

REFERENCES

Ngo, M.K., Piqueras-Fiszman, B., & Spence, C. (2012). On the colour and shape of still and sparkling water: Insights from online and laboratory-based testing. *Food Quality and Preference*, 24, 260-268.

Piqueras-Fiszman, B., & Spence, C. (2012). The influence of the color of the cup on

consumers' perception of a hot beverage. *Journal of Sensory Studies*, 27, 324-331.

Spence, C. (2012). Managing sensory expectations concerning products and brands: Capitalizing on the potential of sound and shape symbolism. *Journal of Consumer Psychology*, 22, 37-54.

Yorkston, E., & Menon, G. (2004). A sound idea: phonetic effects of brand names on consumer judgments. *Journal of Consumer Research*, 31, 43-51.

**An empirical analysis of international consumers' associations with
Bavarian food products.**

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Problem Statement

Knowledge of consumers' perception of foreign food products can be a key element for successful international marketing strategies, as operating on a regional or global level requires deep knowledge about international markets. Based on that knowledge decisions can be taken whether to standardize marketing strategies globally or to adapt to each individual market.

Purchase decisions for most products are strongly linked to a person's attitude towards these products, which are determined by beliefs and meanings associated with the product. In this context, the aim of the present study is to analyze and compare the perception of Bavarian food products in an international context. Two different European countries – Bulgaria and Romania – as well as two Asian countries – China and South Korea – are selected for a comparative study. After analyzing which information is stored in consumers mind we also want to answer the question what are the determining factors for consumers' associations with Bavarian food products. Therefore the influence of normative factors such as ethnocentricity and of socio-demographics such as sex, age and education on consumers' cognitive structures is analyzed. The findings help marketers in taking appropriate international marketing decisions.

Data and Methods

To analyze foreign consumers' associations with Bavarian Food products, the qualitative methods of (1) free elicitation technique and (2) concept mapping are implemented. While the free elicitation technique is used to gather any information stored in the consumer's mind on a certain topic (VAN KLEEF et al., 2005), concept mapping is especially used for a graphical representation of, e. g., product associations (ZSAMBOK, 1993). Originally concept mapping was developed by NOVAK (1977) as a learning technique, while nowadays it is used for representing cognitive structures (JONASSEN et al., 1993). Hence, the combination of these two methods was chosen for this study, as it allows for broadly capturing beliefs regarding Bavarian food production and visualizing these associations and how they are related with each other.

Consumer data was collected via face to face interviews in four different countries – Bulgaria, Romania, China and South Korea – between August 2012 and March 2013. While Bulgaria and Romania are two potential target markets for the Bavarian economy, China is one of the most important export markets for Bavaria. Furthermore South Korea shows a particularly high growth rate in the last years regarding Bavarian exports (BAYERISCHE INDUSTRIE- UND HANDELSKAMMER, 2012). Because of their attractive position in the Bavarian export market Bulgaria, Romania, China and South Korea have been chosen for the present study. Overall

N=308 randomly selected consumers have been interviewed throughout the different countries and in each country at least 60 consumers have been interviewed. The survey took place at different commercial centers and food outlets. After the main concept “Bavarian food products” has been verbally presented, the respondents got handouts with the key concept “Bavarian food products” in the center of the paper. Afterwards the participants had to add all associations they spontaneously have with Bavarian food products and link the concepts to each other. Individual concepts are analyzed by the means of Ucinet 6 (BORGATTI ET AL., 2002). For the evaluation of the results network analysis has been used.

Sociodemographic data was collected as part of the survey as was data on the Consumer Ethnocentric Scale (CETSCALE) by SHIMP and SHARMA (1987).

Results

The overall sample across the four countries (N=308) consist to 56 % of women with an average age of 31.52 years (SD = 12.19). The average household size is 3.29 (SD = 1.30). Looking at education shows that 66 % of the sample have minimum a Bachelor’s Degree. The average number of concepts elicited from each participant is 8.86 (SD = 5.36). However, the number of concepts given by the participants diverges greatly from 2 to 30.

First analyses show that within each national subsample, a great variety of different network structures occurs. Analyzing the individual concept maps demonstrates the differences regarding cognitive structures of the respondents. While associations within one country show a great variety, overall results show that core concepts for European countries (Romania and Bulgaria) are the lead products Beer, Sausage and Pretzel (Bakery). It also can be noted that for the European countries Bavarian products are connected with high quality, but also with luxury and high price. However, these associations are more pronounced in relation with car industry and industry in general, two concepts that are frequently mentioned in the concept maps given the strong image of certain Bavarian brands. Figure 1 shows an example of the concept map of a single individual surveyed.

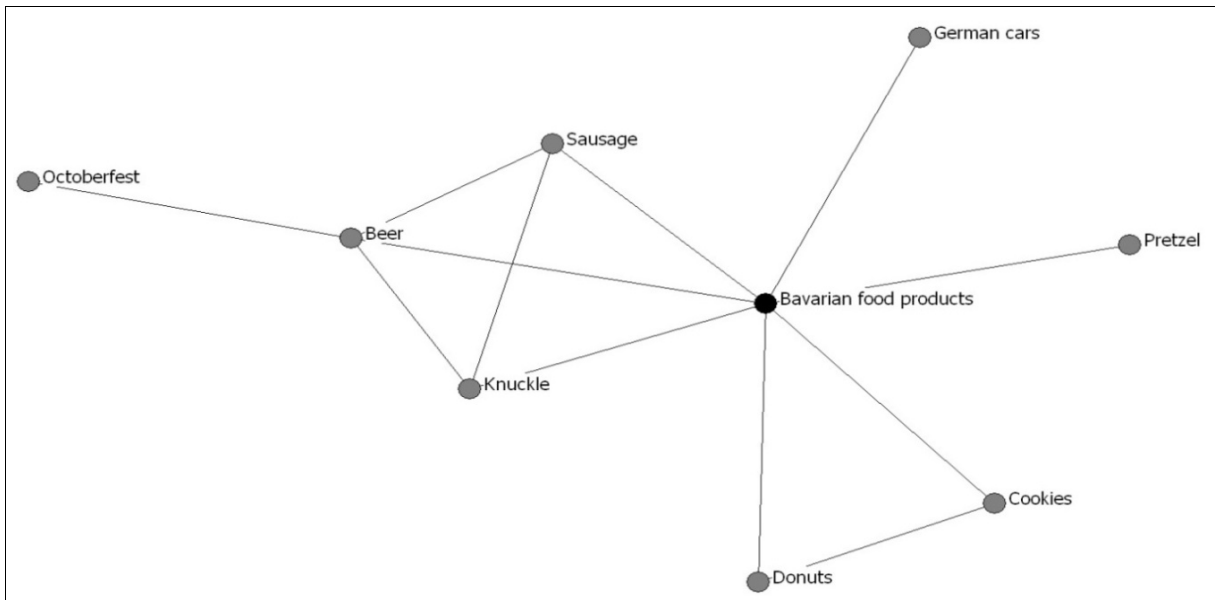


Figure 1: Example of an individual concept map with the key concept “Bavarian food products”

Preliminary results show that consumers, who tend to be more ethnocentric and are led more by patriotic sentiments, have less information about Bavarian Food products stored in their mind compared to less ethnocentric respondents. Hence they may show a lesser involvement with Bavarian food products.

Further analyses examining the influence of sociodemographics as well as the associations regarding Bavarian Food Products from Asian consumers compared to European ones are ongoing.

Overall the findings of the study provide some initial empirical insights regarding the perception of Bavarian food products in an international context. The main associations like Beer, Sausages and Bakery Goods are directly linked to food products and thus to the main concept Bavarian food products. Furthermore there are strong connections to traditional festivals like Christmas Market and Oktoberfest, but also to the Bavarian economy overall which is further connected with safety and quality.

By borrowing from the high quality associated with Bavarian lead products one recommendation for export enterprises will be that the main focus for the communication strategy in the future is the variety of Bavarian food products. While emphasizing the diversity, the higher price for the individual products may be accepted. Another insight from the survey is that Bavarian food is seen in the context of special traditional occasions, like the Oktoberfest or the Christmas Market. This aspect has to be taken into consideration in the future when developing new promotions and communication strategies for Bavarian food products.

References

- BAYERISCHE INDUSTRIE- UND HANDELSKAMMER (2012): Der Außenhandel Bayerns 2011. Available at: <http://www.auwi-bayern.de/awp/inhalte/Aktuelle-Meldungen/Anhaenge/Aussenhandel-Bayerns-2011.pdf> (Date of access: 03/25/2013).
- BORGATTI, S.P., EVERETT, M.G., AND L.C. FREEMAN (2002): Ucinet for Windows: Software for Social Network Analysis. Harvard: Analytic Technologies.
- JONASSEN, D. H.; BEISSNER, K.; YACCI M. (1993): Structural Knowledge. Techniques for Representing, Conveying, and Acquiring Structural Knowledge. Hillsdale, New Jersey, USA.
- KLEEF VAN, E.; TRIJP VAN H. C. M.; KLEEF P. L. (2005): Consumer research in the early stages of new product development: a critical review of methods and techniques. Food Quality and Preference, Vol. 16, p. 181-201.
- NOVAK, J. D. (1977): A Theory of Education. Cornell University Press, Ithaca, New York, USA.
- SHIMP, T. A.; SHARMA, S. (1987): Consumer Ethnocentrism: Construction and Validation of the CETSCALE. Journal of Marketing Research, Vol. 24, p.280-290.
- ZSAMBOK, C. E. (1993): Implications of a Recognition Decision Model for Consumer Behavior. Advances in Consumer Research, Vol. 20, p. 239-244.

Identifying Central Individuals on the Internet: A Case Study with Food-related Weblogs

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The power of ‘electronic Word-of-Mouth’

Online weblogs, discussion forums, opinion web sites and social networks comprise the platforms most frequently used by consumers to share opinions, comments and reviews about products, facilitating all of them what is known as ‘electronic Word-of-Mouth’, or ‘Word of Mouse’ (eWoM).

Like traditional Word-of-Mouth (WoM), eWoM consists of an informal exchange of negative or positive information about products, services and brands, etc. However, in this case it is carried out on the digital platforms available on the Internet (Park and Lee, 2008; Taylor, 2010; Feng and Papatla, 2012). Some definitions of the concept are given in Appendix I, although the notion offered by Henning-Thurau et al. (2004) is the most widely accepted.

In spite of the similarity between traditional and electronic WoM, two important and helpful differences exist which facilitate the freer and quicker flow of information:

eWom transcends local boundaries and the small, intimate and private groups in which traditional ‘WoM’ usually occurs (from a person to another one); consumers are connected with other consumers beyond their personal circle (comprising relatives, friends and acquaintances, etc.) and outside their geographical and sociocultural borders. In other words, they are connected with consumers they do not and probably never will know, but with whom they share a common interest. Supported by the worldwide scope of the Internet, opinions and experiences are transmitted globally through eWoM from a single person to the entire world (Dellarocas, 2003; Steffes and Burgee, 2009; Cheung and Tadani, 2010; Munz and Sergiunaite, 2012).

Moreover, eWoM is usually written in an asynchronous way, passing from informants to recipients of information who are separated in terms of time and space, contrary to the case of traditional WoM where the conversation is oral and immediate. This also implies that the information uploaded onto the Internet remains available worldwide, anywhere, and at any time, rendering the flow of information exponentially freer and faster (Steffes and Burgee, 2009; Cheung and Tadani, 2010; Munz and Sergiunaite, 2012; Datta, Chowdhury, and Chakraborty, 2005).

The consequence of the arrival of eWoM is obvious. Thanks to the Internet, individuals have access to much more knowledge and information at a much lower cost than ever before. Now, customers can evaluate products and brands, etc., and also obtain opinions from other consumers, decreasing risk in their purchase decisions and modifying the perception of brand images, among other outcomes.

Consumers abandon their passive role, progressively attaining a position of control, authority, and prominence in their own consumption activities and, consequently, in the success or failure of products and services, a phenomenon referred to by multiple authors as ‘consumer

empowerment' (Harrison, Waite, and Hunter, 2006; Newholm, Laing, and Hogg, 2006; Pires, Stanton, and Rita, 2006; Gil and Romero, 2008).

Aware of this complex context, the business world now demands a series of new professional profiles to meet these emerging needs. Whilst not aiming to be exhaustive, Appendix II enumerates some of these professions related to the new technologies, a rapidly growing sector.

The foregoing suggests that individuals' informal relationships (eWoM) arise from their need and desire to interact with the environment and other customers.

Homophily in online food-related social networks

Social networks emerge in response to or in order to satisfy the different interests and needs that individuals share and present beforehand by reason of their condition as social beings. Individuals seek to establish ties with other people with similar interests and needs, utilizing these relationships as a mean to achieve their objectives (Mehra, Kilduff, and Brass, 1998).

In addition to needs, there are numerous other motivations and similarities which further the formation of social networks both off- and online. Some of the most common examples are kinship and friendship, or commercial, work-related, affiliate, or hobby-related networks. Thus, those people who form part of a friendship network, whether off- or online, share their need for sympathy and affection, which does not at first fit in with those people interested in food topics, since the common need or hobby is not the same.

Traditionally, sociologists have documented the occurrence of homophily in populations sharing socio-demographic variables such as race or ethnicity, religion, gender, age, education, social class, occupation or affiliation (Verbrugge, 1977; Hoyt and Babchuk, 1983; Brass, 1985; McPherson and Smith-Lovin, 1987; Feld, 1981; Marsden, 1988; Ibarra, 1992; 1993; Mehra et al., 1998; McPherson, Smith-Lovin, and Cook, 2001; Gibbons and Olk, 2003; Rogers, 2003). All these studies have been carried out in specific settings through consulting small groups of people. The impossibility of exploring human relationships in a wider context, beyond geographical boundaries and social circles (workplaces or schools, etc.), has meant that it has been difficult to extrapolate the findings.

Nonetheless, more recent studies have proven the existence of other variables which although less evident, possess a high capacity to influence the formation and organization of social networks on a large scale, such as personality traits and other inner dimensions of the individual (Casciaro, 1998; Mark, 1998; Mehra, Kilduff, and Brass, 2001; Klein et al., 2004; Oh and Kilduff, 2008; Roberts et al., 2008; Kalish and Robins, 2006; Sasovova et al., 2010; Selfhout et al., 2010; Dolgova, 2011).

Furthermore, with the arrival of the Internet and Web 2.0, interests, hobbies, opinions, points of view and thoughts, etc. have become the most convincing components for evaluating homophily in this virtual participative world, since socio-demographic details such as age, gender, education or social status are not always available, and even when they are, they are not very reliable. In addition, the results obtained from such research are potentially much more conclusive and generalizable, given the possibility of reaching a greater number of individuals. Some of these studies can be consulted in Adamic and Adar (2003), Fiore and Donath (2005), Nowak and Rauh (2005), Crandall et al. (2008), and Bisgin, Agarwal, and Xu (2012).

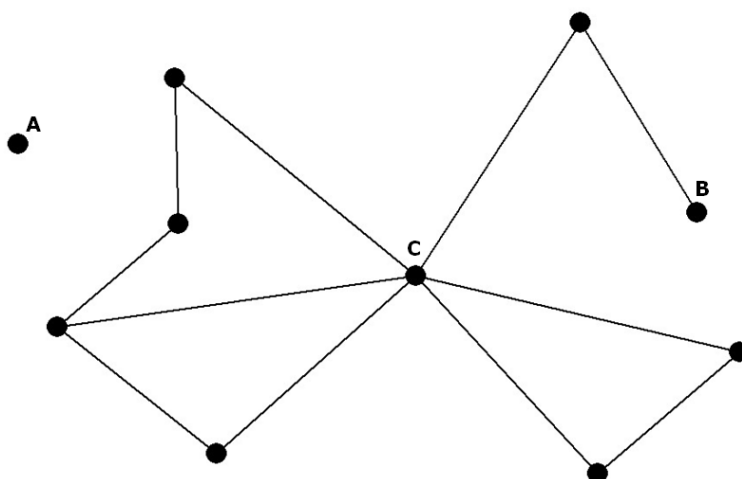
In virtual environments, this kind of homophily, termed ‘psychographic’ (values, attitudes, interests, opinions or preferences), represents the main concept around which social networks are defined, and as can be seen, content may encompass a wide range of topics. In this study, an interest in food topics was the similarity criterion which linked consumers who formed online food-related social networks.

Lastly, a network of interconnected individuals emerges through which information and eWoM conversations flow from the start. Moreover, as Ryan and Gross (1943), Brown and Reingen (1987), Valente and Rogers (1995) and Hienerth and Lettl (2011) have argued, by observing and analyzing these social networks, researchers can identify the diffusion of innovations throughout the network and obtain valuable and useful feedback for developing new ideas.

The analysis of online social networks: the graph theory.

A social network is “a clearly delimited set of actors (individuals, groups, organizations, communities, global societies, etc.) tied to one another by means of a relation or a set of social relations” (Lozares, 1996; p. 108).

Figure 1. Example of a social network with an isolated actor.



Source: Authors.

In the graph theory, a 'sociogram' is the graphic representation of a social network in a normally two-dimensional or Cartesian plane. Figure 1 illustrates an example of a sociogram, in which network actors are represented by nodes, vertices or points, and existing relationships by lines (also designated arcs, edges, ties, bonds or links).

Each of the actors in a social network is, by definition, a component of the ties-nodes structure, and therefore, a participant in the flow of communication. However, not all network actors are equally important from the point of view of a social network analysis (SNA).

Returning again to Figure 1, as can be seen at first glance, actor 'A' is located apart from any information flow and actor 'B' has hardly any kind of involvement in the network activity, while actor 'C' in contrast is the best connected of all of them, benefiting from a privileged position with regard to communication and information flows.

The sections below focus on the definition and theory of this privileged location in the network and the implications for actors in this situation.

Centrality

One of the important functions of SNA is to locate and identify the most influential actors in a network, termed as the 'importance', 'prominence', or 'centrality' of an actor's position in a social network.

'Centrality' (Wasserman and Faust, 2009) refers to the 'strategic position of an actor within a network' (p. 169), which makes him or her 'particularly visible to the other network actors' (p. 171).

Despite relative unanimity regarding the conceptual basis for 'centrality', there are a variety of approaches for measuring this concept, including in-degree centrality, betweenness and flow betweenness centrality (Freeman, 1979; 2000).

In-degree centrality

In its simplest form, degree centrality helps to locate those actors involved to a greater extent in relationships with other actors. Degree centrality provides an easy, local, and dichotomous (among pairs of nodes) means to examine the number of links between actors, designating as 'central' the actor with multiple ties.

Specifically, an actor is central according to 'degree centrality' if he or she exhibits more direct links with adjacent actors in comparison with other network actors.

Figure 2. Star graph.

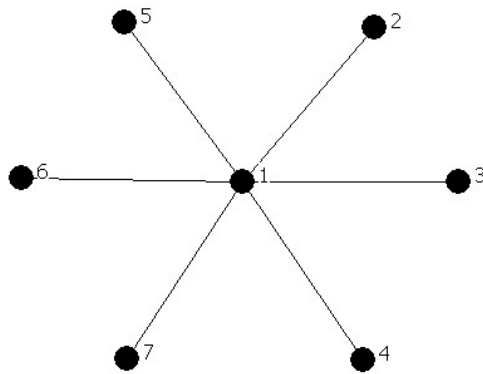
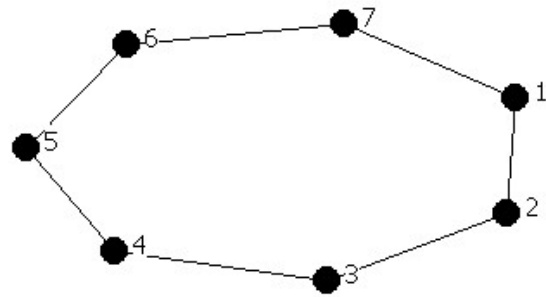


Figure 3. Circle graph.



Source: Authors (Netdraw 2.082).

In the star graph (Figure 2), actor 1 displays all possible links (degree 6) while the other actors show a single tie with actor 6, undoubtedly the most active and central in the network.

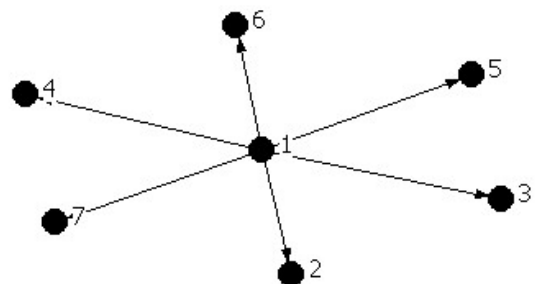
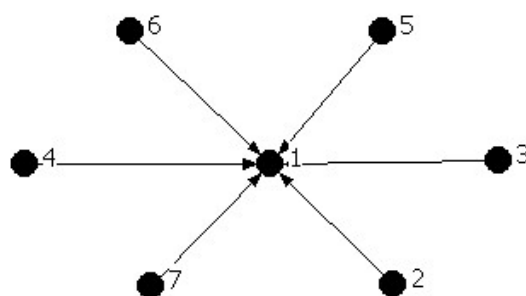
In the circle graph (Figure 3) however, there is no such precise conclusion, since all actors reveal the same number of ties: two. No single actor is more active than the others, and ‘degree centrality’ is the same for all of them.

‘Degree centrality’ can also be calculated using directed data, in this case providing more detailed information. Each node is examined to distinguish ‘in-degree centrality’ (number of received ties) from ‘out-degree centrality’ (number of emitted ties).

Individuals with a high in-degree centrality, such as actor 1 in Figure 4 (left), are considered prestigious and relevant actors, since the other actors try to establish links with them, hence their importance. On the other hand, actors with a high out-degree centrality, such as actor 1 in Figure 4 (right), present high social activity, an information seeking approach and the capacity to access the rest of the actors.

Structurally identical graphs but with different relational directions lead, as seen, to divergent conclusions.

Figure 4. In-degree and out-degree centrality.



Source: Authors (Netdraw 2.082).

Betweenness centrality

According to ‘betweenness centrality’, two non-adjacent, not directly related actors can also interact, although this communication relies on other actors positioned in intermediate locations.

‘Betweenness centrality’ considers the position of an actor to be privileged when he or she is located along the shortest paths (geodesic distances) between pairs of actors, dominating the optimal communication routes.

Returning to the star graph, actor 1 is again the most central actor in terms of intermediation since he or she is located in the exact middle of the fifteen geodesic paths connecting the other six actors.

In the circle graph, control is balanced among all network participants.

‘Betweenness centrality’ is easy to perceive in simple graphs such as these shown. In more complex structures, however, it is necessary to turn to the different algorithms included in specific software packages.

‘Eigenvector’ of geodesic distances

The ‘eigenvector’ of geodesic distances represents a function which enables identification of the most central actors in terms of the global or general network structure, hence its usefulness and attractiveness.

Nevertheless, it presents two main disadvantages. First, this index cannot be calculated for asymmetric data (directed data), so it is based solely on the existence or absence of relationship inter-nodes, and second, the eminently mathematical nature of this measure renders its definition somewhat unintelligible.

Operationally, the ‘eigenvector’ works similarly to a factor analysis. The software extracts general dimensions from the global structure of the network, called ‘eigenvalues’, which are then compared to the dimensions of geodesic distances between all actors, calculating an ‘eigenvector’ for each actor.

The ‘eigenvector’ represents the degree to which the relationship dimension of actors fits in with the global relationship dimension of the network. Therefore, those actors with the highest ‘eigenvectors’ will be the most central actors in terms of the global or general network structure.

Flow betweenness centrality

Flow betweenness centrality considers all possible paths between actors, not only the shortest ones. This index assumes that actors will use all routes, including the most and the least efficient ones. It refers, then, to a generalization of betweenness centrality.

Flow betweenness centrality identifies the mediation position occupied by each actor in all existing communication flows between pairs of actors. It is the total participation index of an actor in a network.

Centrality, the key to innovation processes: generation of ideas and diffusion of new products

The study of network structures based on centrality analysis and its multiple approaches can be of great interest in the innovation process, as suggested by the Theory of the Strength of Weak Ties (TSWT) and the Theory of Structural Holes (TSH), extended by Granovetter (1973) and Burt (1992), respectively, which occupy a distinguished place within SNA.

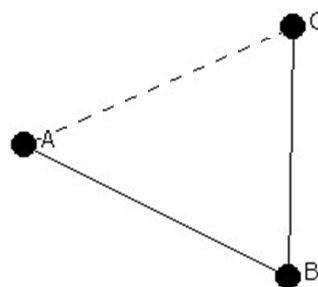
The principle goal of TSWT and TSH is the study of social network structures and attributes, the influence of actors' positions on network operation, the pattern of information flow and network content.

The strength of weak ties

In general terms, TSWT is based on a syllogistic structure: it consists of two propositions and a conclusion.

The first proposition states that the stronger the tie between two actors, the higher the probability that their social circle will overlap. In other words, it is more likely that these actors will have the same ties with third parties. Granovetter said that tie strength would be determined by a combination of several aspects, including time, frequency, power, trust and goods/services exchanged, so that if actor A (see Figure 5) has a strong tie with actor B, and actor B in turn has a strong tie with actor C, actors A and C will also tend to have a common tie, a weak one (weak tie), at least.

Figure 5. Triad formation according to TSWT.



Source: Authors (Netdraw 2.082).

To give an example, if A is a close friend of B and B is a close friend of C, then A and C will probably be at least acquaintances.

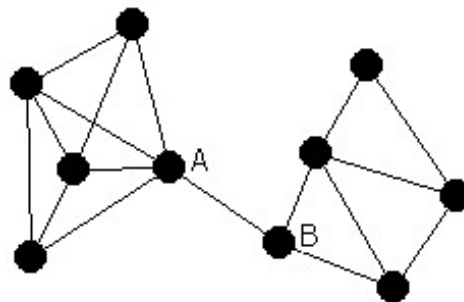
The second proposition asserts that bridge ties are a source of new ideas and innovative information. A bridge tie is the tie, link or relationship that represents the only possible connection between two actors.

Actors who are connected by strong ties use to associate frequently, forming highly cohesive networks¹⁶. Information flows easily in these groups, and consequently tends to be known and redundant for all actors. In contrast, a bridge tie enables an actor to obtain fresh information from outer spheres.

In Figure 6, the link between A and B is a bridge tie, forming the only link between two groups which are especially cohesive in this case. Actor A is the only actor with a tie directed outside his or her group, and therefore probably receives non-redundant information proceeding from B (and his or her network) which is new to his or her own group and vice versa.

Lastly, Granovetter concluded that strong ties were not likely to be a source of new ideas and innovative information, reasoning as follows.

Figure 6. Bridge tie between A and B.



Source: Authors (Netdraw 2.082).

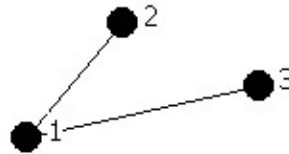
According to the first proposition, if A and B were tied by means of a strong relationship, then B should have a weak link with at least one of the other actors forming A's cohesive group, and vice versa. Thus, if this were true, the link between A and B would not then represent a bridge as there would be other paths for establishing inter group communication. Therefore, bridges are necessarily weak ties between actors and weak ties are necessarily bridges. Furthermore, since bridges are the origin of non-redundant messages, weak ties are indeed a real source of new ideas and innovative information. Hence the strength of weak ties.

Structural holes

¹⁶ In SNA, cohesion is the degree to which actors in a network are directly connected to each other. Groups are called 'cliques' if each node is tied directly to all group members.

A structural hole refers to the existence of a gap or a void in the net, or, in other words, a structural hole represents the lack or absence of link between two nodes (see Figure 7).

Figure 7. Structural hole between actors 2 and 3.

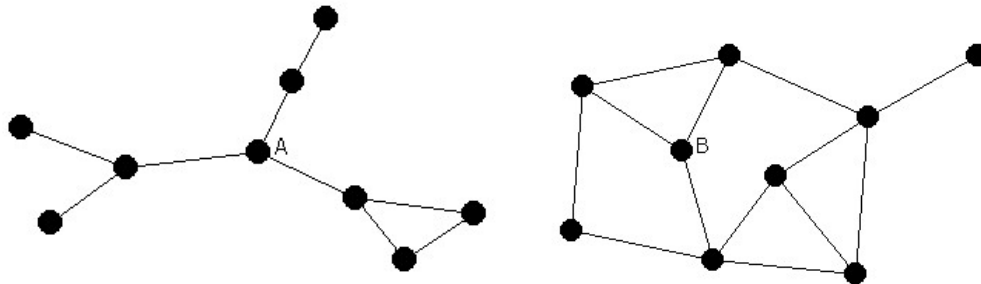


Source: Authors (Netdraw 2.082).

Comparing actors A and B in Figure 8, the shape of A's network, with a higher number of structural holes, is likely to afford A more novel information than B's network does for B, because B's contacts are connected with each other.

Despite both actors, A and B, have the same number of ties, it can be stipulated that A's ties connect to three different pools of information, while B's nodes will provide B more or less the same data since they are well direct or indirectly tied to each other.

Figure 8. Node A's network has more structural holes than B's.



Source: Borgatti and Halgin (2011).

As a result, A is likely to receive more non-redundant information at any given time than B, which in turn can provide A with the capability of being perceived as the source of new ideas.

Therefore, actors linked to other actors through weak ties or benefited from the existence of structural holes in their relations structure occupy privileged positions in network information flow. These favored positions are precisely the central positions referred to in the previous section, and thus it can be reasoned that centrality, or the most central actors in an online social network (actors of reference for those with whom they are connected), such as actor 'C' in Figure 1, will be key consumers in the acquisition of new ideas and the diffusion of innovations.

Why the food sector?

In high uncertainty environments, such as the current situation, the food sector plays a strategic role for the future economy: it is one of the sectors least affected by the crisis, since

foodstuffs are basic products. It presents a great potential for generating employment and including small, medium, and large-size companies simultaneously, conferring sufficient capacity and flexibility to cover international markets.

Nonetheless, when developing a new product or service, certain aspects must be taken into account, such as socio-demographic changes, new kinds of household, their consumption behavior, the legislative framework, different consumer typologies and the effects of the crisis, etc.

Although it is true that online food purchases are not the norm, there is an increasing tendency to share purchase experiences and seek those of other people. The food industry cannot afford to ignore the Internet. However, many food companies in Spain have no presence yet on social networks, and many others merely use them to transmit information rather than to interact with customers. This implies that the potential of social media to gain consumer loyalty, to identify trends or to launch new products successfully remains unexplored in some way.

Sampling and level of data analysis

Social network analyses are usually conducted with entire networks at a macro level. In these cases, it is common to turn to population censuses in order to identify and locate different actors (Lozares, 1996; Hanneman and Riddle, 2005). Data from an entire networks can produce powerful descriptions and comparisons of social structures; however, they can be extremely expensive and difficult to obtain, since the extraction of data from each and every population member and his or her relationships with the rest is a challenging task.

In the present study, data analysis was carried out on a meso level. Thus, due to information requirements, time and cost limits, the study was restricted to a sample or a subgroup of the global population.

Specifically, online snow-ball sampling was performed as described by Hanneman and Riddle (2005), which resulted in a group of 152 usable entries from people with personal food-related weblogs. The study was conducted in October 2011.

Relationship compilation

As with other sociometric measures, centrality requires the calculation of network data, in this instance, relationships between individuals. To this end, the most common procedure is to ask each respondent about the people he or she turns or would turn to for information, affection, advice, help or financing, etc., depending on the case (Coleman et al., 1966; Requena Santos, 1996; Rogers, 2003), and being standard practice to state a specific number of contacts to be cited by one participant.

Thus, with the aim of establishing links between participants, and consequently, a data base with a grid structure, the individuals contacted were asked to answer the following question:

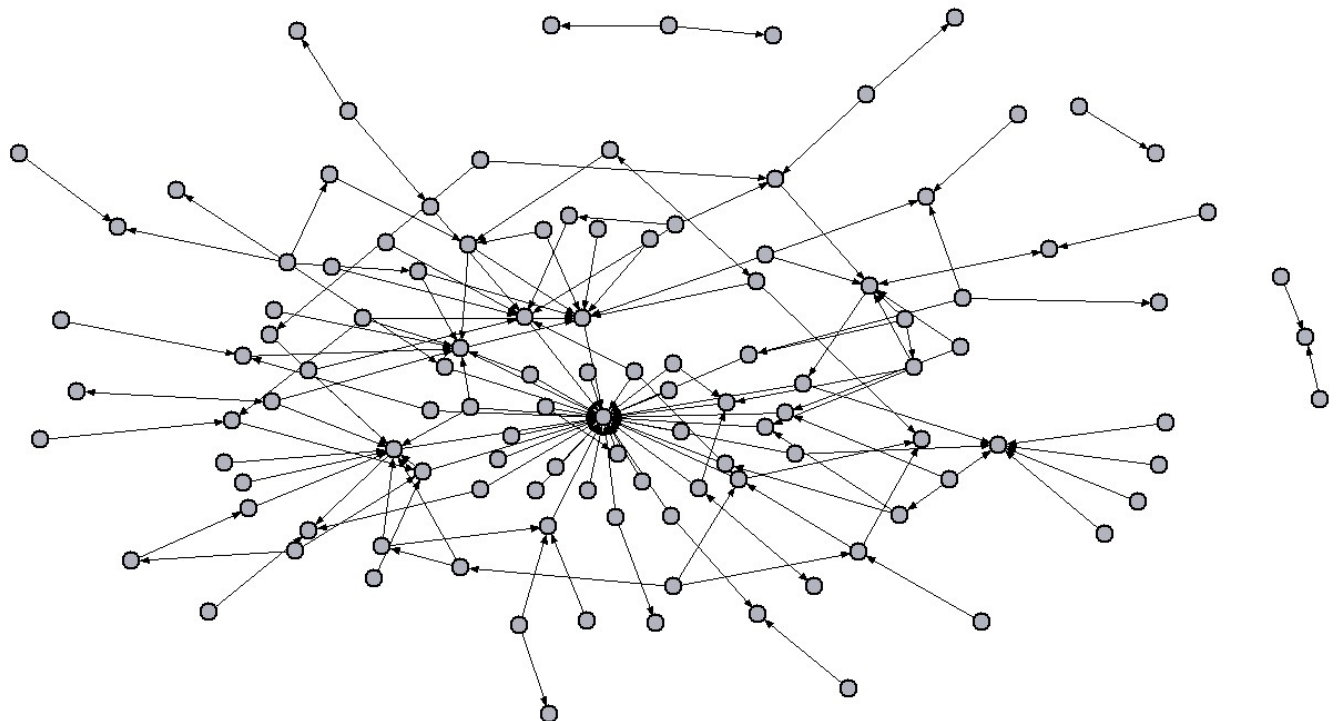
“Please name the 5 Spanish language blogs to which you most frequently turn to obtain information and/or to ask for advice about food-related topics such as recipes, nutrition, restaurants, kitchen tools, etc.”.

Graph generation

Once the data had been compiled and tabulated, a sociogram was constructed using Netdraw 2.082 software (Borgatti, 2002), shown in Figure 7. Isolated nodes have been deleted, and the identity of nodes is not shown in order to respect their anonymity.

As can be seen, there are considerable differences between the relational structures of actors at an individual level. The calculation of centrality indexes according to the diverse approaches described in previous paragraphs enables identification of those individuals who occupy the most prominent positions not only in terms of local contexts, but also globally, in terms of the entire network.

Figure 9. Resultant sociogram with directed ties.



Graphic analysis of centrality

Calculation of the different centrality indexes was performed using the algorithms included in the Ucinet 6.411 software package (Borgatti, Everett and Freeman, 2002). A

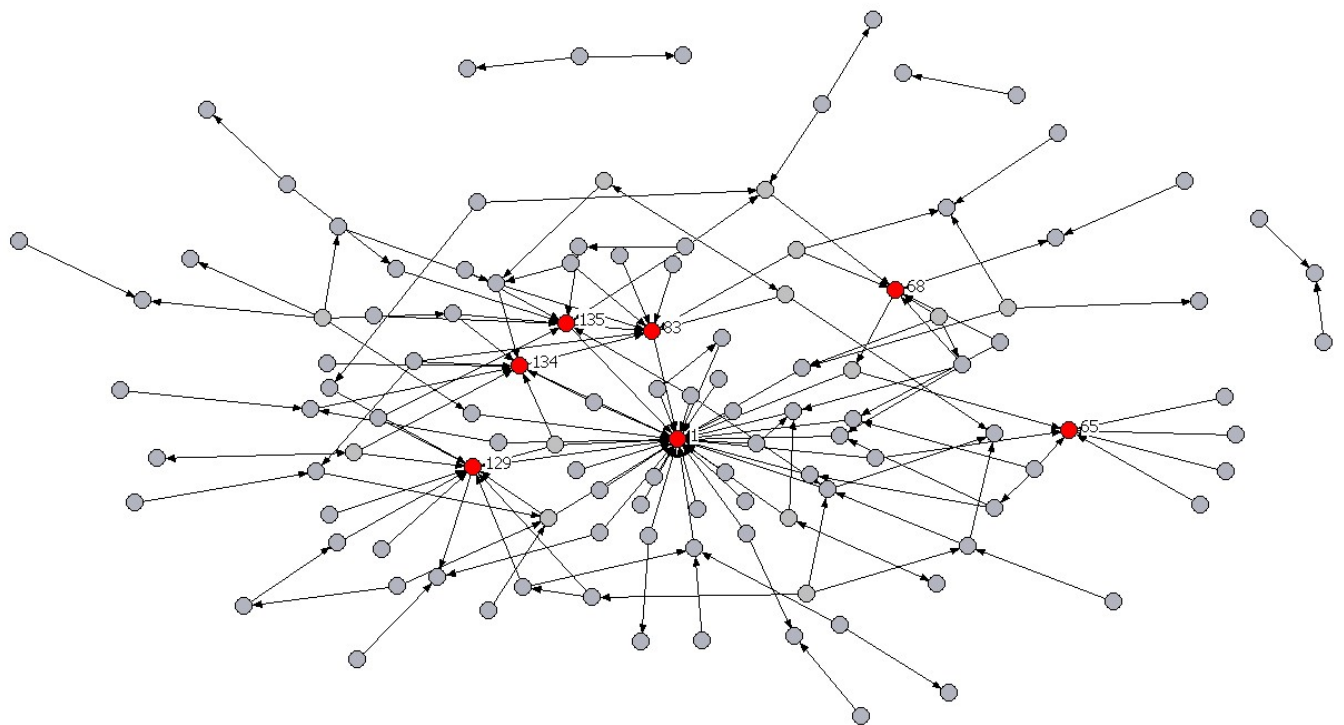
sociogram was directly generated for each index in which those individuals identified as the most central were highlighted, until reaching a total of six. These sociograms are depicted in Figures 8 to 13.

In-degree centrality (Figure 10)

The individuals mentioned most frequently by the sample components were numbers 1, 65, 68, 83, 129, 134 and 135. For this reason, they were considered prestigious and relevant actors.

In-degree centrality is easy to understand and visualize, but the information it provides refers solely to local and specific areas in the network (an actor's direct links), without regard to its global structure, for which it is necessary to turn to the other centrality indexes.

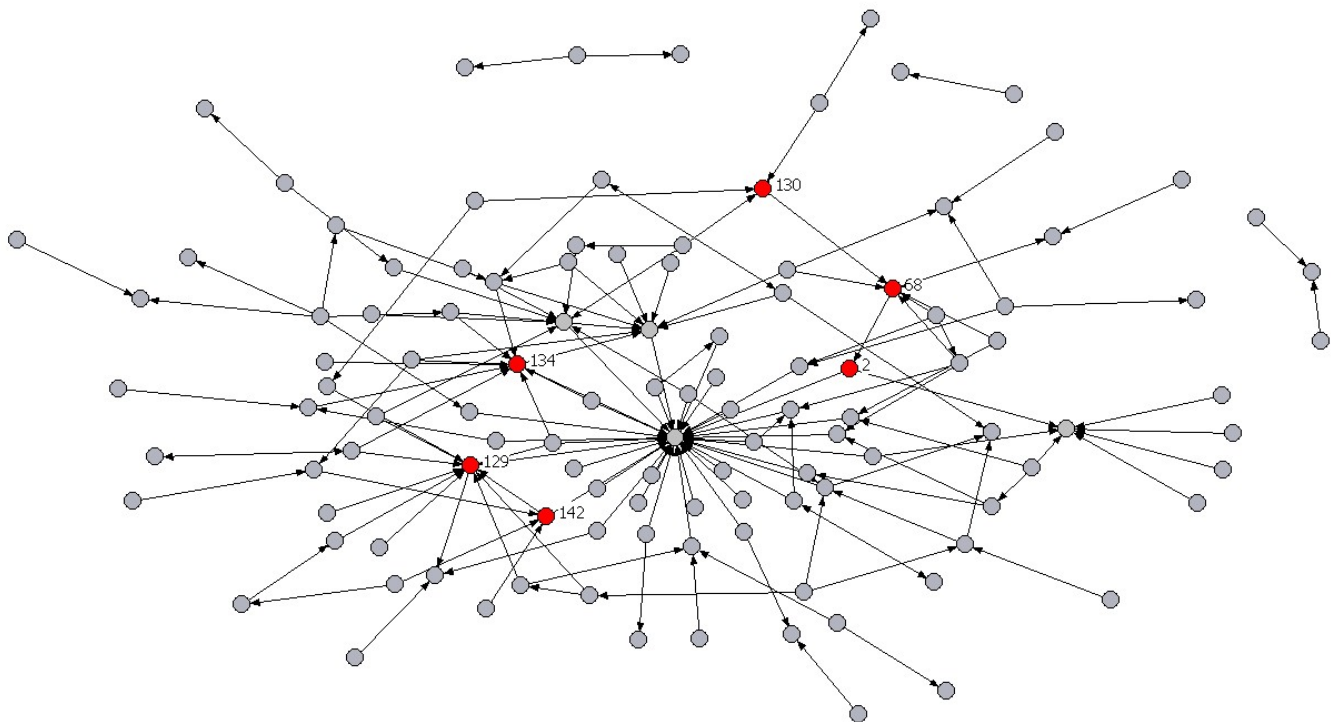
Figure 10. Individuals with a high in-degree centrality.



Source: Authors (Netdraw 2.082).

Betweenness centrality (Figure 11)

Figure 11. Individuals with a high betweenness centrality.

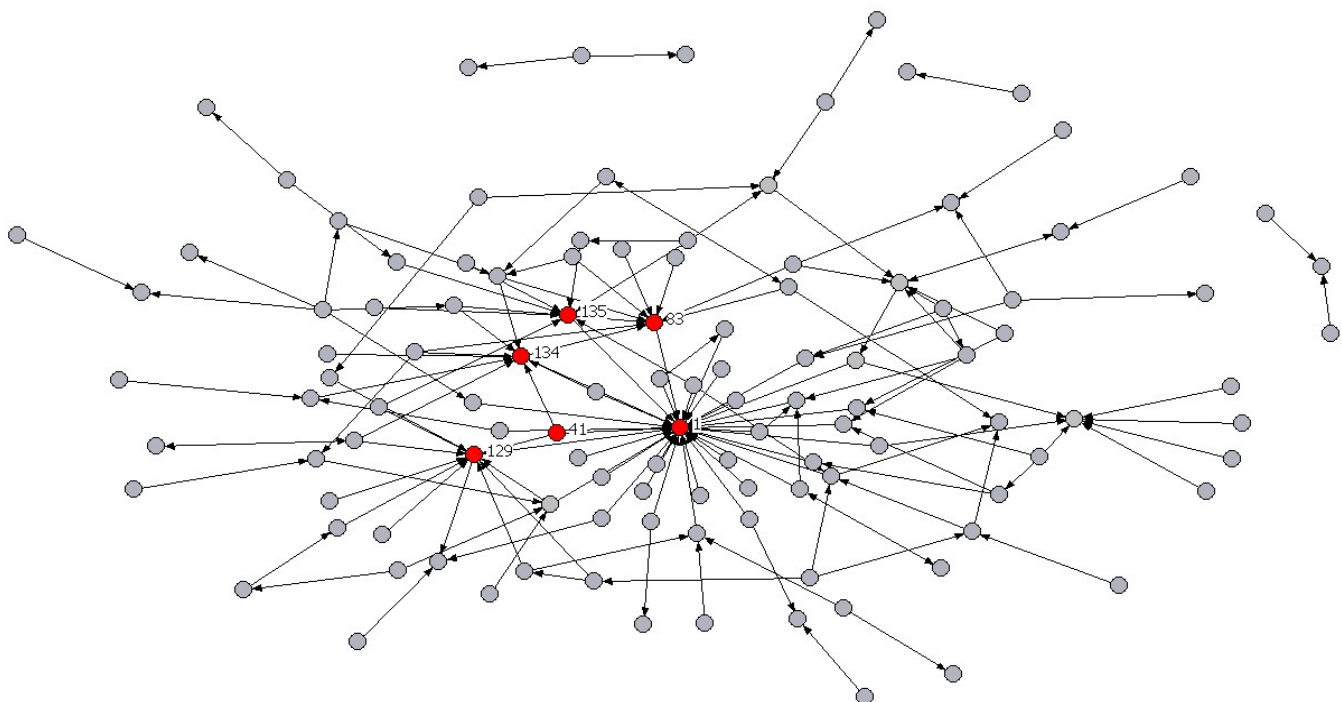


According to betweenness centrality, actors 2, 68, 129, 130, 134 and 142 occupy favored positions in the geodesic paths between all pairs of actors. Given the opportunity, they could dominate the shortest communication routes between individuals.

Eigenvector of geodesic distances (Figure 12)

In the case of the eigenvector of geodesic paths, actors 1, 41, 83, 129, 134 and 135 are most relevant. It is these actors' relationship dimension which fits best with the global relationship dimension of the network, and hence, they are the most central individuals.

Figure 12. Individuals with a high eigenvector.

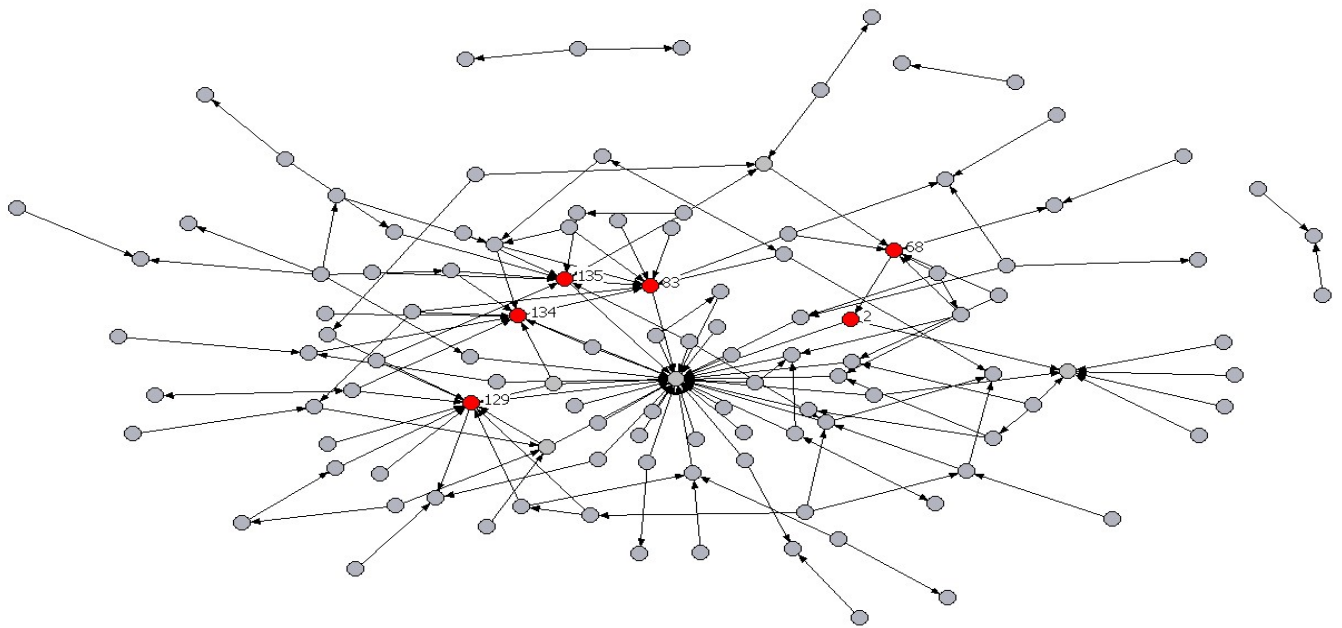


Source: Authors (Netdraw 2.082).

Flow betweenness centrality (Figure 13)

Flow betweenness centrality considers all communication paths between nodes, including the shortest and most efficient as well as the longest and most ineffective. The actors who appear most frequently here are numbers 2, 68, 83, 129, 134 and 135

Figure 13. Individuals with a high flow betweenness centrality.



Source: Authors (Netdraw 2.082).

Conclusions

Table 1 shows the actors previously identified as central and the centrality measures with which they were identified.

Actors 68, 83, 129, 134 and 135 emerged as central on a larger number of occasions (129 and 134, and 68, 83 and 135 in four out of six occasions, and 68, 83 and 135 in three out of six occasions).

Table 1. Summary of central individuals and centrality measures.

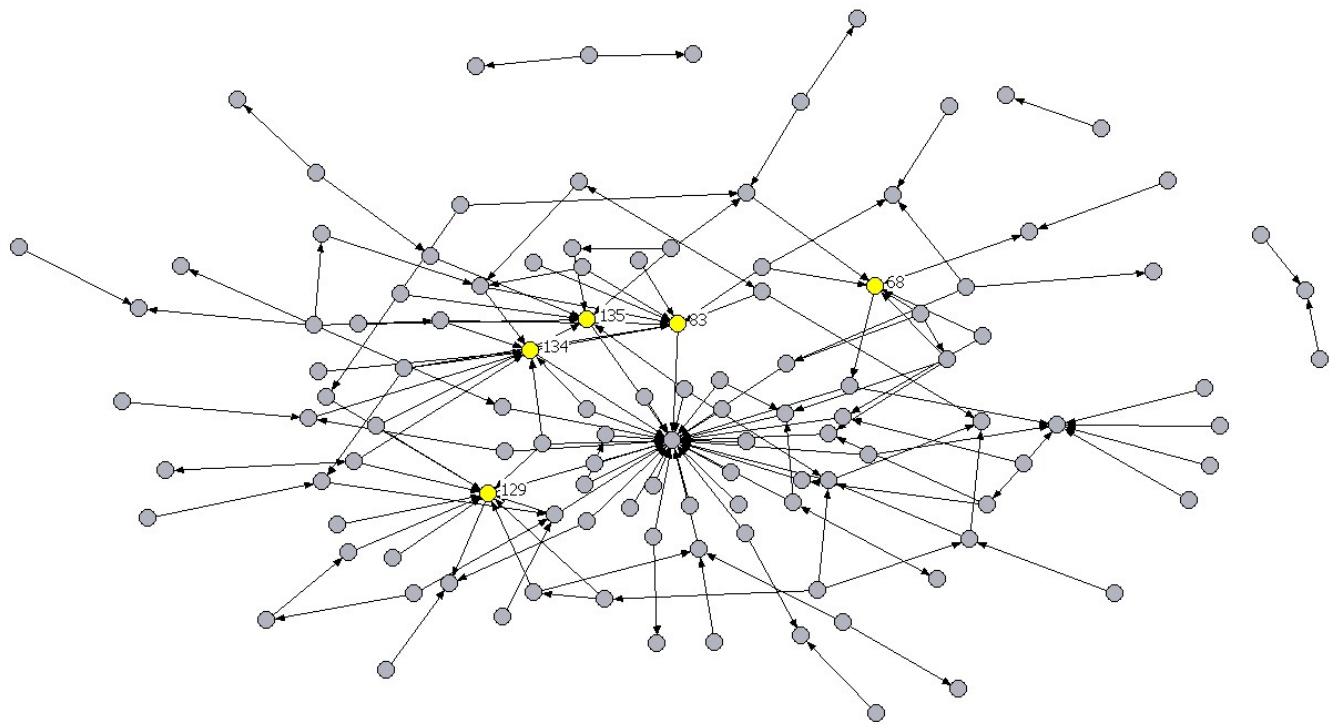
Node number	In-degree	Betweenness	Eigen vector	Flow Betweenness
1	Yes	No	Yes	No
2	No	Yes	No	Yes
24	No	No	No	No

36	No	No	No	No
41	No	No	Yes	No
45	No	No	No	No
65	Yes	No	No	No
68	Yes	Yes	No	Yes
71	No	No	No	No
83	Yes	No	Yes	Yes
84	No	No	No	No
98	No	No	No	No
119	No	No	No	No
129	Yes	Yes	Yes	Yes
130	No	Yes	No	No
134	Yes	Yes	Yes	Yes
135	Yes	No	Yes	Yes
142	No	Yes	No	No
144	No	No	No	No
147	No	No	No	No

Source: Authors.

Contrary to what one would expect a priori, actor 1 is not the most central, appearing in two out of six criteria together with other three actors, despite occupying the graphic core of the network. Rather, it is the actors on the periphery of the network who have better connections (Figure 14). This represents a finding which is hidden by the visual network structure.

Figure 14. Central individuals on more occasions.



Source: Authors (Netdraw 2.082).

Actors 68, 83, 129, 134 and 135 are properly connected individuals who embody the link between the network core and the periphery, enabling them to profit from a doubly favored position: on one hand, they are located next to the network core (actor 1), where communication flows are more continuous, stronger and less redundant; and on the other, they perform a role as mediators in the paths which join the network core with the rest of the nodes, meaning that the information the peripheral nodes receive will have previously passed through mediation positions.

Value and managerial implications

At this stage, one of the main advantages of the proposed methodology is evident. SNA is a simple and helpful research technique, rendering it accessible and attractive to a variety of communities. Despite dispensing with the statistical procedures for estimating validity of results integrated in other techniques, the scientific quality and accuracy of SNA is beyond reasonable doubt.

With respect to marketing and business research, the study of centrality and online social networks encompasses two aspects that businesses cannot afford to ignore in the current context.

Direct observation of online social networks allows companies to identify the consumers who talk about their products and services, to determine their profiles and to obtain first-hand information about comments with so much impact on their corporate image, and thus, on their

results. By gaining knowledge of eWoM in this way, businesses will be able to dominate and control complex situations and, if necessary, to emit a suitable response to the market.

In particular, centrality analysis makes possible the identification of those actors who, due to their positions, are the most prominent in these macro-networks composed of thousands and thousands of individuals, facilitating the efficiently targeting of communication efforts toward concrete goals.

In turn, central actors can perform other attractive roles for the company, providing the link between this latter and the end consumer:

- Thanks to them, knowledge of new products and services can be disseminated more rapidly, representing savings in advertising.
- These actors can provide a greater amount of non-redundant information necessary to develop new product ideas, since they form the core where customer opinions converge.

Limitations and further research

Bearing the above in mind, this study presented two main limitations.

The first aspect to consider is the expiration of these kinds of study. Social networks, in this case personal weblogs, constitute transient and changeable populations that grow and decrease constantly with emerging and vanishing individuals. As a consequence, relationships between actors can reflect different information in the short-term.

In addition, the limited sample size renders it difficult to generalize the final results across such a huge population.

These problems imply the need to increase the sample size in order to achieve a higher scientific strength.

Working with a larger group would produce more representative and stable results in terms of population and time.

Another possible option for minimizing bias would be the construction of a more global and holistic model which considers the variables governing the behavior of those consumers who share contents on the Internet, in accordance with the line indicated by Brass (2002) and by Borgatti and Halgin (2011) when they talk about the antecedents and consequences of networks.

References

- Adamic, L. A. and Adar, E. (2003). Friends and neighbors on the web. *Social Networks*, 25(3), 211–230.
- Bisgin, H., Agarwal, N., y Xu, X. (2012). A study of homophily on social media. *World Wide Web*, 15, 213–232.
- Bonacich, P. (1987). Power and centrality: A family of measures. *American Journal of Sociology*, 92, 1170–1182.
- Bonacich, P. (1991). Simultaneous group and individual centralities. *Social Networks*, 13, 155–168.
- Bonacich, P. (2007). Some unique properties of eigenvector centrality. *Social Networks*, 29 555-564.
- Borgatti, S.P. (2002). *NetDraw: Graph Visualization Software*. Harvard, MA: Analytic Technologies.
- Borgatti, S.P., Everett, M.G. and Freeman, L.C. (2002). *Ucinet for Windows: Software for Social Network Analysis*. Harvard, MA: Analytic Technologies.
- Borgatti, S. P. and Halgin, D. S. (2011). On Network Theory. *Organization Science*, 22(5), 1168-1181.
- Brass, D. J. (1985). Men's and women's networks: A study of interaction patterns and influence in an organization. *The Academy of Management Journal*, 28(2), 327–343.
- Brass, D. J. (2002). Social Networks in organizations: Antecedents and consequences. *Unpublished manuscript*.
- Brown, J. J. and Reingen, P. H. (1987). Social ties and word-of-mouth referral behaviour. *Journal of Consumer Research*, 14(3), 350-362.
- Burt, R. S. (1992). *Structural Holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press.
- Casciaro, T. (1998). Seeing things clearly: Social structure, personality, and accuracy in social network perception. *Social Networks*, 20(4), 331–351.
- Chan, Y.Y.Y. and Ngai, E.W.T. (2011). Conceptualising electronic word of mouth activity: An input-process-output perspective. *Marketing Intelligence & Planning*, 29 (5), 488-516.
- Cheung, C. M. K. and Thadani, D. R. (2010). The Effectiveness of electronic word-of-mouth communication: A literature analysis. *23rd Bled eConference (eTrust: Implications for the Individual, Enterprises and Society)*. June 20 - 23, 2010; Bled, Slovenia.
- Coleman**, J., Katz, E., and Menzel, H. (1966). *Medical Innovation: A Diffusion Study*. Nueva York: Bobbs-Merry.

Crandall, D., Cosley, D., Huttenlocher, D., Kleinberg, J., and Suri, S. (2008). Feedback effects between similarity and social influence in online communities. In: *Proceeding of the 14th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, pp. 160–168. New York: ACM.

Datta, P. R., Chowdhury, D. N., and Chakraborty, B. R. (2005). Viral marketing: New form of word-of-mouth through Internet. *The Cambridge Business Review*, 3(2), 69-75.

Dellarocas, C. (2003). The digitization of word of mouth: Promise and challenges of online feedback mechanisms. *Management Science*, 49(10), 1407-1424.

Dolgova, E. (2011). ***Birds of the feather*** flock together **2.0: Is there a personality based homophily?** Proceedings of the 8th International Conference on Applications of Social Network Analysis. University of Zurich & ETH Zurich, September 13-16.

Feld, S. L. (1981). The focused organization of social ties. *American Journal of Sociology*, 86, 1015–1035.

Feng, J. and Papatla, P. (2012). Is online word of mouth higher for new models or redesigns? An investigation of the automobile industry. *Journal of Interactive Marketing*, 26, 92–101.

Fiore, A. T. and Donath, J. S. (2005). Homophily in online dating: When do you like someone like yourself? In: *CHI'05 Extended Abstracts on Human Factors in Computing Systems*, 1371–1374. New York: ACM.

Freeman, L. C. (1979). Centrality in social networks: Conceptual clarification. *Social Networks*, 1, 215–239.

Freeman, L. C. (2000). La centralidad en las redes sociales. Clarificación conceptual. *Política y Sociedad*, 33, 131-148.

Gibbons, D. E. and Olk, P. M. (2003). Individual and structural origins of friendship and social position among professionals. *Journal of Personality and Social Psychology*, 84, 340-351.

Gil, V. A. and Romero, F. J. (2008), *Crossuser: Claves para entender el consumidor español de nueva generación*. Barcelona (Spain): Ediciones Gestión 2000.

Goldsmith, R. E., and Horowitz, D. (2006). Measuring motivations for online opinion seeking. *Journal of Interactive Advertising*, 6(2), 1–16.

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 6, 1360–1380.

Hanneman, R. A. and Riddle, M. (2005). *Introduction to Social Network Methods*. Riverside, CA: University of California, Riverside. Free text available at <http://www.faculty.ucr.edu/~hanneman/> the 12/07/2011.

- Harrison, T., Waite, K., and Hunter, G. L. (2006). The internet, information and empowerment. *European Journal of Marketing*, 40(9/10), 972-993.
- Hennig-Thurau, T., Gwinner, K. P., Walsh, G., and Gremler, D. D. (2004). Electronic word-of-mouth via consumer-opinion platforms: What motivates consumers to articulate themselves on the Internet? *Journal of Interactive Marketing*, 18(1), 38-52.
- Hienerth, C. and Lettl, C. (2011). Exploring how peer communities enable lead user innovations to become standard equipment in the industry: Community pull effects. *Journal of Product Innovation Management*, 28(1), 175–195.
- Hsieh, J. K., Hsieh, Y. C., and Tang, Y. C. (2012). Exploring the disseminating behaviors of eWOM marketing: Persuasion in online video. *Electronic Commerce Research*, 12, 201–224.
- Hoyt, D. R. and Babchuk, N. (1983). Adult kinship networks: The selective formation of intimate ties with kin. *Social Forces*, 62(1), 84–101.
- Ibarra, H. (1992). Homophily and differential returns: Sex differences in network structure and access in an advertising firm. *Administrative Science Quarterly*, 37(3), 422–447.
- Ibarra, H. (1993). Network centrality, power, and innovation involvement: Determinants of technical and administrative roles. *The Academy of Management Journal*, 36(3), 471-501.
- INKS (2012). Guía Infoempleo Kschool de las Nuevas Profesiones. File available at <http://blog.infoempleo.com/wp-content/uploads/2012/02/guia-inks-Vfinal-DIGITAL-OK.pdf> (retrieved the 31/07/2012).
- Kalish, Y., and Robins, G. (2006). Psychological predispositions and network structure: The relationship between individual predispositions, structural holes and network closure. *Social Networks*, 28(1), 56–84.
- Khammash, M. and Griffiths, G. H. (2011). Arrivederci CIAO.com, Buongiorno Bing.com' - Electronic word-of-mouth (eWOM), antecedences and consequences. *International Journal of Information Management*, 31, 82–87.
- Klein, K. J., Lim, B. C., Saltz, J. L., and Mayer, D. M. (2004). How do they get there? An examination of the antecedents of centrality in team networks. *The Academy of Management Journal*, 47(6), 952–963.
- Lozares C. (1996). La teoría de redes sociales, *Papers*, 48, 103-126.
- Mark, N. (1998). Beyond individual differences: social differentiation from first principles. *American Sociological Review*, 63, 309–330.
- Marsden, P. V. (1988). Homogeneity in confiding relations. *Social Networks*, 10, 57–76.
- McPherson, J. M., and Smith-Lovin, L. (1987). Homophily in voluntary organizations: Status distance and the composition of face-to-face groups. *American Sociological Review*, 52(3), 370-379.

- McPherson, J. M., Smith-Lovin, L., and Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual review of sociology*, 27, 415–444.
- Mehra, A., Kilduff, M., and Brass, D. J. (1998). At the margins: A distinctiveness approach to the social identity and social networks of underrepresented groups. *The Academy of Management Journal*, 41(4), 441-452.
- Mehra, A., Kilduff, M., and Brass, D. J. (2001). The social networks of high and low self-monitors: Implications for workplace performance. *Administrative Science Quarterly*, 46(1), 121-146.
- Munz, K. and Sergiunaite, V. (2012). Electronic word-of-mouth (eWOM): The relationship between anonymous and semi-anonymous eWOM and consumer attitudes (master thesis). University of Jönköping (Sweden).
- Newholm, T., Laing, A., and Hogg, G. (2006). Assumed empowerment: Consuming professional services in the knowledge economy. *European Journal of Marketing*, 40(9/10), 994-1012.
- Nowak, K. L. and Rauh, C. (2005). The influence of the avatar on online perceptions of anthropomorphism, androgyny, credibility, homophily, and attraction. *Journal of Computer-Mediated Communication*, 11(1), 153–178.
- Oh, H. and Kilduff, M. (2008). The ripple effect of personality on social structure: Self-monitoring origins of network brokerage. *Journal of Applied Psychology*, 93(5), 1155-1164.
- Park, D. H. and Lee, J. (2008). eWOM overload and its effect on consumer behavioral intention depending on consumer involvement. *Electronic Commerce Research and Applications*, 7, 386–398.
- Pires, G. D., Stanton, J., and Rita, P. (2006). The internet, consumer empowerment and marketing strategies. *European Journal of Marketing*, 40(9/10), 936-949.
- Requena Santos, F. (1996). *Redes sociales y cuestionarios*. Madrid: CIS, Cuadernos metodológicos, nº 18.
- Roberts, S. G., Wilson, R., Fedurek, P., and Dunbar, R. I. M. (2008). Individual differences and personal social network size and structure. *Personality and individual differences*, 44(4), 954–964.
- Rogers, E. M. (2003): *Difussion of Innovations* (5th Edition). New York: The Free Press.
- Ryan, B. and Gross, N. (1943). The diffusion of hybrid seed corn in two Iowa communities. *Journal of Rural Sociology*, 8(1), 15–24.
- Salzman, M., Matathia, I., and O'Reilly, A. (2004). *Buzz... Le Marketing du Bouche-à-Oreille*. Paris: Pearson France (Village Mondial).

Sasovova, Z., Mehra, A., Borgatti, S. P., and Schippers, M. C. (2010). Network churn: The effects of self-monitoring personality on brokerage dynamics. *Administrative Science Quarterly*, 55(4), 639–670.

Selfhout, M., Burk, W., Branje, S., Denissen, J., van Aken, M., and Meeus, W. (2010). Emerging late adolescent friendship networks and big five personality traits: A social network approach. *Journal of Personality*, 78(2), 509-538.

Steffes, E. M. and Burgee, L. E. (2009). Social ties and online word of mouth. *Internet Research*, 19(1), 42 – 59.

Taylor, D. G. (2010). “*I speak, therefore I am:*” *Identity and self-construction as motivation to engage in electronic word of mouth* (doctoral thesis). University of North Texas, Texas (USA).

Verbrugge, L. M. (1977). The structure of adult friendship choices. *Social Forces*, 56(2), 576–597.

Wasserman, S. and Faust, K. (2009). *Social Network Analysis: Methods and Applications (19th Edition)*. UK: Cambridge University Press.

Xia, L. and Bechwati, N.N. (2008). Word of mouse: The role of cognitive personalization in online consumer reviews. *Journal of Interactive Advertising*, 9 (1), 108-128.

Appendix I. Definitions of ‘electronic Word-of-Mouth’.

Author	Definition
Hennig-Thurau et al. (2004, p. 39), Cheung and Thadani (2010, p. 329), Taylor (2010, p. 15), Chan and Ngai (2011, p. 489), Hsieh, Hsieh, and Tang (2012, p. 202), Munz and	“Any positive or negative statement made by potential, actual, or former customers about a product or company, which is made available to a multitude of people and institutions via the
Salzman, Matathia, and O’Reilly (2004, p. 230)	“Transference of information through social networks, frequently in a spontaneous way”.
Goldsmith and Horowitz (2006, p. 1), Khammash and Griffiths (2011, p. 82)	“Electronic ‘WoM’ is base on the concept of interpersonal influence now expanded into
Park and Lee (2008, p. 386)	“Positive or negative statements made by consumers about a product for sale in Internet
Xia and Bechwati (2008, p. 3)	“Word of mouse differs from traditional WOM in that sources of information are individuals who have little or no prior relationship with the

Steffes and Burgee (2009, p. 42)	“Various forms of WOM include both offline communication (traditional) WOM and Internet facilitated online WOM”
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Source: Authors.

Appendix II. New professional profiles.

Web Analytics Professional	Product Manager
Information Architect	SEM Specialist (Search Engine Marketing)
Web Designer	SEO Specialist (Search Engine Optimization)
Software Usability Expert	Database Administrator
Blogger	Program Developer
Content Manager	Project Manager
Functional Analyst	System Manager
E-Business Consultant	Support Technician
E-commerce Manager	Quality and Testing Manager
Webmaster	Community Manager
Lawyer specialising on the Internet	SMO Manager (Social Media Optimization)
Affiliate Marketing Manager	Social Media Strategist
Online Marketing Manager	Trafficker
Online Media Planner	

Source: Adapted from INKS (2012, p. 98-125).

**Sustainable and healthy diets:
An opportunity for Food Marketing**

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Abstract

The threat of food shortages and consequent famine are becoming significant political challenges for many countries. As such, securing a reliable and healthy food supply for the future is now a key priority for many governments and research bodies around the world.

At present, the world's food system is under great pressure to 'deliver more from less'. An increasing amount of food is required to meet the demands of an expanding and progressively affluent global population. However, the capacity of the agro-ecosystems that support food production is diminishing due to loss of arable land, scarcity of fossil fuels and fertilizers, limited new sources of fresh water and uncertainties associated with a changing climate.

To address these threats to food security, action is being taken to systematically change the food system. This involves transformations across the entire food supply chain, from production to consumption, to ensure that the whole system is sustainable and resilient, and hence less vulnerable to disturbances which may affect food supply. This paper focuses on the impact that consumer choice has on the structure of the food system, and how food marketing could contribute to affecting change within it.

Empirical research based on food marketing methodologies was conducted on a sample of 'early adopters' of low environmental impact diets in a developed country (Australia). This study identified a number of opportunities for behavioral reform based on environmental impact and likelihood of change. In particular, the reduction of 'junk food' consumption and avoidable food waste were identified as priority areas.

KEYWORDS: food, consumer choices, environmentally sustainable diets, food marketing

Introduction

Half a century ago it was predicted that only final solution for providing adequate food for humankind was to limit the rate of reproduction (Slater, 1963). However, today the population has doubled and world's food system is being presented with the challenge of feeding a population that is continuing to grow – with an anticipated peak (due to declining birth rates resulting from increased affluence and education) of a further 50% increase around 2050 (Bongaarts, 2009).

To meet the world's future food security needs, production must grow substantially while, at the same time, to meet the world's sustainability goals, agriculture's environmental footprint must shrink dramatically (Foley et al., 2011). Measures of its current environmental impact include 30% of global biodiversity loss (mainly attributable to clearing land to grow animal feed for intensive livestock production) and 30% of greenhouse gas emissions in developed countries (eg. UK) (WWF, 2012). Or when calculated by the ecological footprint, if current population and consumption trends continue, humanity will need the equivalent of almost three Earths to support it by 2050 (GFN, 2012) [ENREF_5](#). Thus this most vital and resource intensive of all sectors (UNEP, 2012) is dealing with a triad of challenges - rising demand, adapting to climate change, and reducing emissions (SCI, 2012). The relentless drivers behind rising demand are from a population that is growing in size and affluence whilst becoming increasingly urbanised (UNEP, 2012).

Moving from a 'hunter gatherer' lifestyle to modern mega-cities has been made possible through the successful application of humankind's ingenuity to producing food – from the birth of modern agriculture with the first tentative experiments with raising crops and domesticating animals over 10,000 years, to contemporary multibillion dollar agribusiness corporations using global supply chains.

Technological advances over recent centuries have not altered the biological engine that drives food production. This includes management of land, water, energy from sun, nutrients, and carbon dioxide to generate net food surpluses for human consumption (Slater, 1963). Increases in production have been achieved through using more of these resources (eg more land under grazing and cultivation, more fresh water, off farm sources of nutrients mainly nitrogen, phosphorus, potash) and intensification of production through applying new knowledge (eg professional farm management), technology (irrigation, pest and disease management, higher yielding crop varieties and livestock breeds, food processing and storage) and external sources of

energy (eg fossil fuels and electricity - for farm work, processing, storage and transport). Much of this emphasis has been on increasing production by closing 'yield gaps' on underperforming lands and increasing cropping efficiency. This focus has resulted in a tremendous increase in production, particularly over the last 50 years, due to increases in fertilizer use and new high yielding plants, collectively referred to as the 'green revolution'.

The recent Foresight Report on the Future of food and farming stressed that the magnitude of the challenges facing the food system over the coming decades necessitating action on all fronts. This requires continued efforts to increase production, as previously discussed. It also highlights the potential benefits from changing consumer behaviour (GOS, 2011). There is an emerging global discussion on what these changes may be, and how to achieve them. The following sections present an overview of global dietary profile and discussion of changes in behaviour required to achieve a more sustainable diet. It concludes with consideration of how the discipline of food marketing could make a significant contribution to achieving these changes.

Global dietary profiles

In order to predict the range of impacts that different dietary choices could have on human health and sustainability, four future global dietary scenarios have been developed. These have been referred to as the 'fat', 'fit', 'famine' and 'sustainable' diets. The characteristics of these diets are explained in following sections.

Diets for the affluent and informed – the 'fit diet'

Many consumers in the world today are provided with an abundance of food from which they are able to make choices. For those who are affluent and have the knowledge to make healthy dietary choices, the current global food system could be seen as being 'fit for purpose' in that it delivers food security, as defined by the United Nations 'when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life' (FAO, 2012b).

This fit diet is prevalent in developed countries, and an increasing number of consumers in developing countries are benefiting from it. The author estimates that the current food system is supplying around 70% of the global population with a fit diet. In accordance with healthy diet

guidelines, most of the energy for this diet comes from complex carbohydrates (55%) with fat (30%) and protein (15%) making up the balance (Cordain et al., 2005).

Other dominant global diets emerge from situations where consumers eat too much, or too little. Collectively these problematic diets from a human health perspective are estimated to affect most of the remaining 30% of the world's population. Collectively the fit, fat or famine diets are leaving a heavy environmental footprint on the earth, hence it is valuable to consider a global diet that meets human health and food security objectives whilst being sensitive to its impact on the natural resources – the sustainable diet – which is estimated to be adopted by only around 2% of the global population.

Diets resulting in over-nutrition as manifest in obesity – the ‘fat diet’

Eating too much, or too much of the wrong types of food, commonly results in an imbalance where energy consumed in excess of that expended is stored as body fat. Consuming a small surplus of energy leads to a dramatic gain in weight, for example, an adult who consumes 1% more than they expend (100 kJ a day) will gain around 1 kg a year (Lean, Lara, & O'Hill, 2006).

This consumption of energy in excess of bodily requirements has been labelled the fat diet. In its extreme form this manifests itself as obesity which is defined by the World Health Organisation as having a Body Mass Index (BMI) greater than 30 (BMI mass in kilograms/ square of height in meters). Obesity is often a result of ‘nutrition transition’. This occurs when increasing affluence leads to a series of changes to people's diets, physical activity, health and nutrition, as a result of less physical work, greater food choices and the prioritisation of convenience foods rather than well prepared and planned healthy meals (Popkin, Adair, & Ng, 2012).

The worldwide prevalence of obesity has almost doubled in the last 30 years, with estimates that now over half a billion people (10% of men and 14% of women) are obese. Obesity is common in developed countries (eg. USA at 26%) but less pervasive in developing countries (eg. South-East Asia at 3%) although it is increasing (WHO, 2012). From an environmental perspective eating an excess of food may be seen as a form of food waste (although some of the products may not be considered to be healthy foods). In addition, being obese increases health risks (eg. chronic diseases of coronary heart disease, ischemic stroke, type 2 diabetes and some cancers).

The solution to reducing obesity includes balancing individual energy intake; increasing consumption of fruit, vegetables, legumes, whole grains and nuts; and limiting consumption of high salt-sugar-fat products which are commonly known as junk foods (Cordain, et al., 2005).

Diets of the poor resulting in malnutrition – the ‘famine’ diet

In contrast to obesity there is a diet associated with undernourishment or chronic hunger. This diet is often associated with extreme poverty and has been labelled the famine diet. It has been estimated that around 13% of the global population are undernourished. Further, they almost exclusively live in developing countries (FAO, 2012a).

Measures to reduce undernourishment include improving access to high-quality foods and the benefit from increasing utilization of these foods through improving health care in terms of consumer knowledge about water, hygiene and communicable diseases. As undernourishment in children is largely irreversible, and contributes to many deaths of young children in developing countries, breast feeding for the first six months followed by complementary feeding practices are encouraged for all children particularly for the first two years of their life (UNWFP, 2012).

Diets sensitive to environmental resource limits – the ‘sustainable diet’

A diet that contributes to human health, by avoiding both obesity and malnutrition, whilst meeting food security expectations and being sensitive to the use of environmental resources has been labelled the sustainable diet.

Sustainable diets would form the ultimate source of demand for products from an environmentally sustainable food system. It is only recently that researchers have attempted to define a sustainable diet which captures inherent complexity of temporal and spatial variance in impacts of food production and consumption. This task is further complicated by trade-offs that exist between different sustainability indicators (WWF, 2012), such as maintaining soil fertility and water quality, protecting biodiversity, providing livelihoods for workers and their families along the supply chain, being sparing in use of non-renewable resources, and, discharging wastes are within the capacity of earth to absorb them.

The Food and Agriculture Organisation of the United Nations has defined a sustainable diet as being ‘protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimising natural and human resources (FAO, 2011a).

The following figure provides a summary of these global dietary profiles which includes estimates of the world’s population having a fat, fit, famine, or sustainable diet.

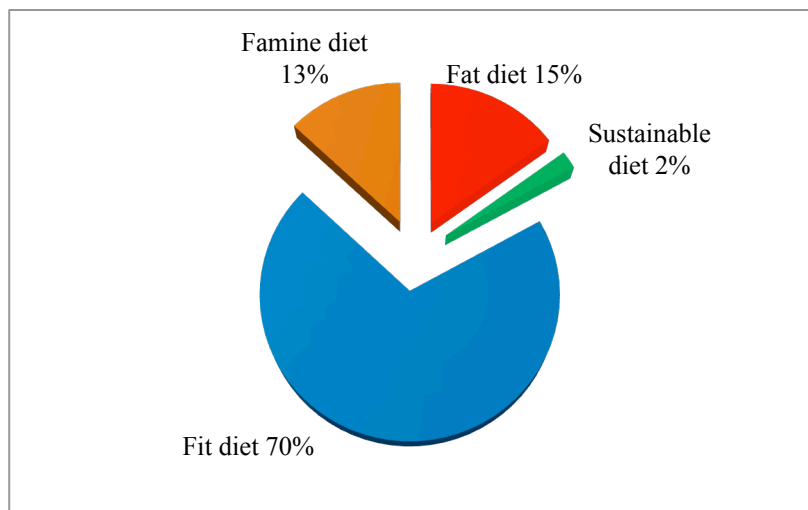


Figure 1: Current dietary profiles (% global population)

Many authors argue that significant changes in consumption patterns will be required for humanity to live within planetary boundaries. These changes require a significant ‘contraction’ in resource usage. Further, many argue that ‘convergence’ to reduce current inequalities in access to resources is also desirable (Raskin, Electris, & Rosen, 2010). This requires reducing the gap between high and low levels of consumption. In addition to the moral issue, this convergence may contribute to reducing hostilities both within and between nations around the globe.

There is considerable debate about the speed of these changes. Some suggest that developing food system *resilience* is appropriate. This perspective emphasises maintaining the status quo through by preserving the current political-economy-societal regime in an attempt to avoid system ‘failure’ through collapse (Nelson, Adger, & Brown, 2007). Others suggest *transition* with incremental changes that enhance system characteristics and functioning – including pervasive areas such as governance structures – is adequate (Rotmans, Kemp, & van Asselt, 2001). Whilst others argue that urgent action is required to achieve even greater changes – what has been referred to as *transformation* – which advocates the perspective that reform in

overarching political-economy-societal regimes and associated cultural discourse is the only pathway for achieving a sustainable society in the long term (Pelling, 2010).

The global dietary profiles that would emerge from such ‘contraction’, ‘convergence’ and ‘transformation’ would require increasing take-up of the sustainable diet and commensurate shrinking of famine, fat and fit diets.

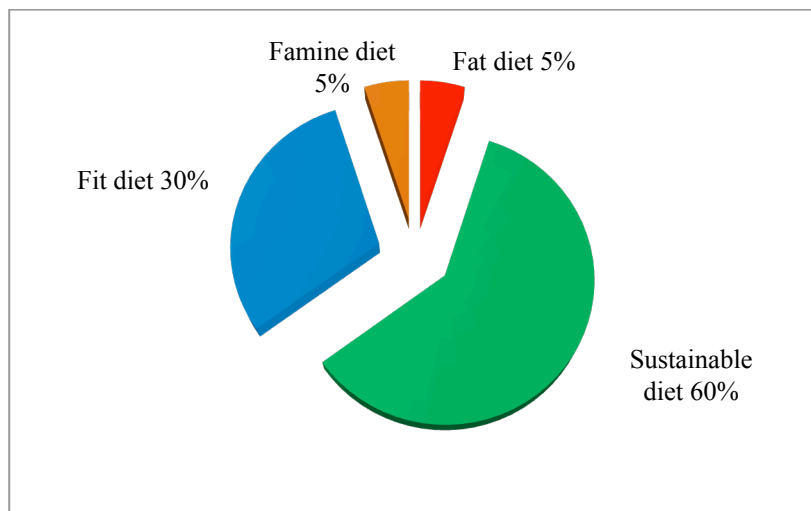


Figure 2: Aspirational goal for dietary profiles (% global population)

The specification of behavioural changes required to achieve these global dietary goals, in particular that of increasing sustainable diets, is an area of emerging research. The contribution to this research agenda from the food marketing discipline is discussed in the following sections.

Food related consumer behaviour

The reasons behind an individual’s food choices are multiple and varied. Food related habits which emerge from culturally acquired traditions have a major influence on food choice (Beagan, Ristovski-Slijepcevic, & Chapman, 2010). Both supply-side (such as product availability and pricing) and demand-side factors (consumers’ preferences) influence their choices. Some factors are real constraints, such as the availability of products within the consumer’s locus of movement as well as their capacity to pay. Many other factors are not constraints, however they may influence choices. These include price, convenience, quality, brand, food labelling, and ethical considerations including concern about the environment.

Furthermore, the actual purchase may involve a compromise. This emerges when a consumer’s preferred choice comes into conflict with other priorities within the broader context in which

food provisioning activities are undertaken. For example, consumers may express a strong desire to purchase organic food, but difficulties in finding it and its higher price mean that it is not purchased on a regular basis (Pearson, Henryks, & Jones, 2011). Studies conducted in the state of New Mexico in the United States also found that consumers' desire to purchase sustainable food products is mediated in particular by socio-demographic characteristics, product knowledge, distance from food retailers, and proximity to metro-areas (Holmes & Yan, 2012). Another relevant example is found with the 'eat local' food mantra which is popular with many consumers, and continues to be promoted in many countries for social, economic and environmental reasons (Pearson et al., 2011). However, an individual's ability to engage in these behaviours is limited by the amount of time and money that they have, and food outlets that are available to them. Similarly, amongst consumers who have a strong interest in prominent issues in the discourse of sustainable food, such as cooking from fresh and minimally processed ingredients, coping with feeding the family within a busy day is still often the dominant concern (McIntyre & Rondeau, 2011). This means that many families purchase 'convenience foods' more than they would ideally like (Lee and Lin, 2013)

Another important consideration is the extent to which consumers, who tend to allocate a limited amount of time to make a decision, either lack relevant information, or base decisions on a misunderstanding. For example, some consumers are confused in relation to food labels that show ethical and environmental product features (Rainbolt et al, 2012). This includes those consumers who assume that 'free range' products are 'certified organic' when in fact they are not (Henryks & Pearson, 2010). This confusion is exacerbated when similar terms are used to describe features that are essentially the same, such as the multiple organizations who certify organic products where each uses their own logo (Pearson & Henryks, 2008). This confusion in relation to certified organic products is likely to continue until a widely used and credible labelling system evolves, such as the one mandatory label that has been used in the USA for some time (USDA, 2011) and the one recently established in the European Union (EC, 2011).

Changes in consumer behaviour required for sustainable diets

Recent research activities have given renewed impetus to understanding and ultimately influencing consumer behaviour in relation to environmental sustainability of human diets (Garnett, 2011; Godfray et al., 2010). Harnessing the collective power of food choices made by individuals has been referred to as demand led changes towards lower environmental impact diets (Defra, 2010). It also offers an area where most consumers are able to make a meaningful

contribution to sustainability by engaging in more environmentally sensitive patterns of consumption in their daily routines.

The Sustainable Development Commission in the UK (SDC, 2009) developed a list of priority actions at the household level for improving sustainability of diets. This study used a very broad definition of sustainability, which included more than just ecological outcomes. It is based around the UK Government's principles of sustainable development by 'ensuring a strong, healthy and just society and living within environmental limits' (p. 8) and it explicitly aimed at integration (rather than trade-offs) between environmental, social and economic outcomes. Thus, these recommendations are consistent with health guidelines (Defra, 2007). This hierarchy of recommendations is based on the relative ease, or difficulty, of implementation. It placed highest priority on actions they considered were 'likely to have the most significant and immediate impact on making our diets more sustainable, in which health, environmental, economic and social impacts are more likely to complement each other.' (p. 4).

The high priority actions are:

- lowering consumption of meat,
- lowering consumption of dairy products,
- consuming less low nutritional value products (i.e. 'junk food'), and
- reducing food waste.

Actions which were likely to result in trade-offs between different aspects of sustainability were given a lower priority. These were:

- increasing consumption of seasonal and field grown fresh fruits and vegetables (and reducing consumption of foods grown in heated greenhouses),
- only eating fish from sustainable sources, and
- increasing consumption of food produced with respect to the environment (e.g. organic food).

Actions expected to make a smaller contribution towards sustainability were given the lowest priority. These were:

- reducing energy use in food purchases and cooking, and finally,
- drinking tap water rather than from bottles.

Although these recommendations are for the UK, they are seen as being relevant to many other developed countries, including Australia, due to the major similarities in both consumer diets (relatively high levels of protein sourced mainly from beef, wheat and potatoes being the main sources of carbohydrates, and an abundance of fruits and vegetables) and the food systems that supply them (dominated by intensely competitive chains of supermarkets, and a food service sector that is increasing its market share, both of which use global sourcing of products).

The following discussion considers issues surrounding these nine priority areas (SDC, 2009) for consumers to reduce the environmental impact of their diets.

Some preliminary research has focussed on the relative amount of plant versus meat products and their extent of processing. For example, in relation to the average diet in the UK, WWF has suggested that eating more plants, less meat, and less processed food would contribute to a diet that is good for both people and the planet (WWF, 2011). Implementation of these aspirational changes would result in a diet that is similar to what is currently consumed in some countries, and has been referred to as the Mediterranean diet (Burlingame & Dernini, 2011).

The production of livestock for human food has a large negative impact on the natural environment as well as having both positive and negative impacts on human nutrition (Walker, Rhubarb-Berg, McKenzie, Kelling, & Lawrence, 2005). It accounts for a very significant portion of global greenhouse gas emissions with estimates that meat and dairy consumption in developed countries accounts for around 50% of the climate change impact of a typical diet (FSA, 2010). The main components of this are methane from enteric fermentation, nitrous oxide from manure and fertilizer, carbon dioxide from land-use change, and use of energy in agricultural activities (FAO, 2006). The environmental impact of red meat production varies according to the specific climate and farming systems used. For example, obtaining calories directly from cereals would support more people than the current food system where about one third of the world's cereal production is fed to animals (Godfray, et al., 2010) prior to their consumption by humans. Hence, although it is possible to reduce environmental impact per unit of meat or milk produced, reducing consumption of these products will have a bigger and more immediate benefit. This is particularly important in many developed countries, such as Australia, where consumption of meat is above recommended dietary requirements (McMichael, Powles, Butler, & Uauy, 2007). Another approach would be to move away from farming beef towards producing meat from animals that do not produce methane. An example for Australia would be the commercial farming of kangaroos (Wilson & Edwards, 2008). This challenges many culturally constructed

norms related to acceptable sources of animal protein. Interestingly, most of the kangaroo meat that is currently harvested in Australia for human consumption is exported to Europe (RIRDC, 2008).

Although there is widespread concern about consuming large amounts of junk foods from a health perspective, less attention has been paid to their environmental impact. In a comprehensive Life Cycle Assessment in a developed country, these products were found to account for one third of total climate change impact in the food sector (Carlsson-Kanyama, Ekstrom, & Shanahan, 2003).

A large amount of food produced is lost on its journey towards human consumption due to degradation by aging, poor handling, or pests whilst in transit along the supply chain. A recent United Nations Food and Agriculture Organisation study (FAO, 2011b) suggests that about one-third of food produced for human consumption is lost due to waste. The reasons for this vary. In developing countries major losses occur post-harvest due to low technology storage and transport conditions, whilst in developed countries, large amounts of food are wasted by consumers in their homes and at food service outlets. The other significant aspect of 'food waste' is that from over-consumption, which has been discussed in the 'fat' global dietary profile section.

Reducing the amount of food wasted in the household also presents an opportunity for increasing the environmental sustainability of diets. It has been reported that perishable products, such as fresh fruits and vegetables, and meat, are most vulnerable to waste. Whilst some waste is unavoidable, better management within households could reduce this (Quested, Parry, Eastal, & Swannell, 2011). For example, it has been suggested that a reduction of food waste from 22% to around 10% is feasible in the UK (FSA, 2010; WRAP, 2011). Current dietary trends are contributing to a context in which it is easy to waste food. For example, consumers are being encouraged to eat more fresh products for health purposes, however these are generally the products that are most susceptible to 'use by dates' and hence likely to be wasted. Moreover, only limited opportunities exist for recycling food waste in many countries, such as Australia, resulting in high proportions of food waste going to landfill (Baker, Fear, & Denniss, 2009).

Whilst there are many health led initiatives aiming to increase consumption of fresh fruits and vegetables, such as the Australian Government's recommendation of two servings of fruit and five of vegetables everyday - 'Go for 2 & 5' (AG, 2011) - inclusion of environmental impact

leads to emphasis on seasonal outdoor production, as opposed to indoor glass or green-house methods. Consumers tend to relate seasonality to fresh fruits and vegetables, and occasionally some meat products. Research shows that concern for the environment tends to be low for these products where taste and freshness are important drivers of consumer demand (Brooks, Foster, Holmes, & Wiltshire, 2011).

An inevitable consequence of seasonal purchases is a more localized diet. However, in addition to issues associated with changing what is produced where, increasing local food purchases may lead to nutritional deficiencies and even be less environmentally sustainable due to reduced opportunities for benefiting from comparative advantages of production as well as economies of scale and scope (Pearson et al., 2011). The appropriateness of using a narrow surrogate measure, such as 'food miles', in the area of environmental impact has recently been questioned (ABARE, 2009; Edwards-Jones et al., 2008). An example of low food miles creating a higher environmental impact is found with in-season apples being transported half way around the world (from New Zealand to the UK) which were found to have a lower impact than within country production that was stored for six months to allow for out of season consumption (Saunders & Barber, 2007).

Whilst the consumption of fish is supported by a number of health initiatives, such as Government dietary guidelines in Australia (NHMRC, 2013), it is recognized that some fish species are susceptible to exploitation (Mitchell, 2011). With this in mind sustainable seafood guidelines are available in many countries, such as the Australian Marine Conservation Society which provides a 'traffic light' system for 60 commonly purchased seafood species (AMCS, 2012).

The superior environmental credentials of the organic food industry are supported by many influential organizations (OECD, 2008; UN, 2006; UNEP, 2008). This includes the United Nations who use it as an exemplar of a more sustainable food production method. Further, with wide spread distribution in most developed countries, including many organic products in supermarkets, and global sales of over \$US55 billion (Willer & Kilcher, 2011), it is now a viable choice for many consumers. However, higher prices when combined with a smaller range of products in supermarkets and limited availability in the food service sector, make it difficult for some consumers to purchase these products (Dixon et al., 2007).

And finally, reducing the amount of energy used in purchasing and cooking foods as well as drinking tap water, which has an environmental impact of less than 1% of bottled water (Jungbluth, 2006), offer additional areas in which the sustainability of diets could be improved.

In summary, it is recognized that diets, and their associated food systems are hugely complex and there are many areas in which environmental sustainability may be improved (Collins & Fairchild, 2007). In addition, consumers' purchasing decisions are a result of many factors, with environmental impact being just one of them.

Culturally specific example of behaviour changes required

The research presented in this paper explores consumers' current behaviour, and willingness to change, in the nine priority areas identified and previously discussed for improving the environmental sustainability of their diets. These have been organised into the product purchased (such as red meat versus beans), its source (ie where it has come from), and provisioning behaviour (ie around purchasing storage, cooking and disposal).

These results support other research (Davies, 2011) that suggests there is a significant opportunity to engage many more consumers in sustainable dietary behaviours as only a small number, around 1 in 10, are already engaging in these behaviours (as shown in Figure 3). Although caution is required in interpreting these results, due to limitations relating to the methodology used which included self-selected 'early adopters' responding to a questionnaire with reporting scales that simplified a complex issue.

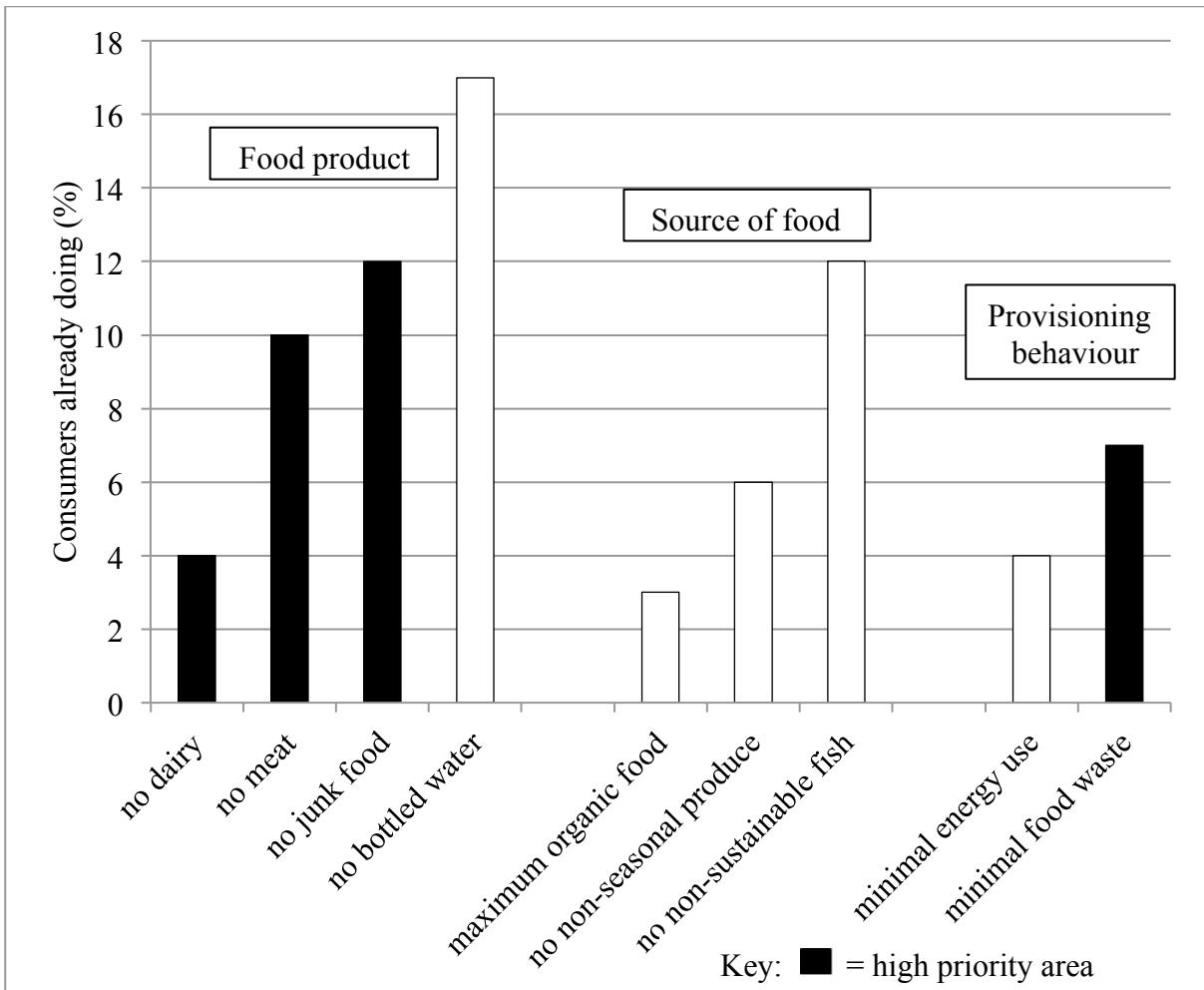
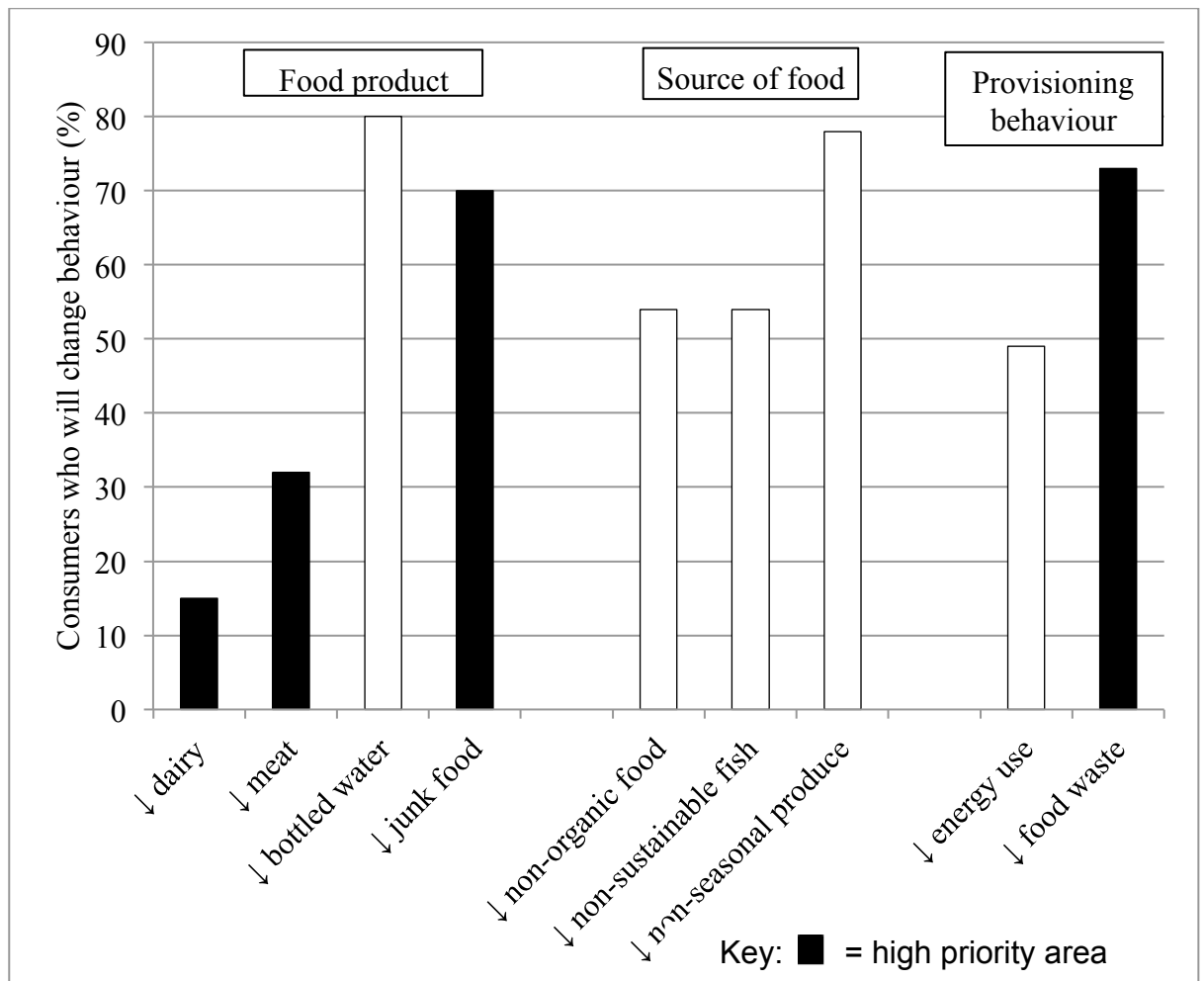


Figure 3: What are consumers doing?

Further, as shown following (Figure 4) the most prospective areas for encouraging a more environmentally sustainable diet are reducing consumption of junk food (which relates to the specific products chosen) and amount of food waste (which relates to food provisioning behaviour). These behaviours have a relatively large negative impact on the environment, and many consumers indicate a willingness to make these changes. Reducing purchases of junk food also offers potential co-benefits of encouraging a healthier diet. Reducing food ‘wasted’ through the related behaviour of overeating also contributes to human health and wellbeing by reducing obesity.



*Sum of respondents who are ‘extremely likely’ and ‘very likely’ on a four point scale which included ‘somewhat likely’ and ‘not likely’.

Figure 4: What will consumers do?

Contribution from food marketing

Research from the food marketing discipline has a major role to play in contributing to understanding choices made by consumers and the potential to nudge these in directions that will reduce environmental impacts from the food system. Although valuable insights could be achieved by focussing on specific products including their price, promotion, and physical distribution, market research has the potential to make a major contribution. It offers a method for creating the necessary knowledge of consumer motivations within temporal, social and spatial lived experiences where food related decisions occur.

Part of this market research is to identify the target audience for behavioural change. This research may focus on opinion leaders who have influence over others, or ‘early adopters’, who pioneer behaviours that ‘followers’ and eventually ‘laggards’ follow.

Taking this market research perspective also leads to consideration of the context in which choices are made. In relation to the priority behaviour changes in a developed country, such as junk food and food waste in Australia, this leads to consideration over who makes food purchases in a supermarket and who subsequently cooks meals at home. It should be noted that gaining an understanding of the context for purchases of meals away from home is also important, as they are increasing in many developed countries, including Australia.

As diets vary due to cultural as well as national agronomic and economic conditions further effort is required to identify priority areas and undertake market research in each country. As a result, it would be valuable to develop methodological protocols that provide a suitable balance between the depth of information gathered using qualitative techniques such as interviews, and generalisations available from more quantitative approaches such as questionnaires. It is also important to note that most market research relies on information from self-reporting questionnaires, rather than observation of actual behaviour.

Further it would be valuable to explore the consequences that emerge from any behaviour change that requires a reduction in consumption in one area. This is known as the ‘rebound’ effect. For example, it is likely that a reduction in the consumption of junk food will lead to an increase in consumption of something else, which may, or may not, leave a smaller footprint on the environment.

In relation to developed countries, and Australia in particular, more detailed market research could be undertaken to quantify the environmental impacts of specific behaviour changes, and to identify additional behaviour changes (beyond the list of nine discussed in this paper) that engage consumers in improving the environmental sustainability of their diets. These may include more explicit consideration of how far the product has travelled (for example, ‘food miles’) the amount of processing and packaging associated with it.

Conclusion

Thankfully the prediction of half a century ago that ‘famine, revolution and war’ (Slater, 1963) would emerge from an inevitable scarcity of food has not come to pass for most countries and individuals around the world. Today, numerous research activities are contributing to food

security's grand challenge of feeding a growing population, with rising demand for meat and high-calorie diets, whilst simultaneously minimizing its global environmental impacts (Seufert, Ramankutty, & Foley, 2012).

The actions required to bring about widespread adoption of dietary changes are manifold and require action by multiple stakeholders. In relation to planetary boundaries, it has been suggested that the world still has choices – but not for much longer (SCI, 2012). Hence it would appear timely for national governments to lead the development of a clear definition of a sustainable diet through comprehensive market research, in conjunction with other stakeholders (in particular retailers who have a central role in monitoring and influencing consumer sentiment) and convert this definition into specific dietary guidance (WWF, 2012).

In summary, the transition to more sustainable diets requires consuming less (where the approaches developed for de-marketing will contribute), consuming less resource-intensive foods and wasting less (both of which require providing information to consumers through advertising and other marketing communications) (UNEP, 2012). Collectively these could simultaneously improve food availability and reduce environmental harm (Foley, et al., 2011). While elimination of food waste is not realistic, nor are rapid changes in human diets likely without massive external shocks, the acknowledgement of these priority areas in policy is likely to be extremely beneficial.

And finally, whilst research from the food marketing discipline will contribute evidence to assist informed policy choices, rapid shifts in patterns of consumption require the identification of complementary fiscal, regulatory and infrastructural measures that collectively reorient behaviours towards healthy and sustainable dietary choices (Garnett, 2011).

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References

- ABARE. (2009). Issues of food miles and carbon labeling. Canberra: Australian Bureau of Agriculture and Resource Economics.
- AG. (2011). Go for 2&5. *Australian Government* Retrieved 4 Jan, 2011, from <http://www.gofor2and5.com.au/>
- AMCS. (2012). Australia's Sustainable Seafood Guide Retrieved 20 March, 2012, from http://www.sustainableseafood.org.au/Sustainable-Seafood-Guide-Australia.asp?active_page_id=695
- Baker, D., Fear, J., & Denniss, R. (2009). What a waste: An analysis of household expenditure on food (Vol. Policy Brief No. 6). Canberra: Australian Institute.
- Beagan, B., Ristovski-Slijepcevic, S., & Chapman, G. (2010). People are just becoming more conscious of how everything's connected: 'Ethical' food consumption in two regions of Canada. *Sociology*, 44(4), 751-769.
- Bongaarts, J. (2009). Human population growth and the demographic transition. *Philosophical Transactions of the Royal Society - Biological Sciences*, 364, 2985-2990.
- Brooks, M., Foster, C., Holmes, M., & Wiltshire, J. (2011). Does consuming seasonal foods benefit the environment? Insights from recent research. *Nutrition Bulletin*, 36(4), 449-453. doi: 10.1111/j.1467-3010.2011.01932.x
- Burlingame, B., & Dernini, S. (2011). Sustainable diets: the Mediterranean diet as an example. *Public Health Nutrition*, 14(Supplement 12 (December)), 2285-2287.
- Carlsson-Kanyama, A., Ekstrom, M., & Shanahan, H. (2003). Food and life cycle energy inputs: consequences of diet and ways to increase efficiency. *Ecological Economics*, 44(2-3), 293-307.
- Collins, A., & Fairchild, R. (2007). Sustainable Food Consumption at a Sub-national Level: An Ecological Footprint, Nutritional and Economic Analysis. *Journal of Environmental Policy & Planning*, 9(1), 5 - 30.
- Cordain, L., Eaton, S., Sebastian, A., Mann, N., Lindeberg, S., Watkins, B., . . . Brand-Miller, J. (2005). Origins and evolution of the Western diet: health implications for the 21st century. *American Journal of Clinical Nutrition*, 81(2), 341-354.

- Davies, S. (2011). Making sustainable choices easier. *Nutrition Bulletin*, 36(4), 454-459. doi: 10.1111/j.1467-3010.2011.01927.x
- Defra. (2007). Public understanding of sustainable consumption of food. London: Department of Environment Food and Rural Affairs.
- Defra. (2010). Food: a recipe for a healthy, sustainable and successful future: Second Report of the Council of Food Policy Advisors. London: Department for Environment Food and Rural Affairs.
- Dixon, J., Omwega, A., Friel, S., Burns, C., Donati, K., & Carlisle, R. (2007). The Health Equity Dimensions of Urban Food Systems. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 84(1), 118-129.
- EC. (2011). Organic farming Retrieved 23 Nov, 2011, from http://ec.europa.eu/agriculture/organic/consumer-confidence/logo-labelling_en
- Edwards-Jones, G., Milà i Canals, L., Hounsome, N., Truninger, M., Koerber, G., Hounsome, B., . . . Jones, D. (2008). Testing the assertion that 'local food is best': the challenges of an evidence-based approach. *Trends in Food Science and Technology* 19(5), 265-274.
- FAO. (2006). Livestock's long shadow. Rome: Food and Agriculture Organisation of the United Nations.
- FAO. (2011a). Final document of the International Scientific Symposium: Biodiversity and sustainable diets united against hunger. Rome: Food and Agriculture Organisation of the United Nations.
- FAO. (2011b). Global food losses and food waste. Rome: Food and Agriculture Organisation of the United Nations.
- FAO. (2012a). Hunger statistics, from <http://www.fao.org/hunger/en/>
- FAO. (2012b). World food day Retrieved 19 Sept, 2012, from <http://www.fao.org/getinvolved/worldfoodday/en/>
- Foley, J. A., Ramankutty, N., Brauman, K. A., Cassidy, E. S., Gerber, J. S., Johnston, M., . . . Zaks, D. P. M. (2011). Solutions for a cultivated planet. *Nature*, 478(20 Oct), 337-342.
- FSA. (2010). Food and Climate change: A review of the effects of climate change on food London: Food Standards Agency.
- Garnett, T. (2011). Where are the best opportunities for reducing greenhouse gas emissions in the food system (including the food chain)? *Food Policy*, 36, Supplement 1(0), S23-S32.
- GFN. (2012). World footprint - Do we fit on the planet? Retrieved 19 Sept, 2012, from http://www.footprintnetwork.org/en/index.php/GFN/page/world_footprint/

- Godfray, H., Beddington, J., Crute, I., Haddad, L., Lawrence, D., Muir, J., . . . Toulmin, C. (2010). Food security: the challenge of feeding 9 billion people. *Science*, *12 February*, 812-818.
- GOS. (2011). *Foresight: the future of food and farming*. London: Government Office for Science.
- Henryks, J., & Pearson, D. (2010). Misreading between the lines: Consumer confusion over organic food labelling. *Australian Journal of Communications*, *37(3)*, 73-86.
- Jungbluth, N. (2006). *Comparison of the Environmental Impact of Drinking Water versus Bottled Mineral Water*. Zurich: ESU Services.
- Lean, M., Lara, J., & O'Hill, J. (2006). ABC of obesity: Strategies for preventing obesity. *British Medical Journal*, *33(7575)*, 959-962
- McIntyre, L., & Rondeau, K. (2011). Individual consumer food localism: A review anchored in Canadian farmwomen's reflections. *Journal of Rural Studies*, *27*, 116-124.
- McMichael, A., Powles, J., Butler, C., & Uauy, R. (2007). Food, livestock production, energy, climate change, and health. *Lancet*, *370*, 1253-1263.
- Mitchell, M. (2011). Increasing fish consumption for better health – are we being advised to eat more of an inherently unsustainable protein? *Nutrition Bulletin*, *36(4)*, 438-442. doi: 10.1111/j.1467-3010.2011.01926.x
- Nelson, R., Adger, W. N., & Brown, K. (2007). Adaptation to environmental change: contributions of a resilience framework. *Annual Review of Environmental Resources*, *32*, 395-419.
- NHMRC. (2013). *Australian Dietary Guidelines* (pp. 226). Canberra: National Health and Medical Research Council.
- OECD. (2008). *Household Behaviour and the Environment*. Paris: Organisation for Economic Cooperation and Development.
- Pearson, D., & Henryks, J. (2008). Marketing organic products: Exploring some of the pervasive issues. *Journal of Food Products Marketing*, *14(4)*, 95-108.
- Pearson, D., Henryks, J., & Jones, H. (2011). Organic Food: What we know (and don't know) about consumers. *Renewable Agriculture and Food Systems*, *26(2)*, 171-177.
- Pearson, D., Henryks, J., Trott, A., Jones, P., Parker, G., Dumaresq, D., & Dyball, R. (2011). Local food: Understanding consumer motivations in innovative retail formats. *British Food Journal*, *113(7)*, 886-899.
- Pelling, M. (2010). *Adaptation to Climate Change: From Resilience to Transformation*. London: Routledge.

- Popkin, B., Adair, L., & Ng, S. (2012). Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews*, 70(1), 3-21.
- Quested, T., Parry, A., Easta, S., & Swannell, R. (2011). Food and drink waste from households in the UK. *Nutrition Bulletin*, 36(4), 460-467. doi: 10.1111/j.1467-3010.2011.01924.x
- Raskin, P. D., Electris, C., & Rosen, R. A. (2010). The Century Ahead: Searching for Sustainability. *Sustainability*, 2(8), 2626-2651.
- RIRDC. (2008). Consumer attitudes to kangaroo meat products. Canberra, Australia: Rural Industries Research and Development Corporation.
- Rotmans, J., Kemp, R., & van Asselt, M. (2001). More evolution than revolution: transition management in public policy. *Foresight*, 3(1), 15-31.
- Saunders, C., & Barber, A. (2007). Comparative Energy and Greenhouse Gas Emissions of New Zealand's and the UK's Dairy Industry (AERU Research Report No. 297 ed.): Lincoln University, New Zealand.
- SCI. (2012). What's Cooking? Adaptation & mitigation in the UK food system. Manchester, UK.: Sustainable Consumption Institute at The University of Manchester.
- SDC. (2009). Setting the table: Advice to Government on priority elements of sustainable diets. London: Sustainable Development Commission.
- Seufert, V., Ramankutty, N., & Foley, J. A. (2012). Comparing the yields of organic and conventional agriculture. [10.1038/nature11069]. *Nature*, 485(10 May), 229-232.
- Slater, W. (1963). Man and his food. *Nature*, 199, 1225-1226.
- UN. (2006). The guide: towards sustainable lifestyles. Rome: United Nations.
- UNEP. (2008). Sustainable Consumption (pp. 7pp.). Rome: United Nations Environment Program.
- UNEP. (2012). The critical role of global food consumption patterns in achieving sustainable food systems and food for all. Rome: United Nations Environment Program.
- UNWFP. (2012). United Nations World Food Programme, from <https://www.wfp.org/hunger/stats>
- USDA. (2011). National Organic Program Retrieved 14 Dec, 2011, from <http://www.ams.usda.gov/AMSV1.0/nop>
- Walker, P., Rhubart-Berg, P., McKenzie, S., Kelling, K., & Lawrence, R. (2005). Public health implications of meat production and consumption. *Public Health Nutrition*, 8(4), 348-356.
- WHO. (2012). World Health Statistics: A Snapshot of Global Health. Geneva: World Health Organization.

- Willer, H., & Kilcher, L. (Eds.). (2011). *The world of organic agriculture: Statistics and emerging trends*: IFOAM, Bonn, and FiBL, Frick.
- Wilson, G., & Edwards, M. (2008). Native wildlife on rangelands to minimize methane and produce lower-emission meat: kangaroos versus livestock. *Conservation Letters*, *1*, 119-128.
- WRAP. (2011). New estimates for household food and drink waste in the UK: Waste Resource Action Plan, UK.
- WWF. (2011). Livewell: a balance of healthy and sustainable food choices. London: World Wide Fund for Nature.
- WWF. (2012). Selling Sustainability? In search of the retail business case for sustainable diets. London: World Wide Fund for Nature.

Contribution from purchase frequency to understanding organic food consumers

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Abstract:

In order to identify some of the barriers preventing the expansion of the organic market, this paper reviews the current literature on consumers' buying behaviour in relation to organic food. This reveals a significant disparity between consumers' positive attitudes towards organic food and their low levels of actual purchasing, yet fails to provide conclusive evidence regarding the reasons for this attitude-behaviour gap. The aim of this paper is to investigate whether an analysis of frequency of organic food purchases will provide insights into the reasons for this.

Results indicate that buyers vary in their frequency of organic food purchases, from a relatively small proportion of consumers who purchase it regularly – at least once per week (around one in ten) to many who have never purchased it (around one in four). Most organic food buyers are partnered (70%), many are from lower income households (30%), and a large number (20%) have been purchasing for less than one year. And finally those who purchase organic products more frequently place higher importance on the attributes that differentiate organic products from alternatives, namely environment, health and product quality.

From the perspective of expanding sales in the organic market the key challenge appears to be finding ways to convince existing consumers to purchase more organic products. Persuasive and targeted marketing communications will assist in achieving this, however structural issues in the organic industry, such as its massive diversity; in range in products, geographic spread and size of operations, make it hard to present consistent marketing communication messages.

KEYWORDS: food, organic consumer, purchase frequency, attitude-behaviour gap, Australia

Introduction

Sustainability of the global food system has been identified as one of the greatest challenges humanity will face in the future. Research has identified that one of the greatest threats to sustainability is conventional industrial agricultural systems are the high energy and material cost they require to function (Zepeda & Nie, 2012). As a result, there is a growing body of research emerging across various disciplines dedicated to finding the most effective ways to reform it. One of the most promising alternatives proposed is the production of food using organic methods. An increasing number of consumers are expressing their concerns about personal health and the environmental impact of the food system by seeking out organically produced food. Over the last 50 years it has developed into the most visible brand for a healthier and more environmentally sustainable food system. The organic food movement has increased in size and popularity over recent decades, however it still retains a marginal market share at around 1% relative to conventionally produced products (Willer and Kilcher 2011).

Organic food refers to food that is grown without artificial chemicals, including growth hormones and genetically modified organisms, as well as avoiding the use of intensive production methods in relation to animal husbandry. The following definition of organic agriculture was developed by the International Federation of Agriculture Movements (IFOAM, 2012):

Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and biological cycles adapted to local conditions, rather than the use of inputs sourced from external ecosystems. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.

This definition is manifest in four Principles: Health, Equality, Fairness, and Care. These are now represented in certification systems and regulations for organic products throughout the world. As such, they provide an example of a food system, and associated products for consumers that give explicit emphasis to human health and environmental sustainability. What makes this definition particularly useful is that it takes into account the whole supply chain - from farmer to consumer. Thus, the focus is not solely on production factors, but also on the social impacts of the process of producing, selling and consuming food. It is inclusive of all

products, people and places. This enables the principles of organic agriculture to be adapted to suit a wide variety of different situations.

As this definition indicates, it is important to emphasise that organic principles extend beyond farming practices to encompass the whole supply chain. In this way, the organic movement advocates a paradigm shift for the entire food system in which all activity associated with food production, distribution, retailing and consumption is underpinned by a concern for human and environmental health (Pearson 2012).

The concepts and philosophies underpinning organic production have evolved since the 1940's as an alternative to the increasing industrialization of food production. Today a wide range of organic products are grown and made available to consumers throughout the world through distribution channels ranging from subsistence farming through to supermarkets with multinational supply chains.

Global sales growth for organic products is anticipated to continue as consumers increasingly reconnect with the source of their food and, as part of this, place value on organic certification. Although global sales of organic products are estimated to be \$US60 billion, they remain, as previously mentioned, a niche that represents only approximately 1% of the market (Willer and Kilcher 2011).

In many developed countries consumer's 'basket' of food purchases includes a few organic products. For example, in Australia it has been reported that two out of every three (65%) consumers purchase organic products, however, in a similar fashion to the global situation, the market share of organic products is around 1% (BFA 2012). This report also provides an analysis of the amount of the household food spend with most (58%) rarely purchasing organic food (spending less than 10% of the budget on organic food), some (28%) being occasional (spending 20 to 50%) and only a few (14%) being regular purchasers (spending more than 50%).

Hence the amount of organic food in an organic food buyer's diet varies significantly. Recent research has highlighted the limitations of conclusions from research that bundles a 'once in a year' consumer of organic food with someone for whom it is the majority of their diet. This concluded that having 65% or more being organic is a realistic threshold for classification as having an organic food diet (Oates, Cohen and Braun 2012).

This paper provides a review of current literature on the buying behaviour of organic food consumers. The knowledge gap as identified in Sultan and Pearson's (2011) study is the point of departure for the current paper. In particular, this paper attempts to explain the disparity between consumers' positive attitudes towards organic food and their relatively low levels of purchases through empirical evidence. This research focuses specifically on how purchase frequency information can provide insights into organic food buyer behaviour and specifically the attitude-behaviour gap that currently exists.

The contribution from research investigating the marketing of organic food

Over the last 20 years, a significant body of research focusing on the marketing of organic food has emerged (Pearson, Henryks and Jones, 2011). From a marketing perspective, organic food may be conceptualised as a 'new' product. A number of models, most of which are based on the work of cognitive psychologists and behavioural theorists, are available to assist in understanding consumer behaviour in relation to new products. Within marketing, the most commonly used models are the 'AIDA' (Strong 1925) and the 'diffusion of innovation' (Rogers 1962). The AIDA (attention-interest-desire-action) model assumes that purchase behaviour (ie. action) will occur once the consumer is exposed to a marketing communication message and develops an interest in the content of the message which grows into a desire to get the product and/or service. In contrast, the diffusion of innovation model discusses consumers' product adoption processes and includes five different stages: awareness, interest, evaluation, trial and adoption. The implication for marketing communications that emerge from both of these models is that each distinct phase should be addressed with a targeted and sequential communication message.

The level of awareness amongst all consumers about organic food would appear to be high in many countries. For example, in Australia it has been reported that in excess of 90% of food buyers know that organic food is produced without the use of artificial chemicals (Pearson 2001), and the level of consumer awareness is likely to have increased since this research was completed. However, awareness (or attention in the AIDA model previously discussed) alone does not result in purchase, interest and desire must be added before purchase (or action) occurs.

It is possible that the low purchase rates of organic food can be attributed to the relative inadequacy of information availability and its quality. It has been reported that, for some consumers, a lack of information about organic food acts as a barrier to them purchasing more of

it (Harper and Makatouni 2002; Yin et al. 2010). As a result, a number of studies emphasise the importance of additional marketing communications that aim to popularise organic foods amongst various consumer groups (Hughner et al. 2007; Latacz–Lohmann and Foster 1997; Pearson and Henryks 2008; Pearson et al. 2007; Sultan and Pearson 2011). Sultan and Pearson's (2011, p. 5) study, in particular, states that 'the focus of marketing communication should be on creating interest and desire amongst consumers. There are two important aspects of this. First, it is essential that the marketing communication appeals to the values held by consumers in the target audience. Second, this communication should aim to develop a positive perception about organic food, and associated with this, trust in the communication sources.

In order to develop the most effective ways to target marketing communications, a number of theoretical approaches have been used. These different approaches may broadly be classified into demographics, marketing mix variables, product attributes, and values and attitudes.

Consumer demographics is one of the most commonly used analytical tools for investigating organic food purchases (Davies, Titterington and Cochrane, 1995; Fotopoulos and Krystallis, 2002; Padel and Foster, 2005; Thompson, 1998; Wier and Calverley, 2002). These studies provide some evidence that generally wealthy families and 'empty nesters' (being a couple whose children are independent and have left home) tend to buy organic food. It is suggested that this may be because they have more disposable income (Padel and Foster, 2005). In addition, demographic studies have revealed that women tend to be core buyers of organic food (Davies et al., 1995) although health conscious men are also found to be increasingly interested in organic foods.

Another area of research has investigated organic food purchases from the marketing mix perspective. This approach considers the product, its price, promotion (ie using a variety of different marketing communication techniques) and physical distribution. Some of these studies (Pearson and Henryks, 2008; Pearson, Henryks and Moffitt, 2007) have found that the relatively high product prices are important as both a deterrent and an incentive. To some consumers the high price of organic food is indicative of quality, while others are discouraged by the higher cost.

Other issues revealed by marketing mix studies relate to the lack of clarity around the value of organic products and consumer confusion. This relates to which foods are organic and which are not, as well as the multiple certification organisations each of which has their own logo or brand

(Henryks and Pearson, 2010). Sultan and Pearson (2011) contend that 'due to the fragmented nature of production and distribution, most of the marketing communications for organic foods are conducted in a limited scale, and most of this is concentrated in product packaging and labelling' (p. 3). The value of organic foods could be emphasised through the effective use of product labels in retail outlets. Marketing could also be utilised to make emotional appeals in relation to specific product attributes. Such strategies are supported by empirical research, as a number of studies have found that consumers' 'like' of organic food, compared with conventional, increases in the presence of marketing communications providing information on the label about the nutritional information and origin of production (Caporale and Monteleone, 2004; Johansson et al., 1999; Kihlberg et al., 2005; Schutz and Lorenz, 1976). It should be noted that this is not universal amongst all consumers and all products (Poelman et al., 2008).

The final contribution from the marketing mix approach is that structural issues impact on the consumption of organic food. This shows that in addition to consumer demand, and increased production, consumption of organic food is influenced by political factors such as regulations and government initiated market development activities (Thøgersen, 2010). In addition, there is still limited distribution of organic products in some areas. However, this is becoming less of an issue as organic products become available in the major supermarket chains. The limited range of organic products does, nonetheless, remain an issue.

Product attributes are another theoretical approach that has been used in a number of studies. The results from this area of research have identified that the three most common reasons for purchasing organic foods are, in declining order of importance, seeking healthy food products, concern for the natural environment, and desire for superior food quality (Hughner et al., 2007; Pearson and Henryks, 2008; Shepherd, Magnusson and Sjöden, 2005; Sultan and Pearson, 2011). The identification of these three attributes as being the most important is remarkably consistent across time, cultures, and products, however, there are differences in their ranking.

It is important to note that the scientific evidence to support some of these consumer perceptions, such as the superior health claim, is inconclusive (Smith-Spangler et al 2012). However, it is still useful for marketing purposes to further categorise consumers who are motivated by perceived health benefits. As such, these consumers have been subdivided into those who are proactive about their health and those who are reactive to a negative situation (Pearson et al 2011). Proactive consumers believe that organic food will have a positive impact upon their wellbeing because it is healthier than conventionally produced food. Conversely, some consumers purchase

organic food as a reaction to an adverse health situation. For example, someone who is ill and believes organic food may assist in their recovery.

The desire for high quality, including taste for some products, as a driver of organic food purchases was found to be less consistent across different cultural contexts than health drivers. For example, Chen (2009) found in the context of Taiwan, consumers experience of the taste of some organic foods was below the expectations created by conventional products and consequently they considered organic foods as a fraud and inferior. In contrast, other research has found that organic foods were perceived to have superior taste for Dutch consumers (Schifferstein and Oude Ophuis, 1998). The reasons for cross-cultural taste discrepancies are explored in several studies (Bourn and Prescott, 2002; Poelman et al., 2008). The primary explanation given for these cultural discrepancies is that different varieties of organic foods and their different growing conditions influence the types of organic food available in specific locations. In addition, product freshness and the recipes used could also contribute to different perceptions of taste (Sultan and Pearson, 2011, p. 3).

Consumer values and attitudes have also been a theoretical focal point of studies investigating the marketing of organic food. These studies are based on the assumption that the motives for consumer intentions emerge from a small number of relatively stable values, which in turn form attitudes (Sultan and Pearson, 2011). The linkage between values, attitudes and intentions is constructed through the Theory of Planned Behaviour (TPB), and its derivatives, along the chain of values-attitudes-behaviour. The current literature in this area is inconclusive, with some research finding a positive relationship between values and attitudes that support organic food and purchase intentions (Aertsens et al., 2009; Chen, 2007; Lodoros and Dennis, 2008; Michaelidou and Hassan, 2008) whilst others did not find this (Chen, 2009; Shepherd et al., 2005; Vermeir and Verbeke, 2008).

A personal value, being a stable construct, is unlikely to shift as a result of any marketing communication messages and may be seen to be one of the antecedents to the impact of any marketing communication (Aertsens et al. 2009). The specific personal values, also referred to as attitudes in some of the literature, that have been identified as being important to organic food buyers are those relating to the individual (eg. longer life, personal health, satisfaction), family (eg. family health and well-being) and society (eg. environment, rights of the animal and their welfare) (Makatouni 2002). More specifically, values that motivate consumers to purchase organic food relate to individual health, rather than family health, and environmental

consciousness (Padel and Foster 2005). Thus, marketing communication that focuses on these values could potentially increase purchases of organic food (Sultan and Pearson, 2011).

In summary, the literature fails to explain the discrepancy between consumers' generally positive attitude towards organic food and their relatively low levels of purchase. Consumers may prefer organic foods for several reasons, such as health and environmental concerns. These reasons may be aligned with personal values, however, consumers' actual purchases of organic food could still be impeded by several factors, including limited information about products, premium prices, less convenient availability, and confusion around and lack of trust in organic labels (Sultan and Pearson, 2011). The current paper endeavours to provide information that may help to explain this attitude-behaviour gap by using the frequency that consumers purchase organic products as a variable to explore differences amongst organic food consumers.

Methodology

This paper reports the findings from one section of a larger Australian study investigating the role of marketing communications in consumer satisfaction with organic foods. A structured questionnaire was developed and revised by the authors of this paper. This included a pre-test with 12 respondents to assess its suitability, readability, and time taken for completion. The questionnaire was standardized and undisguised for all the respondents.

A pilot study was conducted by a research agency with a sample of 37 subjects. Following discussions between the authors of this paper and representatives of the research agency who were engaged to collect the data minor adjustments were made. These included decreasing its length to reduce response fatigue (Burchell and Marsh, 1992) as well changing the wording in several questions for greater clarity.

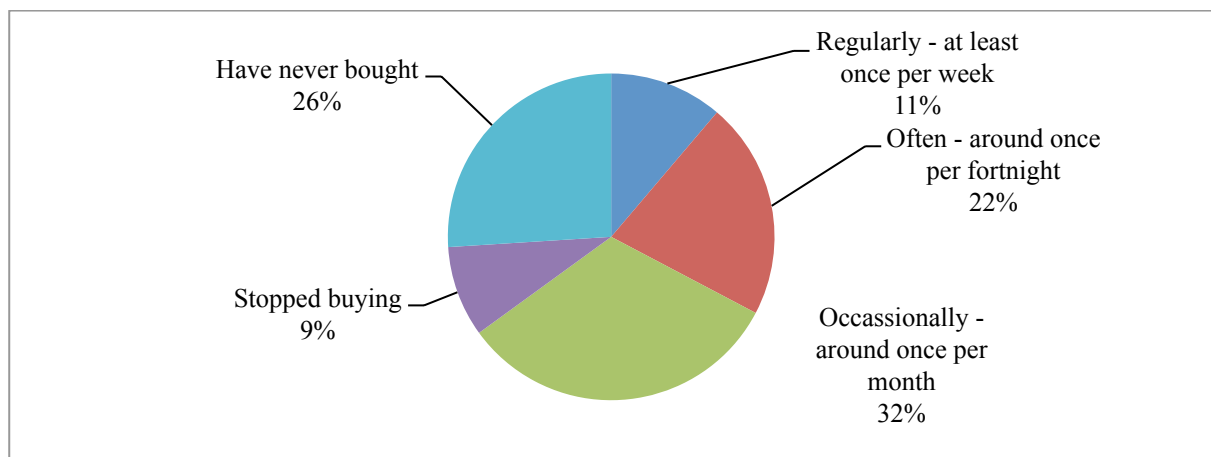
The online survey method was considered most appropriate due to its advantages including access to unique populations and ability to accommodate large sample sizes at relatively low costs in a short amount of time (Wright, 2005). Data was collected during November 2012. A total of 1011 respondents were randomly recruited from a national research only panel of consumers. The only qualifying prerequisite for respondents was that they had to have purchased organic products sometime in the past.

Results and discussion

The primary aim of this study is to investigate the extent to which organic food buyers vary according to their purchase frequency and to explore whether this provides insights into the gap between consumers' positive attitudes towards organic food and their low levels of actual purchasing. The specific areas investigated are demographics, length of time they have been purchasing organic products, and rating of organic food attributes that are important to them.

Purchase frequency

The results as shown in Figure 1 indicate that the frequency of organic food purchases varies, from a relatively small proportion of consumers who purchase it regularly (around one in ten) to many who have never purchased it (around one in four). In between these extremes there are those who purchase organic food often (around one in five), occasionally (almost one in every three), and those who have stopped purchasing it (around one in ten). In total just over half of the population purchase some organic food (two in every three).



(Source: BFA 2012 and results from Questionnaire N=1011)

Figure 1: Frequency of organic food purchases in Australian population

The following results and discussion compare the different purchase frequency groups with the main demographic variables.

Demographics

There is no difference between genders in terms of their behaviour around how often they purchase organic products. However younger people tend to be the more dedicated organic food buyers, as they are more likely to purchase it on a regular basis (such as one in every four of

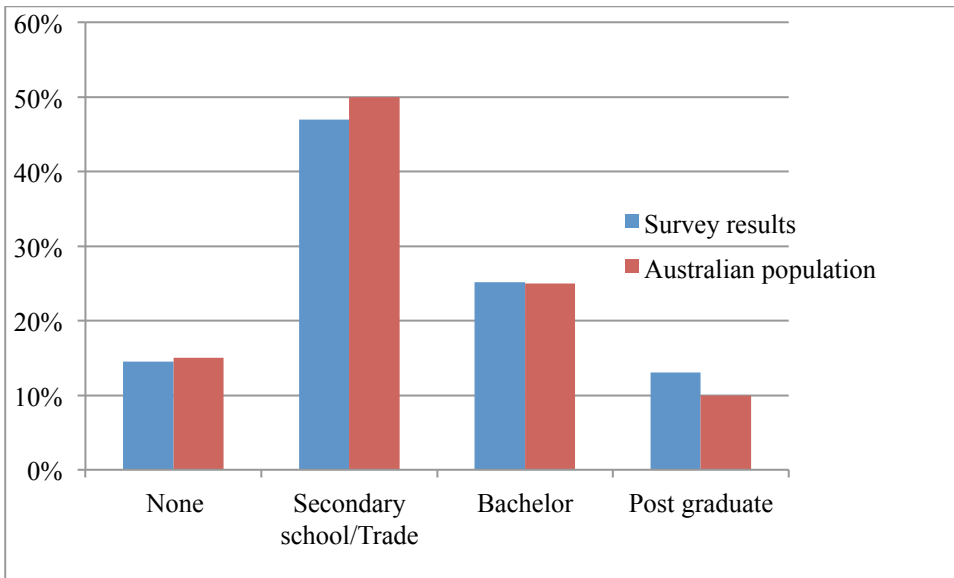
those in the 20-29 year old age bracket of those who purchase organic products, that is excluding those in the have never bought category, is a 'regular' whilst this reduces to only one in every ten for 60-69 year olds). These results are in contrast to those previously discussed where organic food buyers tend to be dominated by the older age categories such as empty nesters (Davies, Titterington and Cochrane, 1995; Fotopoulos and Krystallis, 2002; Padel and Foster, 2005; Thompson, 1998; Wier and Calverley, 2002).

Relatively low income households (the lowest category in this research was below \$US45,000 which is equivalent to the average household earnings in Australia (ABS, 2011), and \$A=\$US) make up 30% of organic food buyers. This challenges the often implicit assumption that it is purchased by higher income households who are more readily able to absorb the generally higher price of organic products (Padel and Foster, 2005).

Further most organic food buyers are in full time employment (36%) (although they must be on relatively low salaries as observed in the preceding paragraph) or retired (23%). These low income households are the ones most likely to have stopped buying in last year (almost one in every two) hence there must be lots of churn amongst low income households, with many new entrants replacing those who leave. Additional research would be required to determine if it is the cumulative impact of price premiums that becomes overwhelming causing these consumers to move into the 'stopped buying category'.

Many organic food buyers (almost one in five) are new entrants having being purchasing for less than one year. Most of them are trialling organic products (as the purchase frequency for over two out of every three of them is rarely). It is likely that a large portion of them (almost one in five) stop buying within a year, and then there is gradual attrition over following years. A small portion contribute to a net increase in the total number buyers as both the population and market share of organic products increases gradually. A solid core of organic food buyers (almost half) have been purchasing for a long time (more than three years).

The finding that many organic food buyers have a low socio-economic status is further supported by results correlating organic food purchases and consumer qualifications (Figure 2).

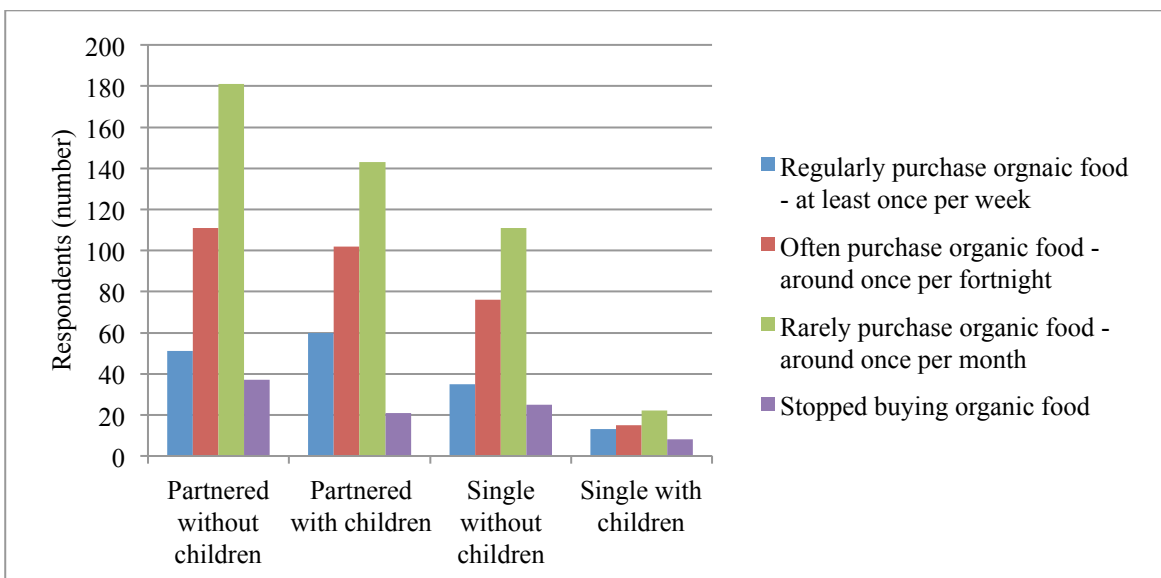


(Source: Derived from ABS 2010 and results from Questionnaire N=1011)

Figure 2: Qualifications of organic food buyers

The results in Figure 2 provide evidence that organic food buyers are from, and equally represented by, all qualification levels in society. As less than 40% have a bachelor degree or higher, this emphasises that organic food buyers are not dominated by more highly educated individuals.

Results are also available for the living arrangements of the organic food consumers (Figure 3).



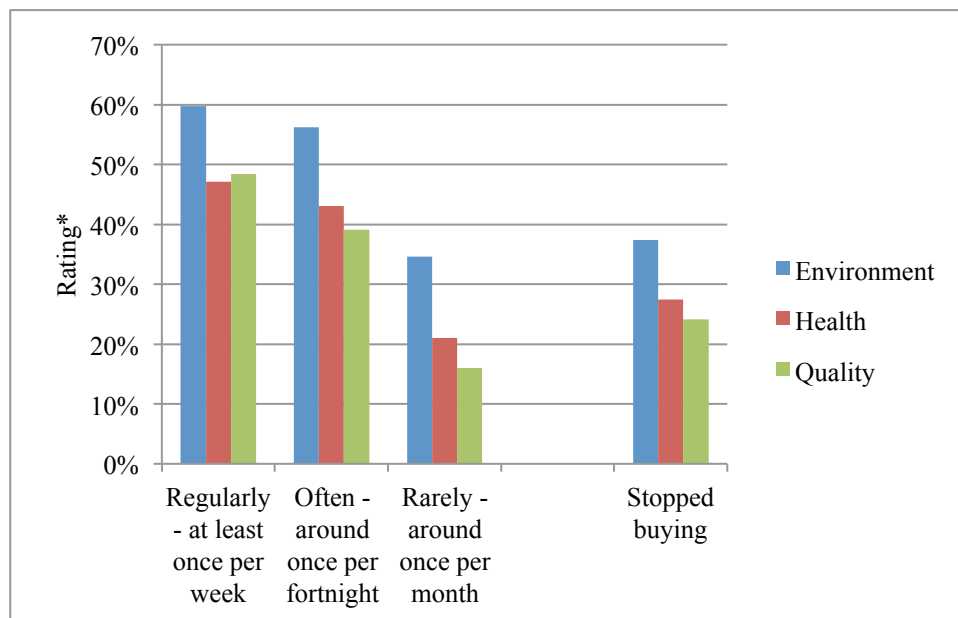
(Source: Questionnaire N=1011)

Figure 3: Living arrangements of organic food buyers

Investigation of the results which profile the living arrangements show that the majority of organic food buyers are partnered (70%), with an approximately equal portion both with, and without, children. Further, across each of these different living arrangements the portion of buyers who purchase organic food at the different frequency levels, that is, regularly through to stopped buying, is approximately the same.

Organic food attributes that are important to consumers

Insights from an analysis of the reasons for purchasing organic food, as perceived by consumers, also assist in understanding which product attributes to emphasise in marketing communications (Figure 4).



*Based on percentage of respondents who ‘strongly agreed’ or ‘agreed’ that the attribute was important on a seven point scale that spanned to ‘strongly disagree’.

Figure 4: Rating of organic food attributes that are important to consumers

The results in Figure 4 show that concern for the environment is the most important motivation, with health and quality approximately equal second across all levels of purchase frequency. Although these three attributes maintain the same ranking, again across all levels of purchase frequency, as it declines, so does importance of these attributes. This is consistent with the

assumption that higher purchase frequency results from a higher importance being placed on the attributes that differentiate organic products from alternatives.

The fact that those who have stopped buying organic products rate attributes higher than those who purchase 'rarely', but below those who purchase 'often', suggests that other factors, such as changing life circumstances which may result in shifts towards issues such as less time or more difficult access, are the dominant drivers for them to have stopped buying.

Conclusion

Expansion of the organic food market over recent decades can largely be attributed to consumers choosing it as an expression of their concern for their own health and a heightened awareness over the impact of the food system on the environment. Other factors such as increased consumer affluence, greater product diversity and availability have assisted consumers to make this choice. Despite these overall increases in organic food consumption, most consumers remain resistant to purchasing large amounts of organic food. Although they have a positive attitude towards organic food, they only purchase it some of the time, with around two in ever three consumers purchasing organic food, yet its market share is only 1%.

This paper sought to provide insights into the reasons for this attitude-behaviour gap, and how it may be closed, by investigating the role of consumer's organic food purchase frequency. Focusing on purchase frequency revealed a number of insights into organic food buyer's behaviour.

Results from this research indicate that buyers vary in their frequency of organic food purchases, from a relatively small proportion of consumers who purchase it regularly – at least once per week (around one in ten) to many who have never purchased it (around one in four). In contrast to results reported from other surveys these organic food buyers are not dominated by older or more highly educated individuals, with higher than average representation from younger and lower income households. These results also add to the literature by highlighting the fact that most organic food buyers are partnered (70%), with an approximately equal portion both with, and without, children. Whilst there is a solid core of organic food buyers (almost half) who have been purchasing for a long time (more than three years), there is a lot of 'churn'. With only a gradual increase in percentage of the population who are purchasing organic food, estimated to

be 2-5% per year in Australia (derived from BFA, 2012), the new entrants (almost one in five or 20%) who have been purchasing for less than one year must be replacing a large number who leave. And finally those who purchase organic products more frequently place higher importance on the attributes that differentiate organic products from alternatives, namely environment, health and product quality.

Foremost, the findings indicate that the key challenge for the organic food movement will be to convince consumers of the superior 'value' of organic products. Results show that people are consuming organic products across most demographic areas, irrespective of education or profession. Higher purchase frequency across all demographic categories could be achieved if greater importance is placed on the positive attributes that differentiate organic from conventional products.

The findings also draw attention to a number of factors that may be preventing higher purchase frequency. Results showed that a noticeable number of consumers (around one in ten) had bought organic food in the past but have stopped. Further research needs to be conducted to discover why this is the case, and it is likely that this will indicate other considerations that influence food purchasing behaviour. These are likely to include those previously identified as reasons for non-purchase including limited distribution, intermittent availability and high prices. However, detailed research for this lapsed organic food buyer segment may identify other factors that explain their change in behaviour.

Recognition and management of these barriers could contribute to more effectively targeted research into consumer food purchasing motivations, and subsequently the development of more sophisticated marketing strategies for the organic food industry. However with its diverse constituency, ranging from global corporates through to local production and consumption, it is going to be a challenge for the organic industry to achieve the coordination required to develop such a market growth strategy.

In addition, there are a number of methodological issues associated with analysing the market for organic products that may distort results. In particular, most studies, including this one, rely on consumer self-reporting to gather data, rather than observation of actual purchases. Hence these results show what consumers would like to do, rather than what they actually do.

It is likely the organic food consumers will provide fertile ground for further research as industry players seek market growth opportunities, and Government agenda aims to achieve human health and environmental sustainability within an informed consumer choice policy framework.

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References

- ABS, 2011. Household income and income distribution Australia 2009-10 Catalogue Number 6523.0. Canberra, Australian Bureau of Statistics.
- ABS, 2010. Australian Social Trends, Catalogue Number 4102.0. Canberra, Australian Bureau of Statistics.
- Aertsens, J., Verbeke, W., Mondelaers, K., Huylenbroeet, G. V., 2009. Personal determinants of organic food consumption: a review. *British Food Journal* 111 (10), 1140–1167.
- BFA, 2012. Australian Organic Market Report. Brisbane, Australia, Biological Farmers of Australia.
- Bourn, D., Prescott, J., 2002. A comparison of the nutritional value, sensory qualities, and food safety of organically and conventionally produced foods. *Critical Reviews in Food Science and Nutrition* 42 (1), 1–34.
- Burchell, B. and Marsh, C. 1992. The effect of questionnaire length on survey response. *Quality and Quantity* 26, 233-244.
- Caporale, G., Monteleone, E., 2004. Influence of information about manufacturing process on beer acceptability. *Food Quality and Preference* 15 (3), 271–278.
- Chen, M. 2007. Consumer attitudes and purchase intentions in relation to organic foods in Taiwan: Moderating effects of food-related personality traits. *Food Quality and Preference* 18, no. 7: 1008–1021.
- Chen, M., 2009. Attitude toward organic foods among Taiwanese as related to health consciousness, environmental attitudes, and the mediating effects of a healthy lifestyle. *British Food Journal* 111 (2), 165–178.

- Davies, A., Titterton, A. J., Cochrane, C., 1995. Who buys organic food? A profile of the purchasers of organic food in northern Ireland. *British Food Journal* 97 (10), 17–23.
- Fotopoulos, C., Krystallis, A., 2002. Purchasing motives and profile of the Greek organic consumer: a countrywide survey. *British Food Journal* 104 (9), 730–765.
- Harper, G. C., Makatouni, A., 2002. Consumer perception of organic food production and farm animal welfare. *British Food Journal*, 104 (3–5), 287–299.
- Henryks, J. Pearson, D., 2010. Misreading between the lines: Consumer confusion over organic food labelling. *Australian Journal of Communication*, 37 (3), 73–86.
- Hughner, R. S., McDonagh, P., Prothero, A., Shultz, C. J., Stanton, J., 2007. Who are organic food consumers? A compilation and review of why people purchase organic food. *Journal of Consumer Behaviour* 6 (2–3), 94–110.
- IFOAM. 2012. Organic standards and certification. International Federation of Organic Agriculture Movements (Online at: http://ifoam.org/about_ifoam/standards/index.html. Accessed 8 November, 2012.
- Johansson, L., Haglund, Å., Berglund, L., Lea, P., Risvik, E., 1999. Preference for tomatoes, affected by sensory attributes and information about growth conditions. *Food Quality and Preference* 10 (4–5), 289–298.
- Kihlberg, I., Johansson, L., Langsrud, Ø., Risvik, E., 2005. Effects of information on liking of bread. *Food Quality and Preference* 16 (1), 25–35.
- Latacz-Lohmann, U., Foster, C., 1997. From "niche" to "mainstream"—strategies for marketing organic food in Germany and the UK. *British Food Journal* 99 (8), 275–283.
- Lodorfos, G. N., Dennis, J., 2008. Consumers' Intent: In the Organic Food Market. *Journal of Food Products Marketing* 14 (2), 17–38.
- Makatouni, A., 2002. What motivates consumers to buy organic food in the UK? Results from a qualitative study. *British Food Journal* 104 (3–5), 345–352.
- Michaelidou, N., Hassan, L. M., 2008. The role of health consciousness, food safety concern and ethical identity on attitudes and intentions towards organic food. *International Journal of Consumer Studies* 32 (2), 163–170.
- Oates, L., Cohen, M., Braun, L. 2012 Characteristics and consumption patterns of Australian organic consumers. *Journal of the Science of Food and Agriculture* 92:14, 2782-2787.
- Padel, S., Foster, C., 2005. Exploring the gap between attitudes and behaviour: Understanding why consumers buy or do not buy organic food. *British Food Journal* 107 (8), 606–625.
- Pearson, D., 2001. How to increase organic food sales: Results from research based on market segmentation and product attributes. *Australasian Agribusiness Review*. 9:8, 1-8.

- Pearson, D., 2012. Consumer concerns: Is organic food important in an environmentally responsible diet? *Journal of Organic Systems* 7(2), 49-60.
- Pearson, D., Henryks, J., 2008. Marketing Organic Products: Exploring Some of the Pervasive Issues. *Journal of Food Products Marketing* 14 (4), 95–108.
- Pearson, D., Henryks, J., Jones, H., 2011. Organic Food: What we know (and don't know) about consumers. *Renewable Agriculture and Food Systems* 26 (2), 171–177.
- Pearson, D., Henryks, J., Moffitt, L., 2007. What Do Buyers Really Want When They Purchase Organic Foods? An investigation using product attributes. *Journal of Organic Systems* 2 (1), 1–9.
- Poelman, A., Mojet, J., Lyon, D., Sefa-Dedeh, S., 2008. The influence of information about organic production and fair trade on preferences for and perception of pineapple. *Food Quality and Preference* 19 (1), 114–121.
- Rogers, E. M., 1962. *Diffusion of Innovations*. The Free Press, New York.
- Schifferstein, H. N. J., Oude Ophuis, P. A. M., 1998. Health-related determinants of organic food consumption in the Netherlands. *Food Quality and Preference* 9 (3), 119–133.
- Schutz, H. G., Lorenz, O. A., 1976. Consumer preferences for vegetables grown under "commercial" and "organic" conditions. *Journal of Food Science* 41 (1), 70–73.
- Shepherd, R., Magnusson, M., Sjöden, P., 2005. Determinants of Consumer Behaviour Related to Organic Foods. *Ambio* 34 (4–5), 352–359.
- Smith-Spangler, C., Brandeau, M., Hunter, G., Bavinger, J., Pearson, M., Eschbach, P., Sundaram, V., Liu, H., Schirmer, P., Stave, C., Olkin, I. and Bravata, D. (2012). Are Organic Foods Safer or Healthier Than Conventional Alternatives? A Systematic Review. *Annals of Internal Medicine*, 157(5), 348-366.
- Strong, E. K., 1925. *The psychology of selling and advertising*. McGraw–Hill, New York.
- Sultan, P. and Pearson, D. (2011), Communicating in the clutter: The case of organic food communications, *Marketing in the Age of Consumerism: Jekyll or Hyde?* Australia and New Zealand Marketing Academy Conference (ANZMAC), 28-30 November, Perth Convention Exhibition Centre, Australia (Accessed 25/3/2013 from <http://anzmac.org/conference/2011/Papers%20by%20Track/Track%2017.%20Food%20and%20Beverage%20Marketing/Sultan,%20Parves%20Paper%20194.pdf>)
- Thompson, G. D., 1998. Consumer Demand for Organic Foods: What We Know and What We Need to Know. *American Journal of Agricultural Economics* 80 (5), 1113–1118.
- Thøgersen, J., 2010. Country Differences in Sustainable Consumption: The Case of Organic Food. *Journal of Macromarketing* 30 (2), 171–185

- Vermeir, I., Verbeke, W., 2008. Sustainable food consumption among young adults in Belgium: Theory of planned behaviour and the role of confidence and values. *Ecological Economics*, 64 (3), 542–553.
- Wier, M., Calverley, C., 2002. Market potential for organic foods in Europe. *British Food Journal*, 104 (1), 45–62.
- Willer, H. and L. Kilcher, Eds. 2011. *The world of organic agriculture: Statistics and emerging trends*, IFOAM, Bonn, and FiBL, Frick.
- Wright, K. 2005. Researching Internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. *Journal of Computer-Mediated Communication* 10(3), article 11.
- Yin, S., Wu, L., Du, L., Chen, M., 2010. Consumers' purchase intention of organic food in China. *Journal of the Science of Food and Agriculture* 90 (8), 1361–1367
- Zepeda, L., & Nie, C., 2012. What are the odds of being an organic or local food shopper? Multivariate analysis of US food shopper lifestyle segments. *Agriculture and Human Values*, 29(4), 467-480.

The Influence of Label Messages on Fluid Milk: A Conjoint Analysis

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Abstract

Background: The sales of milk have been declining in the USA for a number of years. One of the most important ways to improve consumer's perception and likelihood to buy milk is to take advantage of the label. In most industries the label is one of the most important communication vehicles in the company. The label provides greater exposure of the product to the benefits of the product to the consumer than almost anything else.

Objective: The overall objective of this study is to understand the relative value of various persuasive elements that could be included on a milk label. This study was developed in order to measure which Front-of-Pack claims appear to have the greatest impact on the likelihood to buy Milk when placed on the Milk Label.

Sample: 1500 consumers aged 21-64 who do the primary food shopping, purchased milk in the past 3 months, from PA and contiguous states.

Statistical techniques: Conjoint Analysis. From previous research 7 different milk attributes that could have an affect on consumer behavior were developed (for each of the attributes various levels were defined): Price, Structure/Function Claims, Nutrient Content, Production, Origin, Taste and Quality.

Findings: Given a choice between a product at the lowest price with any claim and one at the same low price without claim, it is about 4x more likely consumer will pick the one with label claim. The most prefferable claims for consumers were identified.

The influence of Light on Consumer Behaviour at the Food Market

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Abstract

The results of a number of consumer surveys show that more than half of 50-80% purchases are made at the point of sale, and 80% of them are implemented on the basis of positive emotions. The positive emotions of consumers are evoked by the lighting in stores, which can increase or decrease sales. The lighting in domestic and foreign food stores operating in the Slovak market is essentially the same. All stores are equipped with basic lighting that is in some of the larger stores filled up by accent lighting. For some types of products (fresh, unpackaged foods) lighting is not only powerful, but also the only marketing tool. The paper deals with a comprehensive, interdisciplinary examination of the effect of lighting on the purchasing decisions of consumers and the perception of lighting on the food market. It is the integration of questionnaire survey, measuring of light intensity and colour temperature (chromaticity) respectively of emitted colour spectrum in grocery shops. The object of the study is the accent lighting in served shop departments of fresh food (meat, deli, dairy products, fruit, vegetables, bread, pastry), but also in other departments of supermarkets (wine, alcohol, organic food, specials, seasonal goods). Based on the light tests conducted in retail stores we have identified the light conditions in national and international chains operating in Slovakia. Using EEG equipment in simulated conditions we discovered true consumer preferences for different lighting conditions (colour temperature, colour rendering index) for the selected type of food. Article is concluded with certain managerial implications in the sphere of food retailing and recommendations for further research studies.

INTRODUCTION

In this turbulent world is of great importance how customers are valued by retailers. Shopping can no longer be regarded as a simple act of purchasing but has to provide both space and time for convenient shopping and entertainment. Because a store's image is now recognized as a very important aspect of the retailing mix, store designers pay a lot of attention to atmosphere and various dimensions to evoke certain effects in buyers. These dimensions include colours, scents and sounds (Solomon et al., 2006). There are several studies in this field showing how important various store image factors are and in which way and how intensively they are included into store design. Fashion industry and retail are probably one of the best examples where more fine furniture, more expensive wall coverings and special lighting make customers feel they're in a friendly environment. For instance, a warm pink light that flatters the face and helps banish wrinkles has been used as a step further in lighting retail practice (Blumenthal, 1988). Study of Areni and Kim (1994) found that brighter in-store lighting influenced people to examine and

handle more merchandise. These findings can be considered in terms of their implications for creating a functional store environment as well as an appropriate store image.

All home and international food shops are equipped with basic lighting, which is mostly in larger retail formats complete with accent lighting. Basic lighting in shops operating on the Slovak food market does not essentially differ. Even though with some types of bulk, fresh foods (fruit, vegetables and bakery products) the light or accent lighting is the only and at the same time a significant (strong) marketing tool that some chains still do not give enough importance. High-quality retail lighting can enhance a store's image, lead potential customers inside, focus their attention on products, and ultimately increase sales. Retail lighting must have good colour, contrast, and balance. Often, it is necessary to combine natural and artificial lighting and different lighting sources (Borusiak, 2009). Several surveys of consumer behaviour show that more than half (50-80%) of the decisions are made at the point of sale, with 80% of them made based on positive emotions (Binggeli, 2010). The experimental research on identifying the impact of culture group, colour rendering index, and colour temperature indicate that consumers are aroused and pleased by certain lighting effects and that even cultural differences influence perceptions as well as the behavioral intentions of “approach-avoid” in a retail environment (Park, Farr, 2008). It is properly chosen lighting and light colour that contribute to positive emotions and memories. These sensory tools affect our central nervous system and cerebral cortex which means that they can activate and stimulate our memories, thoughts and experiences.

AIMS AND METHODOLOGY

The main aim of this article is to reveal the true consumer perception preference of accent lighting in retail food shops. In order to meet the main objective it was important to establish and meet the following partial objectives and procedures:

- preparation of the calibration sample and the subsequent visual evaluation of different types of lighting in the simulated conditions of a food shop through questionnaires,
- neuro-marketing (EEG) tests aimed at exploring the emotional involvement of the respondents within the calibration sample for each type of simulated lighting,
- visual and neuro-marketing tests designed to evaluate unconventional forms of lighting (different colours).

The aim of lighting tests under simulated conditions was the mutual confrontation of the findings of consumer preferences from the questionnaire survey based on visual evaluation of lighting

and neuro-marketing tests during active movement in a simulated fresh food shop. The results of the analytical work as well as theoretical and practical experience have been used while formulating proposals and recommendations in the final part of the paper. The research object is the accent lighting in served departments of fresh food shops (fruit, vegetables, bread and pastries). Based on the lighting tests under simulated conditions of a retail shop and using an EEG equipment we have tried to uncover true consumer preferences for different lighting conditions (type of lamp, lamp power, colour temperature) for the selected type of food.

The research was carried out in three parts:

- questionnaire survey on visual assessment of different types of lighting and prediction of unconventional colours used to illuminate fresh food products,
- consumer neuro-tests in combination of an active mode of all kinds of lighting and an active mode of selected types of lighting in simulated conditions,
- spontaneous capturing of brain activity during lighting of displayed products with different unconventional colours (yellow, purple, green, red, blue)

To obtain the necessary information for the implementation of our research, we used:

- a wireless EEG device Emotiv EPOC EEG Headset + software, a digital luxmeter - brand: Mastech, type: MS 6612, a digital colourmeter - brand: Minolta,
- colour LED lights - brand: Eurolite
- a DMX - USB converter + remote light switches - brand: Kanlux
- a CCTV mini video camera MC49S – type: 520 TVL
- a Digital video quadrarecorder + 4 cameras SET - type: H.264DVR
- a 3CCD camcorder – Leica brand : Panasonic type: NV-GS330
- a HD video camera brand: Sony, type: HDR- XR500VE
- two PCs, a tripod to secure the camera, stands for mounting reflectors, different types of light sources (table 1), - five crates of apples, five crates of oranges and stands

Tab. 1 Used lamps during the testing

Station	Light Source	Power	Luminous flux	Colour temperature	Colour rendering index
1	Halogen lamp	160W	650lux	3000K	70CRI

2	Metal-halide lamp	70W	580lux	5400K	60CRI
2	Sodium lamp	150W	850lux	2900K	85CRI
4	LED lamp	60W	620lux	6000K	75CRI
5	Fluorescent lamp (tube)	72W	540lux	4230K	64CRI

Source: own processing based on technical parameters of the lights used during the research

In the first part of the conducted research two members of the calibration sample visually evaluated different types of lighting in simulated conditions by means of a questionnaire survey. Five different types of lighting were used in simulated conditions which were designed to provide about the same luminous flux around 600lux despite different power except for station No.3. During the visual evaluation respondents could carry out a physical examination of different stations with different types of lighting in order to verify the consistency of the sample displayed. A wireless EEG device was fixed to the head of a member of the calibration sample. The device scanned the brain activity of the respondent in real time and wirelessly with a frequency of 2.4 GHz sent these data to the control centre where they were recorded in three software solutions simultaneously. The respondents was also applied a pair of specially prepared glasses with a mini video camera to capture the respondent's eye movement in real time. The record of the respondent's eye movement was an important element in the evaluation of brain activity in different stages of the test. Respondents were then given instructions regarding the testing. The test was conducted with each respondent firstly in an active mode for all types of lighting and subsequently in the setting where all light sources were in a passive mode. As the next step the respondent entered the research area after one of the types of lighting was switched to an active mode.

Last part of the research was the connection of prediction, visual assessment and brain activity examination of the respondents while watching the unconventional forms of lighting of displayed fruit with selected colours. Various types of light that are used in grocery shops as well as those that are unprecedented in the Slovak retailing were intentionally used during the testing.

Light sources at different stations have been designed to provide approximately the same luminous flux (light intensity) despite the differences in power and colour temperature (light colour).

The survey was conducted by accent lighting tests under simulated conditions of (fresh food department) retail shops using the video technology of the wireless EEG equipment, computer equipment and measuring instruments. We conducted the survey firstly with 15 members of the calibration sample and subsequently with students during the class of Marketing. Creating a calibration sample was necessary for the subsequent evaluation of the emotional involvement of the respondents in each exhibition station with different types of lighting.

The obtained data were grouped in clearly arranged tables and files that allow us to compare and evaluate them with the assistance of an EEG certified neurologist.

RESULTS AND DISCUSSION

Lighting in domestic and foreign food shops operating on the Slovak market does not essentially differ. The concept of lighting is mainly composed of multiple systems. Most often used as basic lighting are fluorescent lamps placed around the selling area of domestic and foreign chains. Fluorescent lamps with different colour filters are mostly used for accent lighting in bulk food department (fruit, vegetables and bakery products) as well as in served fresh food departments (meat, cheese and salads). It is a special kind of lamps the main purpose of which is to ensure that the goods look clearer and more engaging to the customer at first the sight. For some types of goods (fresh bulk food) the lighting is not only powerful, but also the only marketing tool. In addition, grocery shops use fluorescent lamps (tubes) directly mounted on the shelves. A customer cannot see them and they are specific for directly illuminating the products or selected product groups. This type of lighting is also used in cold boxes and display cases located in shops. Nowadays, some retail chains of grocery shops mainly with multinational capital links use intelligent lighting control. This means that the system does not only allow to save energy, but also to set the desired level as well as colour of the light, depending on the weather for example, as a precondition of creating the right atmosphere in the shop. Well-designed lighting can not only contribute to significant energy savings, but also increase sales. A calibration sample was created as a data base for the initial phase of the consumer neuro-tests of accent lighting in simulated shop conditions. Table 2 presents the representation of members of the calibration sample by gender. The age range of the members of the calibration sample ranged from 24 to 60 years.

Table 2. Proportion of members of the calibration sample by gender.

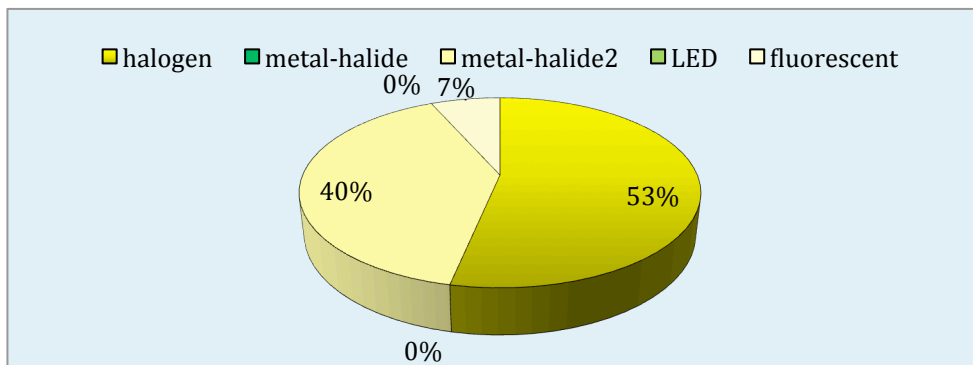
Gender	male	female	total
Number	6	9	15

Proportion	40%	60%	100%
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Source: Research data

In the initial phase the calibration sample members expressed their preferences through a questionnaire survey. Up to 93% of them consider light as an important marketing tool that can stimulate consumers to purchase. Only one member did not assess whether the light can indeed play an important role in consumer decision making during purchase. Subsequently, selected respondents of the calibration sample visually evaluated individual stations with different types of accent lighting. Graph 1 presents the most attractive accent lighting of fruit (apples and oranges) in a simulated retail environment.

Graph 1. The most attractive accent lighting - visual evaluation

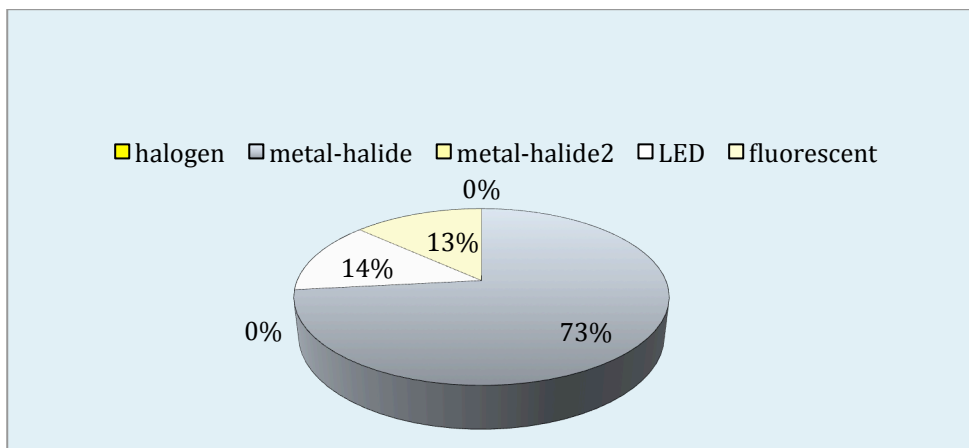


Source: Research results

According to Graph 1 most respondents of the calibration sample considered halogen lighting attractive. This type of lighting produces warm vibrant colours with a value of 3000K and intensity of 650lx and it was used to illuminate the first station. However, the disadvantage of this light is a higher energy consumption and a shorter operating life of the lamp. The second most attractive type of accent lighting, reported by 40% of respondents is a metal halide lamp with a power of 150W. The fluorescent lamp used in the fifth station was considered attractive by one of the respondents. On the other hand, most members of the calibration sample (73%) considered the metal halide light with the power of 70W used at Station 2 the least attractive accent lighting. According to the survey, LED and fluorescent lighting belong to those unattractive (Graph 2).

In the neuromarketing study we used the same sample of older and younger respondents in order to reveal their hidden consumer preferences. In the first phase, we evaluated the rate and prevalence of various rhythms of brain activity. Alpha rhythm is moving at a frequency of 7-13Hz and can be described as a meditation phase, in more emotional phase of brain activity. Beta is the frequency of 13-30Hz and represents issues of consideration, problem solving, and intellectual focusing on something specific. Alfa is therefore characteristic for the subconscious problem solving and is created mostly in the rear parietal and occipital points of the human brain. It hardly appears in front frontal parts and is typical after subsidence of beta. Beta rhythm is typical especially for conscious solutions of situations and occurs predominantly in the front, where the so-called seats of the soul are situated. Graph 3 shows the progress of individual rhythms typical of the conscious and subconscious problem solving and reactions of the members of the calibration sample for each type of accent lighting. The alpha level is typical especially for addressing subconscious situations while beta for the conscious ones. Most subconscious responses were recorded with fluorescent type of lighting. This type of lamp is used as the basic lighting in almost every retail chain. The least subconscious reactions were paradoxically reported with halogen type of lighting that consumers rated as the most attractive.

Graph 2. The least attractive accent lighting - visual evaluation



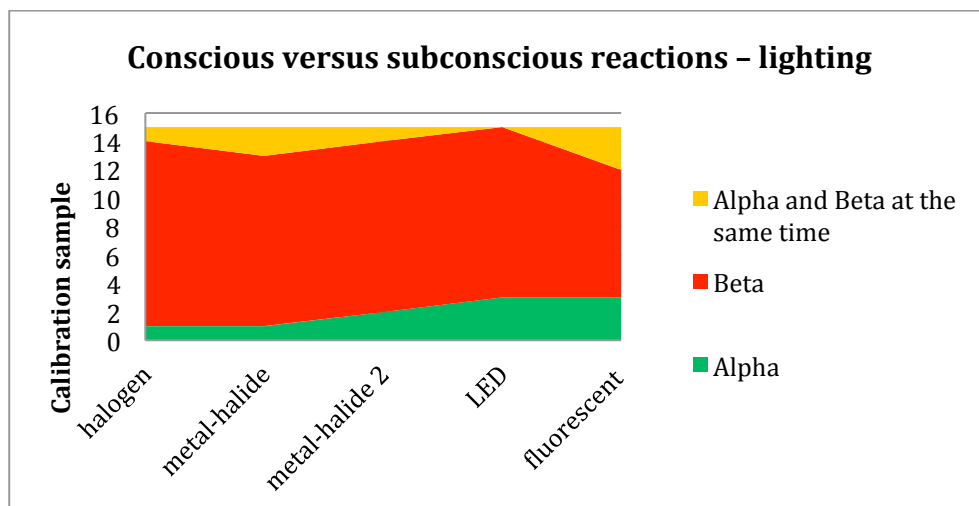
Source: Research results

Beta is the frequency of 13-30Hz and represents issues of consideration, problem solving, and intellectual focusing on something specific. Alfa is therefore characteristic for the subconscious problem solving and is created mostly in the rear parietal and occipital points of the human brain. It hardly appears in front frontal parts and is typical after subsidence of beta. Beta rhythm is typical especially for conscious solutions of situations and occurs predominantly in the front, where the so-called seats of the soul are situated. Graph 3 shows the progress of individual rhythms typical of the conscious and subconscious problem solving and reactions of the

members of the calibration sample for each type of accent lighting. The alpha level is typical especially for addressing subconscious situations while beta for the conscious ones. Most subconscious responses were recorded with fluorescent type of lighting. This type of lamp is used as the basic lighting in almost every retail chain. The least subconscious reactions were paradoxically reported with halogen type of lighting that consumers rated as the most attractive.

Reactions in different parts of the brain of the respondents vary within each type of accent lighting which shows that light actually effects consumer reactions consciously, but also subconsciously. Closer monitoring of the origin of reactions in the right and left hemisphere enables us to identify the type of the lighting of fresh products causing more emotional consumer reactions. Increased responses in the right hemisphere represent emotional response whereas, the response in the right hemisphere reflects a rational response of the respondent.

Graph 3. Monitoring the rhythms of brain activity in different types of lighting (conscious versus subconscious reactions)

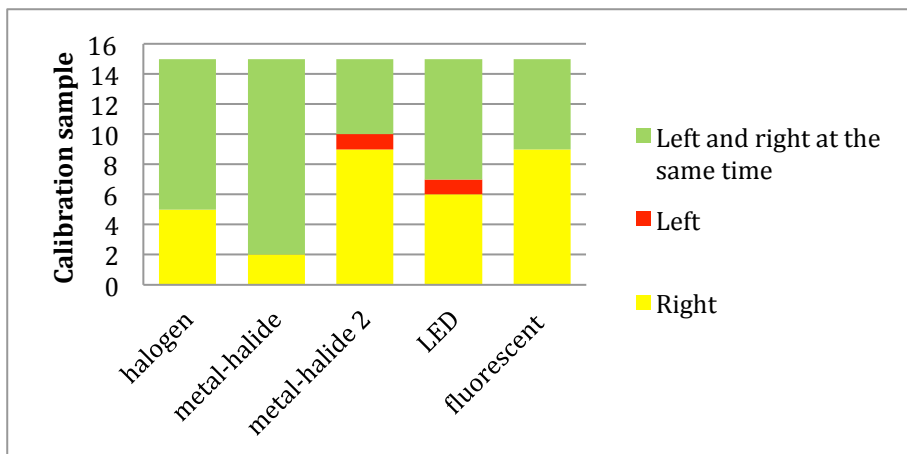


Source: Research results

Most emotional responses were documented with a metal halide lamp (150W) rated in the questionnaire by the consumers as the second most attractive type of lighting along with the fluorescent lighting type. On the other hand, the least emotional reactions of respondents were recorded with a metal halide reflector lamp (70W) as well as with halogen light which was paradoxically rated as the most attractive (Graph 4). Most brain activity of the members of the calibration sample originates predominantly on the right side of the human brain - an emotional, less rational hemisphere. Only after that the activity is extended to other parts of the brain. In

general it can be said that women are more emotional than men and also that a greater emotional response is created in case of younger people compared to older ones.

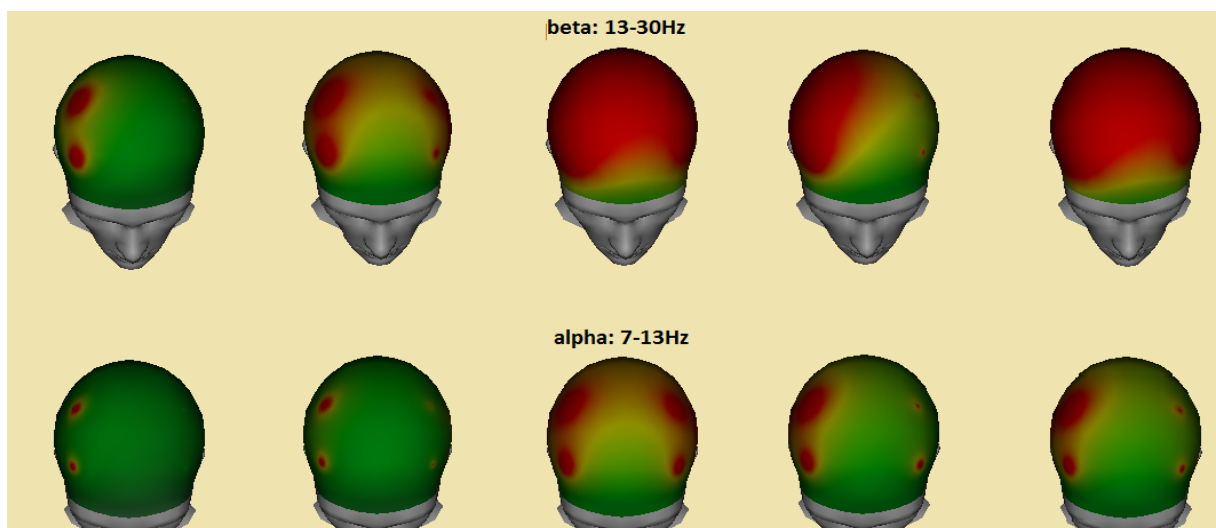
Graph 4. Monitoring the response of the hemispheres with different types of lighting (origin of reaction in the brain hemisphere)



Source: Research results

For a better illustration of brain activity in different parts of the brain we compared reactions of five members of the calibration sample - Figure 1. Looking at the fruit (apples and oranges) illuminated with a metal halide lamp (150W). For a comparison, we chose two men and three women aged 24-44 years. From the figure it is evident that greater emotional response was observed with female respondents. It is also obvious that with the lowest age the largest brain activity by far was recorded with the same stimulus. (Station 3)

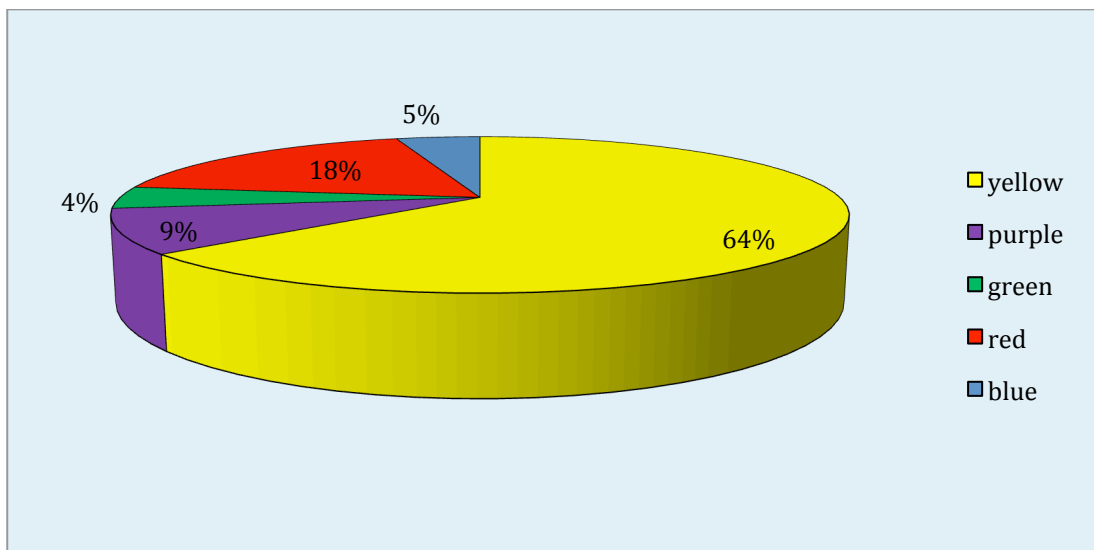
Figure 1. Comparison of brain activity of selected respondents



Source: Research results

The last part of the study was to examine consumer preferences for potential unconventional forms of lighting used for illuminating fresh bulk food. In the questionnaire survey the respondents gave the greatest importance (up to 64%) to the yellow colour. It was followed by the red colour (almost 18%), purple and the least respondents could imagine blue and green colour to be used for the lighting of this food category (Graph 5). In the food business the color-rendering properties of lighting can be used in different ways. They contribute to the visual quality of the general environment but they can be used in display to conceal low quality in products. Lighting is used for food displays, but light also induces photochemical reactions in foods. It is generally agreed that appropriate lighting can create an appropriate mood, which in itself attracts and captures the customer's interest. One important reason to use lighting in design is that it offers the possibility of variation, so one can change the service landscape from time to time (Hutchings, 2003). Subsequently, all members of the calibration sample were shown different examples of unconventional (coloured) lighting. Samples of five colours were again associated with consumer neuro tests in order to discover the true colour preferences and to identify the colour which influences the respondents' subconscious the most.

Graph 5. Unconventional forms of lighting of fresh food (estimation)

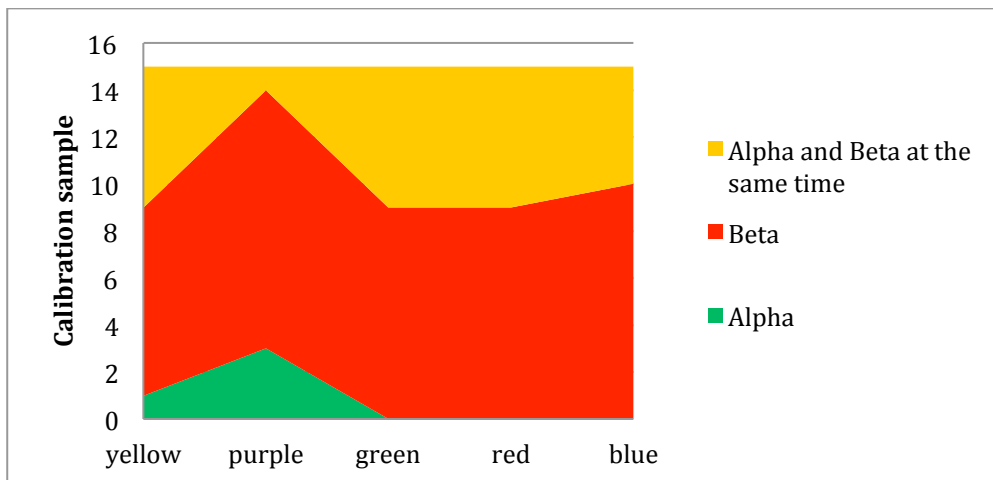


Source: Research results

Graph 6. shows the conscious and subconscious reactions with different colours of light based on the monitoring of rhythms (alpha and beta) in different parts of the brain. The subconscious of

the surveyed respondents is mostly influenced by the yellow and purple colour lighting. On the other hand, the blue colour influenced the respondents' subconscious the least.

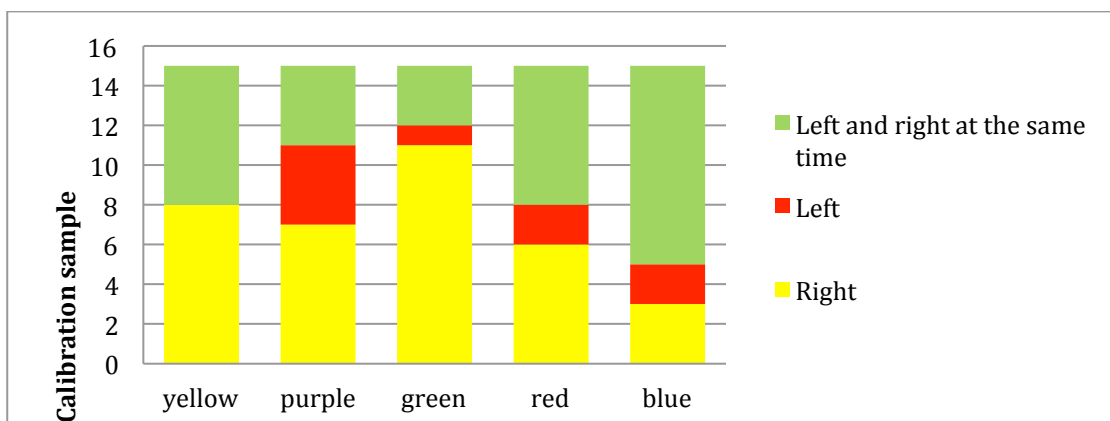
Graph 6. Monitoring rhythms of brain activity with different colours (conscious versus subconscious reactions)



Source: Research results

Graph 7 follows the emotional support of each colour by monitoring responses in the right and left hemisphere. Paradoxically, the green colour emotionally affected the members of the calibration sample the most despite the fact that consumers indicated the yellow colour as an alternative to unconventional forms of lighting of fresh food. A smallest emotional response was recorded with the blue colour used as an unconventional form of lighting. The purple, red and blue were the most rationally justified colours.

Graph 7. Monitoring reactions in different hemispheres with unconventional colours (origin of reaction in the brain hemisphere)



Source: Research results

CONCLUSION AND RECOMMENDATION FOR FURTHER STUDIES

In the short introductory study we used a small sample of older and younger respondents to reveal true consumer perception preferences of accent lighting in grocery shops. We conducted a neuro-marketing pre-test in which we compared five different types of accent lighting as well as unconventional forms of lighting of fresh food in a simulated retail environment. The results obtained from the initial neuro-studies were correlated with the questionnaire survey for the mutual synthesis of conclusions. Through the tests conducted it was found that various types of lighting indeed change the rhythms of brain activity and that the right hemisphere of the human brain is more involved. This proves that lighting has a significant impact on conscious or subconscious consumer reactions. We have shown that the light and lighting is an essential marketing tool that can positively influence and encourage consumers and thus increase sales. The intensity of this reaction varies with different type and colour of lighting. The level of brain activity is largely affected by the emotional involvement as well as the weather and individual fatigue of respondents. The research results show that most subconscious reactions of the members of the calibration sample were caused by fluorescent lighting which is commonly used as a primary lighting in almost every shop. As for the emotional impact most members of the calibration sample were affected by the metal halide lighting with the power of 150W, while on the basis of visual evaluation, respondents rated the halogen lighting as the most attractive. On the other hand, the metal halide lighting with the power of 70W and LED lighting was rated as the least attractive. When designing the ideal accent lighting it is necessary to consider the issue of electricity consumption because the lighting chosen by the members of the calibration sample as the most attractive consumes three times as much electricity per hour as the one rated as the least attractive one. During the tests of unconventional lighting used to illuminate the category of fresh food, the yellow colour was rated most positively based on the examples provided in the simulated conditions. At the same time the yellow colour mostly affected the subconscious of the respondents while the green colour mostly effected their emotions. Based on empirical findings it is planned to conclude a similar research in the future which will include a larger research sample, exact timing of the tests conducted and comparison of respondents under the different weather conditions and individual fatigue.

REFERENCES

1. Areni Ch.S., Kim, D. 1994. The influence of in-store lighting on consumers' examination of merchandise in a wine store. *International Journal of Research in Marketing*, 1994, 11/2, p. 117 – 125, ISSN 0167-8116
2. Borusiak, B. 2009. *Merchandising*. Economic University in Poznan, p. 121, ISBN 978-83-7417-375-9
3. Binggeli, C. 2010 *Buliding Systems for Interior Designers*. Published by John Wiley and Sons, New Jersey, USA. ISBN 978-0-470-22847-0
4. Blumenthal, D. 1988. CONSUMER'S WORLD; Scenic Design for In-Store Try-Ons. *New York Times* (9 April 1988): N9
5. Hutchings, J. 2003. *Expectations and the food industry – Impact of Color and Appearance*. Kluwer Academic /Plenum publishers, New York. 181p. ISBN 0-306-47291-0
6. Park, N.K, Farr, Ch.A. 2008. The Effects of Lighting on Consumers' Emotions and Behavioral Intentions in a Retail Environment: A Cross-Cultural Comparison. *Journal of Interior Design*. Vol. 6, p. 17 – 32, ISSN 1939-1668
7. Solomon, M. et all, 2006. *Consumer behaviour. An European Perspective*. Third Edition. Pearson Education: 2006, 701 p. ISBN 0-237-68752-2

Should the U.S. Invest in Developing a Cultured Flounder Industry?

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There is considerable interest in the culture of southern flounder (*Paralichthys lethostigma*) and summer flounder (*Paralichthys dentatus*) because of the perceived high retail market value, the established worldwide market for flatfish, and their ability to grow in fresh or brackish water. Research scientists and commercial enterprises are in the early stages of research and commercial production. Finfish species have frequently been selected for aquaculture development primarily based on the ease of culture without regard to demand, and development of aquaculture products has historically caused prices to plummet, often below the cost of production, as supply has increased dramatically. A species only has commercial aquaculture potential if, in addition to biotechnical feasibility, there is a ready market at prices that provide a reasonable profit.

This study assessed the U.S. market potential for a cultured flounder, *Paralichthys* sp., industry. Although the U.S. flounder market is large and expanding, there are indications of excess supply suppressing prices below profitable levels for aquaculture producers. Regression analyses were used to estimate both the price and income elasticity of demand for flounder. The dockside demand function was estimated empirically by modeling landings as a log-log function of real dockside price. Demand was price inelastic (-0.78), and price flexibility of dockside supply was estimated at -1.28, so a 1% increase in the flounder supply from aquaculture production will result in a 1.28% reduction in dockside price, reducing total producer revenue. A log-log model was also fitted to per capita flounder consumption as a function of per capita income. Estimated income elasticity of demand was 1.528, so demand appears to be income elastic; a 1% rise in personal income produces a 1.53% increase in demand.

A demand model was estimated to project future demand as a result of the increase in both population and income. The model suggests that the supply of wild flounder may meet estimated demand until the middle of the 21st century. Unless niche markets are targeted or an export market is developed, the outlook for large-scale flounder aquaculture in the U.S. is not economically promising.

The Insight towards Pattern of Beef Cattle Marketing System at East Java, Indonesia

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INTRODUCTION

Beef cattle in Indonesia play an important role not only in providing meat for improving a qualified nutrition for community, but also in enhancing job opportunity for rural people as well as in generating the farmer's income. Demand of meat has increased along with a population growth. Whereas, domestic supply alone cannot meet consumption demand, and thus Indonesia imports from overseas countries. There was about 80 ton of both frozen meat and feeding calf imported from foreign countries. The dependency on meat import, however, was not good solution in resolving a meat shortage. Recently, government has promoted to improve the number of cattle population in order to meet Indonesia's meat demand.

The meat supply shortage may also come from the decreasing cattle population in last decade and disorganized of beef marketing systems. Livestock markets are dispersed to remote areas, and it leads to difficulty in coordinating the cattle marketing. Lacking price information may another impact of the worse marketing pattern. Improper infrastructure and transportation may also hinder in distributing the cattle. Despite this, unstructured marketing channels lead to less efficient occurring in the selling cattle. Beef cattle agribusiness, however still deal with the low bargaining power as farmers has received a lower profit share in comparison with traders.

East Java is an important province for cattle farming development. The region accounts for one-third of the total beef cattle in Indonesia. In regard to generating beef cattle population, Bojonegoro Regency, West Java Province was planned as a research centre of developing local cattle particularly Ongole Crossbred Cattle. Beef cattle agribusiness in this area, however still deal with the low bargaining power and this challenge should be solved by many measures for instance building the integration agribusiness system from up-stream to down-stream sectors. The governance in beef cattle marketing as well as empowering beef cattle farmers will be essential factors toward the long-term sustainable success of beef cattle agribusiness. The measures will help to enhance the beef cattle farmer's income and to meet the demand of meat. Therefore, the research will be urgently needed to solve these problems on how is the appropriate pattern of beef cattle marketing system that can provide benefit for especially farmer as well as for society in general.

Purpose of the research

The reseach was aimed to :

1. investigate the existence of pattern of beef marketing systems at Bojonegoro.

2. determine the marketing margin, mark-up price, percentage margin, and marketing efficiency in the beef cattle marketing system.

LITERATURE REVIEW

East Java is an important province for cattle farming development. The region accounts for one-third of the total beef cattle in Indonesia. There are three types of beef cattle development in Indonesia, (a) farm and beef cattle integrated farming system, (b) Non-farm and beef cattle integrated farming system, and (c) extensive capital and beef cattle fattening with extensive capital (Yusdja and Ilham, 2004). Beef cattle agribusiness, however still deal with the low bargaining power as farmers has received a lower profit share in comparison with traders. This challenge should be solved by many measures for instance building the integration agribusiness system from up-stream to down-stream sectors. Similar to Baker, *et al.*, 2002 that the three sectors in the agribusiness system were grouped into the input supply sectors, the farm sector, and the processing and distribution sector and it was well-known as the agricultural supply chain. The integration system along the livestock supply chain was aimed to meet demand of beef cattle with appropriate in quantity and quality as needed by consumers.

On upstream sector, feeding has an essential role to determine output as well as profit. Belasco, *et al.* (2009) has found that feed efficiency has associated with gender, season, and feedlot location and it will establish yield. Therefore, the variation in feedlot output, feed cost and cattle price leads to profit risk. Teeldemedhin and Kadifil (2009) has discovered that the development of cattle farmers can be pursued through education, experiment and other income as way for diversifying risk strategy.

On farm sector, the governance in production should be considered in order to provide high-quality beef and to generate profit for beef cattle farmer. The planning program in production might become an importance stage in agriculture agribusiness that started with consumer's demand (Belasco, *et al.* 2009). It comprised of scheduling on production, inventory and purchasing order (Crawford, 1997. Erickson, *et al.*, 2002). In regard with beef cattle farmers, still deal with the low bargaining power of farmer in selling cattle that impact on less income per animal unit received by farmer (Utami, *et al.*, 2011; Utami, *et al.*, 2012).

On downstream sector, the governance in beef cattle marketing as well as empowering beef cattle farmers will be an essential factor toward the long-term sustainable success of beef cattle agribusiness. Marketing is the flow of commodity from producers to consumers through the marketing channel (Downey and Erickson, 1987; Amir and Knipscheer, 1989). However, beef cattle marketing may be one of the most complex policy issues particularly at the Eastern Cape Province where its farming become the primary source of income (Musemwa, *et.al.* 2007). So,

collaboration between supporting institutions namely government, small scale farmers, producer organizations and private sector might need to be addressed to enhance the farmer's involvement in beef cattle marketing system. Government can support small scale farmers in providing extension officers and physical means to obtain efficiency in production and marketing and therefore achieving huge profits.

Farmer's empowerment tends to incline on the developing marketing strategy and it is likely to enhance their income (Musemwa, *et al.*, 2007). Set up net working with supporting and related institutions may become useful in order to enhance the relationships with business partner, such as contract farming which needed to manage risk in beef cattle agribusiness. Teeldemedhin and Kadifil, 2009 emphasized on the role of other income sources as alternative for diversifying risk strategy for cattle farmers. Regarding to insurance institution, revenue insurance with the following conditions: higher premium, zero-deductible products; 180-day policy length; the state price series; and in-person method were among beef producers at Louisiana; the state price series; and in-person method of marketing (Fields and Gillespie, 2007). Hedging in the live cattle futures market has also choice of meat packers to deal with the short-term price risk (Maynard, *et al.* 2001).

Moreover, coordination and marketing information indicated a dominant factor that supports the strategy in beef cattle marketing Musemwa, *et al.* (2007). Access to market information involving production systems, prices, value chains, competitors, and consumer preferences has an essential role to enhance farmer's participation in beef marketing system (Alemayehu, 2011). It was supported by Musemwa, *et.al.* 2008 that the existence of the decentralization of cattle marketing information centre and the involvement of communal farmers in the dissemination of information plays a critical role in improving framer's access to formal market. Small scale farmers' participation to formal market can be developed through generating efficiency and sustainable in livestock marketing (Musemwa, *et al.*, 2007). Teeldemedhin and Kadifil (2009) added that quality production was the important determinant to access formal market.

RESEARCH METHOD

The research was held at Bojonegoro Province, East Java, Indonesia. 30 traders were selected by purposive sampling technique and represented by local and national traders. Primary data were collected using three methods: interview with structured questionnaire, Focus Discussion Group, and Business Meeting from 1st October to 31st October 2012. Secondary data obtained from the related institutions. Descriptive method with implementing marketing formulations involving marketing margin, percentage margin, and mark up price, profit margin, and marketing efficiency were executed to analyze the data.

Marketing Margin

Marketing margin refers to the price differences between two or more marketing systems. It is formulated as:

$$MM = P2 - P1$$

Where:

- MM : Marketing margin (%)
P1 : Prices at the first level of marketing systems (Rp.)
P2 : Prices at the second level of marketing systems (Rp.)

Percentage Marketing Margin

Percentage marketing margin is the comparison between price spread and Purchasing Price. It is defined as:

$$PMM = PS / PP \times 100\%$$

Where:

- PMM : Percentage Marketing margin (%)
PS : Price Spread (Rp.)
PP : Purchasing Price (Rp.)

Mark Up Price

Mark up price is price spread divided by selling price. It is structured as:

$$MUP = PS / SP \times 100\%$$

Where:

- MUP : Mark Up Price (%)
PS : Price Spread (Rp.)
SP : Selling Price (Rp.)

Marketing Efficiency

Marketing efficiency refers to the difference price between consumer's level and farmer's level. It is equated as:

$$ME = (PC - PF) / PF \times 100\%$$

Where:

- ME : Marketing Efficiency (%)
PC : Price at consumer's level (Rp.)
PF : Price at farmer's level (Rp.)

RESULTS AND DISCUSSIONS

Beef Cattle Marketing Systems

Many factors may influence in marketing cattle such as time periods, consumer's preferences, cattle weight, and cattle type. Based on cattle type, the research was found that demand of calves and mature cattle were predominantly *Simmental* cattle (56% of each), while marketing culled cattle were represented by similar proportion (50%) between Ongole Crossbreed cattle and *Simmental* cattle.

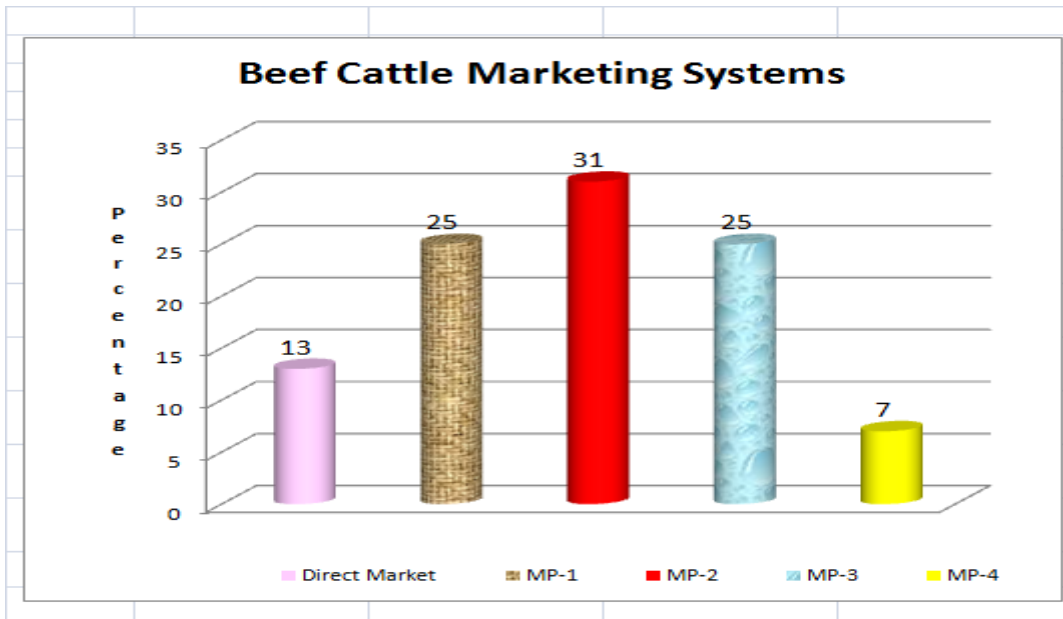


Figure 1. Number of Traders Involved in Beef Cattle Marketing System at Bojonegoro

Interestingly, culled cattle were preferred more by consumers as the presence of these cattle in market. There two purposes in buying culled cattle, first cattle were bought by for meat production purpose. Secondly, farmer may buy culled cattle as they use culled cattle for feedlot purpose. It is because the only short period of time to raise these cattle in producing fattening cattle.

Cattle marketing showed that demand for calves (67%), mature cattle (75%), and culled cattle (82%) have no paid intention on gender. On the other hand, about 25% demands of calves still recognized the importance of gender with male calves as preferences. This finding discovered that male calf was an important factor for fattening purpose as they have a high growth rate than female calf.

Calf was usually bought from livestock market (37%), farmer (27%), combination between farmer, livestock market, and outside city (36%). Mature cattle and culled cattle were obtained from combination between farmer, livestock market, and outside city. It is because both those cattle were needed to provide meat for consumption.

Marketing Channel in Beef Cattle Marketing Systems

Marketing beef cattle refers to the flow of distribution system of beef cattle from producer through intermediate or marketing channels to consumer. Beef cattle marketing refer to a flow of its ownership from farmer to consumer. Consumer can be categorized into direct consumers who consumed or used cattle straightly for breeding purpose and indirect consumers who either repeating sell or slaughtered cattle for meat supply purpose. The flow of cattle from farmer to consumer may not apply marketing channel (direct marketing), whereas other need these

channels (indirect marketing). In this marketing channel have emerged whole seller, retailer, and marketing institutions. Therefore, beef cattle market in this study was grouped into direct (without middleman) (13%) and indirect (without middleman) (87%) marketing systems involving four Marketing Patterns (MPs). Almost one third (31%) of cattle traders have used marketing Pattern-2, while only small number (7%) has adopted Marketing Pattern -4.

Direct Marketing System of Beef Cattle

Direct marketing pattern was held by 27% of cattle traders at Bojonegoro. This marketing model is usually called marketing level 0 (zero level). In this model, marketing cattle was straightly go to end consumer who used cattle for providing meat or cattle for fattening or even for breeding purpose. Some advantages for consumers were knowing quality straightly and attempting to obtain a low cattle's price than buying in market. Cattle farmers also can save marketing cost such as transportation cost, market retribution, intermediate cost and leads to more profitable that sold to intermediate.

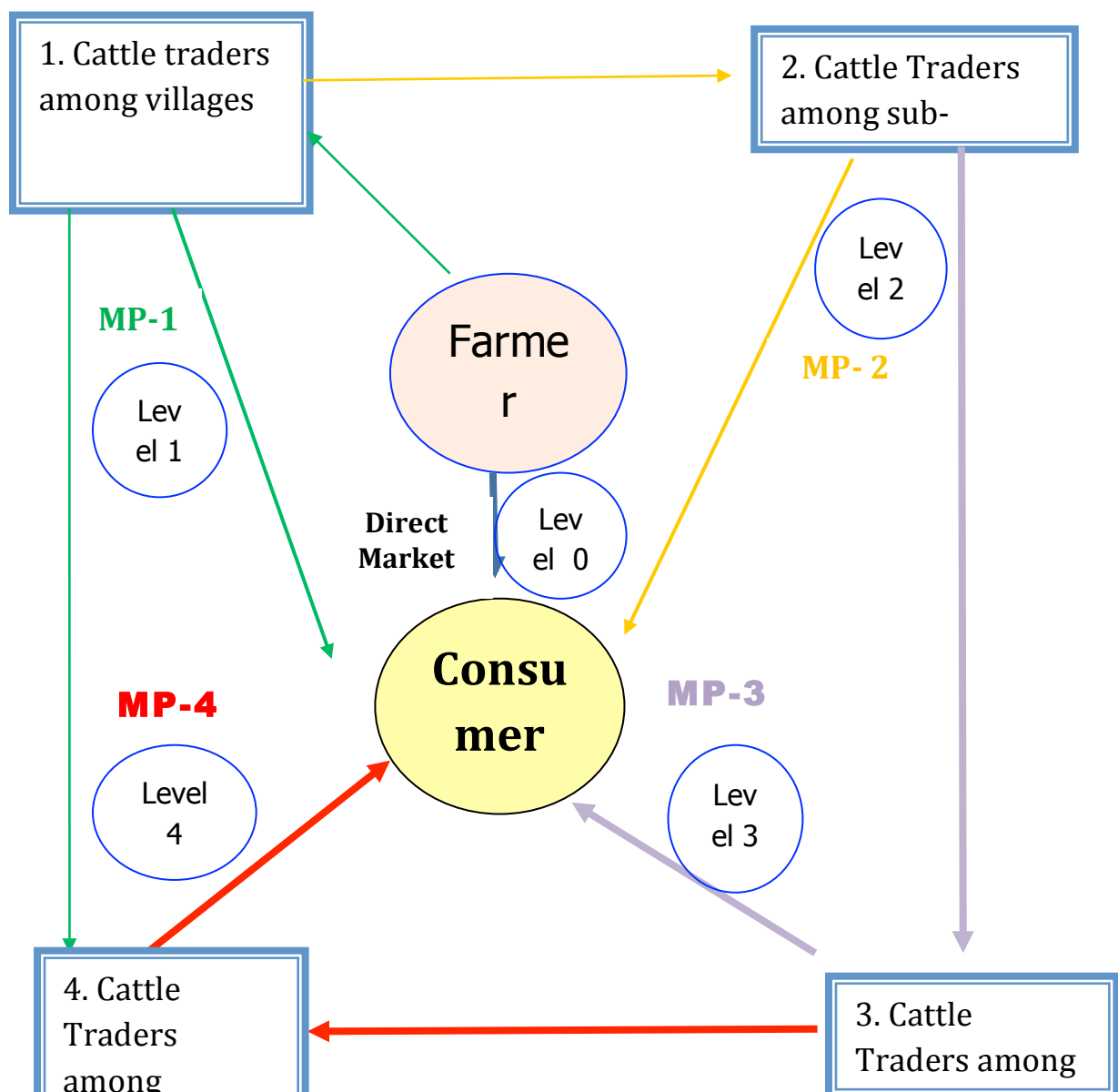


Figure 2. Beef Cattle Marketing System at Bojonegoro

Indirect Marketing System of Beef Cattle

Almost two thirds (73%) of cattle traders has carried out indirect marketing system. This marketing system was categorized into four Marketing Patterns (MPs). MP-1 is called indirect marketing which the movement of cattle from smallholder farmer to consumers at least using one middleman. This marketing pattern is usually called marketing level 1 (one level). This marketing was structured as farmer – village traders- -end consumer. In this model, cattle was purchased from farmer and sold by middleman before it is going to end consumer.

When cattle were delivered to consumer through two middlemen and it is considered as marketing Level 2 or Marketing Pattern-2. It was structured as farmer – village traders- sub-district-traders -end consumer. This third model is usually carried out by cattle traders between sub-districts in one regency.

Cattle traders also can operate between cities in one province and involved at least three middlemen, and therefore it is grouped in marketing level 3 or MP-3. This marketing pattern was structured as farmer – village traders- sub-district-traders- cities traders -end consumer. This marketing pattern was represented by cattle traders in one province.

Only a few cattle traders may sell cattle between provinces in a large number. The traders usually sell cattle to Jakarta where more cattle demand exists in this region. Its marketing is considered as marketing level 4 or MP-4. This marketing used at least four middlemen to deliver cattle from farmer to end consumers. Marketing pattern V was structured as farmer – village traders- sub-district-traders cities-traders - province traders -end consumer. The cattle traders were nationally delivered cattle to consumer through at least four intermediates.

Marketing Margin between Calf and Mature Cattle

Table 2 depicted that Marketing Pattern-4 can reach the high marketing margin than the MP-2. It was Rp. 3, 181, 571, - vs. Rp. 71, 589, - for mature cattle, and Rp.1672448, - vs. Rp. 37, 632, - for calf, respectively. The longer marketing channel was more likely to increase the marketing margin. It can be seen on the up-trend in regard to price per live body weight. The trend was intended to incline along these marketing pattern with the dropping price

in Marketing Pattern-2. Marketing Pattern-4 indicated the high percentage (20.42%) price increase in comparison with those of Marketing Pattern-2 (0.64%).

The differences in marketing margin between those marketing patterns can be explained based on the following reasons. In regard to market area, MP-2 usually operated in local area only involved cattle traders between sub-districts in one regency, whereas MP-4 was carried out nationally that delivered cattle between provinces. The selling number of cattle was also higher for the fifth marketing pattern than those of the third marketing model. Moreover, MP-4 has faced less competitor than the MP-2 and it has resulted on the higher price in selling cattle. Finally, cattle traders on fourth model can obtain share more in marketing cattle than the second marketing pattern as they has already consumer target. It means that cattle traders that operated between provinces can obtain share more in marketing cattle. On the other hand, cattle traders who sold cattle between sub-districts will lost opportunity to acquire these marketing share as they can't directly sell cattle to end consumers.

Price Spread, Percentage Marketing Margin, Mark up Price, and Marketing Efficiency

In marketing beef cattle, price will increase along with the marketing channel and therefore, creating a new price when its product was offered to consumer. Results showed that Price Spread of marketing beef has achieved for Rp. 6, 657, 290, -. It can be interpreted that the cattle price spread across marketing pattern 1 to 4. The comparison between its price and cattle price at farmer's level was defined as percentage margin and identified approximately 121.92%.

Table 1. Cattle Marketing Margin Based On Marketing Pattern at Bojonegoro Year 2012

No.	Beef Cattle Marketing System	Calf (Rp.) ^{*)}	Mature Cattle (Rp.) ^{**)}	Price of Live Body weight (Rp./Kg)	Price Increase (%)
		Marketing Margin	Marketing Margin		
1	Direct Marketing	-	--	21330	--
2	Marketing Pattern-1	359424	683748	22734	6,18
3	Marketing Pattern-2	37632	71589	22881	0,64
4	Marketing Pattern-3	662016	1259382	25467	10,15
5	Marketing Pattern-4	1672448	3181571	32000	20,42
where:					
*) Average Cattle weight = 256 Kg					
**) Average Cattle weight =487 Kg					

It means that the cattle price has propagated more than 100% across the marketing channel. The spreading of price can also provide the advantage for cattle traders up to 74.30% and it was Mark up price. In this area, cattle traders can gain more (74.30%) in comparison with price at consumer levels per unit of cattle selling.

Table 2. Price Spread, Marketing Margin, Mark up Price, and Marketing Efficiency of beef Cattle at Bojonegoro Year 2012

No.	Variable	Price (Rp.)
1	Calf Price at Farmer Level	5460480
2	Mature Cattle Price at Farmer Level	10387710
3.	Calf Price at Consumer Level	8960000
4.	Mature Cattle Price at Consumer Level	17045000
5.	Price spread	6657290
6.	Persentase Margin (%)	121.92
7	Mark up Price (%)	74.30
8	Marketing efficiency	0.61

Cattle traders have appeared obtaining more share margin in marketing cattle through marketing pattern 1 to 4. They can control about 0.61 of share margin, whereas only 0.39 was determined by farmers. It means that cattle traders can obtain share more (61%) in marketing cattle. On the other hand, farmers lost opportunity to acquire this share margin as they can't directly sell cattle to end consumers. In other words, marketing beef cattle was inefficient. This is because of the low bargaining power of farmer in selling cattle that it can impact on receiving a less *income per animal unit*. Unstructured of marketing institutions can also be considered as factors that stimulated inefficiency of marketing beef cattle. Also, the related institutions has found lack function in supporting and facilitating the marketing beef cattle. This gap should be solved in order to increase the farmer bargaining power in marketing cattle. Many measures can be implemented for instance building the integration agribusiness system from up-stream to down-stream sectors. It was aimed to meet demand of beef cattle with appropriate in quantity and quality as needed by consumers. Set up *net working* with supporting and related institutions may become useful in order to enhance the relationships with business partner, such as contract farming in beef cattle agribusiness. Empowerment of local sources may also improve the participation of related institution to generate bargaining power in beef cattle agribusiness.

CONCLUSIONS

The research on beef marketing system at Bojonegoro, East Java, Indonesia has discovered the following findings:

1. There were two systems in marketing beef cattle namely, direct marketing (27%) and indirect marketing systems (73%).
2. Indirect marketing system has comprised of four Marketing Pattern (MP) namely, (i) MP- I was operated Between village in one Sub-District, (ii) MP- II that carried out between Sub-District in one Regency, (iii) MP- III which held between District in one Province, and (iv) MP- IV was executed between Province (national wide marketing).
3. The marketing margin in both calf and mature cattle have varied along the four marketing patterns with the lowest (Rp. 37, 632,-, vs. Rp. 71, 589,-) on MP-II and the highest (Rp. 1, 672, 448, - vs. Rp.3, 181, 571,-) on MP-IV, respectively.
4. The increase price for the four marketing patterns in order was 6.18%, 0.64%, 10.15%, and 20.42%.
5. Beef cattle marketing system was inefficient based on the following criteria: Rp. 6,657,290, - of price spread, 74.30% of mark-up price, 121.92%, of percentage margin and 0.61% of marketing efficiency.

SUGESTIONS

It is suggested to construct an integrated agribusiness system in order to enhance farmers return and the availability of meat to fulfill consumer's demand.

REFERENCES

- Alemayehu. K., 2011. Value chain assessment of beef cattle production and marketing in Ethiopia: Challenges and opportunities of linking smallholder farmers to the markets. **Livestock Research for Rural Development** 23 (12).
- Amir, P. and Knipscheer, H.C., 1989. **Conducting On-farm Animal Research: Procedures and Economic Analysis**. Winrock International Institute for Agricultural Development, A.S.A., and International Development Research Centre, Canada.
- Baker, G.A., Grunewald, O., and Gorman, W.D., 2002. **"Introduction to Food and Agribusiness Management"**. Prentice-Hall International, London, United Kingdom.
- Crawford, I.M., 1997. **Agricultural and Food Marketing Management**. Food and Agriculture Organisation of the United Nations. Rome.
- Downey, W.D. and Erickson, S.P., 1987. **"Agribusiness Management"**. Second Edition. McGraw-Hill Book Company.

- Erickson, S.P., Akridge, J.T., Barnard, F.L., and Downey, W.D., 2002. " ***Agribusiness Management***". Third Edition. McGraw-Hill Companies. New York.
- Fields, D. and Gillespie, J.M., 2007. Preferences for Livestock Revenue Insurance Among Beef Producers. **Journal of Agribusiness** 25,1 , pp. 93-105.
- Lamb, H. and McDaniel, C. (2001). ***Contemporary Marketing Research***. 5th Edition. South Western College Publishing, USA.
- Musemwa, I., Chagwiza, C., Sikuka, W., Fraser, G., Chimonyo M and Mzileni, N., 2007. Analysis of cattle marketing channels used by small scale farmers in the Eastern Cape Province, South Africa. **Livestock Research for Rural Development** 19 (9).
- Musemwa, I., Mushunje, a., Chiminyo, M., Fraser, G., Mapiye, C., and Muchenje, V., 2008. Nguni Cattle Marketing Constraints and Opportunities in The Communal Areas of South Africa : Review. **African Journal of Agricultural Research**. Vol. 3 (4; pp.239-245.
- Teweldemedhin, M.Y. and Kafidii, L., 2009. Risk Management Strategies of Cattle Farmers in Namibia : Case Study from Omaheke and Otjozondjupa Regions. **Journal of Agricultural Extension and Rural Development**. Vol. 1 (2), 00.063-070.
- Utami, H.D., Nugroho, B.A., Hartono, B., and Fanani, Z. 2010. Analysis of Beef Cattle Farming At Poncokusumo Sub-District, Malang Regency. **Research Report**. Faculty of Animal Husbandry, Brawijaya University.
- Utami, H.D., Nugroho, B.A., Hartono, B., and Fanani, Z., 2012. Feasibility Study of Beef Cattle Farming (Case Study at Pakis Village, Tambak Rejo Sub-District, Bojonegoro Province). **Research Report**. Faculty of Animal Husbandry, Brawijaya University.
- Yusdja, Y and Ilham, N., 2004. Concept and Strategy of Future Animal Husbandry. **Agriculture Economic research**. Vol. 25 (1): 19- 28.

Do they really care? Insights on Consumers' Perceptions and Concerns Associated with Beef Credence Attributes

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Abstract

The willingness to purchase differentiated beef products is highly segmented and is often translated in small niche markets. There are still much to be explained concerning the gap between consumers' concerns and their actual demand for differentiated products based on higher production standards, which normally have higher prices. An analysis of consumers' concerns and perceptions related with animal welfare, food safety and the environment within the beef production chain and its links with beef consumption decisions confirms that the potential market for these differentiated beef products have characteristics of niche-markets. Finally, we want to understand if preferences, attitudes and concerns are translated in beef preferences and purchase intentions. There still exist a significant proportion of consumers not taking these credence attributes into consideration.

Keywords

Consumer preferences; Credence attributes; niche-markets

1. Introduction

The demand for differentiated food products is highly segmented and is often translated in niche markets. Beef products can be included in such reasoning, as suggested by the demand for organic (Fox et al., 2008) or PDO beef (Banovic et al., 2009).

Consumers may be willing to pay for differentiated beef and this willingness may arise from higher levels of awareness and concerns related with animal production conditions within modern food production systems (de Passillé and Rushen, 2005, Madureira et al., 2007). For example, Resurreccion (2003) claims that the decline in the consumption of meat products in the UK was related with consumer concerns about food safety, animal welfare and the environmental effects of beef production.

It is thus apparent that food products' differentiation often stems from process-related quality dimensions, which are related with characteristics of the production process, such as production with due concern for animal welfare and the environment (Bech et al., 2001). Though not necessarily leading to a different final product, these dimensions can influence consumer's welfare. It is accepted that consumers' search for process-related quality dimensions has increased for the last decades (Grunert et al., 2004).

Many process-related quality dimensions are credence dimensions, in the sense that their presence must be guaranteed by others, and consumers have no choice but to trust this information (Bech et al., 2001, Grunert et al., 2004). This available information is used to form quality expectations influencing the purchase decisions. This is the case with attributes like food safety, animal welfare and the environment, where consumers must rely on extrinsic quality cues in order to choose the product that is expected to have the quality dimensions consumers are looking for.

However, in spite of these cues, consumers face information problems in choosing those types of food products that best match their preferences and perceptions of quality and that assure satisfaction (Poole et al., 2007). This raises some doubts about the effectiveness of using these attributes as a differentiating tool for some food products.

Additional doubts originate from the fact that altruistic concerns (as those related with animal welfare or the environment) may not be translated in real purchases (Webster, 2001, Lusk et al., 2007, Vanhonacker et al., 2007), as many consumers still opt for the cheapest meat. Furthermore, some consumers may not even care that much about such issues, especially in times of increased income restrictions. As such, failing to recognize that some product's attributes can only add value for some consumer's segments may have implications in demand estimation and in total revenue.

All this uncertainty is aggravated by the fact that beef usually has a considerable low degree of differentiation (Grunert et al., 2004). So there will be increased costs associated with producing, marketing and selling differentiated beef products, which may be large enough to make these goods unprofitable.

Nevertheless, in face of such incertitude and intricate motivations and behaviours, there are well established differentiated food products which ground their competitiveness in attributes like animal welfare (free-range eggs), environmental protection (organic products) or food safety (pesticide free fruit). Even taking into consideration income restrictions, there are small but profitable niche markets that may be worth exploring.

An analysis of consumers' concerns and perceptions related with animal welfare, food safety and the environment within the beef production chain will therefore shed some light into the true market potential for such differentiated beef products.

Faced with all that have been exposed we looked at Portuguese consumers' beef buying and consumption habits looking in particular to the relations between consumption habits and behaviours related with food safety, animal welfare, environment and altruism. This article also intends to explore Portuguese consumers' concerns related with the beef production chain. Finally, we want to understand if preferences, attitudes and concerns are translated in beef preferences and purchase intentions.

2. Methods

A cross sectional survey was implemented in order to assess Portuguese consumers' concerns about animal welfare, safety and environmental protection in beef production and in beef products and how these issues influenced consumer preferences and purchase intentions.

The questionnaire included five sections where the final one inquired about socio-demographic characteristics. The first section dealt with beef purchasing and consumption habits. The second with consumer's behaviours related with care and concern about animal welfare and the environment. Some

additional questions were added to assess whether respondents cared for some more humane causes, like food banks or consumer protection.

The third section was specifically directed towards accessing the degree of concern about animal welfare, the environment or food safety in beef production. Emphasis was put on the fact that the subject of the question was the entire production chain. The questions here included also asked specifically which actors of the production chain did consumers' consider responsible for the problems. The fourth section asked respondents to rank four beef products in terms of their buying preferences, if the prices were the same. The four beef products were an animal friendlier beef, an environmentally friendlier beef, a safer beef and an undifferentiated beef.

Questionnaires were administered by a marketing company in the two Portuguese largest cities (Lisbon and Oporto). A valid sample of 613 respondents was obtained. Table 2 presents the summary statistics for demographic variables. The sample was not representative of the Portuguese population, namely in terms of age, income classes and number of children in the household. The sample bias towards higher income classes was a requirement since these are normally the consumer groups who typically purchase differentiated beef (Banovic et al., 2010).

Table 1 – Summary statistics for demographic variables

Sample characteristics		Percentage
Gender	Male	46.0
	Female	54.0
Age	18 to 37	30.5
	38 to 57	34.6
	58 to 77	25.3
	>78	9.6
Literacy level	Elementary	33.6
	Secondary	15.8
	Bachelor or higher	50.6
Household size	<=2	49.6
	3 or 4	41.4
	>=5	9.0
Disposable monthly income (€)	<950€	5.5
	[951€-1900€]	28.1
	[1901€-2850€]	15.8
	[2851€-3800€]	34.6
	>3801€	16.0

Data were analyzed using SPSS 19.0. All the variables were categorical and therefore descriptive statistics were used to report frequencies. Cross-tabulations and non-parametric tests, such as χ^2 statistics, were used to determine associations between variables.

3. Results

Beef buying and consumption habits

Table 2 presents the frequencies for the questions related with shopping habits, while table 3 refers to the frequencies on consumption habits. Contrary to previous results (Aguiar Fontes et al., 2012) where purchases at the butcher were the preferred place to buy beef, these respondents stated they prefer to buy beef at the big multiples. Beef buying frequency and consumption frequency are positively related ($\chi^2(8, N = 613) = 419.877, p = 0.000$).

Table 2 – Beef buying habits

	Percentage
<u>Preferred beef shopping location</u>	
Hypermarket / Supermarket	53.7
Butcher	45.5
<u>Beef buying frequency</u>	
At least once a week	33.6
One to three times per month	42.6
Less than once a month	23.8
<u>Did you recently reduce your beef purchases?</u>	
No	59.1
<u>Do you buy certified or branded beef?</u>	
No	94.5
<u>Did you recently reduce the certified beef purchases?</u>	
No	70.6

Notice that of those who buy certified beef (6% of the sample, and confirming the characteristics of a niche market) 92% didn't reduce either the beef purchases ($\chi^2(1, N = 613) = 21.511, p = 0.000$). In

contrast, 59% of those who don't buy certified beef did reduce their undifferentiated beef purchases. The majority of certified beef shoppers are people with higher literacy levels.

Table 3 – Beef consumption habits

	Percentage
<u>Consumption frequency</u>	
Almost every day	2.4
2 or 3 times per week	26.9
Once a week	33.0
1 to 3 times per month	24.0
Rarely or never	13.7
<u>Why do you consume beef rarely?</u>	
We don't like it	33.3
It's too expensive	23.8
It's not healthy	35.7
Other	7.1

Regarding beef consumption habits, 58% of the respondents consume beef at least once a week. And for those who state they rarely do it, only about a quarter refers it is too expensive. Those who consume beef less frequently are those who have also reduced their beef purchases ($\chi^2(4, N = 613) = 32.784, p = 0.000$).

Behaviours related with animal welfare, environment and altruism

After the assessment of buying and consumption habits, the questionnaire included a group of eight questions about whether respondents' carry out some activities related with the environment or animals (wild or domestic). Two questions were included in order to verify if there was any kind of association between altruistic behaviours directed towards animals or the environment and altruistic behaviours directed towards people. Table 4 summarizes the results.

Table 4 – Reported behaviours

Do you have any of the following behaviours?	Percentage
1. Read articles or watch television programs about animal welfare	30.2
2. Separate household waste for recycling	84.7
3. Buy (or regularly read) magazines on environmental protection or nature	4.7
4. Buy products specifically because they are environmentally friendly	30.3
5. Donate money (or volunteer) to animal protection associations or environmental protection	22.5
6. Actively participate in association activities or campaigns to protect animals or the environment	6.0
7. Belonging to associations for consumer protection	26.9
8. Deliver cash or goods such as clothing or food in institutions that help people in need	57.1
9. None of the above	7.7

The separation of domestic waste was by far the activity with more adherents, followed by item 8 and here we highlight the delivery of food items such as campaigns within the “Food Bank” Institution³⁰. Item 1 shown in Table 4 was probably misinterpreted by many respondents, who probably considered that programmes about wild life were included. All the other options were chosen by a much smaller percentage of participants and items 3 and 6 are those that gather fewer respondents.

Concerns related with the beef production chain

The three following questions in the questionnaire were related with specific concerns about food safety, animal welfare and the environment in beef production and who do consumers’ consider to be responsible for those aspects (from now on designated as “worrying aspects”). Table 5 summarizes the results.

Table 5 – Concerns and responsibilities related with the beef production chain

<i>Does the beef production chain have worrisome aspects regarding...?</i>	Beef Safety	Animal Welfare	Environment
Yes	48.5	59.4	40.3

³⁰ The “Food Bank” Institution (“Banco Alimentar contra a Fome”, www.bancoalimentar.pt) is a very popular organization in Portugal, and this high participation percentage may be related with the several national campaigns that are undertaken every year, and more than once a year, in supermarkets and hypermarkets.

No	51.5	40.6	59.7
<hr/>			
<i>If yes, due to...?</i>			
<hr/>			
Not enough legislation	13.1	11.0	19.4
Not enough control	74.4	58.8	78.5
Beef producers	55.9	57.4	44.5
Transportation and abattoirs	N.A.	56.3	N.A.
Supermarkets and butchers	31.6	17.3	19.0
Consumers	9.1	1.9	9.3
<hr/>			

About half the sample stated that they don't have concerns about beef safety. Only a low percentage of respondents consider that there isn't enough legislation to ensure beef safety along the production chain. For these respondents the problem seems to lay on the lack of efficient and effective control of the existing legislation. The responsibility for the worrisome aspects regarding the environment has a similar distribution.

Almost 60% of respondents consider that the beef production chain doesn't have worrisome aspects regarding the environment. Moreover, a significant relationship was found between those who declare not to buy eco-friendlier products and those who don't have concerns about the environment ($\chi^2(1, N = 613) = 46.458, p = 0.000$).

On the contrary, almost 60% of the sample does consider that animal welfare may not be ideal along the production chain. These concerns seem to be more meaningful among consumers with higher literacy levels ($\chi^2(2, N = 613) = 8.155, p = 0.017$) and among younger and middle aged consumers (66% of those stating having concerns about animal welfare).

There is also a significant association between the declared concerns regarding these three issues ($\chi^2(1, N = 613) = 138.127, p = 0.000$). In other words, those who don't report concerns about animal welfare, normally have no concerns with beef safety and environmental protection. Those who do state concerns about one of the variables have propensity to worry about the others.

Only 24% respondents have reported concerns about the three issues, whilst 36.8% declared not to have concerns about any of these issues within the beef production chain. Other socio-demographic variables seem not to have significant influence in these reported concerns.

Preferences for differentiated beef

Finally, the questionnaire aimed at determining if the declared concerns would be translatable into willingness to consume. Therefore, respondents were asked to rank four beef products in terms of their buying preferences if the prices were the same. Table 6 presents the rankings made by respondents when asked to order their choices if prices were the same for all the available beef products.

Table 6 – Differentiated beef ranking

	Animal friendlier beef	Environmentally friendlier beef	Safer beef	Undifferentiated beef	No option
1 st choice	21.7%	9.5%	54.5%	4.4%	10.0%
2 nd choice	48.6%	19.7%	19.9%	4.0%	7.8%
3 rd choice	18.9%	59.3%	17.3%	1.6%	2.9%
4 th choice	2.4%	4.9%	0.8%	91.5%	0.4%

Answer to question “Assuming that the prices did not rise, how would you order your choices?”
Indifference was allowed but only after significant indecision.

A “safer beef” was the first chosen beef by 54% of respondents, whilst 22% of respondents chose first an “animal friendlier beef”. An “environmentally friendlier beef” was chosen first 10% of the times.

“Animal friendlier beef” tends to be a second choice, and the “environmentally friendlier beef” is often the third choice. Not surprisingly, as prices were all the same, the “undifferentiated beef” was the last choice by more than 90% of consumers.

Notice that though only 10% of the sample has “no option” at all as first choice, this proportion is basically the same as those choosing the “environmentally friendlier beef”. Approximately 18% of the sample (n=109) did not have an option, that is to say, were completely indifferent between the four types of beef.

It is worth mentioning the fact that 4% of respondents opt for “undifferentiated beef” as their first choice. If to this we add those respondents that make “no option” at all (that is to say, are completely indifferent between available options) then we can consider that 14% of the sample does not care at all with these specific attributes – food safety, animal welfare and the environment – since the prices were all the same.

Regarding the relations between these rankings and the other groups of questions, those who buy certified beef tend to choose “environmentally friendlier beef” first ($\chi^2(4, N = 613) = 44.970, p = 0.000$).

The consumers who declared to have concerns regarding beef safety tend to choose “safer beef” as their first option ($\chi^2(4, N = 613) = 16.630, p = 0.002$). Also, “animal friendlier beef” was more often the first

option for those concerned about animal welfare ($\chi^2(4, N = 613) = 27.640, p = 0.000$). Consumers with higher literacy levels choose, as their first option, mainly a “safer beef”. The other demographic variables do not seem to influence consumers’ choices in this situation, as all classes prefer to buy a “safer beef”.

4. Discussion and conclusion

This analysis of beef buying and consumption habits of Portuguese consumers, together with the scrutiny of concerns and perceptions related with animal welfare, food safety and the environment within the beef production chain has helped unveiling some interesting points.

Considering first the group of questions related with buying frequencies, it is interesting that the percentage of consumers buying beef in the butcher corresponds to about half the respondents, which is a smaller percentage than the 58% reported by Aguiar Fontes, Banovic, Lemos, & Barreira (2012). This may be related with the opportunity cost of time and the increasing importance of the attribute convenience. Moreover, in Portugal, differentiated beef is mainly sold in hypermarkets, so those who do buy certified beef will most likely purchase it in this kind of location.

Also worth mentioning is the small percentage of beef buyers who buy certified beef (6% of the sample and confirming the need to have a sample biased towards higher income classes). This strongly confirms that differentiated beef products represent niche markets, probably appealing only to those with higher available incomes. In line with this conclusion is the fact that the vast majority of people who consume certified beef did not reduce its consumption, in spite of the premium prices associated with these products and the Portuguese economic crisis.

Looking at beef consumption habits, although beef is often considered a premium meat *per se* (as it is normally more expensive than other possible substitutes like chicken and pork), a high percentage of the sample consumes beef at least once a week. It can be suggested that the true beef appreciators try to maintain their consumption levels.

Taking into consideration the group of questions related with altruistic behaviours, we can suggest that behaviours towards helping or being informed about animal welfare or the environment are not among our sample’s habits. Moreover, the 30% of respondents declaring to buy products specifically because they are environmentally friendly (and the 22% declaring to donate money to animal welfare campaigns) should be interpreted with caution. It is well known that respondents’ tend not to be completely faithful to their true behaviours and concerns in surveys, for the most varied reasons. As such, the percentages here presented are most-likely overrated, as eco-friendly products probably don’t achieve such market shares in Portugal, and as the 2€ of per capita consumption of organic products in Portugal in 2010 seem to suggest (FIBL, 2012)

Not surprisingly, this revealed low interest is also apparent in the small levels of concerns about beef safety, animal welfare and the environment. These aspects may support the argument that these are truly niche markets, and that this kind of quality attribute interests only some consumers.

The high percentage of consumers stating that they don't have concerns about beef safety may be due to the fact that food safety is usually not a big concern in daily decision, except in cases when food scare occurred in recent times. These findings are in line with the findings of Grunert (2005) and Wezemaal, Verbeke, Kügler, de Barcellos, & Grunert (2010). According to Viegas, Santos, & Aguiar Fontes (2011), consumers seem to have confidence in the existing legal framework, which is concordant with our findings.

The percentage of respondents not particularly concerned with the environment is concordant with the fact that often consumers don't have a realistic idea of the environmental impact of livestock production (Vanhonacker et al., 2013).

However, when animal welfare is taken into consideration, consumers seem to have a more precise notion of the existing problems, as the percentage of concerned respondents seems to confirm. Moreover, the responsibility is much more divided along the chain, suggesting a more clear idea of the production process.

Rather interesting, although not surprising, is the lack of responsibility consumers' attribute to themselves. This detachment may be due to the indisputable public nature of these attributes. Also, it may be associated with voluntary ignorance (Harper and Henson, 2001, Ngapo et al., 2003). The fact that concerns are more significant among younger and middle aged respondents, and with higher literacy levels, can be interpreted in combination with the finding that these concerns are often combined in a pack of three. Altogether, this supports the fact that lack of awareness and knowledge about the beef production process helps consumers to keep detached and not worry about (and spend money on) issues they don't care that much about and consider not to be able to fix. For those consumers that are more informed, the concerns are probably related with the three issues.

Some comments on the preferences' ranking are also pertinent. The small percentage of respondents preferring an "environmentally friendlier beef" helps support the interpretation that the 30% of respondents declaring to buy eco-friendly products may not be answering truthfully. Furthermore, the fact that the "eco-friendlier beef" is only the chosen product at the third choice could have an additional interpretation. If the attribute that consumers' really care about is safety then, when faced with the same prices, food safety is the need they require in first place. Animal welfare may raise the need to fulfil some altruistic demand but the environment seems not to represent a significant preference in any perspective. All these findings come to support the proposed argument that beef product differentiation based on any of these attributes constitutes mainly a niche market, particularly in countries where organic products, namely organic beef constitute mainly niche markets.

Due to the aforementioned sample bias, however, the results can only be interpreted within the sample's characteristics and the generalization to the overall population is not possible. Moreover, the lack of association with most socio-economic variables hampers the possibility of proposing consumer segments at this point.

Future work will most likely involve correspondence analysis and cluster analysis in order to suggest which groups of consumers would be potential buyers for beef products differentiated on the basis of the credence attributes here covered.

It is possible that beef safety, animal welfare and environmental protection have the potential to be included in marketable beef products. The future focus must be on whether the willingness to pay exceeds the corresponding production costs, on the effectiveness of the information about these credence attributes, and on the transaction costs related to information itself. If these obstacles are surpassed, these niche-marketed food products might offer incentives for producers to differentiate their product, in spite of the greater economic risk.

5. References

- AGUIAR FONTES, M., BANOVIC, M., LEMOS, J. P. C. & BARREIRA, M. M. 2012. PDO beef recognition: how can we improve it? *Journal of International Food & Agribusiness Marketing*, 24, 288-305.
- BANOVIC, M., GRUNERT, K. G., BARREIRA, M. M. & AGUIAR FONTES, M. A. 2009. Beef quality perception at the point of purchase: a study from Portugal. *Food Quality and Preference*, 20, 335-342.
- BANOVIC, M., GRUNERT, K. G., BARREIRA, M. M. & FONTES, M. A. 2010. Consumers' quality perception of national branded, national store branded and imported store branded beef. *Meat Science*, 84, 54-65.
- BECH, A., GRUNERT, K. G., BREDHAL, L., JUHL, H. & POULSEN, C. S. 2001. Consumers' quality perception. In: FREWER, L., RISVIK, E. & SCHIFFERSTEIN, H. (eds.) *Food, people and society. A European perspective of consumer's food choices*. New York: Springer.
- DE PASSILLÉ, A. M. & RUSHEN, J. 2005. Food safety and environmental issues in animal welfare. *Rev. sci. tech. Off. int. Epiz.*, 24, 757-766.
- FIBL 2012. The world of organic agriculture, Statistics and emerging trends 2012.
- FOX, J. T., REINSTEIN, S., JACOB, M. E. & NAGARAJA, T. G. 2008. Niche marketing production practices for beef cattle in the United States and prevalence of foodborne pathogens. *Foodborne Pathog Dis.* 2008 Oct;5(5):559-69. doi: 10.1089/fpd.2008.0094. *Foodborne Pathogens and Disease*, 5, 559-569.
- GRUNERT, K. G. 2005. Food quality and safety: consumer perception and demand. *European Review of Agricultural Economics*, 32, 369-391.
- GRUNERT, K. G., BREDHAL, L. & BRUNSO, K. 2004. Consumer perception of meat quality and implications for product development in the meat sector - a review. *Meat Science*, 66, 259-272.

- HARPER, G. & HENSON, S. 2001. Consumer concerns about animal welfare and the impact on food choice. In: COMMISSION, E. (ed.) *Consumer concerns about animal welfare and the impact on food choice*. European Commission.
- LUSK, J. L., NILSSON, T. & FOSTER, K. 2007. Public preferences and private choices: effect of altruism and free riding on demand for environmentally certified pork. *Environmental and Resource Economics*, 36, 499-521.
- MADUREIRA, L., RAMBONILAZA, T. & KARPINSKI, I. 2007. Review of methods and evidence for economic valuation of agricultural non-commodity outputs and suggestions to facilitate its application to broader decisional contexts. *Agriculture, Ecosystems and Environment*, 120, 5-20.
- NGAPO, T. M., DRANSFIELD, E., MARTIN, J. F., MAGNUSSON, M., BREDHAL, L. & NUTE, G. R. 2003. Consumer perceptions: pork and pig production. Insights from France, England, Sweden and Denmark. *Meat Science*, 66, 125-134.
- POOLE, N. D., MARTÍNEZ, L. M. C. & GIMÉNEZ, F. V. 2007. Quality perceptions under evolving information conditions: implications for diet, health and consumer satisfaction. *Food Policy*, 32, 175-188.
- RESURRECCION, A. V. A. 2003. Sensory aspects of consumer choices for meat and meat products. *Meat Science*, 66, 11-20.
- VANHONACKER, F., VAN LOO, E. J., GELLYNCK, X. & VERBEKE, W. 2013. Flemish consumer attitudes towards more sustainable food choices. *Appetite*, 62, 7-16.
- VANHONACKER, F., VERBEKE, W., VAN POUCKE, E. & TUYTTENS, F. A. M. 2007. Segmentation based on consumer' perceived importance and attitude toward farm animal welfare. *International Journal of Sociology of Food and Agriculture*, 15, 84-100.
- VIEGAS, I., SANTOS, J. L. & AGUIAR FONTES, M. 2011. Joint production of safer, cleaner and animal friendlier beef: do consumers join it too? Insights from Focus Groups. *EAAE Congress 2011, Change and Uncertainty*. Zurich.
- WEBSTER, A. J. F. 2001. Farm animal welfare: the Five Freedoms and the free market. *The Veterinary Journal*, 161, 229-237.
- WEZEMAEL, L. V., VERBEKE, W., KÜGLER, J. O., DE BARCELLOS, M. D. & GRUNERT, K. G. 2010. European consumers and beef safety: perceptions, expectations and uncertainty reduction strategies. *Food Control*, 21, 835-844.

Customer Loyalty and Shopping for Meat in the Czech Republic

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Customer loyalty has been a frequently discussed topic for years and it becomes perhaps even “hotter” issue in times of economic downturn. This paper presents partial results of research focusing on characteristics of customer behavior of Czechs when shopping for meat and meat products, particularly how many outlets do Czechs use for their purchases of such products. The data were collected in 2012 both with online and paper versions of a questionnaire on a sample of 1122 respondents. With use of statistical software Statistica v. 10, frequencies and dependences were calculated. The respondents divided almost equally into three groups of customers: one being loyal to their favorite outlet, elsewhere shopping only rarely (24.2%), the second one having a few favorite outlets visited regardless of their current promotional activities (24.2%), and the third one shopping at outlets depending on their proximity at a particular moment (24.0%). The remaining one quarter of respondents divides into two groups shopping regularly for meat at their favorite retail or butchers chain (13.7%) and shopping at outlets depending on their current special offers promoted in leaflets and advertisements (13.5%). Dependencies were indicated for following respondents’ demographic characteristics: occupation (coef. of contingency = 0.40, p-value = 0.000), type of household structure (0.41, p-value 0.000), age (0.43, p-value 0.000), level of education (0.31, p-value 0.000), no or very weak dependency was identified for: income (0.20, p-value 0.001), gender (p-value 0.097), size of place of residency (0.134).

Key words: meat, loyalty, Czech Republic, consumer behavior

Respondent Explanations for Reactions to Health Benefit Claims that would be placed on Mushroom Packages

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This research investigates consumer responses to different health benefit claims to be placed on mushroom packages. Reasons for both positive and negative responses are examined. The research uses a sample of 549 respondents drawn from an Internet panel maintained by Markettools, Inc. Each respondent was presented with a series of health benefit claims. Rating scales were used to measure reactions to each claim, and respondents had the opportunity to explain their reactions. This paper examines these explanations. The results confirm the findings of the quantitative analysis using rating scales, and also provide new insights. Thus benefits applicable to a large proportion of consumers are more effective than those limited to specific segments with respect to lifestyle, as well as to demographic characteristics. In addition, where the benefit of a nutrient is not well-known there is not only a more negative response but also confusion about whether the respondent would benefit. Also respondents are influenced by their perceptions of substitutes. Finally, the wording of the health benefit statement is important. Our findings suggest that promotional messages should be applicable to most consumer lifestyles, may benefit by positioning mushrooms against substitutes that are less desirable in some respect, should avoid focusing on nutrients where the benefit is not clear to many consumers, and be carefully worded.

Organic Consumers' Reaction to Functional Food

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Organic food continues to be a food market niche that increases at a high rate, with the US and Germany as the largest markets worldwide (Willer et al., 2013). It is defined by an agricultural production process excluding genetic modification and synthetic fertilizers and pesticides, focusing on sustainable farming practices, biological cycles and animal welfare. Foods are usually certified according to standards that are in line with the norms of IFOAM, the sectors international federation (IFOAM, 2012a), and carry respective certification logos in order for consumers to distinguish organic and conventional food.

Organic food standards focus mainly on requirements related to environmental and animal welfare benefits. However, the sector's principles also include 'health', stating that "Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible"; It furthermore underlines that the goal is "to produce high quality, nutritious food that contributes to preventive health care and well-being" (IFOAM, 2012b). Consumer research studies show that health is in fact an important, if not the most important driver for consumers organic purchase decision (Guilabert & Wood, 2012; Hughner et al., 2007; Mondelaers, Verbeke, & van Huylenbroeck, 2009; Magnusson et al., 2003). While some studies find certain health benefits of organic food (Brandt et al., 2011; Huber et al., 2011), others conclude that there is little to back up consumers strong conviction of organic food being healthier (Smith-Spangler et al., 2012).

While organic food consumers choose organic primarily due to health reasons, functional food communicated as such with the help of nutrition and health claims aims at exactly this: trigger food choices driven by health motives, hopefully leading to healthier diets overall. Functional food constitutes a market sector with growth rates as well (Siró et al., 2008; Bech-Larsen & Scholderer, 2007), and the communication of its health benefits is regulated by an increasing number of regulations (Aschemann-Witzel, 2011; Hawkes, 2004). While a large number of consumer research studies have explored consumer behavior towards nutrition and health claims (called claims in the following for shortness) (Lähteenmäki, 2013; Leathwood et al., 2007), little is known about how consumers react to organic foods with such claims. On the one hand, organic consumers are obviously interested in health issues in relation to food. On the other hand, however, there are differing understandings of health in relation to functional food versus organic food (Lähteenmäki, 2013; Ronteltap et al., 2012; Bech-Larsen & Grunert, 2003; Luomala, Paasovaara, & Lehtola, 2006), and functional food is associated with a more technical, nutrient-based approach to health and promoted by large multinational food companies which might appear different from the 'holistic' approach that the organic sector is promoting.

A consumer study was conducted in order to explore whether 1) organic consumers reject

or prefer organic foods carrying a claim, and 2) how organic consumers preferring organic food with a claim are characterized. 210 German occasional or intensive organic consumers were quota-sampled according to age and gender in shopping streets in three mid-German towns. They participated in a laboratory purchase simulation and subsequent interview. The discrete choice test involved one decision among five brands for each of three product categories (spaghetti, yoghurt, muesli). All brands were organic, but two each were shown with a nutrition, health or health risk reduction claim that was unobtrusively added to the packaging. The appearance of the claim rotated between the brands. The choice for a product with or without a claim served as the dependent variable. As independent variables, measures of behavior during purchase, characteristics of the product and individual characteristics were explored. Only the variables of relevance in the analysis are explained along with the results.

It was compared whether the share of choices for a product with a claim differed significantly from the share of its appearance (40%, due to being on two out of five brands). Overall, the organic food consumers did not significantly prefer nor reject the products with a claim. The same was apparent when looking only at those consumers we categorised as ‘intensive consumers’ according to their stated purchase frequency (in more than 50% of purchases for at least two of the three categories). A significant difference of the share of choice could only be identified for occasional buyers of organic food ($n = 318$, $t = 2.001$; $p = .046$). Occasional buyers had chosen a product with a claim in 46% of their choices, which indicates a preference for products with a claim.

A binary logistic regression was conducted to explore which variables characterise those consumers that had chosen a product with a claim (see table 1). The respondents that chose a product with a claim were more likely to rate the organic products with a claim as healthier as the organic products without a claim (in the rating conducted in the subsequent interview), were less likely to have stated that they had seen the claim during the purchase simulation, and had less favourable attitudes towards functional food (as measured with the statements “I think it is positive that nowadays more and more products are developed that possess special added health benefits” and “I do not manage to eat healthily at all times; therefore I think foods enriched with vitamins are practical and convenient”).

Table 1. Binary logistic regression: explanatory factors for choice of a product with a claim

Predictor	B	SE B	Wald χ^2	df	p
HEALTH ORGANIC	.849	.122	48.536	1	.000
READ CLAIM (not read)	-.389	.187	4.331	1	.037

ATTITUDE FUNCTIONAL	-.064	.035	3.348	1	.067
Constant	.716	.702	1.041	1	.308

Likelihood-Ratio-Test: $\chi^2 = 103.661$; $df = 9$; $p = .000$; Hosmer & Lemeshow: $\chi^2 = 5.120$; $df = 8$; $p = .745$; Cox & Snell $R^2 = .153$; Nagelkerke $R^2 = .206$; 64.2% of cases correctly classified (cut-value 0.42)

Note: Number of choices analysed = 623. Only the variables with an influence significant on a 10% level are shown.

The results highlight that organic food marketers can assume organic food consumers either to be indifferent to the use of claims or potentially favouring organic foods with claims. A potential favourable effect of having a claim on an organic food product can be more likely be expected when targeting occasional organic buyers. No indication is found for organic or intensive organic food buyers to reject organic food with claims. However, organic consumers choosing the organic food with a claim were characterised with a negative attitude towards functional food; this might nevertheless indicate that there is a certain conflict in the eyes of consumers between functional food and organic food. Further research might explore this relation more in detail, possibly including the interrelation with modern health worries (Devcich, Pedersen, & Petrie, 2007), perception or preference of naturalness (Rozin et al., 2004) and use of alternative medicine or treatments.

Aschemann-Witzel, J. (2011). The EU health claim regulation in international comparison: review of the possible impact on food marketing and consumer protection. *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*, 6(33), 1–7.

Bech-Larsen, T., & Grunert, K. G. (2003). The perceived healthiness of functional foods: A conjoint study of Danish, Finnish and American consumers' perception of functional foods. *Appetite*, 40(1), 9–14.

Bech-Larsen, T., & Scholderer, J. (2007). Functional foods in Europe: consumer research, market experiences and regulatory aspects. *Trends in Food Science & Technology*, 18(4), 231–234.

Brandt, K., Leifert, C., Sanderson, R., & Seal, C. J. (2011). Agroecosystem management and nutritional quality of plant foods: The case of organic fruits and vegetables. *Critical Reviews in Plant Sciences*, 30(1-2), 177–197.

Devcich, D. A., Pedersen, I. K., & Petrie, K. J. (2007). You eat what you are: modern health worries and the acceptance of natural and synthetic additives in functional foods. *Appetite*, 48(3), 333–337.

Guilabert, M., & Wood, J. A. (2012). USDA certification of food as organic: An investigation of consumer beliefs about the health benefits of organic food. *Journal of Food Products Marketing*, 18(5), 353–368.

Hawkes, C. (2004). *Nutrition labels and health claims: the global regulatory environment*. World Health Organization, Genf.

Huber, M., Rembiałkowska, E., Średnicka, D., Bügel, S., & van de Vijver, L. P. L. (2011). Organic food and impact on human health: Assessing the status quo and prospects of research. *NJAS - Wageningen Journal of Life Sciences*, 58, 103–109.

Hughner, R. S., McDonagh, P., Prothero, A., Shultz, C. J., & Stanton, J. (2007). Who are organic food consumers? A compilation and review of why people purchase organic food. *Journal of Consumer Behaviour*, 6(2-3), 94-110.

IFOAM (2012a). The IFOAM norms for organic production and processing: version 2012. Retrieved December 11, 2012, from http://www.ifoam.org/about_ifoam/standards/norms/IFOAMNormsVersionAugust2012withcover.pdf.

IFOAM (2012b). *The Principles of Organic Agriculture*. Retrieved December 10, 2012, from http://www.ifoam.org/about_ifoam/principles/index.html.

Leathwood, P. D., Richardson, D. P., Sträter, P., Todd, P. M., & van Trijp, H. C. M. (2007). Consumer understanding of nutrition and health claims: Sources of evidence. *British Food Journal*, 98(3), 474–484.

Luomala, H. T., Paasovaara, R., & Lehtola, K. (2006). Exploring consumers' health meaning categories: towards a health consumption meaning model. *Journal of Consumer Behaviour*, 5(3), 269-279.

Lähteenmäki, L. (2013). Claiming health in food products. *Food Quality and Preference*, 27(2), 196–201.

Magnusson, M. K., Arvola, A., Hursti, U.-K. K., Åberg, L., & Sjöden, P.-O. (2003). Choice of organic foods is related to perceived consequences for human health and to environmentally friendly behaviour. *Appetite*, 40(2), 109–117.

Mondelaers, K., Verbeke, W., & van Huylenbroeck, G. (2009). Importance of health and environment as quality traits in the buying decision of organic products. *British Food Journal*, 111(10), 1120–1139.

Ronteltap, A., Sijtsema, S. J., Dagevos, H., & Winter, M. A. de (2012). Construal levels of healthy eating. Exploring consumers interpretation of health in the food context. *Appetite*, 59(2), 333–340.

Rozin, P., Spranca, M., Krieger, Z., Neuhaus, R., Surillo, D., Swerdlin, A., et al. (2004). Preference for natural: instrumental and ideational/moral motivations, and the contrast between foods and medicines. *Appetite*, 43(2), 8-8.

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

Smith-Spangler, C., Brandeau, M. L., Hunter, G. E., Bavinger, J. C., Pearson, M., Eschbach, P. J., et al. (2012). Are organic foods safer or healthier than conventional alternatives?: a systematic review. *Annals of internal medicine*, 157(5), 348–366.

Willer, H., Lernoud, J., & Kilcher, L. (. (2013). *The World of Organic Agriculture*. Frick / Bonn.