THE NEXUS BETWEEN CONSUMER PERCEPTION AND WILLINGNESS TO PURCHASE GENETICALLY MODIFIED (GM) FOODS

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ABSTRACT

The paper investigates a component of the theory of planned action i.e. subjective norms associated with genetically modified foods to determine consumer intention to buy GM foods. The study compared the types of consumer’s proponent and opponents and examined factors influencing GM foods. Cluster analysis and chi-square tests were used for comparison. The findings suggest that opponents are unwilling to purchase foods even though they may be more nutritious than mainstream products. To them these foods are risky and can pose a risk for causing allergens. However, there were no significant differences between the two group clusters as far as use of pesticides were considered, while religious, ethical and price were concerns of the two group clusters. The paper suggests that this will always be a niche market and provides some commentary on how managers may address these issues.
Introduction

Many food companies in Australia are responding to public demand and sourcing GE (genetically engineered) free organic and biodynamic produce. It has been claimed that GM foods are unnatural. There have been reports on banning the growth of genetically modified crops whereby two thirds of respondents (64%) said they were in favour of keeping the current ban. The majority of these were "strongly in favour" of the GM (genetically modified) crop ban (True Food, 2005). The opponents of GM foods allege that GM foods are unsafe and there is not sufficient information that ascertains safety (Pascalev, 2003). There are arguments suggesting the measures involved in long term safety of these products (Hart, 2002). There have also been indications of health hazards such as allergenicity, toxicity, increase in the antibiotic resistance of disease causing bacteria (Hopkins, 2001). Generally most of the studies revealed that consumer concerns were mostly health issues, animal welfare, the environment, and lack of consumer control over genetically modified foods (Miles and Frewer, 2000).

From a country point of view, there has been strong opposition as to how foods are manipulated in Northern Europe (Grunertt et al., 2001; Bredahl et al., 1998). Consumer disagreement towards GM foods were also confirmed in some parts of Asia, (Subrahmanyan and Cheng, 2000). Other parts of the world such as North America appear to be more liberal (Hallman and Metcalfe, 1993). While an Australian study showed that 67 per cent of respondents believed that the benefits of genetic engineering would compensate the risks in the long term, with only 10 per cent believing that the risks would compensate the benefits (Kelly, 1994), scientists and environmentalists have expressed concerns about environmental risks these foods generate (Brown, 2001).

The proponents argue on a different dimension maintaining that there are no adverse effects that have been reported, that GMF are safe and subjected to meticulous testing (Mellon, 2001 and Hart, 2001). The proponents believe that there are misconceptions about these foods and state that the objections are raised from mistaken institutions, cultural bias, hidden economic and political agendas (Becker, 2003). They also believe that GM foods would have a positive impact on the environment (Horsch, 2001). Such conflicting arguments are not particularly compelling as they rely on empirical claims and there is not enough data and no conclusive evidence about the effects on GM foods to support those claims. Given that this controversy exists about GM foods it is worthwhile to explore how consumers make decisions on purchasing GM foods.

The Theory of Planned Action

Ajzen and Fishbein’s model (1980) on reasoned action is one of the most frequently cited. It assumes that behaviour is determined by intentions to perform them and these intentions are determined by a combination of attitude (beliefs about the behaviour’s consequences) and subjective norm. With accordance to this theory, intention to act has a direct effect on behaviour, and can be predicted by attitude. The attitudinal construct examines an individual’s disposition towards a behavior. It is the combination of a consumer’s perception of what other people believe the consumer should do, and the consumer’s motivation to comply with their wishes (Craig-Lees et al., 1995). Ajzen’s subjective norm adds a social element. This measures the
perceived social pressure to perform or not to perform behaviour. Subjective norms construct includes attributes of an individual’s social environment and perceived behavioral control variable addresses variation in an individual’s ability to control the performance of a behavior. A person’s intention to perform behaviour increases, as subjective norms become more favourable.

When comparisons of the TRA were made by Netemeyer and Bearden (1992) to Minard and Cohen's (1983) model that was similar in structure to the TRA, they indicated that it had key conceptual and operational differences. Their argument suggests that TRA constructs involve some degree of redundancy, which makes it difficult to estimate the relative importance of attitudinal and normative influences. TRA regards the attitude towards behaviour rather than the attitude towards the product. To understand the relationship of the model, just attitudinal influence is not sufficient even though many studies reveal that a person’s attitudes toward a behaviour and subjective norms are sufficient determinants of his/her behavioural intention (Bowman & Fishbein, 1978; Goldenhar & Connell, 1993; Jaccard & Davidson, 1972).

The later model introduced by Ajzen, was based on the theory of planned behaviour (Ajzen 1985, 1987, 1991) with the inclusion of the perceived behavioural control variable. This was extended to include those behaviours that were characterized by a low degree of volition. This theory indicates that a person’s intention to perform a behaviour increases as perceived behavioral control increases and behavioural intention is the immediate antecedent to behaviour (Ajzen, 1985, 1987 & 1991) which measures attitudes, subjective norms and perceived behavioral control, together this determines behavioral intention. Ajzen (2001) found that in fact major studies concerned with the prediction of behaviour from attitudinal variables were conducted in the framework of the theory of planned behavior (Ajzen 1991) and to a lesser extent, its predecessor, the theory of reasoned action (Ajzen and Fishbein 1980). As such Bredahl et a.l (1998) extended theory of planed behaviour that underline the factors contributing to purchase or avoid GM foods. The original three factors in Ajzen’s theory i.e attitude, degree of social pressure and degree of control are extended to include additional variables such as moral obligations, subjective norms, behavioural control and perceived difficulties.

Objectives
The objective of the study is to differentiate the consumers within the given sample by using cluster analysis. Secondly, to compare how consumers regard GM foods within the two sub samples and whether there are any differences. Thirdly, to provide recommendations for managers dealing with GM foods. To do this, chi-square tests were conducted on the various types of consumer groups identified by cluster analysis.

For the sake of simplicity we only test questions related to subjective norms and moral obligations on the two types of consumers (Proponents and Opponents). Subjective norms are likely to play a role in determining how and what individuals think about GM foods (Silk, Parrott and Dillow, 2003). Subjective norms are also defined as statements that specific individuals or groups make in regard to GM foods (Silk, Parrott and Dillow, 2003). In order to establish if there is a difference between
the two types of consumers when making decisions on purchasing GM foods the following questions were used.

- How risky would you say GM foods are in terms of risk for human health?
- How willing are you to consume foods produced with GM ingredients?
- How willing would you be to consumer GM food if it reduced the amount of pesticide applied to crops?
- How willing would you be to purchase GM food if it was more nutritious than similar food that isn’t genetically modified?
- How willing would you be to purchase GM food if it posed a risk of causing allergic reactions for some people?

For each of these questions, respondents were proposed the following categorical modalities:

1- Extremely unwilling / risky. 4- Somewhat willing / safe.
2- Somewhat unwilling / risky. 5- Extremely willing / safe.
3- Neither willing nor unwilling / risky nor safe. 6- Don’t know (not spontaneously proposed to the interviewees)

To examine morality and the impact of price the following questions were used:

- How important are ethical or religious concerns when you decide whether or not to consume GM foods?
- How important is the price factor when you decide whether or not to buy GM Foods?

For each of these questions, respondents were proposed the following categorical modalities based on a continuum for no.1 extremely unimportant (3) neither important nor unimportant, and (6) don’t know. These scales were recoded and further collapsed into three categories (1) unimportant/unwilling (2) neutral/don’t know (3) important/willing

**Methodology and Findings**

The random sample for this study was derived from three Universities, one metropolitan and two regional campuses. A total of 130 questionnaires were completed and were used for data analysis. The research instrument used in this study was structured based on the modified questionnaire developed by Chern, *et al.* (2001). The data were analysed using both descriptive measures and cluster analysis to identify and validate items contributing to each component in the model.

To search for a typology of the attitudes related to the consumer acceptance of GM foods, a hierarchical cluster procedure was carried out on the individuals described by the factors (Ward's cluster method). Using this method, individuals are grouped into clusters according to their proximity, i.e., their similar characteristics. A class is then defined as a group of individuals with common characteristics or, more specifically in this study, with a similar degree of acceptance of GM foods.

The agglomerate hierarchical clustering algorithm constructs the hierarchical tree starting with the individuals. Ward's method (Ward, 1963) seeks at each step to form
a new cluster which minimizes the internal variance of the new merged class. Two clusters were chosen for simplicity in this analysis. The purpose of this analysis is to differentiate the respondents according to their attitude towards GM foods with respect to a range of different arguments. To compare how consumers regard GM foods within the two sub samples and if there are any differences, chi-square tests were conducted on the various types of consumer groups identified by cluster analysis.

Results

Table 1: Cross tabulation for advertising claims

<table>
<thead>
<tr>
<th>Condition</th>
<th>$\chi^2$ (2)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are no differences between the variances of the cluster groups in terms of risk for human health</td>
<td>$\chi^2$ (2) = 20.8, p &lt;.05</td>
<td></td>
</tr>
<tr>
<td>There are no differences between the variances of the cluster groups for willingness to consume GM foods.</td>
<td>$\chi^2$ (2) = 9.33, p &lt;.05</td>
<td></td>
</tr>
<tr>
<td>There are no differences between the variances of the cluster groups for willingness to consume GM foods if it reduced the amount of pesticide</td>
<td>$\chi^2$ (2) = 1.52, p &gt;.05</td>
<td></td>
</tr>
<tr>
<td>There are no differences between the variances of the cluster groups for being more nutritious than similar food that is not genetically modified.</td>
<td>$\chi^2$ (2) = 7.25, p &lt;.05</td>
<td></td>
</tr>
<tr>
<td>There are no differences between the variances of the cluster groups if GM foods posed a risk for causing allergic reactions.</td>
<td>$\chi^2$ (2) = 18.7, p &lt;.05</td>
<td></td>
</tr>
<tr>
<td>There are no differences between the variances of the cluster groups for the importance of ethical or religious considerations</td>
<td>$\chi^2$ (2) = 2.53, p &gt;.05</td>
<td></td>
</tr>
<tr>
<td>There are no differences between the variances of the cluster groups for the importance in price in deciding to buy or not to buy GM foods.</td>
<td>$\chi^2$ (2) = 2.68, p &gt;.05</td>
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</table>

Chi-square testing revealed significant differences between the two sub samples of proponents and opponents. Except for reduced pesticides, ethical, religious considerations and price. A major type of integrity threatened by GM food is religious integrity and GM foods appear to be offensive to religious people for a number of reasons i.e. it may interfere with the divine order or it may affect that life, food and reproduction are sacred and wrong for humans to interfere in this processes (Comstock, 2001). Regardless of what these claims suggest, religious and ethical objections are required to be taken seriously due to freedom of religion in a democratic society (Pascalev, 2004). Moreover, religious beliefs and ethical considerations would be similar across the two groups. Similar to our research, convenience sample of undergraduates indicated that price was of premium importance in their purchasing decisions (Fortin and Renton, 2003). There was not a significant difference between proponents (68.4%) and opponents (54.4%). With regards to the willingness to consume GM foods if it reduced the amount of pesticide applied to crops. There were very little significance between proponents willing to purchase foods (52.6%) and opponents (56.7%). Opponents are more unwilling to purchase GM foods (87.5%) as compared to proponents (12.5%) if it was more nutritious than similar food that isn’t genetically modified. With regards to genetically modified foods posing a risk causing allergic reactions for some consumes, 22.2% of the proponents were unwilling to purchase these foods as against 77.8% of opponents.
Managerial implications

Based on the findings, only 12.5% proponents were unwilling to consume foods that were GM as against 87.6% of opponents. While 9.1% proponents as against 90.9% proponents found foods very risky. Many researchers have pinpointed common concerns about long term risks (Silk et al., 2003). The theory of planned behaviour (Bredahl et al., 1998) highlighted that consumer attitudes towards GM food are determined by risk and benefit perceptions which in turn are determined by general attitudes and knowledge about GM foods. Managers should attempt at reducing risks, which in turn would increase perceived benefits of GM foods. Researchers have also found as people become aware of GM foods and more knowledgeable about the subject, their negative perceptions decrease, while their receptiveness to GM foods and propensity to purchase GM foods increases (Fortin and Renton, 2003; Subrumaynan and Chen, 2000). Hence, managers should aim to address these issues and increase consumer awareness. Price is a relative factor and generally speaking most consumers would prefer low priced foods but with GM foods keeping costs low would be problematic if more tests and quality control issues on risks and health are to be maintained. There will always be controversial issues with genetically modified foods and unless these issues in the long term can be scientifically proven, there will only be a niche market for genetically modified foods.
References


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