

# Consumer acceptance of personalised nutrition

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## Nutrigenomics and personalised nutrition

The last decades, science and technology have developed at a rapid rate in many fields, offering potential benefits for the consumer as an individual (e.g. personal computers) and society as a whole (e.g. food preservation technology). Some technologies diffused very successfully into society, others did not. Nutrigenomics is a recent example of an emerging technology in the area of nutrition. It has been defined as “understanding how nutrition influences metabolism and maintenance of the internal equilibrium in the body, how this regulation is disturbed in the early phase of a diet-related disease and to what extent the individual genotype contributes to such diseases” [5]. Nutrigenomics is a research area developing at high speed, both fundamentally and applied. A deeper understanding of how nutrition influences the activity of human genes may contribute to improved quality of life by providing opportunities to develop food products or dietary advice tailored to the nutritional needs of specific groups in society, or even individuals. This so-called personalised nutrition (PN) is the most vivid application of nutrigenomics. PN is an innovative concept that identifies individual nutritional needs based on genetic make-up. Included in the concept are the products and services that will be developed according to those needs. Some authors have argued that these personalised foods will move the food market towards a consumer pull system, where the consumer’s preference for optimal health is a major driver for food choice [3].

However, as well as providing the opportunity for improved consumer health, PN may also raise concerns in society regarding privacy and control over sensitive information. Moreover, PN will only contribute to the quality of life of end-users if they are motivated and able to act according to their personalised recommendations on food intake. In order to maximise exploitation of nutrigenomics’ potential, it is important to integrate the view of the end-user into the development of the technology.

## Who are the end-users?

Issues that are relevant for successful introduction of PN will best be addressed by the people that will be confronted with PN in their daily lives. These end-users can roughly be divided into “patients” and “consumers”. The first group is familiar with diseases or disorders and therefore likely to be highly motivated to take preventive, alleviating or curative action. Moreover, if genomics can provide a visible advantage in the medical field, this can be a basis to facilitate acceptance in the area of food. The latter group of consumers, also the largest in society, is in a relatively healthy condition and less inclined to be involved in preventing disease by applying the innovative nutrigenomics science through PN. In this case, it is crucial that the personal and verifiable benefits are obvious and clearly communicated to the consumer.

## Adoption of innovations

Insights from the social sciences can be valuable to identify possible barriers or success factors for the development and acceptance of new technologies. Research has shown that

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innovations have known high failure rates over the last few decades. It is estimated that 50% of new products launched on the market fail [4]; and the actual number is even higher when products that never reach the consumer are included. Part of this high failure can be explained by unforeseen consumer reactions, as it is the consumer who is the ultimate judge of acceptability of new products. For technologies that deliver really new products or services, accurate prediction of consumer acceptability is complicated by the fact that consumers do not have a cognitive mindset against which they can assess the added value of new offerings. In consumer research it is therefore important to create a proper context for evaluation of future products and services.

Research into consumer acceptance of new food technologies can be traced back to a sociological study in the 1940s by Ryan and Gross. They showed that adoption of innovation follows an S-shaped curve in time, and that potential adopters can be classified into five categories reflecting speed of adoption. Later on, Everett Rogers extended this work by identifying the generics in the process of accepting a new technology [6]. His theory on diffusion of innovations has been the foundation for applications in many different areas.

Rogers' theory has also been incorporated in a recent review of existing literature on consumer acceptance of new technologies. The review reveals that characteristics of the technology, the consumer and the social system together influence consumers' intention to accept a technology through one or more psychological processes. In these processes, the emphasis can be on a rational trade-off between a technology's benefits and costs, or on more emotional perceptions of risk and uncertainty. Communication on an innovation largely determines which of the determinants and which of the psychological constructs have the most important influence on acceptance. So, acceptance is not merely explained by what a technology is or is not, but much more by the end-users' understanding of what it is. This framework is displayed in simplified form in Fig. 1.

Particularly issues of uncertainty and consumer concern seem to be important in the context of food [2]. This is not surprising, given the intimate relationship people have with their foods, in contrast to other new products. Foods are actually ingested into the human system [8]. This suggests

that consumer education about the technical and rational aspects of nutrigenomics alone will not lead to consumer acceptance, because it does not address feelings of risk and uncertainty. Other issues that play a role include perceptions of self-efficacy ("am I able to comply with this diet?") and normative beliefs ("what do my peers think about this?").

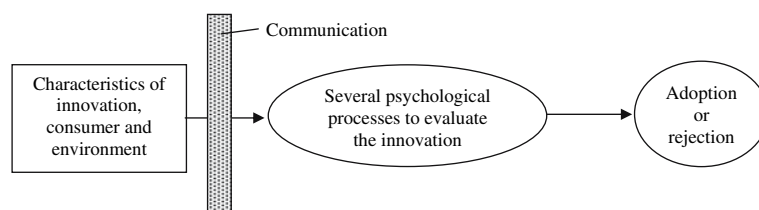
### Acceptance of PN

How can these insights from social research be of value for the development of nutrigenomics and PN? Several lessons can be learned from previous research. In a Canadian research project focus groups were conducted to investigate consumers' hopes and concerns related to genomics research. When the topic of food was discussed, the issues concerning nutritional value and quality were all examples of genetic modification of crops and foods, e.g. Golden Rice [1]. Such associations with gene technology are to be expected, given the closeness of genomics to the core of humankind: genes. These links are inevitable and require a careful management of the promises of the potential deliverables of nutrigenomics. Another resemblance to the introduction of biotechnology is the intensity of communication on nutrigenomics and PN. This intensity is extremely low, especially when compared to investments in nutrigenomics research by governments and industry. If the aim is to profit maximally from the potential benefits of nutrigenomics, it is essential for the expert community to communicate with consumers proactively. Scientists, policy makers, industry, NGOs, and health care providers should take up this challenge together. By doing so, societal involvement and commitment are stimulated, and the consumer is given a voice in determining the boundaries of the applications. Furthermore, it is critical that PN delivers clear benefits to society. This can be achieved by building on successes in related areas, such as the medical, and targeting innovative consumers in niche markets.

### Concluding remark

The end-users of any technology eventually decide upon the fate of the technology by adopting or rejecting it.

**Fig. 1** Conceptual framework for consumer adoption of new technology



Consumer research in an early stage of the development of nutrigenomics and its application in the form of PN may identify the issues that are truly relevant to consumers and is therefore an essential step in the process.

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