

## C-2. INSIGHTS INTO NANOTECHNOLOGIES: SHAPING CONSUMER BEHAVIOUR

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The world has gone through historical processes that are dramatically and rapidly transforming our social and business environment, producing far-reaching effects on our life styles and our habitat. In the hyper-competition era, factors such as global economy, new emerging technologies, information technology, and vague cultural barriers have obliterated the boundaries among countries, organizations, and social groups. Technological progress, especially related directly to basic human rights, needs to be accessed by all consumers and given priority over economic interests, thus contributing to equal opportunities. On the other hand, current developments in scientific and technological research raise a number of ethical questions comprising responsibility. Areas of research as nanotechnology and biotechnology, regarding food, healthcare and environmental issues, elicit complex and undeniable debates within society today.

Our previous research on Nanoeducation has revealed a low level of scientific knowledge in Latvian consumers. The results stimulated the initiation of the project 'Adopting Intellectual Life Approach' (AILA) at Information Systems Management University (ISMA), Riga, Latvia. The aim of this research, focusing on the challenges of nanotechnologies in the food and healthcare sectors, is to explore Latvian intellectual consumers: their habits, new technology perceptions, preferences and values. Intellectual consumption is viewed as an identity project since we will study how Latvian citizens of the recession times construct their identity based on intellectual ethical consumption practices.

**Consumerism in historical context.** Consumerism has emerged as part of a historical process bringing about the creation of global mass markets, industrialization, and the consumer culture, which contributes to the investment of the rising incomes into the purchasing of ever-increasing produced goods and services.

The modern consumer is not an isolated individual making purchases in a vacuum. Rather, we are all part of a contemporary phenomenon that is often referred to as a consumer society. Looking at the contribution of consumption to individual and social well-being requires taking a broader view than that of marketers, who are primarily interested in selling their products. It also means taking a broader view than that taken by utility theorists, who are primarily interested in modelling consumer choice. What is the relation, then, of consumption to well-being? Can social well-being be increased by any particular policies, implemented theories, or practices related to consumption?

**Consumer behaviour phenomenon.** All of us are consumers. We consume things of daily use; we also consume and buy products according to our needs, preferences and buying po-

wer. What we buy, how we buy, where and when we buy, in how much quantity - depends on many factors, both objective and subjective.

Consumer behaviour is a complex, multi-faceted phenomenon. It attempts *to understand the decision-making processes of buyers*, both individually and in groups. It studies characteristics of individual consumers such as *demographics* (statistical characteristics of a population widely used in marketing and include gender, age, ethnicity, knowledge of languages, employment status, etc.) and *behavioural variables* in an attempt to understand people's needs or wishes. It also tries *to assess influences on the consumer* from groups such as family, friends, reference groups, and society in general. Therefore the factors influencing customer behaviour can be divided into *internal* and *external*.

A renowned expert in marketing strategies Delbert Hawkins defines consumer behaviour as 'the study of individuals, groups, or organizations and the processes they use to select, secure, use, and dispose of products and services, experiences or ideas to satisfy needs and the impacts that these processes have on the consumer and society'(2007).

The International Dictionary of Marketing defines it as 'the decision-making process, and activities involved in purchasing, evaluating, using and disposing of goods and services by the general public' (2002).

Behavioural Economics has only recently been given the attention it deserves through the pioneering work of 2002 Nobel prize winning economist Daniel Kahneman, along with Richard Thaler and Cass R. Sunstein and many others. The breakthrough insights from the behavioural sciences suggest we need to understand more deeply the context in which behaviour takes place. It is the context around a person that influences how they make choices and decisions and how they behave. In terms of policy-making, there are also many initiatives or behavioural interventions claiming to be able to shape consumer behaviour. However, they often consider that it is important to increase consumer knowledge or raise awareness. Still, the key challenge to effective consumer policies lies in *bridging the gap between change in attitudes and actual changes in behaviour* – what is often referred to as the 'Attitude-Intention-Behaviour Gap' (Fig.1).

If the ultimate goal is to shape behaviour, then we need to explore how to bridge this gap between changing attitudes and intentions. The skill comes with being able to choose the right theory for the right situation and then finding the most effective tool that will actually lead to the required behavioural change. This is why it is so challenging for marketers and policy-makers to try and understand why consumers behave in different ways and even more so *to shape* their behaviour.

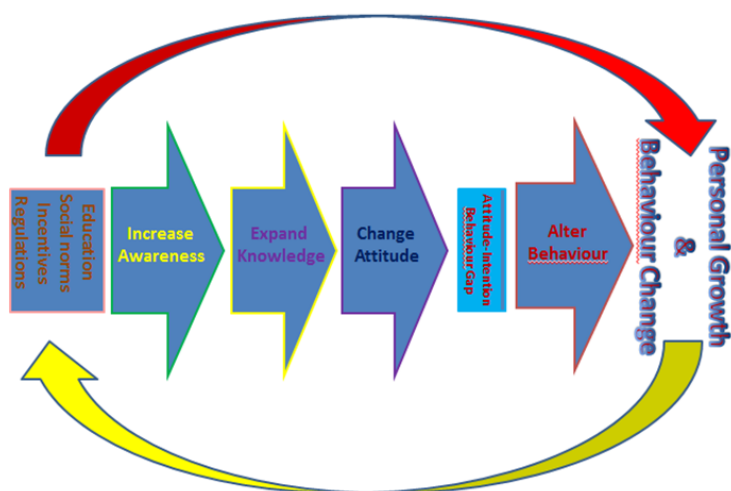


Fig. 1. The Changing Behavior Strands.

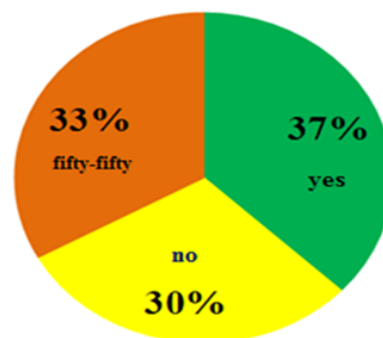


Fig. 2. Student responses to the question: Do you consider yourself an 'intellectual' consumer'? (N=120)

**Why should we study nanotechnologies?** Understanding the complexity of the consumer-market interface (contacting area) requires a degree of scientific understanding. Yet surveys conducted by the National Science Foundation (2009) suggest that only 11% of citizens understand enough of the vocabulary and concepts of science in general to be considered scientifically literate consumers.

Despite steadily increasing dependency of modern societies on technology, society-wide understanding of technology (necessary, for example, in informed and critical decision-making) is usually lacking. Unfortunately, the general public at large is either unaware of nanotechnology or doesn't care. It seems nanotechnology innovations are created on behalf of the technology and not for the intended audiences. The importance of inducing technological literacy and interests in younger generations cannot be overstated, as it impacts future supply of engineers, scientists, and integrated managers.

However, what we witness today is that higher education is not about understanding reality but about accumulating knowledge through individual subjects which are disconnected from each other and decontextualized. If we want higher education to

become an intellectual engagement that goes beyond the study of specific issues inserted in a single and minor subject within the broader context of compulsory curricula, it needs to adopt Development Education (DE) in order for it to become the most efficient and effective response to today's challenges [2].

Being avid consumers of manufactured products, contemporary Latvian youths are very familiar with their wide variety due to the efforts of marketing campaigns, advertising media and their own use of the Internet. However, as they buy and use today's products, they generally pay no attention to how these products came to exist or how they are made. This lack of knowledge creates a strong demotivating barrier preventing many potential students from not only entering, but even considering the field.

**Towards an open dialogue on the benefits and risks of nanotechnologies.** We describe an effort to bridge the technological literacy gap in consumer citizens, currently under way in Latvia. Our previous research results on Nanoeducation stimulated the initiation of the project 'Adopting Intellectual Life Approach' (AILA) at ISMA University of Applied Sciences, Riga, Latvia.

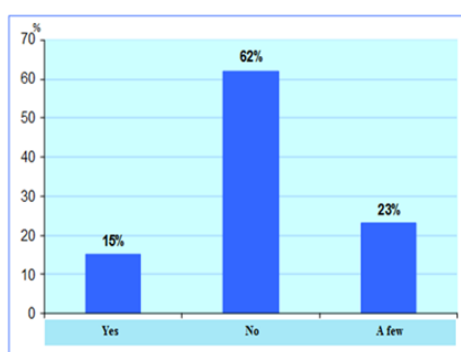


Fig. 3. Student responses to the question: Do you know what products contain nano-ingredients?



Fig. 4. Student responses to the question: If there is a choice: will you buy a product with 'nano' or without 'nano'? (before the general course on Ts).

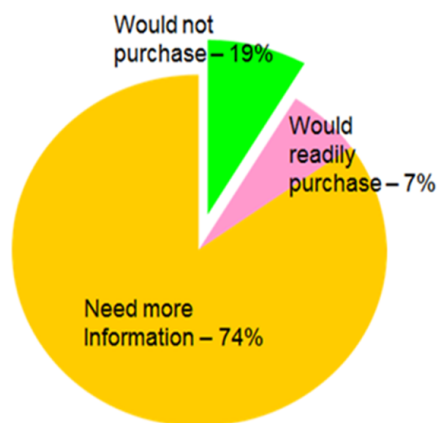


Fig. 5. Students as consumers' impressions of the risks versus the benefits of nanotechnology (after a general course on NTs)

The aim of this research, focusing on the challenges of nanotechnologies in the food and healthcare sectors, is to explore Latvian intellectual consumers: their habits, new technology perceptions, preferences and values. Intellectual consumption is viewed as an identity project since we will study how Latvian citizens of the recession times construct their identity based on intellectual ethical consumption practices. The project covers interdisciplinary priority areas important for everyone: food and healthcare systems. The empirical results have revealed a huge discrepancy between nanotechnology use in products that are already on the market and lack of nanotechnology understanding in a modern Latvian consumer society.

The question arises: does higher education today fulfil its role as a major catalyst to provide the necessary knowledge and relevant skills mix for our students to be prepared to join the highly technological global economy to ensure sustainable future for themselves, in the first place?

To find the answer to this question, we initiated a pilot research with the second-year students as an educational supplement, as a part of market analysis of a particular product that the students are learning how to make [3-5].

The first question addressed to 120 respondents was whether they considered themselves 'intellectual consumers' (Fig 2). As we can see from the pie chart, the answers divided almost evenly among the three groups of students-consumers with a slight shift toward 'intellectual consumer'. As to student awareness of nano enhanced products, judging from the bar graph, the plurality – 62% - have no idea about products containing nano-ingredients, hence we can assume that they cannot make responsible decisions concerning their health. Only 15% of students-consumers say that they know what products contain nano-ingredients (Fig.3).

Among students-consumers who make an initial assessment of nanotechnologies, the plurality think the risks and benefits will

be about equal, and the votes are divided about evenly between benefits and risks – 60% and 40% respectively, with a slight shift to risks. But when potential risks and benefits are outlined in the general introductory course into nanotechnologies, the greatest shift is toward the need of additional information – 74% or risk – 19%. As we can see, life itself imposes the necessity of knowledge and education to make informed choices and responsible decision making, thus, ultimately developing intellectual consumers.

Nanotechnology is likely to change our lives in many ways. Its applications are increasing across all industry sectors, strongly driven by societal needs. It is important that nanotechnology is developed in a responsible way – in a way that responds to the needs and concerns of the consumers. Education for sustainable development should expand knowledge and understanding of the social, economic and environmental dimensions [1]. Addressing these dimensions clearly involves consumer-citizen education based on knowledge and understanding of nanotechnologies fostering the contemporary societal development (Fig. 4). A democracy needs educated consumers.

What does an educated consumer in a technological age look like? To participate in a democracy influenced by technology not only do consumer-citizens need to know how to understand the multiple perspectives that they encounter, they need to feel an obligation to explore multiple perspectives to fully understand the society they live in and make informed decisions (Fig. 5).

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