

Chapter 13

Accepting a New Nano-Tech-Based Technology in the Fruit Storage Industry: A B2B Perspective From the Middle East

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ABSTRACT

Nanotechnology is increasingly being employed in the areas of food production and packaging. While there exists considerable research that analyses consumer trust and perception of nanotechnology use in the food sector, the B2B sector has widely been neglected. This research project analyzes the influence of perceived quality and psychological factors in adopting a new nano-based technology that increases storage life of fruits and vegetables. The research context is Iran and neighboring countries. The results show that customer acceptance of using nanotechnology is influenced by both quality dimensions (performance, features, reliability, conformance, durability, serviceability, aesthetics, perceived quality) and psychological dimensions such as perceived risk and trust. The research also reveals individual differences in accepting nano-technology, depending on the function held by the employee. The authors interpret the results from a culture perspective.

INTRODUCTION

Nanotechnologies are set to impact the food industry at all stages of production from primary production at farming level, due to advances in pesticide efficacy and delivery (novel formulations and better crop adherence), to processing where emulsion creation and encapsulation have progressed to the nanoscale (Neethirajan & Jayas, 2011). Concrete applications in this area include the development of improved tastes, color, flavor, texture and consistency of foodstuffs, increased absorption and bioavailability of

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nutrients and health supplements, new food packaging materials with improved mechanical, barrier and antimicrobial properties, and nano-sensors for traceability and monitoring the condition of food during transport and storage (2009, <http://www.innoresearch.net>).

Public perception is crucial to the realization of these technological advances. As contested by Cobb and Macoubrie already in 2004, trust plays an important part in public opinion about nanotechnology. Research in a consumer context has shown that individuals expose different perceptions with regards to the application of these high-tech products: Some believe the benefits of using nanotechnology products outweighs their risk and promote the use of nano-tech products. Other consumers remain more skeptical, partly because they lack familiarity with and knowledge of nanotechnology (Lee, Scheufele & Lewenstein, 2005; Currall, King, Lane, Madera & Turner, 2006). Overall, food-related applications in general are viewed less positively, or at least differently, to other areas of application (Cobb & Macoubrie, 2004). Research shows that this may vary between different cultural or regional contexts (Kahan, Braman, Slovic, Gastil & Cohen, 2008). For instance, the European public seems to be less optimistic about nanotechnology compared with consumers in the U.S. (Gaskell, Eyck, Jackson, Jonathan & Veltri, 2004). The public opinion in Europe compares the commercialization trajectory of emerging applications of nanotechnology frequently to that of genetic modification of foods (Mehta, 2004).

Approaching the development of novel food technologies through the analysis of psychological, social, political and historical issues is an essential element of commercialization. If consumers feel that they can control the consumption of associated products (and of course this requires more widespread industry acceptance of regulated labeling strategies, and international harmonization of labeling requirements), it is anticipated that consumer acceptance is likely to be higher compared to situations where applications are uncontained (in particular in terms of environmental release) and untraceable (Frewer Bergmann, Brennan, Lion, Meertens, Rowe, Siegrist, & Vereijken, 2011). While the focus on consumer perception of nano-technology products has been subject to a considerable number of studies, the B2B context has so far experienced a lack of interest. We aim to close this gap by looking at the effect of nano-technology perception on product acceptance in the B2B market.

This book chapter is structured as follows:

First, the use of nanotechnology in the food industry in general is discussed. Subsequently, the role of public perception in accepting the use of nanotechnology to improve food products is analyzed. Based on this discussion, we shift perspectives towards the B2B market and crystallize differences in dimensions that might impact the acceptance of nanotechnology amongst B2B customers. We derive a model that is tested in countries of the Middle East. We present our findings and couch the results into already existing literature, with the intention to provide some answers from a culture-related perspective. We conclude this article with implications for theory and practice.

THEORETICAL BACKGROUND

The Role of Nanotechnology in the Food Industry

The food and beverage sector is a global multi trillion dollar industry. All major food companies are consistently looking for ways to improve production efficiency, food safety and food characteristics. Extensive research and development projects are ongoing with the ultimate goal of gaining competitive advantage and market share. For an industry where competition is intense and innovation is vital, nano-

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