Research on the Consumption Intention of Consumers in Different Lifestyles for Portable Hydrogen Fuel Cell

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Abstract

Recently, with global warming worsening, nations are working to develop new energy and application technologies to reduce pollutants and save energy to cope with climate changes and reduce green house gas (GHG) emissions. Of the various new energies, hydrogen energy is clean and extremely safe, and has been recognized as a major energy to be utilized in the future by the International Energy Agency (IEA); it is expected to comprise 50 % of the energy consumed in 2050.The Ministry of Economic Affairs (MOEA) of Taiwan proposed a third stage in the development program for emerging industries—the Dawning Green Energy Industry Program—selecting several green energies, hydrogen energies, and fuel cells as key industries. The Taiwan government will budget 25 billion TWD (1US$=30 TWD) for renewable energy sources, facilities, and subsidies to promote energy saving. Additionally, the government will budget 20 billion TWD for technical developments to improve the efficiency of green energy industries and key technologies. The government expects to generate an estimated value of over 200 billion TWD in private investments, 115,800 job opportunities each year, as well as an output value of 1.158 trillion TWD from the green energy industry by 2015. The Bureau of Energy, MOEA, R.O.C. also predict that the output values of Taiwan's fuel cell industry will reach 4 billion TWD in 2011, rise to 13 billion TWD in 2016, and reach almost 100 billion TWD in 2020, holding 5 % of the international market share and occupying a vital role in the global development of product technology and industrial-scale of hydrogen energy and fuel cell production.

With a public consensus on the need for environmental awareness and sustainable development of enterprises, green products, such as transportation fuel cells and stationary power generation facilities, are expected to become mainstream in the market, promoting hydrogen and fuel cell development to reduce pollutants and emissions. Additionally, with 3G/4G mobile phones emerging, portable mobile devices support more information extraction and video functions, increasing the demand for longer endurance, and establishing a foundation for portable fuel cell development. Taiwan is one of the major designers and manufacturers of portable

electronic products, such as laptops, mobile phones, PDAs, and digital cameras. Instancing the 3C-application direct methanol fuel cells (DMFC), as the power supply stability and power supply duration of hydrogen fuel cells are better than that of lithium cells, major 3C manufacturers one after another rush to launch the portable hydrogen fuel cells that are applied to 3C products. However, as the portable hydrogen fuel cells are still on the preliminary stage as 3C-application products, and the consumers' acceptance of such new products and their external variables have yet to be clarified. Therefore, it is important and necessary for the manufacturers to carry out adequate market evaluation before launching the products, in which consumers' consumption intention is an important evaluation criterion. Howard and Sheth thought that consumption intention would influence consumers' purchasing (adopting) behavior; Fishbein and Ajzen also put forward the rational behavior pattern, thinking that individual behavior was based on the consumption intention; Lin (2007) took LCD TV as an example to discuss the influence of product attributes, product brand knowledge and store environment on consumers purchasing intention; and Lin took smart mobile phone as an example to discusses the consumption intention for technological product features according to different lifestyles, and all the above have shown the significance of using consumption intention to evaluate consumers' acceptance of the products.

According to the above background analysis, the research aims to probe into the consumers' demand, acceptance and consumption intention for portable hydrogen fuel cells. This paper adopts the structural equation model (SEM) to discuss consumers' demand, acceptance and consumption intention for portable hydrogen fuel cell products. The research findings have revealed: no matter which type the consumers belong to, their demand motive, product features and information source all positively influence their consumption intention; therein, as to product features, practicality pavorers prefer "real-time chargeable", "durable", "less weight" and "portable", taste favorers prefer "real-time chargeable", "less weight" and "portable", and conformity favorers prefer "durable" and "portable"; as to information sources, practicality favorers go for "word of mouth", taste favorers go for "network or magazine introduction" and "corporate advertising or government promotion", and conformity favorers go for "network or magazine introduction" and "word of mouth". And the above research findings are hoped to provide reference for the government, relevant enterprises and manufacturers in making strategies, to improve the market competitiveness and acceptability of the products and to achieve the goal of promoting green consumption and sustainable development.