Sustainable Cities and Society 40 (2018) 83–90

Contents lists available at ScienceDirect

Sustainable Cities and Society

journal homepage: www.elsevier.com/locate/scs

A preliminary study of Hello Barbie in Brazil and Argentina

Marcelo Fantinato[a], Patrick C.K. Hung[b,*], Ying Jiang[b], Jorge Roa[c], Pablo Villarreal[c], Mohammed Melaisi[b], Fernanda Amancio[a]

[a] School of Arts, Sciences and Humanities, University of São Paulo, Brazil
[b] Faculty of Business and IT, University of Ontario Institute of Technology, Canada
[c] CIDISI-UTN-CONICET, Santa Fe, Argentina

ARTICLE INFO

Keywords:
Smart city
Smart toy
Survey
South America
Brazil
Argentina
Hello Barbie
Perceived innovativeness
Privacy risks
Parental control

ABSTRACT

A smart city is an urban development vision based on Information and Communication Technology (ICT) and the Internet of things (IoT) for the city's management and operations. The smart city concept is raised simultaneously in many modern societies. IoT is always playing an important role as smart devices to support complex scenarios in smart cities. A smart toy, such as "Hello Barbie," is a smart device consisting of a physical toy component that connects to a computing system with online services through networking to enhance the functionality of a traditional toy. In this research, we particularly studied Brazilian and Argentinian consumers' perceived innovativeness, risks and benefits of smart toys and their purchase intention toward such toys. Results indicate that Brazilian consumers have better perception and evaluation of the toy and thus higher purchase intention than Argentinian consumers do. Such difference may be explained by the cultural differences between the two countries, such as relatively low vs. high uncertainty avoidance. We also provide our recommendations for smart toys manufacturers to address these issues for the future products.

1. Introduction

Toys have been a part of human existence for thousands of years, across every culture, being uncovered from as far back as ancient Egyptian times. A toy is an item or product intended for learning or play, which can have numerous benefits to childhood development. As such a substantial part of human development, toys have continued to maintain a presence in the daily lives of billions of individuals of all ages (Tracy and Westeyn, 2012). Toy makers are increasingly playing an important and innovative role in the global toy market. Based on the reporting from the 114th Annual American International Toy Fair, toy makers are aggressively incorporating Artificial Intelligence (AI) functions into their products using mobile software and hardware as the Internet of Things (IoT).

After Amazon's Echo line of smart speakers powered by its Alexa virtual assistant system became one of the best-selling products on Amazon in the past holiday seasons (eMarketer, 2016), children could have their own version of Echo, Smarty, a voice-controlled digital assistant designed particularly for kids (Corbyn, 2017). Smarty is just one example of the many Internet-connected smart toys that appear on the market in recent years. Another example is Osmo, which uses computer vision to identify different toys with which the kids are playing or drawings enabled by iPads (Hong & Baker, 2014).

A smart city is an urban development vision based on Information and Communication Technology (ICT) and the Internet of things (IoT) for the city's management and operations (Sotres, Santana, Sánchez, Lanza, & Muñoz, 2017). The smart city concept is raised simultaneously in many modern societies. IoT is always playing an important role as smart devices to support complex scenarios in smart cities (Marsella and Marzoli, 2017; Monzon, 2015). In 2015, the research team of this paper proposed a new concept called "Toy Computing," which transcends the traditional toy into a new area of computer research using services computing and mobile technologies (Hung, 2015). Hung et al. define a smart toy as a smart device consisting of a physical toy component that connects to one or more toy computing services to facilitate gameplay in the Cloud through networking and sensory technologies to enhance the functionality of a traditional toy (Rafferty et al., 2017). Some examples include Mattel's Hello Barbie, CogniToys' Talking Dino, and Fisher-Price's Smart Toy Bear. UK-based Juniper Research has reported that smart toys are the new key market for toy companies and the sales of smart toys would grow from $2.8 billion in 2015 to $11.3 billion by 2020 (Juniper Research, 2017).

These Internet-connected smart toys usually have a component that connects to a computing system with online services to enable voice

* Corresponding author.
E-mail addresses: m.fantinato@usp.br (M. Fantinato), patrick.hung@uoit.ca (P.C.K. Hung), ying.jiang@uoit.ca (Y. Jiang), jroa@frsf.utn.edu.ar (J. Roa), pvillarr@frsf.utn.edu.ar (P. Villarreal), mohammed.melaisi@uoit.ca (M. Melaisi), f.amancio@usp.br (F. Amancio).

https://doi.org/10.1016/j.scs.2018.03.006
Received 24 August 2017; Received in revised form 6 March 2018; Accepted 7 March 2018
Available online 03 April 2018

recording, recognition, and database search. Therefore, a traditional teddy bear can now listen and talk back to a child intellectually. Whilst these are new educational and entertaining values of smart toys, experts have warned consumers of the data security and privacy issues of these toys. A recent U.S. Senate report states that these toys may gather a child's personal information, which may potentially cause serious consequences such as identity theft (Nelson, 2016). Likewise, the Federal Network Agency (Bundesnetzagentur) in Germany is telling parents to abandon Internet-connected smart toys designed for their kids because of it's insecure and hackable structure that could reveal personal information (Dudau, 2017). Further, the United States Federal Trade Commission (FTC) released an updated guidance document for complying with the Children's Online Privacy Protection Act ("COPPA"), which explicitly identifies connected toys as being covered under COPPA, on June 21, 2017 (Depas, 2017). The FTC COPPA protects the online privacy of children under the age of 13 and indicates that a child's personal information cannot be collected without parental consent. In 2010, an amendment to COPPA further elaborated that personal information includes geolocation information, photographs, and videos (Hung, Fantinato, & Rafferty, 2016).

Prior research on data privacy shows that greater concern often leads to negative responses (Sheehan & Hoy, 1999) and consumers often weigh the consequences of personal information disclosure against the value offered by the marketer (Hann, Hui, Lee, & Pang, 2007). However, most such research has primarily focused on western cultures and not much research has studied data privacy issues among Brazil, Russia, India and China (BRIC) countries (Martin & Murphy, 2017). Further, although smart toys have been getting their popularity in developed countries, they have not been widely introduced in emerging markets. The objectives of this research are to investigate: (1) whether consumers in emerging market such as Brazil and Argentina perceive the innovativeness, risks and benefits of the conversational function of smart toys differently, and (2) how such perceptions influence their overall evaluation of and purchase intention toward smart toys. Therefore, this research contributes to the literature of consumer data privacy by demonstrating the outcomes of data privacy concerns in Brazil and Argentina. Further, our research also adds to the literature of consumer new product adoption by demonstrating how perceived innovativeness of a product may have either positive or negative impact on product evaluation and purchase intention in different cultures.

It is believed that information and communication technologies like smart toys will play an important role in context gathering and predicament to realize more intelligent and sustainable environments (Silva & Analide, 2017) (Sotres, Santana, Sánchez, Lanza, & Muñoz, 2016). The objective of this study is to investigate how privacy concerns affect adoption decisions in different cultures from the concepts of risk perception and adoption decisions. This paper is organized as follows: Section 2 provides background information, Section 3 describes the research framework applied, Section 4 presents the results of our empirical study in Brazil and Argentina, Section 5 provide a discussion for parental control and Section 6 concludes the paper with future work.

2. Background information

Brazil (Portuguese: Brasil) is the largest country in South America and Latin America. Brazil is ranked the fifth-largest country in the world with the population size of 210 million in 2017. In Brazil, the toy industry has been growing significantly during the last decade. According to ABRINQ, the Brazilian toy association, the toy industry has earned more than BRL 5934 billion in 2015. Brazilian consumers are eager to follow the newest international trends regarding toys (Euromonitor International, 2017). For example, a Brazilian toy named Elo was developed by Amaral Carvalho foundation, a Brazilian hospital in Jahu city, inside São Paulo state. Elo delivers audio messages to kids under cancer treatment by pressing Elo's hand (Hung, 2015). On the other side, toys industry in Brazil, unfortunately, is facing some problems with public safety. Since 2003, the Brazilian Federal Government has prohibited the production and sale of replica toy. However, this action was not sufficient to avoid and stop crimes made using toys (Hung, 2015). According to Instituto Sou da Paz, between 2011 and 2012, 37.6% of guns used in crimes inside the state of São Paulo were toys, simulacrum or pressure guns. In 2014, the state of São Paulo approved a project of law to prohibit production and sale of toy guns to prevent crimes.

Argentina is a federal republic member of the G-20 world's largest economies with a population size of 44 million in 2017 and is third in population in South America. It is a federation of twenty-three provinces and one autonomous city, Buenos Aires (Roa, Villarreal, Fantinato, Hung, & Rafferty, 2017). Traditional toys and games, which accounts for over 56% of total toys and games in value terms globally, recorded its best performance for more than a decade in 2014 with 5% value growth while sales exceeded US$85 billion marks (Euromonitor International, 2015). Latin America benefited around 6% increase in value sales in 2014, and Argentina was part of the world's top 5 best-performing markets with double-digit growth rates (Euromonitor International, 2015).

Both Argentina and Brazil incorporate the Technical Regulation about Toy Safety (International Council of Toy Industries, 2015) in conformance to the Resolution N° 23 of the MERCOSUR (Common Market of the South), which establishes essential toy safety requirements that must be fulfilled to commercialize toys in countries of the MERCOSUR, including Argentina, Brazil, Paraguay, Uruguay, and Venezuela. Safety measures include physical and mechanical properties of toys, inflammability, electrical properties, sanitation, radioactivity, chemical properties, and noise.

The Congress of the Argentine Nation ratified the Convention on the Rights of the Child on September 27, 1990 (Office of The High Commissioner, 1990) through Law 23,849 and the Constituent Assembly incorporated it into Article 75 of the Constitution of the Argentine Nation in August 1994. From this commitment, The Government must make every effort to ensure that all children and adolescents have access to all the rights contained in the Convention, including article 16, "No child shall be subjected to arbitrary or unlawful interference with his or her privacy, family, home or correspondence, nor to unlawful attacks on his or her honor and reputation," and "The child has the right to the protection of the law against such interference or attacks."

Why are smart toys under scrutiny for data privacy and security? We illustrate this issue using the example of Hello Barbie. Hello Barbie is a smart toy manufactured by Mattel Inc. (Mattel, 2015). Mattel leads traditional toy market in Brazil, accounting for 15% of total value sales in 2016 (Euromonitor International, 2017). Mattel introduced Barbie in early 1959, the doll has then gone through many phases, allowing it to sell over 800 million units around the world. Thus, Barbie has become a fashion doll icon. Hello Barbie is introduced as "the first fashion doll that can have a two-way conversation with girls" with speech recognition and cloud computing technologies (Hung, Iqbal, Huang, Melaisi, & Pang, 2016). While the doll is made by Mattel, the online conversation software is powered by ToyTalk. ToyTalk has previously released a smartphone application known as SpeakALegend, which allowed children to interact and engage in conversation with imaginary characters such as the unicorn, mermaid, and Bigfoot (Mattel, 2015). With their expertise in this field, Mattel cooperated with them to develop the software behind an interactive Hello Barbie. Referring to the vocabulary of Hello Barbie as of November 17, 2015, she can speak 56,367 total English words and 3935 unique English word forms in 8000 English phrases (Hung and Iqbal et al., 2016).

Referring to Fig. 1, the children interact with Hello Barbie equipped with WiFi, microphone, and speaker in a physical and social environment. When Hello Barbie turns on, the system inside the doll checks if the doll has been linked to a ToyTalk.com account via WiFi. For the parental control, the parents/guardians must download a mobile