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## Consumer acceptance of product innovations

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## Chapter 1 Introduction

### 1.1 General introduction

Innovation is the real driver of progress.

—Bill Gates, Co-Founder, Microsoft.

At Uniqlo, we're thinking ahead. We're thinking about how to create new, innovative products... and sell that to everyone.

—Tadashi Yanai, Founder, Uniqlo.

Product innovation is used generically to refer to both new goods and services (Evanschitzky et al. 2012; Henard and Szymanski 2001) and is widely accepted as an imperative for firm survival and growth (Warren and Sorescu 2017). Successful product innovations function as the key contributor to long-term firm sales, financial performance, and stock returns (Cillo, Griffith, and Rubera 2018; Lamey et al. 2021; Srinivasan et al. 2009; Story, Boso, and Cadogan 2015). To achieve sustainable growth, firms have invested a massive amount of time and money in new product development. For example, in 2018, the Lego Group's expenditure on new product development increased by around \$41 million, an increase of about 50% (Harris 2019). Huawei, the leading global provider of telecommunication services and devices, spent approximately \$22.04 billion (around 15.9% of its total revenue) in 2020, to develop new goods and services (Bajpai 2021).

The huge investments in innovation bring in various types of new market offerings. Over 250,000 new products launch every year in the global market (NielsenIQ 2019; Wong 2010). Such countless new goods and new services overwhelm consumers and are difficult to stand out in the market. In this case, most new launches fail (Schneider and Hall 2011). Only 30% of US launches in the consumer packaged goods market can survive during their first two years (NielsenIQ 2019). Therefore, consumer acceptance of product innovations is still a challenge (Pisano 2015).

The strategic importance of product innovations to the firm has inspired a large body of literature that examines the determinants of new product success. Henard and Szymanski (2001) conducted a comprehensive meta-analysis on key factors determining new product success to synthesize and generalize the substantial empirical findings. More than ten years later, this meta-analysis was updated by Evanschitzky et al. (2012). These two meta-analyses revealed that product characteristics and firm strategy characteristics contribute to the success of new products. Product characteristics refer to elements related to the offering, such as price, technological sophistication, and innovativeness (Evanschitzky et al. 2012; Henard and Szymanski 2001). Firm strategy characteristics capture a firm's planned actions that have the potential for offering it a competitive advantage in the market, such as marketing synergy, technological synergy, and order of entry (Evanschitzky et al. 2012; Henard and Szymanski 2001).

The literature has deepened the understanding of new product success, but at least three research gaps still remain. First, as two meta-analyses indicated (Evanschitzky et al. 2012; Henard and Szymanski 2001), the technology involved in new products influences product performance. The technology integrated into products evolves over time due to firms' investment in new technology (Hoffman et al. 2022). The appearance of new technologies changes consumer experiences (Hoffman et al. 2022; Hoffman and Novak 2018). For example, as one important emerging technology, Artificial intelligence (AI) has been employed to replace or collaborate with human workers to create new service experiences for consumers (Huang and Rust 2018; Mende et al. 2019). However, from a consumer perspective, AI currently may not be acceptable for all types of service tasks (Castelo, Bos, and Lehmann 2019). Yet, little empirical research has investigated how task characteristics interplay with AI-human collaboration types to influence consumer acceptance of AI services.

Second, one important product characteristic is missing in these two meta-analyses (Evanschitzky et al. 2012; Henard and Szymanski 2001), that is, product (a)typicality—to the degree to which a product is (not) a good example of the category (Hekkert, Snelders, and Van Wieringen 2003; Veryzer Jr and Hutchinson 1998). Although the concepts of product atypicality (emphasis on the goodness of example) and product novelty (emphasis on originality) are often used interchangeably in the literature, these two concepts are related but not identical (Gemser and Barczak 2020; Hekkert, Snelders, and Van Wieringen 2003; Kim and Petitjean 2021). Hekkert, Snelders, and Van Wieringen (2003) show that product typicality and product novelty are two joint predictors of consumer evaluation of products. Recent studies further suggested that researchers need to distinguish between typicality and novelty in empirical studies (Gemser and Barczak 2020; Kim and Petitjean 2021). Therefore, although the effect of product innovativeness on new product success has been well discussed by multiple meta-analyses (Evanschitzky et al. 2012; Henard and Szymanski 2001; Rubera and Kirca 2012; Szymanski, Kroff, and Troy 2007), the findings cannot directly apply to product typicality. In this way, a meta-analysis is still needed to integrate prior findings on the effect of product typicality on new product success (e.g., product attitude and behavioral intention) given that the product typicality effect is not consistent in the literature (Celhay and Trinquécoste 2015).

Third, two meta-analyses have recognized the importance of firm strategies to new product success (Evanschitzky et al. 2012; Henard and Szymanski 2001). However, they overlooked one important firm strategy, that is, branding strategy. In particular, the most common branding strategy for new products—brand extensions—has not been studied within prior meta-analyses. Brand extensions refer to the strategy of using an existing brand name for a new product such as the motorcycle brand name Harley Davidson for new T-shirts (Aaker and Keller 1990; Kim and Park 2019). Brand extensions are so prevalent in the market that

almost 70% of new products in the consumer-packaged goods market are brand extensions (*NielsenIQ 2019*). However, the success rate of brand extensions is low (Völckner and Sattler 2006), attracting much academic attention to brand extension success. Yet, no meta-analysis has been performed to build a comprehensive framework to explain the determinants of brand extension success (e.g., attitude towards extension products and behavioral intention) as well as the moderators.

Therefore, the three studies in this dissertation aim to explore consumer acceptance of product innovation in terms of AI service, product typicality, and brand extension (see Figure 1.1 and Table 1.1). Given that AI service is an emerging research topic, Chapter 2 conducts a series of experiments to investigate how task characteristics of service and AI-human collaboration jointly influence consumer acceptance of AI service. Then, Chapters 3-4 discuss a meta-analysis on product typicality and brand extension, respectively for two reasons. These two fields are relatively mature and prior studies differ substantively in research settings (e.g., countries of data collection). Meta-analytic techniques allow researchers to (1) estimate the empirical generalizations about a particular effect size (e.g., the correlation between product typicality and new product success) across diverse research settings and (2) examine whether and how the characteristics of research settings influence the focal effect size (Babić Rosario et al. 2016). We discuss the details of Chapters 2-4 in the following sub-section.

**Figure 1.1 Outline of Empirical Chapters in the Dissertation**



**Table 1.1 Description of Empirical Chapters in the Dissertation**

Chapter	Method	Sample	Contribution	Findings
Chapter 2: The interplay between required warmth and AI-human collaboration in consumer acceptance of artificial intelligence in service	Conjoint experiment and survey	- Study 1: 234 students - Study 2: 234 students - Study 3a: 218 students - Study 3b: 141 students - Study 3c: 204 individuals	- Identify an important task characteristic of determining consumer acceptance of AI service, that is, required warmth - Uniquely contribute to the literature by revealing the underlying process of consumers' reluctance to accept AI for tasks requiring high warmth - Be the first to compare several types of AI service (i.e., a human laborer working independently, AI supporting a human, AI supervised by a human, and AI working independently) and investigate their interplay with required warmth	- Required warmth to conduct a task can significantly decrease consumer acceptance of an AI employee in service - Consumers' reluctance to accept AI for tasks requiring high warmth is due to the lack of perceived fit between the task and the AI employee - AI supporting a human increases acceptance of AI also for tasks that require high warmth. However, this is not the case for AI supervised by a human.
Chapter 3: The impact of product typicality on new product success: A meta-analysis	Meta-analysis	145 effect sizes from 48 independent studies	- Generalize the effect of product typicality on new product success to address the mixed effect of product typicality in the literature - Disentangle the paths through which product typicality influences new product success - Reveal the cross-cultural boundary conditions of the influence of product typicality on new product success	- Product typicality positively influences new product success in general - Product typicality positively influences new product success (through increasing consumers' perceived reliability), but it also negatively affects new product success (by decreasing consumers' perceived excitement) - Individualism indirectly mitigates the generalized positive effect of product typicality on new product success, while uncertainty avoidance indirectly strengthens this positive effect
Chapter 4: Drivers of brand extension success: A meta-analysis	Meta-analysis	2,594 effect sizes of 13 brand extension success drivers from 158 independent studies	- Build a comprehensive framework to systematically identify important drivers of brand extension success - Reveal important but understudied drivers - Investigate a broad range of important but rarely examined moderators	- Parent brand strength and brand extension fit are among the most influential drivers of brand extension success - Several drivers are important but understudied such as parent brand extension history, marketing mix support for extension products, and consumer mood - The impact of parent brand strength depends on certain category characteristics of both the parent brand and the extension product, such as parent brand industry type (service vs. durables vs. FMCG) and whether the extension category is characterized by experience versus search products. - The impact of brand extension fit is hardly affected by category characteristics. - The impact of fit depends on the naming (sub-branding vs. direct brand name) and direction (horizontal vs. vertical, line vs. category, and upward vs. downward extension) of the brand extension, while the effect of parent brand strength is only sensitive to whether a line or category extension is implemented.

## 1.2 Outline of the dissertation

*Chapter 2.* AI—the intelligence manifested by machines using algorithms or statistical models in an embodied or non-embodied form—is increasingly integrated into service to replace human employees (Davenport et al. 2020; Huang and Rust 2018; Mende et al. 2019). Yet, AI usually does not fully take over human jobs but rather specific tasks in which AI and humans collaborate (Brynjolfsson and Mitchell 2017; Brynjolfsson, Mitchell, and Rock 2018; Huang, Rust, and Maksimovic 2019). Recent technological advances allow AI to undertake tasks that require emotion (Huang, Rust, and Maksimovic 2019; Huang and Rust 2021a; Huang and Rust 2021b), but consumers currently may be reluctant to accept AI for such tasks as AI does not truly understand feelings (Ho, Hancock, and Miner 2018).

Chapter 2 aims to explore consumer acceptance of AI service. In particular, it focuses on what tasks can be delegated to AI, and how different types of AI-human collaboration influence AI acceptance. As such, it offers insights on how to design AI service successfully and frame AI-human collaboration. Our empirical results show two main findings. First, consumers tend to refuse AI for tasks that require high warmth (an indicator of emotion) due to the low fit between AI and the task at hand. Second, based on concept combination theory, an AI-human collaboration where AI supports a human employee increases consumer acceptance of AI also for tasks that require high warmth. Unexpectedly, this is not the case for AI-human collaboration where AI performs a task that is supervised by a human employee.

*Chapter 3.* Firms often develop new products that are relatively typical or atypical with the relevant product category. Multiple studies have examined the role of product typicality in new product success. However, current empirical findings are divergent. For example, the effect of product typicality on new product success is strongly positive (e.g., correlation = .711 in Kumar and Garg 2010), or absent (e.g., correlation = .08 in Noseworthy and Trudel 2011), or negative (e.g., correlation = -.243 in Michaelson, Arya, and Chattaraman 2016). A

comprehensive quantitative review of prior empirical findings is still lacking. Against this background, Chapter 3 conducts a meta-analytic study to explain how product typicality influences new product success.

The study identifies 145 effect sizes from 48 independent studies reported in 27 manuscripts from 10 different countries. With this database, the investigation of meta-analytical mean effect sizes yields a generalized, positive effect of product typicality on new product success. Results of the meta-analytic structural equation modeling further reveal that product typicality positively influences new product success via reliability but negatively affects it via excitement to some degree. Linking the data with relevant Hofstede (2001)'s cultural dimensions, a moderator analysis shows that individualism indirectly moderates the typicality—new product success relationship by mitigating (strengthening) the positive (negative) effect of product typicality on reliability (excitement). Uncertainty avoidance, though, moderates that association in the opposite way.

*Chapter 4.* Managers often implement brand extension strategies for new products, but the success rate of brand extensions is relatively low (Duckler 2018; Kim and Park 2019; Völckner and Sattler 2006). Multiple studies have investigated brand extension success drivers in the past 30 years. However, prior studies vary widely in terms of examined drivers, parent brands, brand extensions, and research contexts, yielding divergent findings. Therefore, a comprehensive empirical generalizations on brand extension success is required (Parker et al. 2018; Sichtmann and Diamantopoulos 2013). The meta-analysis in Chapter 4 integrated 2,594 effect sizes of 13 brand extension success drivers from 158 primary studies in 25 countries/areas, comprising 888 brand extensions from 306 parent brands.

Our meta-analysis shows that parent brand strength and brand extension fit are among the most influential drivers of brand extension success, which is in line with the strong focus on these drivers in previous empirical studies. However, several other drivers related to the



parent brand, the extension product, and the consumers are relevant as well with substantial effects on brand extension success, but have been examined (much) less frequently so far (e.g., parent brand extension history). Furthermore, we explored a broad range of moderators, providing new insights into the varying roles that parent brand strength and brand extension fit play in extension success. For example, the impact of parent brand strength depends on certain category characteristics of both the parent brand and the extension product, such as parent brand industry type (service vs. durables vs. FMCG) and whether the extension category is characterized by experience versus search products. In contrast, the impact of brand extension fit is hardly affected by category characteristics. However, the impact of fit depends on the naming (sub-branding vs. direct brand name) and direction (horizontal vs. vertical, line vs. category, and upward vs. downward extension) of the brand extension, while the effect of parent brand strength is only sensitive to whether a line or category extension is implemented.