Cross border acquisition: Effects of country-of-origin on consumers' acceptance of new healthcare systems

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ABSTRACT

This research discusses the impacts of country-of-origin (COO) and COO fit between acquiring and acquired firms in the context of cross-border acquisition (CBA). The Unified Theory of Acceptance and Use of Technology are applied to the assessment. The online survey data collected in Japan showed the significant impacts of tech-related COO on consumers' acceptance of a new system, whereas the effects of COO fit were marginal. Thus, the technological image simply affects consumers, while they do not care about the COO consistency as the heath-tech-related association network seems immature in their minds. The results suggest health tech practitioners/medical workers/related policymakers should consider CBA as one of the risk drivers in the healthcare system development. Literature discussing the relationships between CBA and consumers' acceptance of personal health tech is scarce although the diffusion of such systems is socially meaningful. Thus, this research is relevant to both the social and theoretical fields.

Keywords: *Cross-border acquisition, Unified Theory of Acceptance and Use of Technology, Country-of-origin, Fit, Healthcare system*

Introduction

Medical advancement and an aging population are driving up the social cost of maintaining Japan's national healthcare system. To control the rising medical costs, the efficiency of medical care is socially required (Kumagai, 2024a). In these social circumstances, the contribution of digitalization of the medical system using information technologies is expected (Japan Cabinet Secretariat Office, 2023). However, regardless of the advanced functions and capabilities of the system, it will not be effective unless consumers accept and use it.

Regarding information technology, new systems are frequently launched as business ventures. In such a business area, it is common practice for founding managers to sell their equity stake to varying degrees when there is an increase in commercialization potential. In this context, if a majority stake is sold to a foreign firm (i.e., acquirer), it is assumed that consumer psychology toward the acquired firm (i.e., acquiree) and its products/systems will differ from that in the domestic acquisition case. Moreover, this psychological effect may also vary depending on the country of origin (COO) of the acquirer (Jin *et al*., 2021). In the case of a medical tech firm, the impact of a cross-border acquisition (CBA) is expected to be significant as it may affect an individual's health. Furthermore, when consumers evaluate the acquiree

negatively and are less motivated to use its new product/system for social healthcare improvement, the efficiency of medical care will be inhibited. Accordingly, this consumer psychology associated with CBA is an issue not only for an individual's health but also for medical infrastructure.

From these perspectives, this research discusses the psychological impact of CBA on consumers' evaluation of the acquired tech firm and acceptance of its new healthcare systems. The Unified Theory of Acceptance and Use of Technology (UTAUT; Vencatesh *et al*., 2003) is applied to the assessment, as this theory has demonstrated a high level of predicting effects, and is supported by researchers in various fields including the medical area (Attuquayefio & Hilla, 2014; Yairi, 2016). As the literature reports the psychological effects of COO (Jin *et al*., 2021; Ommen *et al*., 2012; Maurya & Gupta, 2015) and also COO fit between the acquirer and the acquiree (Fang & Wang, 2018; Lee, J. *et al*., 2013; Lee, H. *et al*., 2014) in the CBA context, this research focuses on these effects on consumers' evaluation of the system provided by the acquiree (i.e., the system vendor). The research question is how COO and/or COO fit affect consumers' acceptance of a new medical system in the CBA context.

Specifically, we discuss consumers' acceptance of a smartphone application for personal healthcare concerning cardiac disease (heart care application: HCA), which connects users and hospitals online. This disease is responsible for approximately 15% of deaths in Japan (Ministry of Health, Labor & Welfare, 2022), with related medical costs being considerable due to the serious nature of the condition. Indeed, a number of leading medical institutions, local governments, and technology companies have initiated empirical assessments of the impact of HCA among users, primary hospitals, and advanced medical institutions. They attempt to estimate the impact of HCA adoption on medical efficiency and national healthcare cost reductions (Mie University, 2021). However, if consumers are reluctant to use HCA due to CBA, the effectiveness of these trials will decline. In this regard, the contribution of this research on consumer psychology and HCA is expected.

In a mature country with an aging population like Japan, improving the efficiency of healthcare infrastructure through the use of information technology, such as HCA, is crucial. Additionally, in the tech venture field, CBA appears to be a viable option. However, while CBA has been extensively discussed in the fields of business strategy and corporate finance (Wang & Fang, 2018), the history of consumer literature concerning CBA and COO is relatively short. Few researchers discuss the relationships between CBA, healthcare, and technology acceptance. Thus, the implication of this research is theoretically meaningful.

Literature review and hypotheses development

User acceptance of information technology

The theory of reasoned action suggests two cognitive elements such as attitudes and social norms predict behavioral intention, leading to behavior (Fishbein & Adjen, 1975). Based on

this theory, Davis *et al*. (1989) suggested a technology acceptance model in which two dimensions of an individual's beliefs such as usefulness and ease of use predict his/her attitude, leading to behavioral intention and behavior. While this model well examines both cognitive and affective dimensions (Maillet *et al*., 2015) and is widely employed in the literature on technology acceptance (Mugo *et al*., 2017; Taheroost, 2018), it does not count external elements (Yairi, 2003).

Through discussions of eight models regarding technology acceptance including the above two models, Venkatesh *et al*. (2003) proposed UTAUT, a comprehensive model predicting an individual's technology acceptance. UTAUT suggests three predictors of behavioral intention. Among them, performance expectancy represents an individual's perception of usefulness, effort expectancy represents an individual's perception of ease associated with the use of a product/system, and social influence represents an individual's perception that important others believe he/she should use the product/system. It also suggests that behavioral intention and facilitation condition affect consumer behavior. As UTAUT appears relatively effective, this research discusses consumer psychology based on this theory.

Impacts of COO and COO fit in the CBA context

While the literature on CBA from the consumer psychology perspective is scarce, numerous researchers have investigated the psychological effects of COO. As a result, COO effects were found on consumers' evaluations of products (Jin *et al*., 2021; Ommen *et al*., 2012), services (Berentzen *et al*., 2008; Maurya & Gupta, 2015), brands (Cheah *et al*., 2020; Rambocas & Mahabir, 2021), and companies (Bradley, 2001; Peltokorpi *et al*., 2019).

Meanwhile, associative network theory implies that a good fit between perceptions of an object and prior associations built in mind increases a consumer's evaluation of the object. In this case, such perceptions are smoothly integrated into the existing memory network. By contrast, in the low-fit case, it is difficult to integrate perceived new information into the existing association network so that a consumer's evaluation of the object is assumed to decline (Aaker & Keller, 1990; Keller, 1993). Thus, empirical literature reports contributions of the image/personality fit between an object and related information in various marketing situations (Aaker & Keller, 1990; Kumagai, 2023; Gabrielli & Baghi, 2020 Roth & Romeo, 1992).

Accordingly, as some researcher reports, not only COO but also the COO fit between acquirer and acquiree is likely to impact consumers' psychology associated with CBA (Fang & Wang, 2018; Lee *et al*., 2013; Lee *et al*., 2014). The literature on consumers' perceptions of fit suggests two measurement approaches, such as direct measurement and attribute score disparity (Sirgy *et al*., 1997; Kumagai, 2024b). The direct measurement approach evaluates the perceived fit levels between evaluated objects (Lee *et al*., 2013). Based on this approach, unfit attributes and their scores are unspecifiable although the fit effects are well observed. The attribute score disparity approach evaluates the score disparity (Lee *et al*., 2014) of multiple attribute items of evaluated objects. Hence, based on this approach, attribute scores between

objects are comparable (Kumagai, 2024b). While both approach types have been employed in the literature on COO fit, this research employs the attribute disparity approach to compare the COO scores between acquirer and acquiree.

Hypotheses development

Consumers are considered to refer to COOs of both acquirer and acquiree when CBA occurs (Lee *et al*., 2013). In this context, the high levels of acquirer's and acquiree's COOs associated with technology are assumed favorable for the evaluation of a new system provided by the acquiree. The high COO fit also seems desirable. Once perceiving the favorable information on a system, consumers presumably expect its high performance and usability. In addition, social recommendation for the use of such a new system is relatively expected.

Thus, in this research context, it is presumed that COO and/or COO fit contribute to three predictors suggested in UTAUT (i.e., performance expectancy, effort expectancy, and social influence), leading to behavioral intention toward HCA. Accordingly, this research formulates six hypotheses as follows:

H1: COO and/or COO fit positively affect performance expectancy.

H2: COO and/or COO fit positively affect effort expectancy.

H3: COO and/or COO fit positively affect social influence.

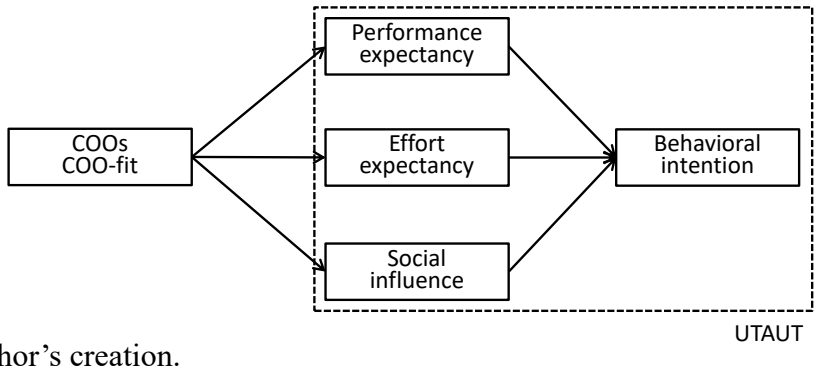
H4: Performance expectancy positively mediates the effects of COO and/or COO fit on behavioral intention.

H5: Effort expectancy positively mediates the effects of COO and/or COO fit on behavioral intention.

H6: Social influence positively mediates the effects of COO and/or COO fit on behavioral intention.

To assess these hypotheses, this research proposes the mediated regression model as illustrated in Figure 1. The components of UTAUT are surrounded by a dotted line.

Figure 1: Conceptual model



Note: The author's creation.

Methodology

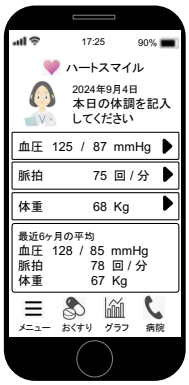
This research comprises two studies: Study 1 assesses the impacts of COO fit and Study 2

assesses the effects of acquirer's and acquiree's COOs according to the mediated regression model (Figure 1). Both studies were based on the same survey according to three hypothetical settings. In the assessments, the acquiree was set as a Japanese tech vendor providing HCA. The settings were presented to three experiential groups as follows: Group 1: No CBA (Control), Group 2: CBA (Acquirer = U.S. tech firm), and Group 3: CBA (Acquirer = Chinese tech firm). As the U.S.A. and China are the world's top two economic powers, these settings are really likely.

In the survey, the information on hypothetical HCA and above settings was presented to the participants (Table 1). Thereafter, participants reported their perceptions of performance expectancy (four items), effort expectancy (four items), social influence (three items) (employed from Maillet *et al*., 2014), and behavioral intention (three items employed from Lam and Hsu, 2006) toward HCA. Then, they reported the technological image (three items from Maheswarran, 1994; Fang & Wang, 2018) of Japanese tech firms (All groups) and that in U.S. (Group 2) or that in China (Group 3). Finally, they declared household income and education.

Table 1: Experimental stimuli: Information on HCA and CBA

A Japanese medical IT (information technology) company run by engineers with advanced skills has developed a smartphone heart care app called "Heart Smile" in collaboration with a leading university, with the aim of improving the health of patients with heart disease. In the near future, the Heart Smile service is scheduled to begin.



The app's functions are outlined as follows

① Blood pressure, pulse, weight, and symptoms can be recorded and managed by entering them in the morning and evening.
② Exercise volume and calories burned are recorded in conjunction with the iOS device's Healthcare app or the Android device's Google Fit.
③ The app calculates an exacerbation score based on changes in numbers and symptoms, and displays a sign when a medical consultation is required.
④ You will receive notifications to prevent you from forgetting to take your medication, or to remind you to measure and record your weight and blood pressure.
⑤ When you need to see a doctor, you can make an appointment or call your family doctor directly from the app.
⑥ You can send notifications to family members you have registered.
⑦ The records in the app can be used in medical treatment at hospitals.
⑧ It is also possible to record activity data during rehabilitation by linking with wearable devices (such as Apple Watch and Fitbit).

Note: The Japanese medical tech firm that developed and operates this app is a subsidiary of a Chinese (U.S.) medical tech company due to the majority share transfer.

Note: Author's creation.

The data were collected through an online survey in collaboration with Macromill, a leading online research firm in Japan. Participants were Japanese consumers in their 40s to 70s who had heart disease experiences to a greater or lesser extent. Based on a between-subject survey design, 308 samples were collected according to stratified random sampling so that each group

had almost equal numbers of participants and genders. The survey was conducted in compliance with the Code of Ethics of the Japan Marketing Research Association.

Results

Meajorment model assessment

Although the established measurement items were employed from the literature, they were retested via confirmatory factor analysis (CFA) as the survey was conducted in Japanese. In this test, one of the measurement items of effort expectancy was removed as its factor loading was relatively small. Consequently, the CFA result sufficiently showed goodness of fit indices as follows: $\chi^2 = 390.55$, $df = 137$, $\chi^2/df = 2.85$, CFI = 0.95, RMSEA = 0.08, SRMR = 0.03. In this test, each factor loading was from 0.81 to 0.98, each composite reliability was from 0.90 to 0.97, and each average variance extracted (AVE) was from 0.74 to 0.90. Each Cronbach's alpha was from 0.90 to 0.96. These results showed mostly sufficient levels of indicator reliability, consistency reliability, and convergent validity (Peterson, 1994; Hair *et al*., 2019). Additionally, each square root of AVE exceeded the correlation coefficients between each related construct, and each heterotrait-monotrait ratio was from 0.28 to 0.79. These results showed each discriminant validity (Henseler *et al*., 2015; Hair *et al*., 2019).

To avoid the common method variance (CMV), the predictors and outcomes were questioned on different pages. In addition, as a post-hoc assessment, Harman's one-factor test through a CFA resulted in a very poor fit. Furthermore, the measurement model including a latent common method factor still showed each factor loading exceeded 0.70. Thus, CMV was unlikely in this research (Podsakoff *et al*., 2003, 2012).

In addition, the data confirmed age, gender, household income, disease experiences, and the acquiree's COO did not vary between participant groups, indicating their comparability.

Study 1

The mediated regression model (Figure 1) was assessed using Process Macro (5,000 bootstrap samples; Hayes, 2018). As the correlation between household income and behavioral intention was found, this factor was included as a covariate in both studies 1 and 2.

Study 1 showed the insignificant impacts of COO fits on performance expectancy, effort expectancy, and social influence while performance expectancy and social influence significantly contributed to behavioral intention (Std. $\beta_P = 0.24$, $t = 4.58$, $p < 0.001$; Std. $\beta_S = 0.58$, $t = 11.42$, $p < 0.001$). Consequently, each indirect effect of COO fits mediated by these elements was insignificant. Thus, all hypotheses regarding COO fit were rejected. Additionally, the overall effect of COO fit on behavioral intention was insignificant.

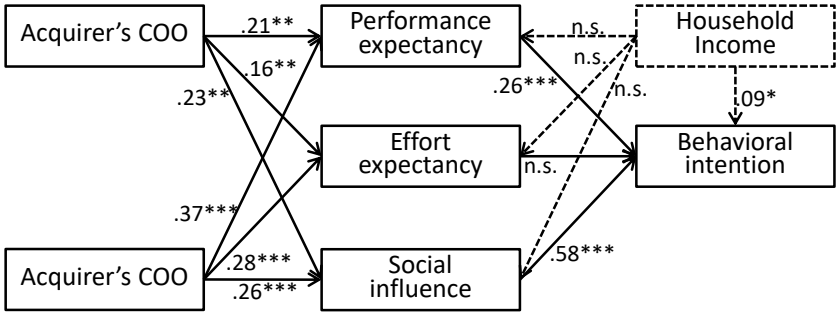
Study 2

Study 2 showed acquirer's COO significantly impacted performance expectancy (Std. $\beta = 0.21$, $t = 3.75$, $p < 0.1$), effort expectancy (Std. $\beta = 0.16$, $t = 2.67$, $p < 0.1$), and social influence (Std. $\beta = 0.23$, $t = 3.96$, $p < 0.1$). Also, acquiree's COO significantly impacted performance

expectancy (Std. β = 0.37, t = 6.74, p < 0.01), effort expectancy (Std. β = 0.28, t = 4.80, p < 0.01), and social influence (Std. β = 0.26, t = 4.50, p < 0.01). The impacts of performance expectancy and social influence on behavioral intention were significant (Std. β_P = 0.26, t = 4.78, p < 0.001; Std. β_S = 0.58, t = 11.38, p < 0.001). Consequently, the indirect effects of the acquirer's COO on behavioral intention were significant via performance expectancy (Std. β = 0.05, 95% CI [0.02 to 0.10]) and via social influence (Std. β = 0.13, 95% CI [0.05 to 0.22]). Similarly, the indirect effects of the acquiree's COO were significant via performance expectancy (Std. β = 0.13, 95% CI [0.06 to 0.22]) and via social influence (Std. β = 0.20, 95% CI [0.10 to 0.33]). In addition, the overall effects of the acquirer's COO (Std. β = 0.18, t = 2.94, p < 0.01) and acquiree's COO (Std. β = 0.20, t = 3.35, p < 0.01) were significant on behavioral intention. Accordingly, all hypotheses except H5 were supported regarding COOs.

Both studies 1 and 2 found that household income significantly impacted behavioral intention (Std. β = 0.08 to 0.09, t = 2.17 to 2.29, p < 0.05). Figure 2 presents the results of study 2 presenting the significant impacts of acquirer's and acquiree's COOs.

Figure 2: Study 2 (Impacts of COOs)



Direct effect:

Acquirer's COO-->Behavioral intention: n.s.

Acquiree's COO-->Behavioral intention: n.s.

Indirect effect:

Acquirer's COO-->Performance expectancy-->Behavioral intention: Std. β = 0.05, 95% CI [0.02 to 0.10]

Acquirer's COO-->Effort expectancy-->Behavioral intention: n.s.

Acquirer's COO-->Social influence-->Behavioral intention: Std. β = 0.13, 95% CI [0.05 to 0.22]

Acquiree's COO-->Performance expectancy-->Behavioral intention: Std. β = 0.13, 95% CI [0.06 to 0.22]

Acquiree's COO-->Effort expectancy-->Behavioral intention: n.s.

Acquiree's COO-->Social influence-->Behavioral intention: Std. β = 0.20, 95% CI [0.10 to 0.33]

Overall effect

Acquirer's COO-->Behavioral intention: Std. β = 0.18**

Acquiree's COO-->Behavioral intention: Std. β = 0.20**

Note: Author's own creation. The figure shows standardized estimates. ***p < .001, **p < .01, *p < .05, n.s. = non-significant at the 5% significance level.

Discussion and conclusion

As the impact of COO fit seems insignificant while COOs are effective, the data imply consumers focus on function levels rather than association consistency in the health tech

context. In this regard, consumers may not have constructed a sufficient associative network regarding the discussed HCA, a new technological product. Thus, the higher the acquirer's and vendor's tech-related COOs, the greater the HCA evaluation, regardless of the COO fit.

The results suggest that the cross-border share transfer is possible to inhibit the use of HCA and decrease its contribution to national healthcare efficiency. Health tech practitioners, medical workers, and related policymakers should consider not only the vendor's technology but also CBA and related COO as risk drivers when estimating the contribution of medical digitalization to the national healthcare system.

This research only discusses a personal healthcare app, an innovative healthcare system. The impact of COO fit regarding conventional products may differ as consumers have already constructed sufficient associations. Additional research is required in this regard.

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