The Acceptance of Amazon Go: An Analysis based on the Technology Acceptance Model and Cultural Dimensions

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Abstract

The purpose of this article is to analyze the acceptance of the new technology of Amazon Go by consumers in Germany. For this, items of the Technology Acceptance Model (TAM) by Davis et al. (1989) and cultural dimensions (Hall 1989; 1990; Hofstede 2010) are assessed in an online survey (n= 176) with German consumers. By doing so, four hypotheses derived from the literature review are tested, each of which studies the influence of a cultural dimension within the Technology Acceptance Model. Based on our analysis, we provide managerial implications for a potential introduction of Amazon Go into the German market.

Keywords: Amazon Go, Technology Acceptance Model, Culture

Track: Innovation Management and New Product Development

1. Introduction and Research Objective

Amazon Go represents an innovative supermarket business model and consumer experience which consists of a new self-checkout system which was first introduced to US citizens in January 2018. Considering Amazon's previous success in the e-commerce business, Amazon Go aims to revolutionize consumers' offline shopping experience. In particular, Amazon Go's vision is to "*create a shopping experience with no lines and no checkout*" (Amazon, 2019). With the "Just Walk Out" Technology, Amazon integrated existing technologies used in autonomous cars such as computer vision, sensor fusion and machine learning. These technologies detect when customers take or return products from shelves and collect the information in a virtual cart, which is being charged off the customer's Amazon account later on. This allows shoppers to walk out of the store without queuing or having to pay cash at the cashier. The necessary equipment for the future shopping experience with Amazon Go is an Amazon account and a smartphone with the Amazon Go app (Amazon, 2019; Polacco & Backes, 2018).

The evolution of Amazon Go's self-checkout service brings benefits for both retailers and consumers. From one perspective, the innovation enables the potential to reduce ques, relocate personnel resources, and potentially gain customer trust by providing fast service. All of these represents an extraordinary economy of scale. For consumers, Amazon Go enables a shorter waiting time, and a new technology which enhances the shopping experience (Polacco & Backes, 2018).

Although Amazon Go is a pilot project with currently 16 stores in the US, Amazon intends to expand to international markets on the long term in order to gain a "first mover" advantage. Nevertheless, despite the clear business benefits, the company might be challenged by the diversity in consumer culture and expectations found in different countries (Schader, 2019). Therefore, this study investigates the potential case of Amazon Go entering Germany, the largest economy in Europe. The German market represents incredible growth opportunities for foreign retail companies (Santander, 2018). Thus, the research question of this paper is:

To which extent will consumers in Germany accept the Amazon Go technology and how can Amazon launch the innovation of Amazon Go in Germany successfully?

2. Conceptual Framework and Hypotheses

The Technology Acceptance Model (TAM) by Davis et al. (1989) and cultural dimensions by Hofstede (2010) and Hall (1989; 1990), were the basis of the development of a conceptual framework in order to assess the acceptance of Amazon Go in the German market. Taking into consideration Ashraf et al.'s (2014) remark that the Technology Acceptance Model is not a universal solution and not valid across different cultures, we included potential cultural moderators in our model.

Figure 1 shows our conceptual model based on Davis et al. (1989) which shows that the *perceived ease of use* (EOU) and *perceived usefulness* (PU) have a positive impact on the attitude toward using the new technology introduced by Amazon. The attitude towards using a technology impacts the behavioural intention to use it, which has an effect on the actual system use (black frames in Figure 1). As the consumers' culture plays a major role in consumer behaviour, we extend this established framework by four cultural dimensions (black frames in Figure 1): (1) *low/high context*, (2) *long/short-term orientation*, (3) *uncertainty avoidance*, and (4) *monochronic/polychronic* time (Hall 1989, 1990, Hofstede 2010). Hereafter, we explain how we derive the four hypotheses.

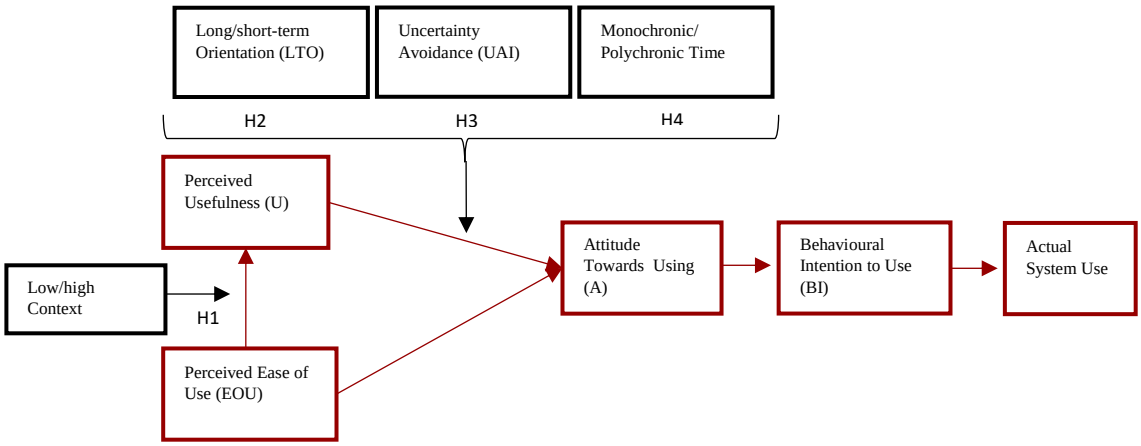

Figure 1. Conceptual Framework (own illustration based on Davis et al., 1989)

Amazon Go has designed its innovative technology for individuals who enjoy interacting with technology through clear communication. Traditionally, clear communication is preferred by low context cultures (Hall 1989, 1990) as individuals living in these cultures would tend to prefer to clearly understand the message that is sent by a person or a system. Therefore, by extending the framework of Davis et al. (1989), we propose that the effect perceived ease of

use has on the perceived usefulness will be stronger for low context cultures when compared to high context cultures. High context cultures, on the other hand, are used to imprecise messages that are open for interpretation and need further physical signals to convey the right message to the recipient (e.g., facial expressions, gestures). This cannot be granted when using the Amazon Go technology as there is no human interaction to support a specific message during the shopping experience. Thus, we hypothesize:

H_1: Low context culture moderates the relationship between perceived ease of use and perceived usefulness positively.

Studies have shown that perceived usefulness and perceived ease of use are strong determinants of attitude toward using a technology and subsequently, of the behavioural intention to use it (Davis et al., 1989). When compared to perceived ease of use, perceived usefulness has generally a stronger impact on the attitude toward using a technology (Davis & Venkatesh, 2000, p. 187). Therefore, given this rationale, we are interested in investigating potential moderators of this relationship.

Cultures with a short-term orientation hold on to tradition and the known. They avoid new inventions that threaten to change their ways of living. Long-term oriented cultures, on the other hand, are rather futuristic. They are adaptive to change and easily accept technological innovations, even the ones coming from distant countries and cultures (Hofstede et al., 2010, p. 243-244). Thus, it can be assumed that these individuals will be more willing to accept the technology of Amazon Go when compared to short-term oriented individuals. Thus, the second hypothesis states the following:

H_2: Long-term oriented culture moderates the relationship between the perceived usefulness and the attitude toward using positively.

In general, the perceived usefulness has a positive impact on the attitude toward using (Davis et al., 1989). Individuals with low uncertainty avoidance are willing to accept a certain amount of risk, which a new product or service incorporates. They are more likely to be lead users and appreciate the usefulness of new inventions, like Amazon Go (Hofstede et al., 2010, p. 238-239). Therefore, we claim that for risk-friendly cultures the relationship between perceived usefulness and attitude towards using will be stronger when compared to those who

are lower risk-takers. Individuals who avoid uncertainty need more time to adopt innovations in their daily lives (Zakour, 2004). Their feeling of uncertainty only decreases over time, when a product becomes more common. Therefore, they will be more likely to reject Amazon Go at first (Hofstede et al., 2010, p. 207; 494-495). Based on the above-mentioned points, we propose:

H_3: Uncertainty avoidance moderates the relationship between the perceived usefulness and the attitude toward using positively.

Monochronic cultures value time efficiency and technologies that can help them monitor and control time (Zakour, 2004). Likewise, it can be expected that they will prefer the Amazon Go technology in order to save time, potentially for other activities. Polychronic cultures, in contrast, will tend to be more spontaneous and flexible (Hall, 1989, 1990). We assume that these cultures will not value the fast payment system of Amazon Go as much as monochronic cultures. As a result, for monochronic individuals, the relationship between the perceived usefulness and attitude toward using Amazon Go will be stronger. Thus, we hypothesize:

H_4: Monochronic time moderates the relationship between the perceived usefulness and the attitude toward using positively.

3. Methodology and Sample

In order to test the hypotheses, an online survey in Germany was created via unipark (N=176). Scales were adopted from Davis et al. (1989), Hofstede et al. (2010), and Hall (1989) and were measured through 5-point-Likert scales (1 = Completely disagree, 5 = Completely agree). The survey included an official promotional video of Amazon Go, which was shown to participants prior to completion of the questionnaire. The video lasted 1.50’ minutes and explained the new business idea and technology behind the *Just Walk Out* system (YouTube, 2018). Prior to the data collection, a pre-test with 10 participants was conducted in order to improve the quality of our survey and adjusted it based on the feedback of our pre-testers. The actual data collection took place from 2nd of June 2017 and 16th of June 2017. The online survey was distributed via email and social media. The participation was voluntary and all participants had the chance to win an Amazon voucher worth 20 Euro. Finally, the collected data was analyzed in SPSS Statistics 24 by means of factor, reliability, and regression analyses.

Among all participants, 47 % were female, 49% were male, and 4% preferred not to say. 58% of the participants were 20-29 years old, 26% were 30-39 years old, 6% were 40-49 years old, and 8% were 50 and older. 42% were full-time employees, 10% worked part-time, 40% were students, 6% were unemployed and the rest did not indicate the employment status. We embedded a filter question so that only consumers who live in Germany were allowed to participate in the study.

4. Results and Discussion

In this section, the results of each hypothesis is shown and the final conceptual framework is presented (cf. Figure 2). First, in order to analyze the hypotheses, the moderating influence of each cultural dimension was calculated. To generate the interaction terms, the variables were mean-centered, which was done by subtracting the mean of the factor from each of the 176 answers for the respective factor. After all variables were mean-centered, the interaction terms were generated by multiplying the two independent mean-centered factors for each hypothesis (e.g., H1 interaction term: EOU_meancentered*Context_meancentered). With these generated variables the regression analysis was performed. The results are shown in Table 1.

Dependent	**R^2**	**Independent**	**b**	**S.E. (b)**	**β**	**t**	**Sig.**
U*	0.247	EOU*	0.716	0.096	0.493	7.447	0.000
		Context*	0.072	0.085	0.057	0.846	0.399
		Interactionterm_H1	-0.050	0.111	-0.030	-0.453	0.651
A*	0.357	U*	0.578	0.059	0.595	9.730	0.000
		LTO*	-0.014	0.093	-0.009	-0.153	0.879
		Interactionterm_H2	0.054	0.087	0.038	0.625	0.533
A*	0.365	U*	0.564	0.060	0.581	9.452	0.000
		UAI*	-0.119	0.090	-0.081	-1.317	0.190
		Interactionterm_H3	0.077	0.079	0.059	0.973	0.332
A*	0.420	U*	0.594	0.057	0.612	10.516	0.000
		Monochronic*	-0.233	0.064	-0.212	-3.631	0.000
		Interactionterm_H4	0.105	0.051	0.119	2.042	0.043
*meancentered variables, b: unstandardized Beta, S.E. (b): Standard Error, β: standardized Beta, t: t-test, Sig.: significance N=176							

Table 1. Results of Regression with Interaction Terms.

Hypothesis 1, which proposed that low context culture moderates the relationship between perceived ease of use and perceived usefulness positively, was rejected (p=0.651). Cronbach's Alpha for this factor was not satisfactory (0.476). Hypothesis 2 tested the effect of long-term orientation on the relationship between perceived usefulness and attitude toward using. This cultural factor indicated also a non-satisfactory reliability score (Cronbach's Alpha=0.433). The interaction term was not significant (p=0.533) and thus hypothesis 2 was rejected. Hypothesis 3 assessed the effect of the uncertainty avoidance culture on the relationship between perceived usefulness and attitude toward use. Hypothesis 3 was equally rejected as the interaction term was not significant in the regression analysis (p=0.332). Cronbach's Alpha for this factor was 0.636, thus acceptable. Finally, hypothesis 4 evaluated the influence of the monochronic culture on the relationship between perceived usefulness and attitude toward using. Hypothesis 4 was confirmed by our regression analysis as the interaction term was significant (p=0.043). Cronbach's Alpha for this cultural dimension (0.721) and the overall fit of the model were the highest (R^2=0.420) when compared to the other potential moderators. Thus, monochronic/polychronic time is the only moderator that we include in our final framework (cf. Figure 2).

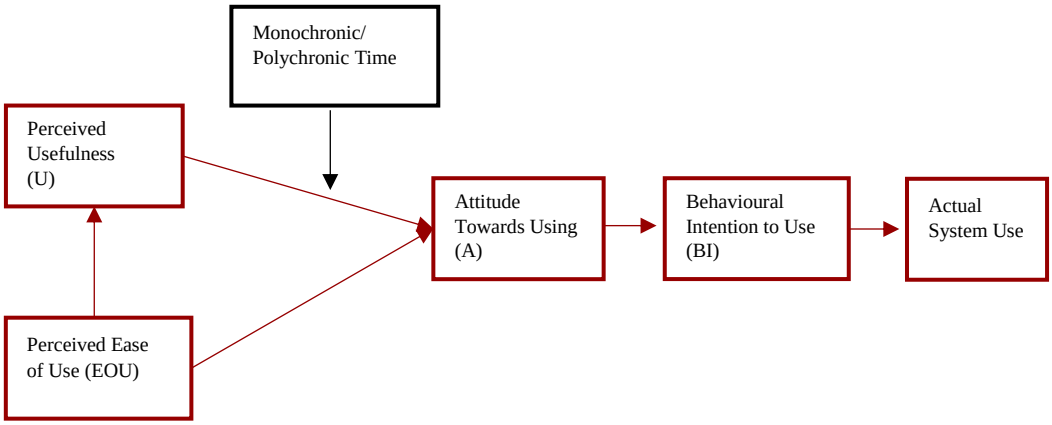

Figure 2. Final Framework (own illustration based on Davis et al., 1989)

5. Conclusion, Implications, and Limitations

Our survey data shows that individuals in Germany are rather unsure about the new technology of Amazon Go (mean of BI=3.24). Therefore, it is pivotal to approach the German culture with care. Results suggest that cultural insensitivity might lead Amazon to lose potential customers due to cultural unawareness about the German market. Thus, we provide Amazon Go with timely recommendations to be applied when entering the German market. These

recommendations are also applicable to other innovative technological businesses that intend to enter the German market.

First, the service of Amazon Go has to display a high ease to use and perceived to be useful for the customers in order to support the efficiency in Germany and address their monochronic culture (mean of monochronic=3.48). For this, the time-saving and overall customer experience benefits should be clearly communicated as a competitive advantage through targeted channels in order to reach different customer segments. Second, German consumers revealed above-average values of uncertainty avoidance (mean of UAI=3.15; 65 points of index of 100 points on Hofstede Insights, 2019). This may negatively influence their acceptance of Amazon Go. Specifically, the lack of acceptance could occur when consumers have to register their private data and bank details on the Amazon Go App. Consequently, data privacy measures should be clearly implemented and communicated. We recommend allowing customers to have the option to reject the storage of the purchase history and that the Amazon Go application should include safety features, such as passwords that diminish the risk of fraud. Amazon Go should closely take into consideration the recently launched European General Data Protection Regulation (GDPR). This can evoke trustworthiness with potential consumers. Third, our analyses show that German consumers have a long-term oriented culture (mean of LTO=3.75; 83 points of index of 100 points on Hofstede Insights, 2019). Long-term oriented cultures are pragmatic. Germany as a pragmatic country shows an ability to adapt traditions easily to changed conditions, a strong propensity to save and invest, thriftiness, and perseverance in achieving results (Hofstede Insights, 2019). In order to gain German customers, Amazon Go has to explain that it is a pragmatic and an uncomplicated service that fits well into the German culture. Summing up, a strategic marketing campaign in German language that highlights the time-saving benefit and pragmatism of Amazon Go are key to succeed in the German market.

Finally, this paper presents certain limitations. First, the relatively small sample size (N=176). Second, no trial Amazon Go supermarket in Germany existed to test the actual usefulness of the technology and attitude of potential users. Thus, the measurement was based on respondent's personal understanding of the innovation through the promotional video. Third, the reliability scores for some cultural dimension scales were not satisfactory (<0.7). Thus, given the limitations, future research should aim to increase the scale reliabilities in order to test our proposed final framework (cf. Figure 2). Fourth, we tested our framework only with German consumers. However, the framework might also contribute to intercultural marketing at large if future studies test the framework in different countries. Consequently, additional markets should be addressed in future studies.

Overall, this paper aimed at providing initial insights about how the technology acceptance model by Davis et al. (1989) might be moderated by cultural dimensions. We applied our proposed framework on the recent case of Amazon Go and its potential introduction to German consumers. However, considering the limitations, further research is needed to fully clarify whether the framework can be used in different countries. It is our hope that this study provides a foundation and motivation for future investigations into the intercultural use of the technology acceptance model and the acceptance of Amazon Go.

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