E-Payment Acceptance Among German Millennials: Perception and Demographic Background

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During the last twenty years, the growth of the internet and its ability to facilitate e-commerce transactions has had a profound impact on the way business is done by both corporations and individuals (Herhausen et al., 2015; Jeffus et al., 2017). The unprecedented growth of e-commerce has driven the creation of new payment systems to transfer funds electronically from person-to-person or person-to-business (Teoh et al., 2013; Sumanjeet, 2009).

The intent of this research is to explore the factors surrounding e-payment use in specific geographical regions to provide a better understanding of that regions e-payment behaviors. This research centers on German millennials, how they value e-payment, and what factors influence their acceptance of electronic funds transfer technology. To reach this goal, a survey was conducted with German millennials exploring what behavior affects their usage of e-payment systems. The results of this survey can provide insights to understand attitudes and behaviors of young generations in their e-payment. The results of this exploratory study center on the descriptive statistics of the respondents.

Keywords: e-payment, online banking, international commerce, technology adoption, TAM, Technology Acceptance Model, self-efficacy

INTRODUCTION

The internet has impacted daily life worldwide in ways very different than previous societal evolutions (e.g. roads, the industrial age, TV). This impact has arguably made one of the largest impacts on the business world. Shopping in the past was mainly done at brick-and-mortar stores, but today we buy goods and services from home, while traveling, or anywhere we have an Internet connection. We can buy clothes, groceries, and even a car, and have all of them delivered to us at home, all because of e-commerce. This is not only convenient for the consumer but profitable for businesses. E-payment systems help businesses lower production costs (i.e. efficient supply chains), reduce waste with just-in-time processing, predict

market movements with data analytics, and manage labor resources more efficiently. Even though e-payment systems are becoming popular and available around the world, the rate of usage of e-payment systems is low for some populations, including many modern countries.

Two primary forces have driven the growth of e-payment. The first of these is understandably the growth of the internet across the globe and the subsequent transition to a more data-driven economy. The second force driving the growth of e-payment is the increased popularity and use of mobile computing devices such as smartphones and tablets which enable customers to conduct business when and where it is convenient for them (Arif et al., 2016).

There are many aspects of e-payment systems beyond the technology used to connect buyers and sellers. Some of the more commonly studied aspects of e-payment research include:

TABLE 1
COMMONLY STUDIED ASPECTS OF E-PAYMENT

1) customer perceptions	Liao, Shi, and Wong 2012
2) customers' intention to use	Chin and Ahmad 2015; He, Luton, Fu, and Li 2006; Wang, Wang, Lin, and Tang 2003
3) customer adoption of e-payment	Lorenzo-Romero, Constantinides and Alarcon-del-Amo 2011; Ozkan, Bindusara and Hackney 2010
4) usage behavior	Kavitha and Gopinath, 2021
5) the importance of convenience	Azmi, Ang, and Talib, 2016; Chin and Ahmad, 2015

However, this study focuses on the factors which are believed to influence the adoption of e-payment systems by a specific group of young millennials from a single cultural region of Germany. The factors in this study are listed in Table 2 with corresponding studies which suggest that these factors influence the adoption and usage of e-payment systems.

In support of the exploratory nature of this study, the authors extend this research to include subjective norms and relate them to the usage of e-payment. Specifically, 1) whether the subjects use e-payment systems, 2) how much money they spend each month using e-payment platforms, and 3) the percentage of monthly expenses they pay with an e-payment system. These were selected as dependent variables while controlling for age, gender, education, and the respondents' working status.

TABLE 2
FOCUSED ASPECTS OF THE STUDY

1) the benefits of e-payment	Teoh, Siong, Lin, and Jiat, 2013
2) ease of use	Chin and Ahmad, 2015; Teoh, Siong, Lin and Jiat, 2013; Lin and Nguyen, 2011
3) trust in e-payment systems	Sikolia, et al., 2010; Teoh, Siong, Lin, and Jiat, 2013; Kumar et. al., 2021; Travica, Josanov, Kajan, Vidas-Bubanja and Vuksanovic 2007
4 & 5) security	Chaudhry, Farash, Naqvi, and Sher 2016; Tella and Abdulmumin 2015; Kumar et. al., 2021
6) self-efficacy	Teoh, Siong, Lin, and Jiat, 2013
7) perceived quality or usefulness	Davis, 1989

The rest of the paper is organized as follows. In the next section, the literature review contains a definition of e-payment, a brief discussion of the role culture plays in e-payment acceptance, a review of the theoretical foundation of the study, the technology acceptance model (TAM), and a review of the study

constructs. The study methodology along with study results are then presented. The paper concludes with limitations and future research possibilities.

LITERATURE REVIEW

E-payment systems refer to a mode of payment that does not involve physical cash or money typically from person-to-person or person-to-business (Chen, and Guo, 2022; Kumar, et. al., 2021). Other authors define e-payment more narrowly as the transfer of funds electronically from a payer to the payee through an e-payment platform which enables customers to remotely access and manage their financial transactions through an electronic network (Sumanjett, 2009; Teoh, Chong, Lin, and Chua, 2013). This study adopts the narrower definition of e-payment as it emphasizes the technology more readily used by millennials around the world and across many cultures.

Culture

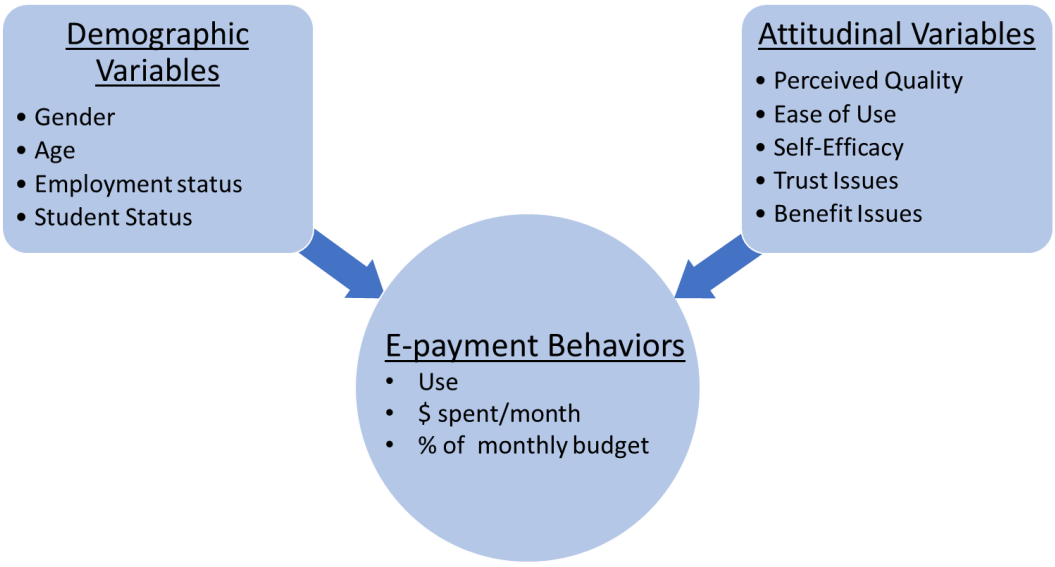
Hofstede defined culture as the collective programming of the mind, which distinguishes the members of one human group from another (Hofstede, 1980). Hofstede also developed an index model that included five cultural dimensions: individualism, power distance index, masculinity, uncertainty avoidance, and long-term orientation. Of particular interest to e-payment, usage is the long-term orientation. Long-term orientation looks at people's consideration of their future (i.e., accepting a sacrifice now for a long-term benefit later). Cultures that encourage long-term-oriented thinking value saving, determination, and a willingness to adapt to changes in their environment (e.g. new technology).

Even though e-payment systems are becoming popular around the world, the rate of usage is low for some populations. Despite cultural similarities among most Western Europeans, they maintain their distinct differences in regard to the economy and the adaption of technology into their personal financial decisions. However, to better understand the diversity of cultures concerning e-payment acceptance, we must first examine them individually. This study examines Western European culture, specifically Germany, in an attempt to establish a baseline for future cultural comparison and their use of e-payments on a global scale.

Theoretical Background

E-payment systems have been studied from many points of view in previous research. This study adopts the technology acceptance model (TAM) based on the work of Davis (1989). The technology acceptance model (TAM) is an information systems theory that found perceived usefulness and perceived ease of use are the major two decisions when people accept new technology (Davis, 1989). TAM is derived from the Theory of Reasoned Action or TRA to the field of information systems. The theory of reasoned action is predicated on the assumption that people are rational decision-makers. Constantly evaluating and reevaluating their beliefs toward specific behaviors (Fishbein and Ajzen, 1975). Davis (1989) proposed the TAM as a means to better understand the different factors that lead people to adopt or fail to adopt a specific technology or technological system. Davis (1989) suggests that perceived quality/usefulness and perceived ease of use are the primary beliefs that determine whether or not a given technology is accepted or rejected. Davis (1989) goes on to define perceived quality/usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance." He also defines perceived ease of use as "the degree to which a person believes that using a particular system would be free of effort." Perceived usefulness is also seen as being directly impacted by perceived ease of use (Davis, 1989).

FIGURE 1
THEORETICAL FRAMEWORK



TAM studies have also shown that culture slightly moderates the relationship between TAM variables and technology adoption (Ahmad, 2018).

TAM has wide applicability but could be adapted with additional factors pertinent to the context of the current study (e.g., situational involvement in various forms of e-payment) that may increase the power of the TAM model (King & He, 2006).

The study focuses on the factors which are believed to influence the adoption of e-payment systems: Perceived Quality (PQ), Ease of Use (EU), Self-Efficacy (SE), Trust Issues (TU), and Benefit Issues (BI). Figure 1 above is our theoretical framework, based on the TAM model with the selected demographic variables, the attitudinal independent variables, and the e-payment behavior dependent variables.

Hypothesis Development

Perceived Quality

Perceived Quality has been variously defined as the degree to which a person believes that using a particular system will require little effort on their part and that it will enable them to complete their intended task more effectively (Dastan and Gurler, 2016; Chin and Ahmad, 2015. Past research has also demonstrated that when users hold increased perceptions of quality when they find that a system is easy to learn and manage. This research has also found that users are more likely to be satisfied and perceive that there is a reduction in the risk associated with mobile transactions as perceptions of quality increase (Liao, Shi, and Wong, 2012; Zhou, 2011; Lorenzo-Romero, Constantinides, and Alarcon-del-Amo, 2011). Thus, the following hypothesis is provided.

H1a: *Perceived Quality is positively related to whether the individual ever uses e-payment systems.*

H1b: *Perceived Quality is positively related to how much money an individual spends each month via e-payment.*

H1c: *Perceived Quality is positively related to the percentage of the monthly budget an individual pays via e-payment.*

Perceived Ease of Use

Perceived Ease of Use (PEOU) can be defined as the level of difficulty users encounter when using a particular system (Davis, 1989). Past research consistently suggests that customers are less likely to adopt e-payment systems that they feel are overly cumbersome or complex (Nader et al., 2019; GAO, 2005; Truong and Jitpaiboon, 2008). Tella (2012) argued that ease of use will increase a user's level of satisfaction and further affect the usage of e-payment. Vinitha and Vasantha (2017b) found that perceived ease of use was the most significant predictor for e-payment use in India. Hence, the following hypothesis is provided:

H2a: *Perceived Ease of Use is positively related to whether the individual ever uses e-payment systems.*

H2b: *Perceived Ease of Use is positively related to how much money an individual spends each month via e-payment.*

H2c: *Perceived Ease of Use is positively related to the percentage of the monthly budget an individual pays via e-payment.*

Self-Efficacy

Self-efficacy can be defined as "judgments of how well one can execute courses of action required to deal with prospective situations" (Bandura, 1982). Bandura (1986, 1997) suggests that the perception one has of his or her capabilities to perform a task will increase the likelihood that the task will be completed successfully. In a study conducted in Kuwait, it was found that internet experience was a significant variable affecting e-payment adoption (Khaili and Nasrallah, 2014). Self-efficacy was not an important predictor for a Japanese e-payment usage study, but it was identified as a predictor for e-payment adoption in the Ivory Coast (Chen et al., 2020; Chen et al., 2018). For less developed countries, it is relatively more important for explaining e-payment adoption behavior. Therefore, based on this we propose the following hypothesis:

H3a: *Perceptions of Self-Efficacy are positively related to whether the individual ever uses e-payment systems.*

H3b: *Perceptions of Self-Efficacy are positively related to how much money an individual spends each month via e-payment.*

H3c: *Perceptions of Self-Efficacy are positively related to the percentage of the monthly budget an individual pays via e-payment.*

Perceived Trust Issues

A high level of user confidence and trust in an e-payment system is a contributing factor to the successful adoption of e-payment systems (Kurnia and Benjamin, 2007). Without customer trust, it would be extremely difficult for an e-payment system to gain widespread usage. The trust factor was found to be statistically significant in Arab cultures (Rouibah, 2012). Kim et al., (2010) found that both perceived security and perceived trust affect the use of e-payment systems in Korea. It was found that customer trust affected e-payment usage in Nigeria (Gholami et al., 2010). Similarly, it was found that perceived trust was an important factor for e-payment usage in the United States. (Carter and McBride, 2010; Schaupp and Carter, 2010). In a study in the United Arab of Emirates (UAE), it was found the was no relationship between trust and e-payment intention (Salloum et. al., 2019). Trust was also found important in Traffic Violation E-payment System (TVEPS) in Kuwait (Khalil and Nasrallah, 2014). Therefore, consumers' perceived trust in e-payment systems is defined as consumers' belief that e-payment transactions will be processed in accordance with their expectations (Tsiakis and Sthephanides 2005, Mallat 2007). This definition then provides the basis for the following hypothesis.

H4a: *Perceived Trust Issues are positively related to whether the individual ever uses e-payment systems.*

H4b: *Perceived Trust Issues are positively related to how much money an individual spends each month via e-payment.*

H4c: *Perceived Trust Issues are positively related to the percentage of the monthly budget an individual pays via e-payment.*

Perceived Benefit Issues

Lee (2009) identifies benefits as a significant driver for e-payment systems acceptance and use. Gerrard and Cunningham (2003) view perceived economic benefits to include fixed and transaction costs in adopting e-payment. Fixed costs refer to the costs of installing payment equipment such as card readers and payment software, while transaction costs are those incurred by customers and merchants each time they carry out a business transaction (Lee, 2009; Chen et al., 2020). Vendors typically bury these costs in the total cost of a transaction, for example, by including a small markup in a product's price to cover the cost of providing e-payment services. The benefit seen by the user of e-payment systems is the increased transactional efficiency experienced. This effect of perceived benefits on use has been applied in many studies to date (e.g., Vinitha and Vasantha, 2017a; Teoh et al., 2013; Pei et al., 2015). Based on the support provided the following hypothesis is proposed:

H5a: *Perceived Benefit Issues are positively related to whether the individual ever uses e-payment systems.*

H5b: *Perceived Benefit Issues are positively related to how much money an individual spends each month via e-payment.*

H5c: *Perceived Benefit Issues are positively related to the percentage of the monthly budget an individual pays via e-payment.*

METHODOLOGY

This study targeted 240 respondents from Germany. Respondents were selected based on a convenience sample and asked to fill out the online survey which was hosted on Qualtrics. Study constructs and scales were selected based on a review of the literature. The survey was translated using the standard translation back-translation process by native speakers and was then pretested with another group of native speakers. Each of the scales selected demonstrated adequate reliability and validity. The survey instrument was then pretested with a different group of native speakers. This process indicated that no additional changes were required.

The survey instrument has comprised the constructs of interest, whether the respondent used e-payment systems, the amount of money that they typically spend in using e-payments, and demographic data.

RESULTS

Respondent Demographics

This study targeted 240 respondents based on the convenience sampling technique. Table 3 shows the demographic profiles of study respondents. The split between male and female respondents was relatively close at 107 and 128 respectively. This finding was consistent with the sex ratio of 1.02 between males/females reported by the CIA's World Factbook (2018). The age of respondent groups was somewhat spread with the majority of them, 193 (or 80.42%) being between 18 to 34 years old. This was the target age for a study of millennials and reasonably consistent with the expectation of more young people at universities. In terms of occupation, about half of the participants did not work (51.3%). This is consistent with the number who were students, either part-time or full-time (51.25%).

TABLE 3
DEMOGRAPHIC VARIABLES (N=240)

Variables	Classification Variables	n	%
Gender	Male	128	51.0
	Female	109	43.4
	Missing	14	5.6
Age	Below 18	31	12.4
	18-24	173	68.9
	25-34	22	8.8
	35-44	1	.4
	45-54	6	2.4
	Above 55	1	0.4
	Missing	17	6.8
Do you work?	Full-time	67	26.7
	Part-time	45	17.9
	Not working	125	49.8
	Missing	14	5.6
Are you a student?	Full-time	110	43.8
	Part-time	15	6.0
	Not studying	111	44.2
	Missing	15	6.0

Scale Validity and Reliability

The questionnaire was translated using a standard translation back-translation process where the translated document is translated back to the original language by an independent translator. All translators were native German-speaking college students; English was confirmed accurate by native English-speaking college professors. This process was repeated until a consensus was reached.

The scale's reliabilities were then assessed based on Cronbach's Alphas. This portion of the analysis indicated that all but two of the scales exceeded the .60 minimum cutoff recommended by Nunnally (1978). The two Security scales did not meet the minimum cutoff. They were left in the survey, but their impact should be considered with bias. Based on this analysis the survey instrument was deemed to be both valid and reliable, with an exception.

TABLE 4
MEANS, STD DEV, AND CRONBACH'S ALPHA FOR FIVE ATTITUDINAL VARIABLES (N=240)

Measure	Items	Mean	SD	Cronbach's Alpha
Perceived Quality	4	3.61	0.75	0.831
Ease of Use	4	2.94	0.33	0.820
Self-Efficacy	7	3.94	0.82	0.824
Trust Issues	3	3.17	0.82	0.705
Benefit Issues	4	3.57	0.92	0.750

Attitudinal variables were found to have five unique groups (Table 4). Self-Efficacy had the highest mean at 3.94 suggesting German millennials feel very confident in their ability to utilize e-payment technology properly. It can also be seen in Table 4, that Ease of Use and quality have high mean scores of 3.82 and 3.62 (on a Liker-scale of 1-5) among seven dependent variables. This implies that it is very

important that e-payment systems for German millennials should have good quality and be easy to use for them to accept their use.

In terms of utilization, Table 5 indicates almost all respondents did at some point use an e-payment system (95.6%), and most used their smartphones (97.5%). Just over 80% of the respondents spend less than $400 each month using e-payment platforms but the percentage of their monthly expenses varied a great deal. It must also be noted that up to 24 or 10% of respondents failed to answer at least one question.

TABLE 5
USAGE MEASURES (N=240)

Variables	**Categories**	**n**	**%**
Ever used e-payment	Yes	240	95.6
	No	7	2.8
	Missing	4	1.6
If used e-payment, did you use a smartphone	Yes	234	97.5
	No	6	2.5
Dollars per month spent on e-payment	Less than $100	96	38.2
	$101 - $200	57	22.7
	$201 - $400	46	18.3
	$401 - $800	21	8.4
	$801 - $1200	7	2.8
	$1201 - $2400	3	1.2
	More than $2401	1	0.4
	Missing	20	8.0
Percent of your monthly expenses paid via e-payment	0%	2	0.8
	1% - 10%	46	18.3
	11% - 20%	33	13.1
	21% - 30%	24	9.6
	31% - 40%	11	4.4
	41% - 50%	28	11.2
	51% - 60%	14	5.6
	61% - 70%	23	9.2
	71% - 80%	19	7.6
	81% - 90%	12	4.8
	91% - 100%	5	2.0
	Missing	34	13.5

Student Status and Employment were two demographic variables found to be statistically significant on whether they use e-payment systems (Table 6). This would seem to suggest that millennial students are more accepting of e-payment systems. The researchers believe the reason Employment is statistically significant is because there is a high correlation between Student Status and Employment. Whether Employment taken from a broader demographic would be correlated with e-payment use is beyond the scope of this research but noted for future study. Ease of Use was also found to be statistically significant on whether they used an e-payment system. As a factor affecting initial use, it is expected that people try new technology that is easy to use and understand; it would be unexpected to find contradictory data.

TABLE 6
EVER USED E-PAYMENT?

Ever Used E-payment?					
Model	**Basic Model**			**Complete Model**	
	Unstandardized B	**t**		**Unstandardized B**	**t**
Student Status	.098	4.075**		0.084	3.667**
Employment	.101	3.784**		0.083	3.211**
Perceived Quality				-0.001	-0.085
Ease of Use				0.074	2.351
Self-Efficacy				0.014	0.948
Trust Issues				0.005	0.37
Benefit Issues				-0.01	-0.762
F value	11.252**			3.752**	
R squared	.089			.106	

*Level of significance at 0.05
**Level of significance at 0.01

Gender, Age, Student Status, and Employment were four demographic variables found to be statistically significant on dollars per month spent on e-payment (Table 7).

TABLE 7
DOLLARS PER MONTH SPENT ON E-PAYMENT

Dollars per Month Spent on E-payment					
Model	**Basic Model**			**Complete Model**	
	Unstandardized B	**t**		**Unstandardized B**	**t**
Gender	.540	3.601**		0.396	2.674*
Age	.313	2.867**		0.308	2.911**
Student Status	.395	2.318*		0.438	2.686*
Employment	.937	4.620**		0.812	4.119**
Perceived Quality				0.079	0.709
Ease of Use				-0.129	-0.589
Self-Efficacy				0.09	0.904
Trust Issues				0.096	0.957
Benefit Issues				0.258	2.701*
F value	16.671**			10.611**	
R squared	.232			.312	

*Level of significance at 0.05
**Level of significance at 0.01

As with the Used E-Payment variable (Table 4), Student Status and Employment were also found to be statistically significant on the percent per month of expenses paid via e-payment (Table 8). The fact someone used e-payment systems could be a single event but incorporating e-payments into a monthly budget demonstrated systematic use and acceptance of the technology.

Benefit Issues is the attitudinal variable that was found to be statistically significant on dollars per month and the percent per month of expenses spent with e-payment.

TABLE 8
PERCENT PER MONTHLY OF EXPENSES PAID VIA E-PAYMENT

Percent per Monthly of Expenses Paid Via E-payment					
Model	**Basic Model**			**Complete Model**	
	Unstandardized B	**t**		**Unstandardized B**	**t**
Student Status	1.221	2.922**		1.167	2.922**
Employment	1.802	3.879**		1.443	3.211**
Perceived Quality				0.187	0.69
Ease of Use				-0.627	-1.173
Self-Efficacy				0.336	1.367
Trust Issues				-0.202	-0.814
Benefit Issues				0.969	4.122**
F value	8.529**			7.264**	
R squared	.074			.200	

*Level of significance at 0.05
**Level of significance at 0.01

DISCUSSION

Overall, this study achieved its stated objectives through the use of a survey instrument and descriptive statistics. Study results do provide important insights into the overall e-payment construct as it is currently used by German millennials.

This study like many other survey-generated studies suffers from two primary limitations. These limitations include the use of a convenience sample and a lack of flexibility. The heavy use of sample data obtained from an urban setting makes the generalizability to other areas questionable but perhaps not critical. The second shortcoming underlying this study, the lack of flexibility refers to the lack of personalization, accessibility issues, interpretation issues, and survey fatigue to name a few. Both these limitations suggest the need for additional research in this area.

The results of this study also provide important implications for future research. These potential research topics include but are not limited to the need to study the use of e-payment systems while controlling for variables such as national culture and the level of economic development. A second potential research stream will ideally look at how this study's findings change as the country develops economically and if changes occur as their primary international trading partners change. Finally, study findings suggest the need for future research to identify other constructs which may have an even greater impact on customers' willingness to adopt e-payment systems. Finally, the poor result in security shows potential for further research as this was not expected.

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