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A literature review of the classic and extended Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) model

Przegląd literatury wykorzystującej klasyczną i rozszerzoną jednolitą teorię akceptacji i użycia technologii 2 (UTAUT2)

UTAUT2 is a model that explains why technology is adopted by the users. It integrates eight most important technology acceptance models that were proposed in the past. The aim of this article is to answer the question "why people use technology?" by summarizing seven years of research based on classic and extended UTAUT2 since the model was formulated in 2012. This paper consist of three main parts. The first part is devoted to presentation of different technology acceptance theories / models including presentation of the three different types of UTAUT2 based research. Second part is regarding methodology of the literature review. Third part consists discussion (including limitations and further research ideas). Table summarizing 25 UTAUT2 studies is added as attachment.

Keywords

UTAUT2, Unified Theory of Acceptance and Use of Technology 2, technology acceptance theories, literature review

UTAUT2 to teoria, która wyjaśnia, dlaczego dana technologia jest akceptowana i wykorzystywana przez użytkowników. Integruje osiem najważniejszych modeli akceptacji technologii, które zostały zaproponowane w przeszłości. Celem tego artykułu jest odpowiedź na pytanie: Dlaczego ludzie używają technologii? Cel ten został osiągnięty przez podsumowanie siedmiu lat badań opartych na klasycznej i rozszerzonej teorii UTAUT2. Artykuł składa się z trzech głównych części. Pierwsza część jest poświęcona prezentacji różnych teorii/ modeli akceptacji technologii, w tym prezentacji trzech różnych typów badań opartych na UTAUT2. Druga część dotyczy metodologii przeglądu literatury. Trzecia część obejmuje dyskusję (w tym ograniczenia i dalsze pomysły badawcze). Tablica podsumowująca 25 badań opartych na UTAUT2 została dodana jako załącznik.

Słowa kluczowe

UTAUT2, jednolita teoria akceptacji i użycia technologii 2, teorie akceptacji technologii, przegląd literatury

JEL: D11, O14

Introduction

Over the last two decades technology acceptance has become one of the most discussed topics in the modern organizations (Tamilmani, Rana, & Dwivedi, 2017). There is a growing demand for understanding why users are adopting various systems, machines and devices both in consumer and work context, as it leads to increase in product

sales and job efficiency. Such behavior in scientific literature is explained with the usage of technology acceptance theories / models. There are multiple literature review papers dedicated to various theories for example TAM (Technology Acceptance Model; Yousafzai, Foxall, & Pallister, 2007) and UTAUT (Unified Theory of Acceptance and Use of Technology; Taiwo & Downe, 2013), but there is lack of similar articles for UTAUT2 model, which is

one of the newest and the most efficient technology acceptance models (Venkatesh, Thong, & Xu, 2012)

The aim of this article is to answer the question "why people use technology" by filling this gap, analyzing and comparing 25 UTAUT2 based studies. The article structure consists review of technology acceptance theories / models, methodology and discussion with implications, limitations and ideas for future research. As for methodology of literature review descriptive review method was chosen. Researchers may claim that findings from this method represent the state of the art in a particular domain (Pare & Kytsiou, 2017).

Technology acceptance theories / models

For the purposes of this article technology acceptance is defined as intention to use or use of technology (Davis, 1986). Technology acceptance theories "have been developed over the years and resulted from the extension of each other" (Momani & Jamous, 2017). Chronological graph for their evolution is presented on Figure 1. Below is the short summary of the most important models proposed in those theories with definition of variables they consist of.

The aim of Diffusion of Innovations Theory (1962) is to explain how, why and at what pace new ideas and technologies are spreading in society. It was originally proposed by Everett Rogers (1983) and then modified by Moore and

Benbasat (1991) to adjust to technology acceptance context.

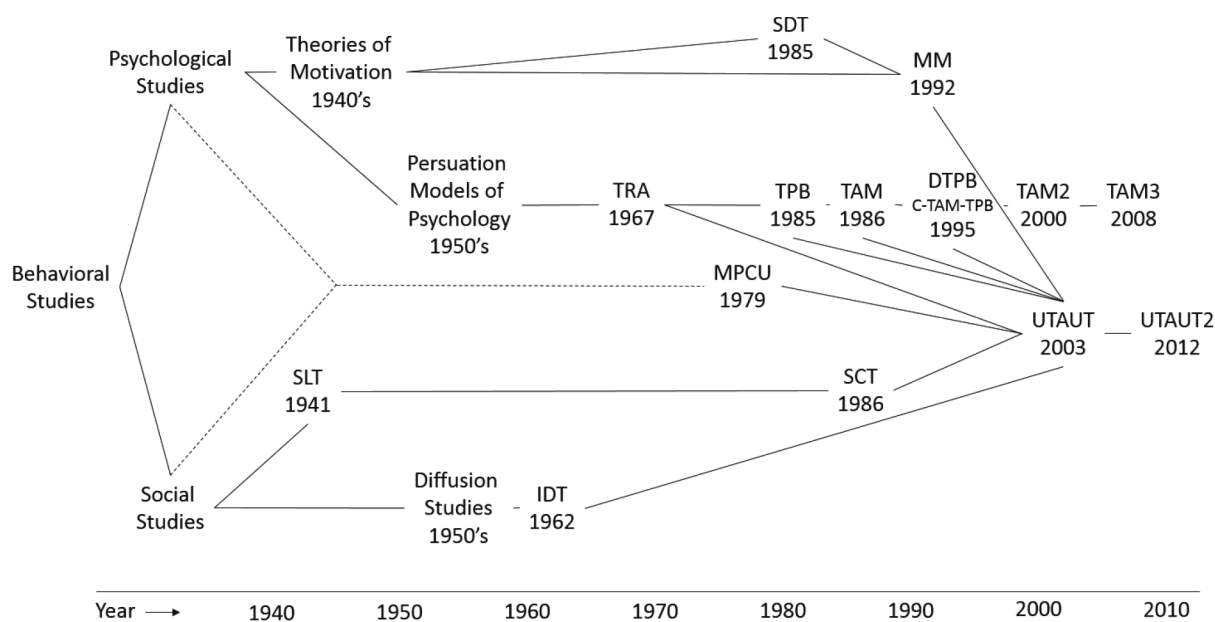
The Theory of Reasoned Action (1967) has introduced the key concept that there is a direct influence of Behavioral Intention on the Actual Behavior, used in subsequent technology acceptance theories. It was created as general behavior theory, but was further adopted as technology acceptance theory by many researchers (Trojanowski & Kułak, 2016). Fishbein and Ajzen (1975) proposed two exogenous variables in the model that explains Behavioral Intention: Attitudes Toward Behavior ("an individual's positive or negative feelings about performing target behavior") and Subjective Norms ("the person's perception that most people who are important to him, think he should or should not perform the behavior in question").

The Model of Personal Computer Use (1979) was designed as the answer for the technology acceptance research stream based on the Theory of Reasoned Action. It did not use the concept of crucial influence of Behavioral Intention on Use Behavior.

Theory of Planned Behavior (1985) was an extension of Theory of Reasoned Action. The aim was to consider also mandatory situations (e.g. in work). For this purpose Ajzen (1991) added variable Perceived Behavioral Control ("The perceived ease or difficulty of performing the behavior").

Social Cognitive Theory (1986) originally was proposed by Bandura (1986). It explains human behavior by modeling the interaction between the personal factors, environment, and behavior. It was later adjusted to computer use context by Compeau AND Higgins (1995).

Figure 1. Chronological graph for the technology acceptance theories evolution



Source: authors' own work based on (Momani & Jamous, 2017).

Technology Acceptance Model (1986) is an adaptation of the Theory of Reasoned Action to the information systems context. Behavioral Intention is a predictor of Use Behavior. Davis (1986) proposed two antecedents of Behavioral Intention: Perceived Usefulness ("The degree to which a person believes that using a particular system would enhance his or her job performance") and Perceived Ease of Use ("the degree to which a person believes that using a particular system would be free from effort").

Davis, Bagozzi, and Warshaw (1992) formulated Motivational Model (1992) to find out why people use computer at work. Researchers studied two aspects — usefulness and enjoyment (extrinsic and intrinsic motivation).

A Combined Theory of Planned Behavior / Technology Acceptance Model (1995) was proposed by Taylor and Todd (1995). They added two variables from Theory of Planned Behavior: Subjective Norms and Perceived Behavioral Control into Technology Acceptance Model. It was done to explain behavior of both experienced and inexperienced technology users.

Unified Theory of Acceptance and Use of Technology (2003) was proposed because researchers in the field of technology acceptance were "confronted with a choice among a multitude of models and find that they must 'pick and choose' constructs across the models, or choose a 'favored model' and largely ignore the contributions from alternative models".

Behavioral Intention and Use Behavior in this model are explained by: Performance Expectancy

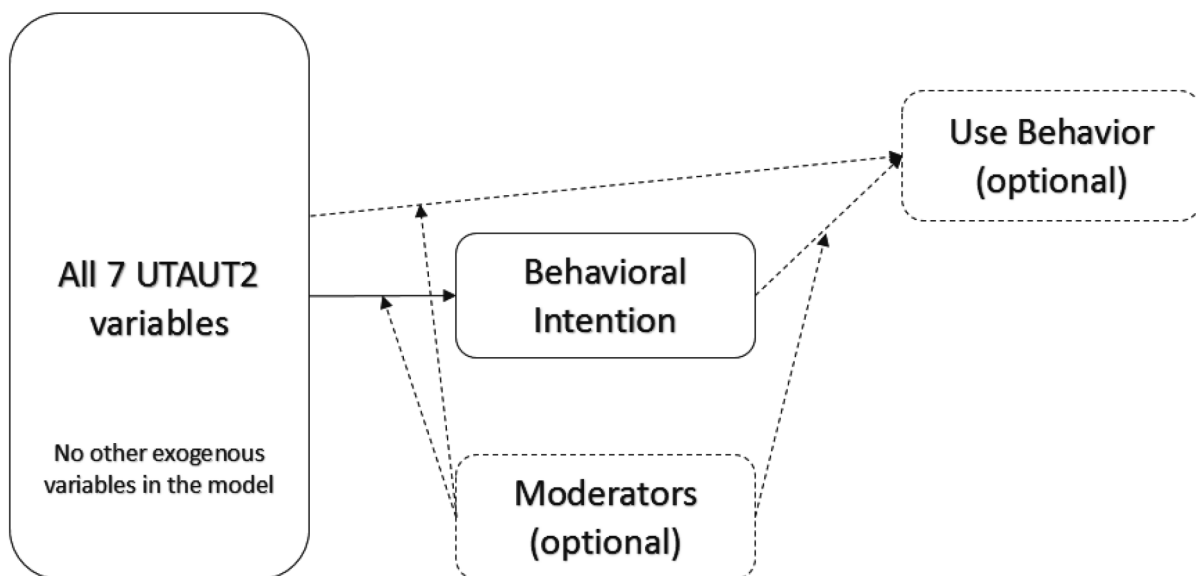
("The degree to which the user expects that using the system will help him or her attain gains in job performance"), Effort Expectancy ("The degree of ease associated with the use of the system"), Social Influence ("The degree to which an individual perceives that important others believe that he or she should use the new system") and Facilitating Conditions ("The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system"). The relationships in the model are moderated by four variables: age, gender, experience in technology use and voluntariness.

Unified Theory of Acceptance and Use of Technology 2 (2012) was proposed to adjust UTAUT theory to consumer context. Therefore three new variables were added to the model: Hedonic Motivation ("The fun or pleasure derived from using a technology"), Price Value ("The consumers' cognitive trade-off between the perceived benefits and the monetary cost of behavior") and Habit ("The extent to which people tend to perform behaviors automatically because of learning"). The relationships in the model are moderated by three variables: age, gender and experience in technology use.

Venkatesh, Thong, and Xu (2012) underlines that there are three different types of research based on the UTAUT model, which is the case also for the UTAUT2 model:

- Research using classic UTAUT2 model, where there are exactly the same exogenous variables used as in the original study with no additional exogenous variables (Figure 2).

Figure 2. Graphical scheme for research based on the classic UTAUT2 model



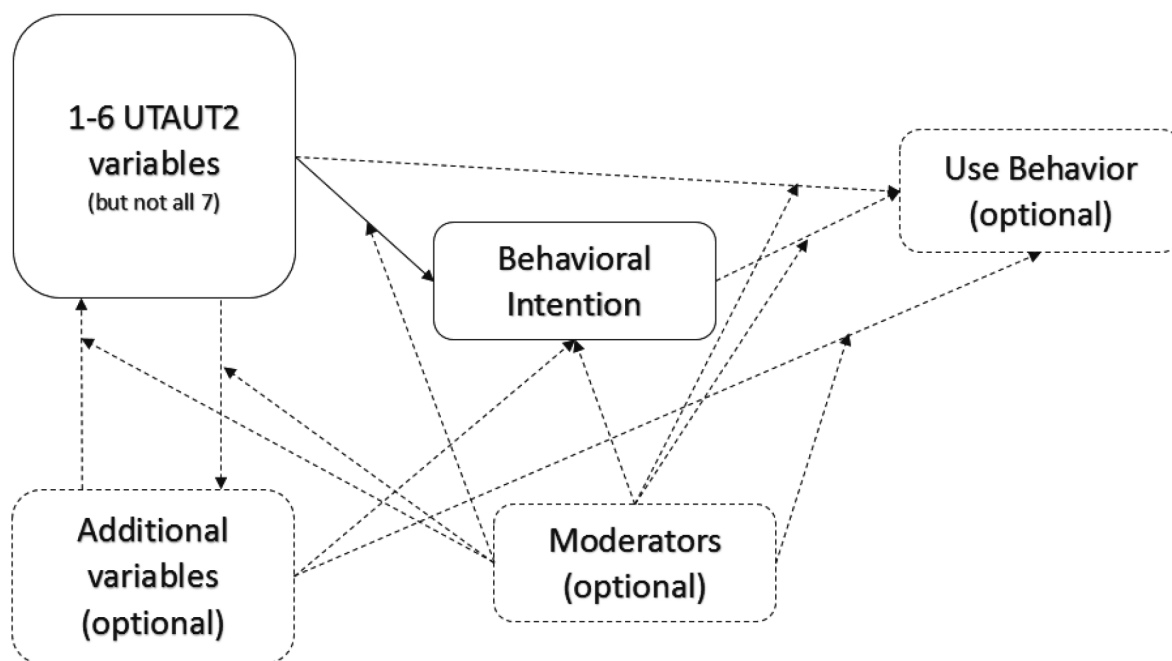
Source: authors' own work.

- Research using part of the UTAUT2 model, where only part of exogenous variables from the original study are used (Figure 3).
- Research using extended UTAUT2 model, where there are exactly the same exogenous variables used as in the original study and also

some new exogenous variables are proposed (Figure 4).

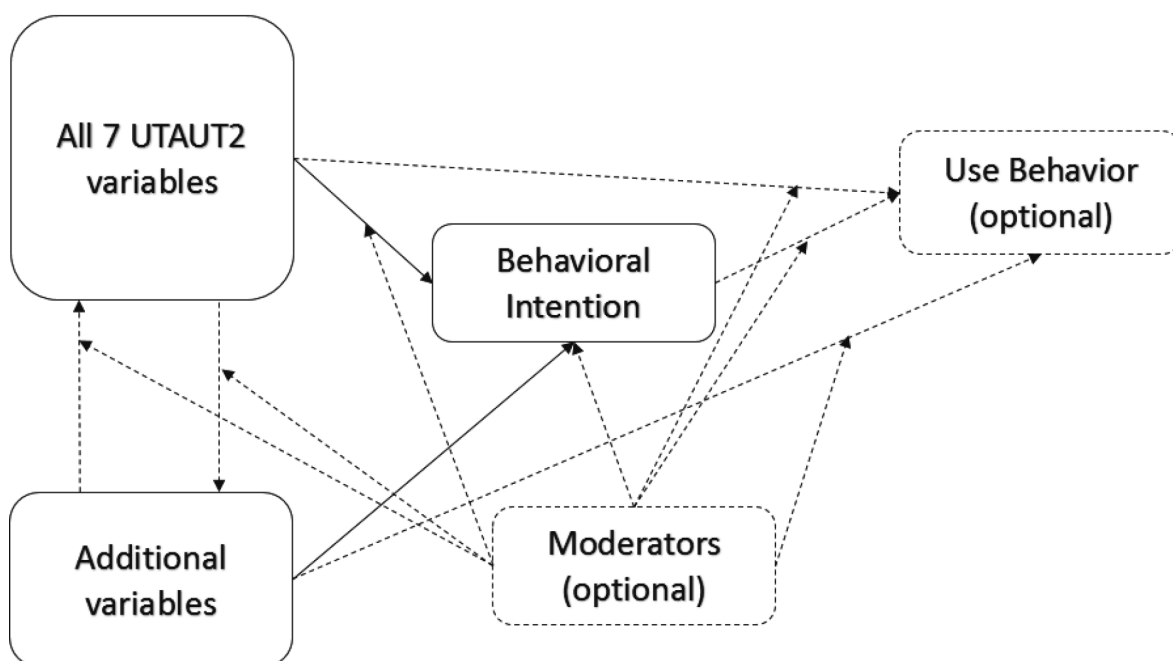
In this article only classic and extended types were analyzed, as they are the only types that include all 7 exogenous variables proposed in the original UTAUT2 article.

Figure 3. Graphical scheme for research based on the partial UTAUT2 model



Source: authors' own work.

Figure 4. Graphical scheme for research based on the extended UTAUT2 model



Source: authors' own work.

Methodology

There are couple of literature review methods of analysis to choose from including narrative review, descriptive review, mapping review, scooping review, aggregative review, realist review and critical review. Descriptive review was used as methodology for this literature review. It allows finding of interpretable patterns or trends. In this method researchers "extract from each study certain characteristics of interest, such as publication year, research methods, data collection techniques, and direction or strength of research outcomes (e.g., positive, negative, or non-significant) in the form of frequency analysis to produce quantitative results" (Pare & Kytsiou, 2017). Some researchers have concerns that this method may not be as powerful as meta-analytic review and is limited in predictive and explanatory power (Sylvester, Tate, & Johnstone, 2013). The biggest benefit of this method is that researchers can "identify any interpretable trends or draw overall conclusions about the merits of existing conceptualizations, propositions, methods or findings" (Pare & Kytsiou, 2017).

To be included in this literature review, research had to meet the following conditions:

- presence in the Scopus database,
- available for cost-free download for members of University of Warsaw,
- at least 3 citations,
- empirical study with presented results,
- published in English,
- based on the UTAUT2 model and includes all 7 exogenous variables of Behavioral Intention proposed by Venkatesh (2012).

If there were no aggregated results presented in the study, research results were presented for the group with more respondents. As in only 64% of articles Use Behavior variable was included, articles with Behavioral Intention as the only endogenous variable are still considered UTAUT2 based. The same applies for articles without moderators and with different modelling of relationships. The only criteria to be regarded as UTAUT2 based were inclusion of UTAUT2 exogenous variables and explicit information by the authors that their model is created based on the UTAUT2 model.

Discussion and implications

The aim of this literature review to answer the question "why people use technology?" by summarizing research on classic and extended UTAUT2 has been achieved. The most important

factors influencing technology acceptance with recommendations for academics and commercial organizations have been presented below. The full table with the results (including significant and insignificant variables, methods, citations) can be found in the attachment. Technology acceptance topic is more and more popular among both scientists and business people. UTAUT2 model is no different with increase from 4 articles present in Scopus database in 2012 to 61 articles in 2018 (1525% growth). However there is a lack of complex literature review articles devoted mainly to this model, similar to the ones for earlier models, such as UTAUT (Taiwo & Downe, 2013) or TAM (Yousafzai, Foxall, & Pallister, 2007). Yousafzai et al. (2007), Tamilmani, Rana, and Dwivedi (2017) proposed only a systematic review of citations of UTAUT2 article and its usage trends. This article fills this gap with 25 different classic and extended UTAUT2 based studies analyzed. This allowed comparison and drawing useful conclusions for both academic and business.

UTAUT2 studies included in this literature review were conducted in many different contexts. Out of 25 articles the most popular topic was learning (including online and mobile learning) with 8 articles (32%). This means that classic and extended UTAUT2 model is probably mostly used by teachers, who would like to improve their teaching efficiency by understanding behavior of their students. However these results might be used by providers of the online learning platforms selling different courses, such as Udemy, Coursera or Lynda (part of LinkedIn group). The topic with the second most articles was banking and payments (including online banking and mobile payments) with 6 articles (24%). This was expected, as this sector is growing, innovative (new mobile apps and solutions for banks, NFC payments with vast arrays of devices e.g. smartphones, tablets, smartwatches or even different wearable devices such as clothes). Conclusions from studies in this area can be utilized mainly by banking institutions and retailers. No other topic was included in more than 15% of analyzed articles, only shopping (12%), mobile and on-line health (8%) and social media (8%) contexts exceeded 5% threshold.

In the original UTAUT2 model there are 2 endogenous variables — Behavioral Intention and Use Behavior. Due to the fact that Use Behavior may be hard to measure, only 64% of analyzed articles included Use Behavior endogenous variable. Although it is important limitation of those studies, it should be noted that Behavioral Intention is usually very good predictor of Use Behavior (Venkatesh, et al., 2003). R^2 value for Behavioral Intention for analyzed articles is within

range from 46% to 86% with the average of 66% and the median of 65%. The lowest R^2 value for Use Behavior is 32% and the highest is 78% with the average of 56% and the median of 59%. Both R^2 values for Behavioral Intention and Use Behavior are very high and in most cases should be assessed as moderate or substantial (Wong, 2013). Although these research use different methodologies, contexts, respondents group and it is not possible to directly compare them, it proves that the UTAUT2 model is very efficient and may be used with success in many different areas of research and in business organizations.

Performance Expectancy turned out to be significant in 24 out of 25 cases (96 percent), also it was the strongest predictor of Behavioral Intention in 32% of articles (8 cases). These results makes this variable almost mandatory to use in majority of contexts when constructing model that is based on the UTAUT2. It also confirms that for the most people utilitarian aspects are the most important factors when it comes to adoption of technology. Business managers should ensure that their technology is efficient, free of damage, help to save time and is perceived that way by the consumers.

Effort Expectancy was statistically significant only a little above half of the times it was used (13/25). It never had the greatest influence on Intention. Researchers should consider whether to add this variable to UTAUT2 based model. It should be done only if technology is hard to learn or has a steep learning curve. This variable is also more important for elderly. Recommendation for the business is not to underline ease of use in marketing communication if the product is not complicated for the target group, for example mobile phones for customers under 35 years old.

Neither of Social Influence, Facilitating Conditions and Price Value variables were statistically significant predictors of Behavioral Intention in more than 60% of analyzed cases. Therefore these variables should be approached by researchers with caution and only included if they were significant in similar research context.

Hedonic Motivation was significant in 84% of cases. It was the most important antecedent of Behavioral Intention 7 times (28%). Researchers may consider adding this variable to UTAUT2 based model mainly in consumer context, as in mandatory context (e.g. usage in work context), it may often be insignificant. Especially this variable should be strong predictor in the online and mobile shopping context (Chopdar, et al., 2018), as for large part of people buying with the usage of Internet is associated with fun and pleasure. For this reason traditional retailers may be interested in incorporating innovative technologies inside

their shops that provide interaction with the customers (e.g. beacon technologies allowing communication with mobile phone users).

Habit was also very important variable, statistically significant in 22 out of 23 cases (96%), and percentage-wise it has the best ratio of being the strongest predictor of Behavioral Intention (8 times, 35%). It should always be included when the research is regarding technology that can be used in repeatable way.

As for Use Behavior, the most important predictor is by far the Behavioral Intention. It was used in 100% of analyzed studies (16/16), and in 88% cases (14/16) it had the strongest influence on usage. This confirms the observation regarding this relationship first proposed in Theory of Reasoned Action (Fishbein & Ajzen, 1975) that was incorporated in many subsequent technology acceptance models, such as Theory of Planned Behavior (Ajzen, 1991) or Technology Acceptance Model (Davis, 1986).

Analyzed UTAUT2 based models were extended with 16 different variables, mainly connected with the context of the research (for example Washability in the context of adoption of smart interactive textiles in home), and not applicable to the other studies. Due to that only 1 variable was used in at least 3 cases — Perceived Risk. Researchers should take into consideration aspects connected with privacy where potential loss of value (e.g. money) for the user can occur.

In 40% of all analyzed articles (10/25) there are no moderating variables included. This is very important problem as "groups of respondents are likely to diverge significantly from each other in terms of their beliefs, values or their understanding of different constructs; therefore, the value of path coefficients for each group may be different. Failure to examine the impact of heterogeneity may result in drawing incorrect conclusions and formulating invalid recommendations" (Trojanowski & Kuřak, 2017).

Respondents from analyzed articles were students in 37,5% (9/24) of cases, and non-students in 62,5% of cases (15/24). This is promising information, as there is a better chance that those results will be used by commercial organizations. The smallest sample size was 64 people, and the biggest one was 1360 people. The average was 373, median was 308 and standard deviation was 256. In majority of the cases minimum sample size requirement suggested by Wong (2013) was fulfilled. Researchers can consider longitudinal studies with representative respondents groups in the future.

Researchers in the UTAUT2 based articles from this literature review used three data analysis methods. PLS-SEM was the most popular with 64% of cases (16/25). Partial Least Square is heavily used in all technology acceptance studies, and with

development of dedicated intuitive software such as Smart PLS and Warp PLS, it probably will gain in popularity. Second most popular method was CB-SEM (5/25, 20%). Regression analysis (4/25, 16%) — mainly stepwise multiple regression was used least often. Future studies can focus on other methods of data analysis as well, for example examining non-linear relationships and using various big data techniques such as data mining and text mining.

A couple of limitations were identified in this literature review. Firstly, not all UTAUT2 articles were analyzed. Only Scopus database was used. There are articles that are not indexed in the Scopus, therefore other databases (such as Google Scholar) should be checked. This study includes only research papers that are free of charge for University of Warsaw students, paid articles should also be included. Article had to have at least 3 citations to be part of the analysis, articles with less citations also provide valuable insights and should be considered in the future. In analyzed articles different contexts, methods of analyzing and collecting data were used. Therefore it must be taken into consideration that studies are not directly comparable and some error is connected with this literature review. UTAUT2 is a young model, quickly evolving, so this literature review should be updated in the near future.

This article can help technology acceptance researchers by serving as classic and extended UTAUT2 research database and in making decision regarding what variables they should include in their model, inclusion of moderators, choice of data analysis method, building respondent sample and creating relationships in the model. This article should help also business, to understand why people want to buy products, why they decide to use particular technologies in work and what areas should be improved in production process and communicated by marketing teams in advertising.

Attachment 1. Comparison of different UTAUT2 adaptations

Below is the table with the summary of 25 UTAUT2 based studies. Negative relationship are marked with (-). Endogenous variables are underlined. In parenthesis () after endogenous variable is R² value, if included in the article. Strongest predictor is marked in **bold**.

Detailed analysis of the table is included in the *Discussion and implications* part of the article.

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Table 1. Comparison of different UTAUT2 adaptations

Author / Year / Context	Article title	Significant variables	Insignificant variables	Moderators	Analysis method	Respondent sample	Citations / Type
(Baptista & Oliveira, 2015) Adoption of mobile banking in Mozambique	Understanding mobile banking: The unified theory of acceptance and use of technology combined with cultural moderators	<u>Behavioral Intention</u> (R ² =69%); Performance Expectancy, Hedonic Motivation, Habit <u>Use Behavior</u> (R ² =59%); Behavioral Intention, Facilitating Conditions, Habit	<u>Behavioral Intention</u> : Effort Expectancy, Social Influence, Facilitating Conditions, Price Value	Cultural moderators adapted from Hofstede: Individualism, Uncertainty avoidance, Long term orientation, Masculinity, Power Distance. Only Masculinity was not significant	PLS-SEM	252 Mozambican mobile Internet users	96 citations Classic UTAUT2 model
(Escobar-Rodriguez & Carvalaj-Trujillo, 2013) Adoption of online airline tickets purchasing	Online drivers of consumer purchase of website airline tickets	<u>Behavioral Intention</u> (R ² =82%); Performance Expectancy, Facilitating Conditions, Price Saving Orientation <u>Use Behavior</u> (R ² =58%); Behavioral Intention , Facilitating Conditions, Habit	<u>Behavioral Intention</u> : Effort Expectancy, Social Influence, Hedonic Motivation <u>Use Behavior</u> : Price Saving Orientation	No moderators	CB-SEM	1360 Spanish people who had visited different airline tickets websites during the six months prior to the study	36 citations Classic UTAUT2 model
(Slade, et al., 2015) Adoption of NFC mobile payments	Exploring consumer adoption of proximity mobile payments	<u>Behavioral Intention</u> (R ² =58%); Social Influence, Performance Expectancy , Habit, Trust in Provider, Perceived Risk(-)	<u>Behavioral Intention</u> : Effort Expectancy, Facilitating Conditions, Price Value, Hedonic Motivation	No moderators	Regression analysis	244 British citizens and residents	28 citations Extended UTAUT2 model
(Wong, et al., 2014) Adoption of mobile TV	Mobile TV: a new form of entertainment?	<u>Behavioral Intention</u> (R ² =65%); Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation, Habit	<u>Behavioral Intention</u> : Price Value, Performance Expectancy	Gender — only significant for relationship between Facilitating Conditions and Behavioral Intention	PLS-SEM	193 respondents	22 citations Classic UTAUT2 model

(Gaitan-Arenas, et al., 2015) Internet banking adoption by elderly	Elderly and Internet Banking: An Application of UTAUT2	<u>Behavioral Intention</u> (R ² =62%): Performance Expectancy, Effort Expectancy, Price Value, Habit Use Behavior (R ² =39%): Habit, Behavioral Intention	<u>Behavioral Intention</u> : Social Influence, Facilitating Conditions, Hedonic Motivation Use Behavior: Facilitating Conditions	Gender — not significant for any relationship	PLS-SEM	415 respondents over 55 years old	21 citations Classic UTAUT2 model
(Khan, et al., 2017) Online banking adoption in Pakistan	Understanding Online Banking Adoption in a Developing Country: UTAUT2 with Cultural Moderators	<u>Behavioral Intention</u> (R ² =58%): Performance Expectancy, Facilitating Conditions, Hedonic Motivation, Price Value, Habit , Perceived Security Use Behavior (R ² =50%): Facilitating Conditions, Behavioral Intention	<u>Behavioral Intention</u> : Effort Expectancy, Social Influence Use Behavior: Habit	Individualism / Collectivism, Uncertainty avoidance, Long / Short term, Masculinity / Femininity, Power Distance — only Individualism / Collectivism Uncertainty avoidance significant	PLS-SEM	Respondents from Pakistan	20 citations Extended UTAUT2 model
(Yuan, et al., 2015) Usage of health mobile apps	Keep Using My Health Apps: Discover Users' Perception of Health and Fitness Apps with the UTAUT2 Model	<u>Behavioral Intention</u> (R ² =63%): Performance Expectancy , Hedonic Motivation, Price Value, Habit	<u>Behavioral Intention</u> : Effort Expectancy, Social Influence, Facilitating Conditions	Gender, Age and Experience — not significant for any relationships	CB-SEM	317 students from USA who have used health and fitness apps	19 citations Classic UTAUT2 model
(Nguyen, et al., 2014) Adoption of e-learning based on cloud computing	Acceptance and Use of e-Learning Based on Cloud Computing: The Role of Consumer Innovativeness	<u>Behavioral Intention</u> (R ² =70%): Performance Expectancy, Social Influence, Hedonic Motivation , Habit Use Behavior (R ² =74%): Habit, Behavioral Intention , Innovativeness	<u>Behavioral Intention</u> : Effort Expectancy, Facilitating Conditions, Price Value, Innovativeness Use Behavior: Facilitating Conditions	Age, Gender, Education, Experience — significant for some relationship	CB-SEM	282 cloud-based e-learning users in Vietnam	17 citations Extended UTAUT2 model

Table 1. Comparison of different UTAUT2 adaptations (cont.)

Author / Year / Context	Article title	Significant variables	Insignificant variables	Moderators	Analysis method	Respondent sample	Citations / Type
(Buetner, 2016) Usage of Career-oriented Social Networking Sites for Job Search	Getting a Job via Career-oriented Social Networking Sites: The Weakness of Ties	Number of contacts (R ² =62%); Usage Intensity Usage Intensity (R ² =36%); Behavioral Intention Job Offer Success (R ² =80%); Number of Contacts(-), Behavioral Intention Behavioral Intention (R ² =82%); Facilitating Conditions , Habit, Performance Expectancy, Hedonic Motivation	Behavioral Intention; Effort Expectancy, Social Influence, Price Value <u>Job Offer Success</u> : Usage Intensity	Gender and Age — only Age significant for some relationships	PLS-SEM	523 online respondents	16 citations Extended UTAUT2 model
(Nguyen, et al., 2014) Adoption of cloud based e-learning in Vietnam	Acceptance and Use of Information System: e-Learning Based on Cloud Computing in Vietnam	Behavioral Intention (R ² =60%); Performance Expectancy, Social Influence, Hedonic Motivation , Habit <u>Use Behavior</u> (R ² =78%); Habit, Behavioral Intention	Behavioral Intention; Facilitating Conditions, Effort Expectancy, Price Value <u>Use Behavior</u> : Facilitating Conditions	Age, Gender, Education, Experience — all significant for some relationships	CB-SEM	282 respondents who used or intend to use e-learning	14 citations Classic UTAUT2 model
(Ali & Lim, 2015) Adoption of lecture capture system ReWIND	Factors affecting acceptance & use of ReWIND: Validating the extended unified theory of acceptance and use of technology	Behavioral Intention (R ² =70%); Performance Expectancy , Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation, Price Value, Habit <u>Use Behavior</u> (R ² =74%); Habit, Facilitating Conditions, Behavioral Intention	No insignificant variables	No moderators	PLS-SEM	398 students from Taylor University in Malaysia	12 citations Classic UTAUT2 model

(Oechslein, et al., 2014) Adoption of social recommender systems	An Application of UTAUT2 on Social Recommender Systems: Incorporating Social Information for Performance Expectancy	<p><u>Performance Expectancy</u> (R² = 38%): User's Social Network, User's Profile Information, User's Reading Behavior</p> <p><u>Behavioral Intention</u> (R² = 74%): Performance Expectancy, Effort Expectancy, Social Influence, Habit</p>	<p><u>Behavioral Intention</u>: Facilitating Conditions, Hedonic Motivation, Price Value</p>	Age, Gender, Experience — not significant for any tested relationship	PLS-SEM	266 students of German university	12 citations Extended UTAUT2 model
(Alalwan, et al., 2018) Adoption of internet banking in Jordan	Examining factors influencing Jordanian customers' intentions and adoption of internet banking: Extending UTAUT2 with risk	<p><u>Performance Expectancy</u> (R² = 52%): Effort Expectancy, Hedonic Motivation</p> <p><u>Price Value</u> (R² = 52%): Hedonic Motivation, Performance Expectancy</p> <p><u>Behavioral Intention</u> (R² = 64%): Perceived Risk(-), Hedonic Motivation, Price Value, Performance Expectancy, Effort Expectancy</p> <p>Use <u>Behavior</u> (R² = 32%): Behavioral Intention, Habit, Facilitating Conditions</p>	<p><u>Behavioral Intention</u>: Social Influence</p>	No moderators	PLS-SEM	348 Jordanian banking consumers	9 citations Extended UTAUT2 model
(Kang, et al., 2015) Mobile learning adoption in South Korea	Investigating the Determinants of Mobile Learning Acceptance in Korea Using UTAUT2	<p><u>Behavioral Intention</u> (R² = 46%): Performance Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation, Habit</p>	<p><u>Behavioral Intention</u>: Price Value, Effort Expectancy</p>	No moderators	Step-wise multiple regression	305 students from 4 universities in Seoul	9 citations Classic UTAUT2 model

Table 1. Comparison of different UTAUT2 adaptations (cont.)

Author / Year / Context	Article title	Significant variables	Insignificant variables	Moderators	Analysis method	Respondent sample	Citations / Type
(Ali, et al., 2016) Adoption of computer supported collaborative learning	An assessment of students' acceptance and usage of computer supported collaborative classrooms in hospitality and tourism schools	Behavioral Intention (R ² =68%); Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation , Price Value Habit Use Behavior (R ² =71%); Behavioral Intention , Habit, Facilitating Conditions	No insignificant variables	No moderators	PLS-SEM	222 students	8 citations Classic UTAUT2 model
(Baptista & Oliveira, 2017) Adoption of mobile banking services in Brazil	Why so serious? Gamification impact in the acceptance of mobile banking services	Behavioral Intention (R ² =79%); Performance Expectancy, Effort Expectancy, Social Influence, Hedonic Motivation (-), Price Value, Habit , Gamification Impact Use Behavior (R ² =66%); Habit , Behavioral Intention, Facilitating Conditions	Behavioral Intention; Facilitating Conditions	Age, Gender — significant for most relationships	PLS-SEM	326 bank customers in Brazil	8 citations Extended UTAUT2 model
(Macedo, 2017) Adoption of computer and Internet by older people	Predicting the acceptance and use of information and communication technology by older adults: An empirical examination of the revised UTAUT2	Behavioral Intention (R ² =57%); Performance Expectancy , Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation, Habit Use Behavior (R ² =38%); Behavioral Intention , Habit	Behavioral Intention; Price Value Use Behavior; Facilitating Conditions	Age, Gender, Experience, Education — only as control variables for Use Behavior, Only Experience and Education significant	PLS-SEM	278 older adults between 55 and 94 years of age	8 citations Classic UTAUT2 model
(Chong & Ngai, 2013) Adoption of location-	What influences travelers' adoption of	Review Information Adoption	Review Information Adoption;	No moderators	PLS-SEM	200 shopping mall customers in China	7 citations Extended UTAUT2 model

<p>-based social media for travel planning</p>	<p>a location-based social media service for their Travel planning?</p>	<p>(R²=42%): Argument Strength, Review Rating, Reviewer Expertise, Reviewer Trustworthiness, Review Sidedness <u>Behavioral Intention</u> (R²=64%): Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation, Price Value Habit Use Behavior (R²=48%): Review Information Adoption, Behavioral Intention, Facilitating Conditions, Habit (-), Mobile Internet Experience</p>	<p>Review Consistency, Review Timeliness <u>Behavioral Intention</u>: Mobile Internet Experience, Review Information Adoption</p>	<p>No moderators</p>	<p>CB-SEM</p>	<p>807 university students from Qatar and USA</p>	<p>6 citations Extended UTAUT2 model</p>
<p>(El-Masri & Tarhini, 2017) Adoption of e-learning systems in Qatar and USA</p>	<p>Factors affecting the adoption of e-learning systems in Qatar and USA: Extending the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)</p>	<p>Results presented separately for USA and Qatar USA: <u>Behavioral Intention</u> (R²=68%): Performance Expectancy, Facilitating Conditions, Hedonic Motivation, Habit, Trust Qatar: <u>Behavioral Intention</u> (R²=63%): Performance Expectancy, Effort Expectancy, Social Influence, Hedonic Motivation, Habit, Trust</p>	<p>USA: <u>Behavioral Intention</u>: Effort Expectancy, Social Influence, Price Value Qatar: <u>Behavioral Intention</u>: Facilitating Conditions, Price Value</p>	<p>807 university students from Qatar and USA</p>	<p>CB-SEM</p>	<p>6 citations Extended UTAUT2 model</p>	

Table 1. Comparison of different UTAUT2 adaptations (cont.)

Author / Year / Context	Article title	Significant variables	Insignificant variables	Moderators	Analysis method	Respondent sample	Citations / Type
(Brauner, et al., 2017) Adoption of smart interactive textiles in home	Age, Gender, and Technology Attitude as Factors for Acceptance of Smart Interactive Textiles in Home Environments Towards a Smart Textile Technology Acceptance Model	Attitude Toward Technology (R ² =16%); Gender (Male=0; (-)), Age (-) <u>Behavioral Intention</u> (R ² =86%); Habit , Hedonic Value, Performance Expectancy, Social Influence, Facilitating Conditions, Technical Conditions, Price Value, Washability, Effort Expectancy, Attitude Toward Technology	No insignificant variables	Technology cluster (tech-savvy and tech-weary) — significant for some relationships	Step-wise multiple regression	124 people from rural area	5 citations Extended UTAUT2 model
(Wittland, et al., 2015) Adoption of game application	Serious Games for Cognitive Training in Ambient Assisted Living Environments -A Technology Acceptance Perspective	<u>Behavioral Intention</u> (R ² =63%); Performance Expectancy, Social Influence, Hedonic Motivation , Price Value, Habit	<u>Behavioral Intention</u> : Effort Expectancy, Facilitating Conditions	Age, Gender — significant for some relationships	Step-wise multiple regression	64 people from 16 to 84 years	4 citations Classic UTAUT2 model
(Farooq, et al., 2017) Adoption of lecture capture system	Acceptance and use of lecture capture system (LCS) in executive business studies Extending UTAUT2	<u>Behavioral Intention</u> (R ² =58%); Performance Expectancy , Effort Expectancy, Social Influence, Facilitating Conditions, Habit, Hedonic Motivation, Personal Innovativeness, Price Value Use Behavior (R ² =68%); Behavioral Intention , Personal Innovativeness, Habit, Facilitating Conditions	No insignificant variables	No moderators	PLS-SEM	481 executive business students of 5 foreign universities in Malaysia	3 citations Extended UTAUT2 model

(Sheikh, et al., 2017) Adoption of social commerce framework	Acceptance of social commerce framework in Saudi Arabia	Behavioral <u>Intention</u> (R ² =66%): Performance Expectancy, Habit , Hedonic Motivation, Price Saving Orientation, Social Support, Social Commerce Constructs <u>Use Behavior</u> (R ² =44%): Behavioral Intention, Habit , Facilitating Conditions	Behavioral <u>Intention</u> : Effort Expectancy, Social Influence, Facilitating Conditions <u>Use Behavior</u> : Price Saving Orientation	Individualism / Collectivism, Uncertainty Avoidance — tested and significant only for relation between Behavioral Intention and Use Behavior	PLS-SEM	310 university students in Saudi Arabia	3 citations Extended UTAUT2 model
(Tavares & Oliveira, 2017) Adoption of EHR portals	Electronic Health Record Portal Adoption: a cross-country analysis	Behavioral <u>Intention</u> (R ² =53%): Performance Expectancy , Effort Expectancy, Social Influence, Hedonic Motivation (-), Price Value, Habit <u>Use Behavior</u> (R ² =36%): Behavioral Intention , Habit	Behavioral <u>Intention</u> : Facilitating Conditions, <u>Use Behavior</u> : Facilitating Conditions, Collection, Error, Unauthorized Access, Secondary Use	No moderators	PLS-SEM	597 respondents from USA and Portugal	3 citations Extended UTAUT2 model
(Chopdar, et al., 2018) Adoption of mobile shopping apps	Mobile shopping apps adoption and perceived risks: A cross-country perspective utilizing the Unified Theory of Acceptance and Use of Technology	Behavioral <u>Intention</u> (R ² =68%): Performance Expectancy, Effort Expectancy, Facilitating Conditions, Hedonic Motivation , Price Value, Privacy Risks <u>Use Behavior</u> (R ² =62%): Behavioral Intention , Habit	Behavioral <u>Intention</u> : Habit, Social Influence, Security Risks <u>Use Behavior</u> : Facilitating Conditions, Privacy Risks, Security Risks	Country India vs USA — significant for some relationships	PLS-SEM	366 respondents from USA and India	3 citations Extended UTAUT2 model

Source: authors' own work.

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