- ORIGINAL ARTICLE -

The Taxonomy of Factors of Acceptance and Use of Technologies for Human Computer Interface in Digital Services

La Taxonomía de los Factores de Aceptación y Uso de las Tecnologías para Interfaz Hombre Computadora de Servicios Digitales

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Abstract

Emerging technologies, e.g., cloud computing, artificial intelligence, robotics, and information technologies, facilitate digital transformation and promote digital services. Significant research exists on the acceptance and use of technologies and specific digital transformation (DT) practices. However, more research is needed to better understand user's acceptance and how they use technology to better de-sign digital services. Thus, this paper: 1) proposes a Systematic Literature Re-view (SLR) of the models of acceptance and use of technologies, as well as of certain DT practices applied to the human-computer interaction (HCI) of digital services; 2) provides an analysis of the results of the behavior of the factors and practices; and 3) proposes a taxonomy of the acceptance and use factors applied to HCI of digital services by economic activity. The main contribution of this work is the proposed taxonomy in a vacancy area relevant to digital transformation efforts applied to digital services pursued globally, both in the private and public sectors.

Keywords: acceptance and use factors, digital transformation, human-computer interaction, taxonomy, digital services.

Resumen

Las tecnologías emergentes, como la computación en nube, la inteligencia artificial, la robótica y las tecnologías de la información, facilitan la transformación digital y promueven los servicios digitales. Existen numerosas investigaciones sobre la aceptación y el uso de tecnologías y prácticas específicas de transformación digital (TD). Sin embargo, se necesita más investigación para comprender mejor la aceptación de los usuarios y cómo utilizan la tecnología para desarrollar mejor los servicios digitales. Por ello, este artículo 1) propone una Revisión Sistemática de la Literatura (SLR) de los modelos de aceptación y uso de las tecnologías, así como de determinadas prácticas de TD aplicadas a la interacción humano-computadora (HCI) de los servicios digitales; 2) proporciona un análisis de los resultados del comportamiento de los factores y prácticas; y 3) propone una taxonomía de los factores de aceptación y uso aplicados a la HCI de los servicios digitales por actividad económica. El principal aporte de este trabajo es la taxonomía propuesta en un área de vacante relevante para los esfuerzos de transformación digital aplicados a los servicios digitales que se llevan a cabo a nivel mundial, tanto en el sector privado como en el público.

Palabras claves: factores de aceptación y uso, transformación digital, interacción humano-computadora, taxonomía, servicios digitales.

1. Introduction

Today, considering technology acceptance and use factors is a common practice when designing digital services, and there is a significant body of knowledge on such topics as well as in the use of some digital transformation practices. To assess the state of the art, a SLR [1] facilitates conceptualizing the underlying technology models and theories for technology adoption. In particular, it can reveal how new technologies are applied in HCI to humanize the

interface causing a satisfactory effect on the user [2]. In addition, [3] demonstrated that the Unified Theory of Acceptance and Use of Technology (UTAUT2) model has a more remarkable predictive ability than UTAUT, and that certain DT practices that allow optimizing the implementation and uses of digital services with cognitive enhancement in HCI contribute to increase their usefulness [4]. These practices are increasingly used for agile digital service delivery [5].

We consider that acceptance and use factors, and certain DT practices are related to HCI aspects of digital services, such as usability, efficiency, security, and design thinking, among others [6]. We also argue that their relevance is different according to the economic activity of the digital services; for example, social influence and facilitating conditions factors are relevant in financial activity and may be irrelevant in other economic activity. Thus, this research aims at determining which factors are relevant for designing digital services, and their influence based on the economic activity of the services. To do the study, we conducted a SLR based on the methodology applied in [7], correlated with Barbara Kitchenham's SLR methodology [8], whose result offer taxonomies [9].

The rest of the paper is structured as follows. Section 2 discusses previous works existing in the literature. Section 3 explains the methodology used for this research, including the analysis and taxonomies of the results obtained from the factors of acceptance and use of digital services by economic activity. Section 4 discusses some conclusions, recommendations, and outlines our future work.

2. Background

2.1. Human-computer interaction

HCI encompasses two main concepts. On the one hand, there is an interface, that is the visible part of the system that the user sees, hears, touches or interacts with when interacts with the system. On the other hand, the interaction is the user's activity, such as typing or touching part of the system. HCI involves designing, implementing, and evaluating interactive interfaces to provide computer systems that satisfy users. HCI promotes digital services usability by being efficient, effective, secure, functional, easy to learn, and to use, including a sustainable design to recognize new technologies to meet user needs [6].

2.2. Models and theories of acceptance and use of technologies

Technology Acceptance Model (TAM), UTAUT, ISO 9241-210 - Ergonomics of human-system interaction, ISO-IEC-25010 - Software quality models, among others, are applied to HCI to intuit user behavior [10]. In [11], related TAM and user experience model (UX) determine which factors influence the experiential component. In [3], the authors demonstrated that UTAUT2 is much higher than UTAUT. [12] focuses on ergonomics in the application development process, applying ISO 9241-210 to evaluate efficiency, effectiveness, and user satisfaction. Also, in the SLR [13], the authors generated a catalog of quality measures focused on ISO-IEC-25010.

2.3. Certain digital transformation practices

Emerging technologies hasten digital transformation, conceptualized as the interception of two dimensions: the adoption of disruptive digital technologies and the people who guide the organizational change regarding processes, culture, and even the user interface and its environment [14].

In recent years, agile development has been widely adopted since it allows rapid product delivery through an iterative and incremental approach. In [15], they integrated HCI practices and agile methodologies to increase software life, decrease failure, and improve usability features. Moreover, for problem identification and resolution methods in [16], they determine that HCI and design thinking follow similar and complementary procedures. For process simplification and automation methods in [17], research related to DT and specifically with Straight Through Processing (STP) for online currency trading for multiple banks revealed user acceptance for its time savings in executing transactions. The SLR [18] on automation of robotic processes concludes that the application of bots can improve operational and organizational processes. Likewise, [4] refers to certain practices such as design thinking, Robotic Process Automation (RPA), and scrum, among others, facilitating the use of technologies.

Based on the review of previous works related to acceptance and usage factors, and certain DT practices for HCI, we observe that they focus on applying factors and practices in specific areas and not how such factors influence digital services depending on the economic activity in which such services are provided. Therefore, we understand that there is a gap in the state of the art, and through this paper, we propose to assess such factors, how they affect depending the economic activity and how can we classify them, providing a kind of taxonomy.

3. Methodology

On July 2021, we conducted an SLR in ACM, IEEE Xplore, and Springer Link. We searched for scientific papers published in the last six years on the

acceptance and use of technology and certain DT practices.

As a research methodology, we apply a SLR methodology as presented in [7], correlated with Barbara Kitchenham's SLR methodology [8], as shown in Table 1 and explained below.

Table 1 Research methodology

	SLR in [7]		**SLR in** [8]
Stage I (Analyze)	Step 1: Define framework		
	Step 2: Identify the domains	**Planning**	Research questions
	Step 3: Define data collection		Data sources and search strategy
			Selection criteria primary studies
			Data extraction strategy
			SLR quality assessment
	Step 4: Select relevant papers	**Execution**	Search process
			Selection of studies
	Step 5: Document papers		Data extraction and synthesis
	Step 6: Analyze selected articles		
	Step 7: Generate report	**Report**	Analysis of results

3.1. Step 1: Define framework

The framework focused on the SLR allowed us to **analyze** the factors of acceptance and use of technology and certain DT practices of digital services by economic activity.

3.2. Step 2: Identify the domains

Based on the research domains, we posed the following research questions:

Question: What are the models of technology acceptance and certain DT practices applied to HCI of digital services?

Sub questions: We refine the research question into five sub questions:

RQ1: What are the factors of acceptance and use of technologies applied to HCI in digital services?

RQ2: What are the methods of identifying and resolving problems related to the acceptance and use of technologies applied to HCI of digital services?

RQ3: What are the tools for simplifying and automating processes related to the acceptance and use of technologies applied to HCI of digital services?

RQ4: What are the agile software development methods related to the acceptance and use of technologies applied to the HCI of digital services?

RQ5: What are the economic activities of digital services related to the acceptance and use of technologies applied to HCI?

3.3. Step 3: Define data collection

It covers data sources and search strategy, defining the selection criteria for primary studies, data extraction strategy, and SLR quality assessment.

Data sources and search strategy

Two types of searches are applied: general/automatic and specific/manual.

General searches: The libraries used were: ACM, IEEE Xplore, and Springer Link.

Specific searches: To complement the general searches, we manually select conference proceedings and journals in which studies relevant to our domain had been previously published [19]: IFIP TC13 International Conference on Human-Computer Interaction (Core A), International Conference on Human-Computer Interaction with Mobile Devices and Services (Core B), International Conference on Advances in Computer-Human Interaction (Core C). As well as journals: International Journal of Human-Computer Interaction (Q2), Advances in Human-Computer Interaction (Q3), and International Journal of Mobile Human-Computer Interaction (Q4).

Search string: We conducted the search using the following keywords:

(("Acceptance model" OR "Acceptance and Use of Technology" OR "Digital transformation" OR (("ISO 9241-210" OR "ISO-9241-210") AND "Accessibility") OR (("ISO-IEC-25010" OR "ISO/IEC-25010" OR "ISO/IEC 25010" OR "ISO IEC 25010") AND ("Efficiency" OR "Performance"))) AND ("Human-computer interaction" OR "Digital Services" OR "Robotic Process Automation" OR "Straight-through processing" OR "Design Thinking" OR "SCRUM" OR "Pandemic")). We selected research work published in the period 2016 to 2021.

Selection criteria for primary studies

We selected studies containing at least one of the following inclusion criteria: technology acceptance models, certain digital transformation practices, HCI of digital services, area of computer science, and scientific articles from conferences and journals.

We excluded studies that met the following criteria: articles for special editions, books, and workshops; duplicate articles for the same study in different digital libraries; articles with less than five pages; and articles not written in English.

Data extraction strategy

The extraction criteria (EC*) used for the possible answers to each research sub-questions (see Table 2) facilitated the classification of the selected articles.

Table 2 Data extraction criteria

RQ1: ¿What are the factors of acceptance and use of technologies applied to HCI in digital services?		
EC1	Acceptance and use models or related	TAM*, UTAUT*, ISO 9421, ISO-25010, Others.
EC1.1	UTAUT3 [1]	Performance expectancy, effort expectancy, social influence, enabling conditions, hedonic motivation, price value, habit, behavior intention, usage behavior / adoption, personal innovation.
EC1.2	UTAUT2 [20]	Perceived usefulness, perceived ease of use, social influence, facilitating conditions, hedonic motivation, price value, habit, behavior intention, usage behavior, gender, age, experience.
EC1.3	UTAUT [21]	Perceived usefulness/ease use, social influence, facilitating conditions, behavior intention, usage behavior, gender, age, experience.
EC1.4	TAM3 [1]	Perceived usefulness, perceived ease of use, perceived enjoyment, objective usability, intention to use, usage behavior, experience.
EC1.5	TAM2 [22]	Perceived usefulness, perceived ease of use, perceived behavior intention, usage behavior, experience.
EC1.6	TAM [23]	Perceived usefulness/ease of use, intention to use, usage behavior.
EC1.7	ISO 9241 [24]	Ergonomics of interaction, productivity, easy to understand, improve user experience, accessibility, ease of use.
EC1.8	ISO-25010 [25]	Usability, functional suitability, safety, efficiency, performance efficiency
EC1.9	WCAG 2.1 [26]	Accessibility: operability, understandability
EC1.10	Other factors	
RQ2: ¿What are the methods of identifying and resolving problems related to the acceptance and use of technologies applied to the HCI of digital services?		
EC2	Identification, problem-solving methods	Design thinking [27]
RQ3: ¿What are the tools for simplifying and automating processes related to the acceptance and use of technologies applied to the HCI of digital services?		
EC3	Process simplify & automation tools	STP [28], Business Process Management (BPM) [29], RPA [30]
RQ4: ¿ What are the agile software development methods related to the acceptance and use of technologies applied to the HCI of digital services?		
EC4	Agile software development methods	SCRUM [31]
RQ5: ¿ What are the economic activities of digital services related to the acceptance and use of technologies applied to HCI?		
EC5.1	E- commerce	Yes / No
EC5.2	Economic activity	CIIU: Financial, commercial, public services, educational, tourism, transportation, health, other

SLR quality assessment

Validation of the selection of primary studies: The reliability in interpreting the articles we validate with two evaluators taking ten articles from the search string. Cohen's Kappa was 0.78, i.e., a reliable degree of concordance [32].

Evaluation of the quality of the primary studies: We apply a three-point Likert scale questionnaire. The order of relevance provided by the digital library in the CORE-Conference classification (A, B, and C) and the Journal Citation Reports (JCR) was rated. We classify the articles as “Very Relevant” with 10 points

to those published in CORE A classification conferences or JCR; "Relevant" with 5 points to articles published in CORE B or C classification conferences or published in journals not included in JCR lists, theses, and technical reports; and "Poorly Relevant" with 0 points to articles published in congresses not indexed in the CORE classification. The mean of this quality assessment was 9.07 points.

By the number of citations of the article, we classify the articles into three categories: high, medium, and low. Papers published between 2016 and 2018 were graded differently – i.e. "High" - articles with more than five citations, and for those, we assigned 10 points; "Medium" - articles cited by 1 to 5 authors, and we gave them 5 points; and "Low" - articles not cited, rated with 0 points. For the rest of the papers, published later, we classified them as "High"- cited articles, given 10 points; and "Medium" - articles not cited, assigned with 5 points. The average quality rating (number of article citations) was 7.13 points. The results prove that the selected articles are published in relevant conferences or journals and referenced by several other publications.

Validation of data extraction and classification criteria: We validate the data extraction criteria with the same steps as those applied to validate the primary studies. Two evaluators randomly selected seven studies from the set of articles of SLR. We checked and classified the election results with the data extraction criteria. Consensus resolved discrepancies, and Cohen's Kappa analysis was 0.71, representing a considerable degree of agreement [32].

3.4. Step 4: Selection of relevant articles

We selected scientific articles within the framework of the research, as well as we apply the data collection technique according to the scope of the research. We retrieved 1,203 research articles with the general search (Springer Link-821, IEEE Xplore-364, ACM-18). Out of them, forty-one studies were aggregated with a selective examination of major computer science conferences related to HCI. Fifty-five articles were selected using inclusion and exclusion criteria, considered relevant to SLR. These studies were then documented, coded, and recorded in the data extraction as step 5.

3.5. Step 6: Analysis of selected articles

Table 3 presents a synthesis of the analyzed data from the selected studies (55). It shows that the models of acceptance and use with the highest scores are the TAM* and UTAUT*; and that the most referenced economic activities are the educational, commercial and health. It also highlights that the factors and practices with the highest scores are perceived usefulness, ease of use, effort expectancy, performance expectation, BPM, scrum and design thinking.

Table 3 Results by extraction criteria

Extraction criteria	Sum	%
EC1 - Acceptance and use model		
UTAUT3	8	14.54
UTAUT2	8	14.54
UTAUT	8	14.54
TAM3	14	25.45
TAM2	14	25.45
TAM	14	25.45
ISO 9241	1	1.82
ISO-25010	3	5.45
W3C-WCAG 2.1	1	1.82
Otros	1	1.82
EC1.1 - UTAUT3 [1]		
Performance expectation	5	9.09
Effort expectancy	6	10.91
Social influence	4	7.27
Facilitating conditions	4	7.27
Hedonic motivation	0	0
Price value	0	0
Habit	1	1.82
Behavior intention	4	7.27
Usage behavior / adoption	3	5.45
Personal innovation	0	0
EC1.2 - UTAUT2 [20]		
Perceived usefulness	1	1.82
Perceived ease of use	1	2
Social influence	4	7.27
Facilitating conditions	4	7.27
Hedonic motivation	0	0
Price value	1	1.82
Habit	1	1.82
Behavior intention	4	7.27
Usage behavior	3	5.45
Gender	2	3.64
Age	2	3.64
Experience	2	3.64
EC1.3 – UTAUT [21]		
Perceived usefulness	1	1.82
Perceived ease of use	1	1.82
Social influence	4	7.27
Facilitating conditions	4	7.27
Behavior intention	4	7.27
Usage behavior	3	5.45
Gender	2	3.64
Age	2	3.64
Experience	2	3.64
EC1.4 - TAM3 [1]		
Perceived usefulness	13	23.64
Perceived ease of use	12	21.82
Fit: Perceived enjoyment	1	1.82
Intention to usage	4	7.27
Usage behavior	4	7.27
Experience	1	1.82
EC1.5 - TAM2 [22]		

Perceived usefulness	13	23.64
Perceived ease of use	12	21.82
Intention to usage	4	7.27
Usage behavior	4	7.27
Experience	1	1.82
EC1.6 - TAM [23]		
Perceived usefulness	13	23.64
Perceived ease of use	12	21.82
Intention to usage	4	7.27
Usage behavior	4	7.27
Experience	1	1.82
EC1.7 - ISO 9241 [24]		
Ergonomics of interaction	1	1.82
Productivity	0	0
Ease of understanding	0	0
Improved user experience	0	0
Accessibility	0	0
EC1.8 ISO-25010 [25]		
Usability	3	5.45
Functional adequacy	0	0
Security	0	0
Efficiency performance	2	3.64
EC1.9 - W3C-WCAG 2.1 [26]		
Accessibility	1	1.82
EC1.10 - Other factors	1	1.82
EC2 - Problem identification / resolution		
Design thinking [27]	5	9.09
EC3 - Process simplify and automation tools		
STP [28]	1	1.82
RPA [30]	2	3.64
BPM [29]	13	23.64
EC4 - Agile software development methods		
SCRUM [31]	13	23.64
EC5 - E-commerce		
Yes	22	40.00
No	33	60.00
EC6 - Economic activity – CIIU		
Financial	2	3.64
Commercial	18	32.73
Public services	5	9.09
Educational	30	54.55
Tourism, hotels, gastronomy	0	0
Transportation	2	3.64
Health	8	14.55
Other	1	1.82

Fig. 1 presents the factors of acceptance and use of technologies and certain DT practices relevant to HCI in digital services. Quantitative data analysis was applied to the outcome of the reviewed articles (55), based on descriptive statistics represented with a frequency distribution, as well as in previous research [33,34], where they apply the measure "mean" as the best option. Factors considered relevant are those above the average (7.96%).

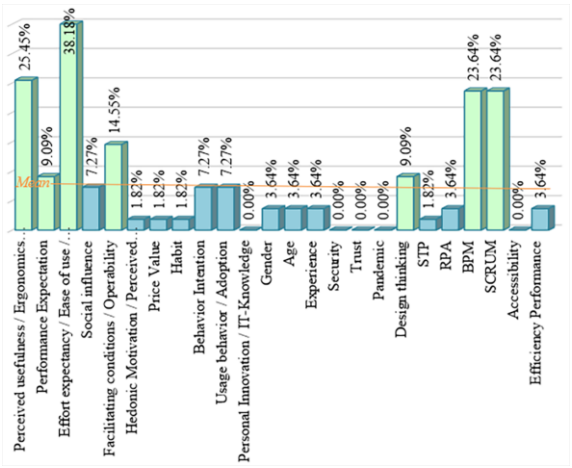

Fig. 1 Degree of general relevance of factors of acceptance and use of technologies and DT practices

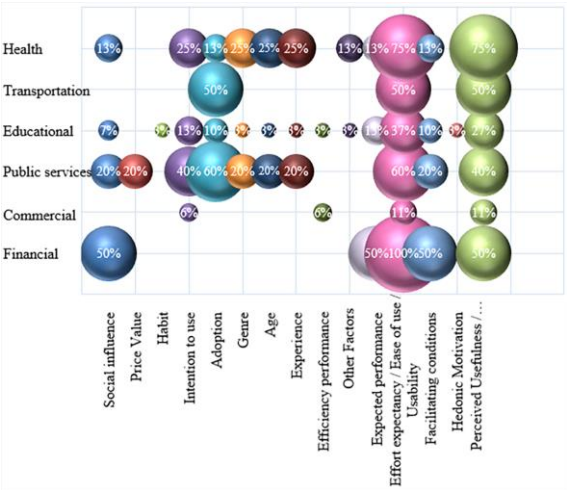

Fig. 2 Degree of relevance of factors of acceptance and use of technologies by economic activity

Fig. 2 shows the acceptance and use factors applied to the HCI of digital services by economic activity, based on their relevance by invocation of articles by economic activity. The clustered factors of effort expectancy/ease of use/usability, followed by perceived usefulness/ergonomics of interaction, are relevant across all economic activities. In contrast, the price value factor is only relevant in public services; while expected performance is considered in commercial and educational areas.

Fig. 3 shows the relevance of certain DT practices for the HCI of digital services by economic activity, such as BPM, scrum, and design thinking. The commercial activity has referenced all the DT practices analyzed; while transportation and health have only referenced BPM. This shows different behavior concerning the

factors of acceptance and use by economic activity.

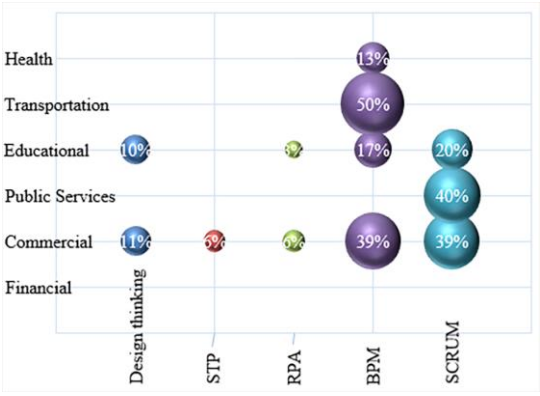

Fig. 3 Degree of relevance of certain DT practices by economic activity

3.6. Step 7: Generate report - Taxonomies

We applied the taxonomy classification technique to represent the behavior of the factors and practices of acceptance and use of digital services, grouping by dimensions the common characteristics and the limits of specificity of each group [9,35]. The "Taxonomy of factors of technological acceptance and use and certain DT practices" (see Table 4), we applied Bailey's empirical to deductive taxonomy approach [9], identifying the distinctive characteristics of the factors, placing them in the secondary taxonomy, and grouping them in the dimension of acceptance and use of technologies in the primary taxonomy. Next, using a deductive to empirical approach [9], characteristics and dimensions of DT practices were conceptualized and placed in the secondary and primary taxonomy group, respectively; new elements were sought and recorded in the tertiary taxonomy group. In addition, the specificity limits of each group as the Constructor/factor/practice are according to the proposed by Stoddard [35].

As well as, "Taxonomy of factors of acceptance and use and of DT practices by economic activity" (see Fig. 4), applying the taxonomy techniques of Bailey [9] and Stoddard [35], the characteristics of acceptance and use factors and DT practices of digital services by dimensions of economic activities were grouped and related in the secondary and tertiary taxonomies groups. The specificity limits of each group were placed on the Constructor/factor/practice [35]. Based on the results, its shows that digital services by economic activity only invoke some of the factors of acceptance and use and DT practices.

4. Discussion

The objective of this SLR was to propose taxonomies of acceptance and use factors and certain DT practices to the HCI of digital services by economic activity. We used the SLR methodology applied in [7] in conjunction with the method of Barbara Kitchenham [8] (see Table 1). We validated the reliability of the interpretation of the articles by confirming the selection of primary studies by Cohen's Kappa of 0.78 considered acceptable [32]. We also checked the data extraction and classification criteria with Cohen's kappa of 0.71, also considerable acceptable. We obtained one thousand two hundred three research articles with the general search, to which we added 41 studies with a selective examination of computer conferences. After applying the inclusion and exclusion criteria, we selected 55 articles.

The acceptance and use factors and certain DT practices related to HCI aspects of digital services include design thinking, agile software development methods, usability, efficiency, and security [6].

The first finding (see Fig. 1) is that not all acceptance and use factors and certain DT practices for HCI in digital services with a general approach are relevant; factors such as effort expectancy, ease of use, and usability are relevant, while accessibility did not score. In addition, scrum practice is more referenced, while RPA is irrelevant.

As a second finding, through the crossing of variables (see Fig. 2), we obtained the relevant factors of acceptance and use applied to HCI of digital services by economic activity, determining cross-cutting factors in all economic activities such as the effort expectancy/ease of use/usability, followed by perceived usefulness/ergonomics of interaction. We observed different behavior for each factor; i.e., adoption is relevant in public services and transportation and irrelevant in commercial and financial activities, while the security factor did not score in all economic activities. As shown in Fig. 3, BPM practice applies in transportation and commercial areas and is irrelevant in public services activity. Thus, it is evident the different behavior of factors and practices by economic activity of digital services.

We summarized the results about the variation in the relevance and behavior of factors and practices in taxonomies [9]: "Taxonomy of factors of acceptance and use of technology and certain DT practices" (see Table 4), and "Taxonomy of factors of acceptance and use of technology and certain DT practices by economic activity" (see Fig. 4). We believe that the contribution of the proposed taxonomies is valuable for digital services providers, since they can apply such factors and practices for having greater certainty that users can adopt their solutions.

Our future work will focus on conducting a survey to assess the factors by demographic characteristics.

Table 4 Taxonomy of factors of acceptance and use of technology and certain DT practices

Prim	Secondary taxonomy	Tertiary taxonomy	Constructor / Factor / Practice
Technology acceptance and use	Utility	Perceived usefulness	UTAUT* Perceived usefulness
			TAM* Perceived usefulness
	Performance	Performance expectation	UTAUT3 Performance expectation
			ISO 9241 Productivity
			ISO-25010 Performance efficiency
	Effort	Effort expectancy	UTAUT3 Effort expectancy
		Perceived ease of use	UTAUT* Perceived ease of use
			TAM* Perceived ease of use
		Ease of understanding	ISO 9241 Easy to understand
			ISO-25010 Usability
	Social influence	Social influence	UTAUT* Social influence
	Facilitating conditions	Facilitating conditions	UTAUT* Facilitating conditions
			ISO 9241 Easy to understand
			ISO-25010 Usability
			WCAG 2.1 Accessibility
			ISO 9241 Accessibility
		Interaction ergonomics	ISO 9241 Interaction ergonomics
		Portability	ISO-25010 Portability
	Hedonic motivation	Hedonic motivation	UTAUT* Hedonic motivation
			TAM3 Perceived enjoyment
		Functional adequacy	ISO-25010 Functional adequacy
	Price value	Price value	UTAUT* Price value
	Usage behavior / Adoption	Habit	UTAUT* Habit to use
		Behavior intention	UTAUT* Behavior intention
			TAM* Behavior intention
		Usage behavior / adoption	UTAUT* Usage behavior
			TAM* Usage behavior
	Personal innovation / IT knowledge	Personal innovation/IT-knowledge	UTAUT3 Personal Innovation IT-Knowledge
		Experience	UTAUT* Experience
			TAM* Experience
			ISO 9241 Improve user experience
	Demographic	Gender	UTAUT* Gender
		Age	UTAUT* Age
Digital transformation	Simplification/automation	Simplification	Simplification/STP
		Automation / Robotization	Automation
			Process robotization
	Customized	Customized	Design thinking
			ISO-25010 Functional adequacy
	Agile development Software	Early implementation	Early delivery of technology
			ISO-25010 Maintainability

Competing interests

The authors have declared that no competing interests exist.

Authors' contribution

IJ and DP execution of the systematic review. PP conceived the idea and created the taxonomies; EE and PP analyzed the results and corrected the manuscript. All authors read and approved the final manuscript.

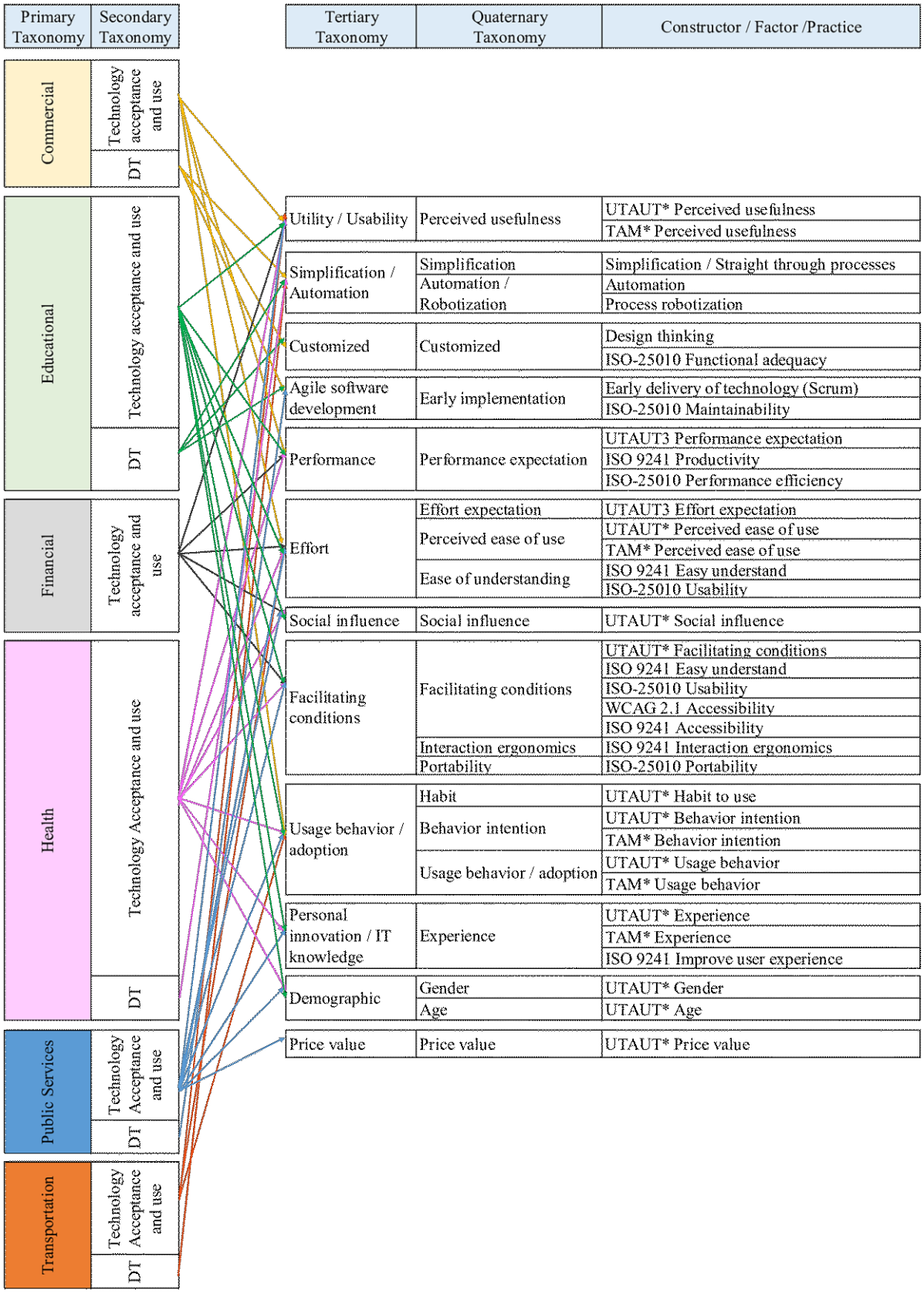

Fig. 4 Taxonomy of factors of acceptance and use of technology and of DT practices by economic activity

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