

Development of a conceptual digital technology acceptance model for micro and small organizations

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Abstract. *This paper aims to propose research with the aim of developing a conceptual digital technology acceptance model for micro and small organizations that will offer improvement of existing models. In order to develop a conceptual model, a review of the literature on the topic of technology acceptance by organizations was made with special emphasis on micro and small organizations. The analysis of previous research shows a lack of research that would focus on developing digital technologies acceptance models for micro and small organizations while covering the digital maturity of the organization and the decision-making style of decision-makers. Micro and small organizations differ from medium and large organizations, primarily in resource availability and limited knowledge of new technologies. The paper presents the identified key factors influencing the acceptance of technologies by micro and small organizations. A review of the decision-making style of decision-makers and the digital maturity of the organization in the process of digital transformation is given. The proposed conceptual digital technology acceptance model for micro and small organizations is presented, and the factors defined by the literature review are briefly explained. The proposed model will be tested as part of further research by the author.*

Keywords: intention to accept digital technologies, perceived risk, decision-making style, external pressure, digital maturity

1 Introduction

Every organization aspires to ensure market competitiveness and business profitability through achieving greater efficiency. New technologies are the ones that make it easier to cope with changes in the

environment and respond quickly to the increasingly demanding needs of customers, suppliers, competitors, and other participants in the business environment (El-Haddadeh, 2020), (Hameed, Counsell, & Swift, 2012), (Oliveira & Rosario, 2011), (Frambach & Schillewaert, 2002). New technologies mean "technology that radically changes the way something is produced or performed, especially by automation or informatization that saves human effort" (lexico, n.d.). "Digital technologies, on the other hand, mean the use of digital resources (technologies, tools, applications, and algorithms) that effectively find, analyze, create, forward and use digital goods in a computer environment" (Spremić, 2017). They refer to the most modern technologies of today and can be classified into primary (mobile technologies, social networks, service computing, big data and sensors, and the Internet of Things) and secondary (3D printers, robotics, drones, wearable technologies, virtual and augmented reality, artificial intelligence, etc.) (Spremić, 2017).

Investment and adoption of digital technologies lag behind in micro and small organizations. According to the definition of the European Commission, micro and small organizations are each entity involved in economic activity, regardless of its legal form, which meets one of three criteria: revenue: up to HRK 60,000,000, total assets of HRK 30,000,000 and number of employees up to 50 (eur-lex.europa.eu, 2020). In the overall structure of business entities, micro and small organizations occupy a significant share, making them crucial for economic development. In the Republic of Croatia alone, micro and small organizations make up 98% of total organizations (Anon., n.d.). Existing research involving micro and small organizations explores acceptance by SMEs, while only a few have focused exclusively on micro and small organizations. There is a lack of research that would fully cover all the key characteristics of micro and small organizations, i.e., which would include the

lack of financial and human resources and the way of making a decision that is entirely in the hands of the director, i.e., the owner. Micro and small organizations lag behind in accepting new technologies precisely because of their characteristics that act as barriers to acceptance and lead to fear of the unknown and thus perceiving technology as risky and unnecessary (Thong & Yap, 1995), (Kuan & Chau, 2001), (Eze, i dr., 2019), (Richie & Brindley, 2005), (Lucchetti & Sterlacchini, 2004).

The importance of acceptance and investment in digital technologies by micro and small organizations is emphasized by the European Commission's strategies adopted in March 2020, which aim to accelerate the technological growth of micro and small organizations (europa.eu, 2020). In order for digital technologies to help micro and small organizations to improve their business, ensure their survival in the market and achieve a competitive advantage, they need to be accepted and perceived as useful and necessary for the continuation of business and the growth of the organization (Thong J. Y., 1999), (Kamal, 2006). The number of models that explain the intention to adopt technologies in the literature is numerous. Still, due to the accelerating development of technologies and the number of their characteristics, it is difficult to develop a single general model suitable for research into the acceptance of all innovations. Therefore it is necessary to go in the direction of developing new models, and not in the direction of using the same factors and confirming their significance, i.e., use and validation of existing theories and models (Chiu, Chen, & Chen, 2017), (Thong J. Y., 1999), (Kaur Kapoor, K. Dwivedi, & D. Williams, 2014), (Rogers, 2003).

This paper aims to present the existing research in the acceptance of technologies by organizations and, through the presentation of the observed shortcomings, to propose a conceptual model for measuring the intention to accept digital technologies by micro and small organizations. The paper is structured as followed: after reviewing the existing research and previous knowledge on the subject, a presentation of the conceptual model and related hypotheses follows. In the last part of the paper, the research methodology is presented, followed by a conclusion.

2 Literature review

The importance of identifying factors influencing the intent of technology adoption in micro and small organizations is seen in the steady increase of studies addressing this issue (Kaur Kapoor, K. Dwivedi, & D. Williams, 2014), (Ahmed, 2020). Acceptance is defined as an organization's decision to accept technology and recognize its usefulness (Frambach &

Schillewaert, 2002). Rogers (2003) defines the process of accepting innovation as "the process through which an individual (or another decision-making unit) goes from the first knowledge of innovation to forming an attitude and decision to adopt or reject, implement and use a new idea and confirm that decision" (Rogers, 2003).

Several models and theories that measure technology acceptance have been developed. Some of them are (in chronological order): Diffusion of Innovation Theory (DOI), Theory of Reasoned Action (TRA), Social Cognitive Theory (SCT), Technology Acceptance Model (TAM 1), Technology Organization, Environment (TOE), Theory of Planned Behavior, Motivational Model, (MM), Technology Acceptance Model 2 and 3 (TAM 2 and 3), Unified Theory of Acceptance and Use of Technology (UTAUT) (Jeyaraj, Rottman, & Lacity, 2006), (Klačmer, 2020), (Ahmed, 2020). Observing the intention to accept technologies from the aspect of organization, the DOI and TOE framework stand out from the mentioned models as the most frequently used, mutually combined, and upgraded models over the years. Rogers theory (DOI), as the theory that occupies the highest position in the research of technology acceptance, starts from the assumption that the acceptance of technologies from the aspect of the organization is influenced by the characteristics of the organization and innovation itself (Kaur Kapoor, K. Dwivedi, & D. Williams, 2014), (Hsu, Kraemer, & Dunkle, 2006). Tornatzky and Fleisher, noticing the lack of Rogers' theory, develop a TOE framework (eng, technological, organizational, and environmental framework) in which they include the influence of the environment. By environment, they mean "an arena that surrounds organizations and consists of its industry, infrastructure, technology support, and government regulations (Hsu, Kraemer, & Dunkle, 2006). A review of the literature shows that these two theories are the most common in the research of acceptance of new technologies in the context of the organization and are the most common starting point for researchers in developing new models of acceptance.

In their paper, Hmeed et al. (2012) provide an overview of technology acceptance research and identify how identified factors influencing acceptance by various authors can be classified into four categories: technological, organizational, environmental, and individual, and how most authors use this formulation. (Hameed, Counsell, & Swift, 2012).

According to Jeyaraj et al. (2006), key factors are divided into innovation characteristics, organizational characteristics, and environmental characteristics (Jeyaraj, Rottman, & Lacity, 2006).

In the continuation of this review, the factors influencing the intention to accept are grouped into the organizational factor associated with the intent to adopt digital technologies, factors from the environment of organizations and environmental characteristics, and the barriers to accepting technologies. It is followed by a review of the organization's digital maturity in terms of digital transformation and an overview of the decision-making style of the decision-maker.

2.1 Organizational factors associated with the intent to adopt digital technologies

Considering the micro and small organizations, it is necessary to adapt models and theories to the specifics that characterize these organizations, such as lack of human, financial and technological resources that act as barriers to technology acceptance (Ekanem & Smallbone, 2016), (Thong J. Y., 1999), (Liu, 2019), (Eze, i dr., 2019), (El-Haddadeh, 2020). A key feature of micro and small organizations is a high degree of centralization with the director, who is in most cases the owner of the organization, in a central role (Thong J. Y., 1999), (Ekanem & Smallbone, 2016), (Liu, 2019). The top management support has been confirmed in numerous studies as key in technology acceptance, especially in micro and small organizations where the director, who is also the owner, has the main say in most decisions, including investment and technology acceptance (Rantapuska & Ihanainen, 2008), (Jeyaraj, Rottman, & Lacity, 2006), (Hameed, Counsell, & Swift, 2012). Hameed and others (2012) confirm that the greatest influence in the acceptance of technologies in small organizations had the support of top management (Hameed, Counsell, & Swift, 2012), (Ekanem & Smallbone, 2016), (El-Haddadeh, 2020), (Thong J. Y., 1999). Acceptance of technologies is influenced by the characteristics of the director and his innovation and level of knowledge about technology (Thong J. Y., 1999). The director's perception of innovation is crucial, and it will be more positive if the level of technological knowledge is higher (Thong J. Y., 1999). It is clear that directors (top management) greatly influence the perception and acceptance of technology in micro and small organizations, without whose approval and knowledge nothing happens within organizations. They know everything, are familiar with everything, and approve every decision (Thong & Yap, 1995). Their decision-making is often influenced by informal information from their environment and is influenced by previous experiences (Ekanem & Smallbone, 2016).

Characteristics of directors are key in embracing innovation, so Thong and Yap (1995) emphasize that directors who are prone to innovation are more receptive to technology. Their research confirmed that directors who had a positive attitude toward technologies and who were innovative and had

knowledge of the technology being accepted were more likely to accept it (Thong & Yap, 1995).

An important obstacle in the acceptance of technologies by micro and small organizations is the insufficient level of knowledge about the technologies themselves within the organization (Masood & Sonntag, 2020), (Eze, i dr., 2019), (Rantapuska & Ihanainen, 2008), (Thong J. Y., 1999). The lack of required knowledge and skills results from slow technological change and transformation in micro and small organizations (Richie & Brindley, 2005), (Lucchetti & Sterlacchini, 2004). The level of knowledge about technology is one of the most influential factors influencing the acceptance of innovation, especially by small organizations. Lack of knowledge about digital technology implies a lack of knowledge about the benefits it can bring. In micro and small organizations, all decision-makers are directors who are also owners, so their level of knowledge about technology influences the acceptance of technologies (Kamal, 2006). Thong and Yap (1995) state that decision-makers in micro and small organizations lack adequate knowledge of technologies, and thus knowledge of available technologies (Thong & Yap, 1995). Their research confirmed that the acceptance of technologies in small organizations largely depends on whether the decision-maker has knowledge of the technology being accepted (Thong & Yap, 1995).

2.2 Factors from the environment of organizations associated with the intent to adopt digital technologies

According to Tornetzky and Fleischer (1990), it is crucial to include elements of the organization's environment in technology acceptance research, which includes: industry, infrastructure, technology support, and government regulation (Oliveira & Rosario, 2011), (Tornatzky & Fleischer, 1990). The literature emphasizes that the use of technology is key to market survival and achieving competitive advantage (Oliveira & Rosario, 2011), (Frambach & Schillewaert, 2002). Chiu and Chen (2017) consider that the environment includes competition and business partners, with which Iacovou and others agree, defining this impact as external pressure (Chiu, Chen, & Chen, 2017), (Iacovou, Benbasat, & Dexter, 1995). External pressure towards Gibbs and Kraemer also includes competition pressure and pressure from customers who demand more (Gibbs & Kraemer, 2004). Kuan and Chau (2001) and Hsu et al. (2006) agree that small organizations may be encouraged to invest in technologies due to pressure from suppliers or customers who may require the use of a particular technology (Kuan & Chau, 2001), (Hsu, Kraemer, & Dunkle, 2006).

External pressure includes both emerging and crisis changes in the market. The current situation of the world, caused by the COVID 19 pandemic, has affected the prompt response of organizations in

adapting their business. Thus, bans on work in certain activities and maintaining physical distance have forced organizations to make certain rapid changes and adjustments. The COVID-19 pandemic is an unexpected and thus critical external circumstance that has indicated the need for digitalization and digital transformation of the business that would enable organizations to respond effectively to unexpected disruptions and challenges in business.

Crisis situations, in particular, have an impact on the business of micro and small organizations due to their limited resources (Turner & Akinremi, 2020). Regarding the impact of the COVID 19 pandemic on the business, Long and Feng (2000) emphasize in their research that 30% of surveyed business owners (out of 761) stated that they would be able to maintain their business for a maximum of three months, half of the respondents stated that they would lose 10 to 30% of their revenue this year (Turner & Akinremi, 2020), (Long & Feng, 2020). The pandemic has undoubtedly forced organizations to accelerate the processes of digitalization of their business in order to respond to the rapid changes that occur in both customer demand and demand and supply by competition and in the organization of quality and competitive, sustainable business increasingly based on impersonal communication and work from home (Roe, 2020). It is clear how sudden market disruptions can affect the intention of micro and small organizations to embrace digital technologies (Kane, Phillips, Copulsky, & Nanda, 2020).

2.3. Barriers to acceptance of digital technologies

The introduction of technologies in micro and small organizations can lead to certain risks and complexities, consequently affecting the acceptance itself (El-Haddadeh, 2020). Acceptance of technologies is perceived by micro and small organizations as a radical change that carries a certain level of risk (Thong & Yap, 1995). Previous research has confirmed the negative impact of perceived risk on technology acceptance (Kaur Kapoor, K. Dwivedi, & D. Williams, 2014). Jacoby and Kaplan (1972) describe perceived risk as a multidimensional concept consisting of 5 different mutually independent risk components: performance risk, financial risk, social risk, physical risk, psychological risk, while Rijdsdijk and Hultink (2003), quoting Roselius (2003) add another component: the risk of wasting time (Jacoby & Kaplan, 1972), (Kaur Kapoor, K. Dwivedi, & D. Williams, 2014), (Rijdsdijk & Hultink, 2003), (Roselius, 1971).

Most authors agree that lack of financial resources is one of the main features of micro and small organizations (El-Haddadeh, 2020), (Masood & Sonntag, 2020), (Rantapuska & Ihanainen, 2008), (Thong & Yap, 1995). In previous research, the financial component was viewed as the so-called

primary attribute; Downs and Mohr define a primary attribute as attributes inherent in innovation or technology immutable in all environments and organizations; while defining secondary attributes as perceptually grounded (or subjective) characteristics (Downs & Mohr, 1976).

It is assumed that the perception of secondary attributes is not influenced by the characteristics of a particular environment and the actors involved in the implementation of a particular innovation. The financial impact was viewed in most studies as a primary attribute that could be measured objectively. However, the authors emphasize that although some factors can be measured objectively, in the end, everything is assessed within the perception of the one who accepts the technology, and therefore they believe that the financial component also becomes a secondary attribute. Although the acceptance of technology can cost a certain fixed amount, the one who accepts the technology and decides to invest estimates that amount in relation to its financial resources, and that is why the financial component should be viewed as a perception, i.e., as a secondary attribute. Perceptions are always evaluated in relation to some internalized value system or cognitive framework; the result is a subjective assessment of the significance of "fact" (e.g., size, cost, etc.) (Tornatzky & Klein, 1982) (Downs & Mohr, 1976). In their research, Kuan and Chao (2001) include the perceived cost factor and determine its impact on technology acceptance in small organizations (Kuan & Chau, 2001).

Rijdsdijk and Hultink (2003) cite the risk of wasting time as one of the risks. In micro and small organizations, one of the main issues is the lack of human resources. Employees are usually overburdened with their work, and it is difficult for them to take the time to implement and educate the use of technology. Perceived risk of wasting time includes time to select adequate technology, time to self-introduce, and time to educate employees (Kaur Kapoor, K. Dwivedi, & D. Williams, 2014), (Rijdsdijk & Hultink, 2003), (Roselius, 1971). In their research, Masood and Sonntag identified time as a possible barrier to acceptance of innovation. Respondents involved in the research stated that the time required for technology and training, and education are negatively perceived in relation to its acceptance (Masood & Sonntag, 2020). If the perceived time for training and education is long, it is very likely that the innovation will not be accepted (Eze, i dr., 2019). Most directors do not have the time or patience to learn new things and are, in their own perception, overworked to learn to use technology (Rantapuska & Ihanainen, 2008). Lack of financial resources and lack of time have been identified as the biggest obstacles in the attempt to digitally transform the business among organizations in the Republic of Croatia (Burišević, 2020).

An important element of risk that has recently gained importance is a security risk. Security risk

means the possibility of the occurrence of an adverse event that may adversely affect the confidentiality, integrity, and availability of information resources. Information resources denote all the resources that an organization uses to meet its business goals (hardware, software, human resources, etc. (cis, 2003)). Security risk implies a level of confidence in the security of technology use and plays a major role in its acceptance (Park & Kim, 2014). Security risk refers to the fear of the unknown, and its negative impact has been confirmed in several researched technology acceptance (Kaur Kapoor, K. Dwivedi, & D. Williams, 2014), (Tanakinjal, Deans, & Gray, 2010), (Tan & Teo, 2000).

Thong and Yap (1995) found that small organizations have an aversion to technology due to the perception of risk and fear (Thong & Yap, 1995). El Haddadeh (2020) agrees, confirming the negative link between perceived risk and technology acceptance, stating that decision-makers in small organizations consider the negative effects of observed technology when considering technology acceptance (El-Haddadeh, 2020).

2.4. Decision-making style

A key feature of micro and small organizations is the central role of the decision-maker (director), who is also the organization's owner. The director's primary function is decision-making, and it is the decisions that create or destroy them, and the quality of the outcome of the decision makes him successful (Garvin & Roberto, 2001), (Sikavica & Bahtijarević-Šiber, Menadžment, 2004).

Analyzing the decision-making process, Sikavica et al. (2004) identified several of its phases, which include initiative, preparation, decision-making, implementation, and control. They believe that the decision-making process is an essential part of the management function. It is intertwined and necessary in all management phases, from goal setting, planning, organization, leadership, and control (Sikavica & Bahtijarević-Šiber, Menadžment, 2004). The decision-making process is the foundation of the management function and thus the essence of management itself. Bulog (2014) defines the decision-making process as a process that consists of activities that include collecting, processing, and evaluating information, i.e., talks about the process of transforming knowledge and information into entrepreneurial actions and decisions (Bulog, 2014).

Scott and Bruce (1995) consider that decision-making style is a learned habit, i.e., the usual pattern of the response given (reacted) by an individual when faced with a decision situation. The decision-making style towards them is not a personality trait but a tendency based on habits to react in a certain way in a certain decision context (Scott & Bruce, 1995). In their research, the authors identified five decision-making styles: rational, intuitive, dependent, avoidant, and

spontaneous. Research has found that individuals use a combination of decision-making styles when making important decisions, and that the decision-making style is not influenced by context and problems and that the decision-making style reflects individual cognitive style (Scott & Bruce, 1995).

Cognitive style implies the preferred style of the individual when collecting, processing, and evaluating information; it is a unique way in which individuals perceive, approach, and react to decision-making situations, i.e., individual mode of cognitive information processing (Barbosa, Gerhardt, & Rich, 2007), (Hamilton, Shih, & Mohammed, 2016). In essence, the human cognitive information processing system is divided into fast, holistic, which does not require conscious cognitive effort, and slow, analytical, and cognitively strenuous (Salas, Rosen, & DiazGranados, 2010), (Allinson, Chell, & Hayes, 2000).

The theory of dual information processing as a general theory in understanding the human way of information processing is one of the most frequently cited in the literature (Bulog, 2014), (Hogarth, 2020), (Epstein, 1994). Salas et al. (2010) point out that there are many variations on the theme and various terms, but essentially the human cognitive information processing system is divided into fast, holistic that does not require conscious cognitive effort and slow, analytical, and cognitively strenuous (Salas, Rosen, & DiazGranados, 2010), (Wood & Highhouse, 2014), (Hammond, Hamm, Grassia, & Pearson, 1987), (Sadler-Smith, 2016), (Spicer & Sadler-Smith, 2005). The paper adopts a decision-making style based on the foundations of the cognitive decision-making perspective and the duality of how information is processed, according to which individuals process information intuitively and rationally. Two decision-making styles are considered to be two separate dimensions of decision-making, rather than two ends of one continuum (Hamilton, Shih, & Mohammed, 2016), (Hammond, Hamm, Grassia, & Pearson, 1987).

Intuitive decision-making style is a cognition-based style without obvious rational thought backed up by the experience and expertise of the decision-maker. It implies subconscious mental processing based on values and ethics (Sikavica, Hunjak, Begičević Ređep, & Hernaus, 2014). Furthermore, it is characterized by rapid decision-making, reliance on premonitions and feelings, is automatic, subconscious, relatively fast, charged, heuristic, and experience-based (Hamilton, Shih, & Mohammed, 2016). Unlike intuitive, rational decision-making style is a decision-making style based on systematic collection and retrieval of information, systematic evaluation of all possibilities and potential alternatives, consideration of available options, and use of analytical methods and techniques in decision-making (Bulog, 2014), (Hamilton, Shih, & Mohammed, 2016).

2.5. Digital maturity of the organization

According to certain authors, adopting digital technologies is not enough and does not play a significant role in the process of digital transformation. The organization must change the way this technology is used to create new products and services in order to gain a market advantage (Boström & Celik, 2017). Measuring the intent to embrace digital technologies should be placed in the context of an organization's ability to apply and use the adopted technology in order to transform its business digitally. The ability of an organization is manifested in its digital maturity. Digital maturity describes the level of digital transformation of the organization, i.e., describes how much and what the organization has done so far in terms of managing digital transformation in order to achieve and maintain market competitiveness (Ifenthaler & Egloffstein, 2020), (Berghaus & Back, 2016), (Teichert, 2019), (Chaniyas & Hess, 2016).

In measuring digital maturity, maturity models are used, which, in addition to assessing the state of the organization itself, also observe its attitude towards competition and enable the management of progress towards higher stages of maturity. The main task of the maturity model is to describe the stage of maturation and measure the current position on the maturation path. The models of maturity experienced their beginning with the CMM model (Capability Maturity model), and since then, several models have developed, the most famous of which are: BPMMM (de Bruin & Rosemann, 2005); BPMM (Weber, Curtis, & Gardiner, 2008); PEMM (Hammer, 2007); CMMI (Carnegie Mellon University); DPMM (Visconti & Cook, 1993), (Kruljac, 2020), (Poepplbuss & Roeglinger, 2011).

With the advent of digital transformation, digital maturity models are being developed that have the function of an objective assessment of the organization in the success of the implementation of digital transformation. They are applied to the overall business of the organization or a particular function and consist of several dimensions and criteria whose task is to describe the area of activity and stages of maturity that indicate the path of evolution towards maturity of the organization (Berghaus & Back, 2016), (Kruljac, 2020). According to Teichert, the most commonly used dimensions in measuring digital maturity are the dimension related to available technology within the organization, the digital skill dimension that includes available skills within the organization, and the dimension that includes processes within the organization, i.e., the extent of their digitization (Teichert, 2019). In his research, Kruljac (2020) found that the factors that affect the level of digital maturity of the organization include the dimension of organizational and the dimension of technological readiness, and the dimension of organizational culture. Organizational readiness includes resources for the implementation of digital transformation; technological readiness includes the

use of advanced technologies and the efficiency of technology management, while organizational culture includes openness, communication, and risk acceptance (Kruljac, 2020).

Incorporating the organization's digital maturity into the model of measuring the intention to accept digital technologies will help get a broader picture of the "state" of the organization and its overall thinking about the digitalization of business or digital transformation itself.

3 Conceptual model

Based on the literature review, a conceptual model of digital technology acceptance in micro and small organizations is created. Factors related to the intention to accept digital technologies in micro and small organizations were selected, and hypotheses were formulated. The factors are described below, the conceptual model and the associated hypotheses are presented.

Perceived financial risk

Perceived financial risk implies possible financial losses if the investment in digital technology does not meet expectations, i.e., possible loss of money when accepting the new and unknown (Jacoby & Kaplan, 1972), (Piri Rajh, 2012). Therefore, the following hypothesize is propose:

H1 Perceived financial risk is negatively related to the intention to accept digital technologies in micro and small organizations.

Perceived security risk

Perceived security risk implies a level of confidence in the security of digital technology use and a perceived level of fear and risk when accepting digital technologies (Park & Kim, 2014), (Kaur Kapoor, K. Dwivedi, & D. Williams, 2014). Hence:

H2 Perceived security risk is negatively related to the intention to accept digital technologies in micro and small organizations.

Perceived loss of time

The perceived loss of time is manifested in the perception of the time required to adopt digital technology. It includes time to select adequate technology, time to introduce, and time to educate employees (Eze, i dr., 2019), (Masood & Sonntag, 2020), (Rantapuska & Ihanainen, 2008). Therefore:

H3 Perceived time loss is negatively associated with the intention to accept digital technologies in micro and small organizations.

External pressure

External pressure involves pressure from the business environment and is manifested in competitive pressure and pressure from business partners (customers and suppliers) (Iacovou, Benbasat, & Dexter, 1995).

External pressure is also manifested in the form of crisis circumstances that cause sudden market disruptions that result in significant economic losses. The impact of the current COVID 19 pandemic can be seen as a crisis circumstance that forced organizations to accelerate their digitization process but at the same time caused financial difficulties that led to the abandonment or postponement of major investments in digital technologies. Therefore, it is proposed:

H4 Pressure from market participants is positively related to the level of knowledge of directors

H5 Crisis circumstances are positively related to the level of knowledge of the director.

Level of knowledge

The level of knowledge includes the level of knowledge and the mere knowledge of the technology that is accepted by the decision-maker in the organization. Lack of knowledge about the technology being accepted implies a lack of knowledge about the benefits technology can bring (Kamal, 2006). The level of knowledge of the decision-maker is influenced by external pressure, which is manifested in the pressure of market participants and crisis circumstances. How the pressure of market participants and crisis circumstances affect the level of knowledge is influenced by the decision-making style of the decision-maker. Hence:

H6 The level of knowledge of directors is positively related to the intention to accept digital technologies in micro and small organizations

Decision-making style

The decision-making style implies the usual pattern of response that an individual shows when confronted with a decision situation. The decision style scale will

be determined using a Decision style scale developed by Hamilton and others (Hamilton, Shih, & Mohammed, 2016). The proposed hypotheses are:

H7.1. The decision-making style moderates the relationship between the pressure of market participants and the level of knowledge of the director about the digital technology being accepted.

H7.2. The decision-making style moderates the relationship between crisis circumstances and the level of knowledge of the director about the digital technology being accepted.

Digital maturity

The level of digital maturity of the organization implies the state of the organization in the process of digital transformation from the aspect of management. It describes what changes the organization has achieved in the process of digital transformation (Chanias & Hess, 2016). A descriptive model of the organization's digital maturity developed by Kruljac will be used, which includes four dimensions: digital maturity of the organization, organizational readiness, technological readiness, and innovative organizational readiness (Kruljac, 2020). The proposed hypotheses are:

H8.1. The level of digital maturity of an organization moderates the relationship between perceived financial risk and intention to accept.

H8.2. The level of digital maturity of an organization moderates the relationship between perceived security risk and intention to accept.

H8.3. The level of digital maturity of an organization moderates the relationship between perceived loss of time and intention to accept.

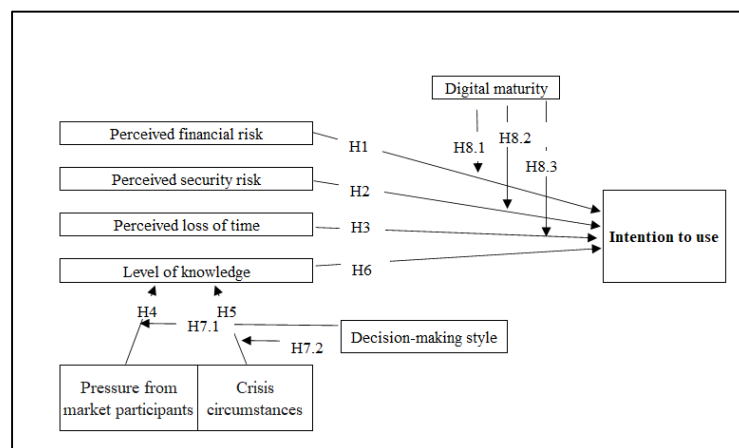


Figure 1. Conceptual model

4. Research methodology

In order to test the proposed model, the acceptance of digital technologies in micro and small organizations will be tested. Furthermore, a measuring instrument

(survey questionnaire) will be developed, which will consist of variables taken from previous research that will contain items adapted to the defined research goal. The empirical part of the research will start before the research (pilot research) to ensure that the variables (factors) truly measure what is to be explored. Data will

be collected by survey method in both the pilot study and the main study.

The method of determining the level of digital maturity will be taken from the research of Blatz and others who propose a model of digital maturity for small and medium enterprises (Blatz, Bulander, & Dietel, 2018). The Cronbach's alpha coefficient will be used to confirm the reliability of the measuring instrument. Confirmatory factor analysis (CFA) will be used to validate the measuring instrument (Ahmad, Zulkurnain, & Khairushalimi, 2016). PLS-SEM (structural modeling by the method of partial least squares) will be used to test the conceptual model and to evaluate the set hypotheses (Orehovački, 2013).

5 Conclusion and further direction of research

A review of the literature shows that research on the intention to adopt technologies is numerous. However, it has been observed that the vast majority of these studies cover large organizations. At the same time, only a small number look at acceptance in the context of micro and small organizations. Research involving micro and small organizations usually looks at acceptance at the level of the so-called SMEs (small and medium organizations). Analyzing the definition of small and medium size organizations, a significant difference between them is visible (in the context of their size), which leads to the conclusion that for more successful measurement of technology acceptance in micro and small organizations, it is necessary to focus research exclusively on micro and small organizations. The research needs to be focused exclusively on the needs and characteristics of micro and small organizations. There is a lack of research in existing research that would look at the impact of decision-making style and the level of digital maturity of the organization when researching the relationship between factors on the acceptance of new technologies. The characteristics of directors and their decision-making style are crucial in accepting innovation, so it is necessary to investigate whether and how different decision-making styles affect the relationship of environmental factors to the level of directors' level of knowledge. It was noticed that there is a lack of research that would include the impact of decision-making style on the level of knowledge of the director and the impact of the level of digital maturity of the organization on the very intention to accept. By identifying the decision-making style, it will be investigated how different decision-making style (intuitive and rational) affects the relationship between external pressure (market participant pressure and crisis circumstances) and the level of knowledge of the decision-maker or director. The intention to accept technologies needs to be seen in the context of the organization's maturity to apply and use the adopted

technology for the purpose of digital business transformation. Using the model of digital maturity, the current state of the organization in the process of digital transformation will be known, and it will be determined what changes the organization has achieved so far in the process of digital transformation.

This will provide insight into the organization's readiness to use the accepted technology for the purpose of digital transformation of its business. It will also provide insight into what hinders organizations that are at a lower level of digital maturity in embracing technology. To fill the gap in the existing research, a conceptual model of digital technology adoption for micro and small organizations is proposed, which will include all the key characteristics of these organizations.

The limitation of the paper is the lack of a numerical/statistical analysis, which will be performed in the future research. The main aim of this paper is to propose a conceptual digital technology acceptance model for micro and small organization that will be tested as part of further research by the author. Another limitation is the lack of a trust variable in the model. Trust as a crucial factor in digital technology acceptance is replaced with the perceived security risk which implies a level of confidence in the security of digital technology use and a perceived level of fear and risk when accepting digital technologies. The perceived security risk will allow to check if organizations have some concerns regarding the security of their business data when using digital technologies and in one way it corresponds to the trust concept.

References

- Ahmad, S., Zulkurnain, N., & Khairushalimi, F. (2016). Assessing the Validity and Reliability of a Measurement Model in Structural Equation Modeling (SEM). *British Journal of Mathematics and Computer Science*, str. 1-8.
- Ahmed, I. (April 2020). Technology organization environment framework in cloud computing. *TELKOMNIKA Telecommunication, Computing, Electronics and Control*, Vol. 18, No. 2., str. 716-725. doi:DOI: 10.12928/TELKOMNIKA.v18i2.13871
- Allinson, C., Chell, E., & Hayes, J. (March 1 2000). Intuition and entrepreneurial behaviour. *European Journal of Work and Organizational Psychology*, str. 31-43. doi:10.1080/135943200398049
- Barbosa, S. D., Gerhardt, M., & Rich, J. (May 2007). The role of cognitive style and risk preferences on entrepreneurial self-efficacy and entrepreneurial

- intensions. *Journal of Leadership and Organization Studies*.
doi:<https://doi.org/10.1177/10717919070130041001>
- Berghaus, S., & Back, A. (2016). Stages in Digital Business Transformation Results of Empirical Maturity Study. *MCIS 2016 Proceedings*.
- Blatz, F., Bulander, R., & Dietel, M. (2018). Maturity Model of Digitization for SMEs. *2018 IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC)*, str. 1-9.
- Bostrom, E., & Celik, O. C. (2017). *Towards a Maturity Model for Digital - A qualitative study of how an organization can analyze and assess*. Dohvaćeno iz <http://www.diva-portal.org/smash/get/diva2:1113444/FULLTEXT01.pdf>
- Bulog, I. (2014). Odnos između pristupa odlučivanju na strateškoj razini menadžmenta i organizacijskih performansi na primjeru hrvatskih poduzeća. *Ekonomika misao i praksa : časopis Sveučilista u Dubrovniku*, str. 3-29.
- Burilović, L. (2020). Digitalna transformacija poslovanja u maloprodaji, Vol. 14 No. 2. *Poslovna izvrsnost*, str. 197-221. doi:<https://doi.org/10.22598/pi-be/2020.14.2.197>
- Chaniyas, S., & Hess, T. (2016). How digital are we? Maturity models for assessment of a company's status in digital transformation. *LMU Munich Management Report 2/2016. Munich_ Munich School of Management*.
- Chiu, C., Chen, S., & Chen, C. (2017). An integrated perspective of TOE framework and innovation diffusion in broadband mobile applications adoption by enterprise. *International Journal of Management, Economics and Social Sciences*, str. 14-39.
- de Bruin, T., & Rosemann, M. (2005). Towards a Business Process Management Maturity Model. *Proceedings of the 13th European Conference on Information Systems*, (str. 521–532).
- Downs, G., & Mohr, L. (1976). Conceptual Issues in the Study of Innovation. *Administrative Science Quarterly* 21 (4), str. 700-714. doi:[10.2307/2391725](https://doi.org/10.2307/2391725)
- Ekanem, I., & Smallbone, D. (2016). Learning in Small Manufacturing Firms: The Case of Investment Decision-making Behaviour. *International Small Business Journal*. doi:[10.1177/0266242607074515](https://doi.org/10.1177/0266242607074515)
- El-Haddadeh, R. (2020). Digital Innovation Dynamics Influence on Organisational Adoption: The Case of Cloud Computing Services. *Information Systems Frontiers, Volume 22 Issue 4*, str. 985-999. doi:[10.1007/s10796-019-09912-2](https://doi.org/10.1007/s10796-019-09912-2)
- Epstein, S. (August 1994). Integration of the cognitive and the psychodynamic unconscious. *The American Psychologist* 49 (8), str. 709-724. doi:[10.1037//0003-066x.49.8.709](https://doi.org/10.1037//0003-066x.49.8.709)
- europa.eu. (2020). Dohvaćeno iz <https://ec.europa.eu/digital-single-market/en/news/sme-strategy-launched-european-commission>
- Eze, S., Chinedu-Eze, V., Bello, A., Inegbedion, H., Nwanji, T., & Asamu, F. (2019). Mobile marketing technology adoption in service SMEs: a multi-perspective framework. *Journal of Science and Technology Policy Management, Volume 10 Issue 3*, str. 569-596. doi:[10.1108/JSTPM-11-2018-0105](https://doi.org/10.1108/JSTPM-11-2018-0105)
- Frambach, R., & Schillewaert, N. (2002). Organizational innovation adoption: a multi-level framework of determinants and opportunities for future research. *Journal of Business Research* 55(2), str. 163-176. doi:[10.1016/S0148-2963\(00\)00152-1](https://doi.org/10.1016/S0148-2963(00)00152-1)
- Garvin, D., & Roberto, M. (2001). What You Don't Know About Making Decisions. *Harvard Business Review*.
- Gibbs, J. L., & Kraemer, K. L. (January 2004). A Cross-Country Investigation of the Determinants of Scope of E-commerce Use: An Institutional Approach. *Electronic Markets*. doi:[DOI:10.1080/10196780410001675077](https://doi.org/10.1080/10196780410001675077)
- Hameed, M., Counsell, S., & Swift, S. (2012). A meta-analysis of relationships between organizational characteristics and IT innovation adoption in organizations. *Information & Management*, 5, str. 218-232. doi:[10.1016/j.im.2012.05.002](https://doi.org/10.1016/j.im.2012.05.002)
- Hamilton, K., Shih, S.-I., & Mohammed, S. (2016). The development and validation of the rational and intuitive decision styles scale. *Journal of Personality Assessment* 98 (5), str. 523-535. doi:[10.1080/00223891.2015.1132426](https://doi.org/10.1080/00223891.2015.1132426)
- Hammer, M. (2007). *Process and Enterprise Maturity Model*. Harvard Business Review,.
- Hammond, K., Hamm, R., Grassia, J., & Pearson, T. (October 1987). Direct comparison of the efficacy of intuitive and analytical cognition in expert judgment. *IEEE Journals & Magazine*, str. 753-770.

- Hogarth, R. (22. 10 2020). *Deciding Analytically or Trusting Your Intuition? The Advantages and Disadvantages of Analytic and Intuitive Thought*. Dohvaćeno iz Deciding Analytically or Trusting Your Intuition?: <https://papers.ssrn.com/abstract=394920>
- Hsu, P.-F., Kraemer, K., & Dunkle, D. (1. June 2006). Determinants of E-Business Use in U.S. Firms. *International Journal of Electronic Commerce* 10 (4), str. 9-45. doi:10.2753/JEC1086-4415100401
- Iacovou, C., Benbasat, I., & Dexter, A. S. (December 1995). Electronic Data Interchange and Small Organizations: Adoption and Impact of Technology. *MIS Quarterly*, Vol 19, No. 4, str. 465-485.
- Ifenthaler, D., & Egloffstein, M. (2020). Development and Implementation of a Maturity Model of Digital Transformation. *TechTrends* 64(2), str. 302-309. doi:10.1007/s11528-019-00457-4
- Jacoby, J., & Kaplan, L. B. (1972). The Components of Perceived Risk | ACR. *Proceedings of the Third Annual Conference of the Association for Consumer Research*, (str. 382–393).
- Jeyaraj, A., Rottman, J., & Lacity, M. (2006). A review of the predictors, linkages, and biases in IT innovation adoption research. *Journal of Information Technology*, 1(21), str. 1-23. doi:10.1057/palgrave.jit.2000056
- Kamal, M. (2006). IT innovation adoption in the government sector: identifying the critical success factors. *Journal of Enterprise Information Management*, 19(2), 192-222.
- Kane, G. C., Phillips, A. N., Copulsky, J., & Nanda, R. (06. August 2020). *Deloitte*.
- Kaur Kapoor, K., K. Dwivedi, Y., & D. Williams, M. (2014). Innovation adoption attributes: a review and synthesis of research findings. *European Journal of Innovation Management*, 3, str. 327-348. doi:10.1108/EJIM-08-2012-0083
- Klačmer, M. (2020). Činitelji prihvaćanja javnih usluga e- participacije u Republici Hrvatskoj. *doktorska disertacija, Fakultet informatike i organizacije, Varaždin*.
- Kruljac, Ž. (2020). Ključni čimbenici digitalne zrelosti poduzeća i utjecaj razine zrelosti na poslovanje poduzeća, doktorska disertacija. Zagreb: Ekonomski fakultet.
- Kuan, K., & Chau, P. (1. October 2001). A perception-based model for EDI adoption in small businesses using a technology–organization–environment framework. *Information & Management* 38(8), str. 507-521. doi:10.1016/S0378-7206(01)00073-8
- lexico. (n.d.). Preuzeto 25. 11 2020 iz https://www.lexico.com/definition/new_technology
- Liu, C. (2019). Understanding Electronic Commerce Adoption at Organizational Level: Literature Review of TOE Framework and DOI Theory. *International Journal of Science and Business*, str. 179-195.
- Long, W. H., & Feng, J. W. (Feburary 2020). Research report on companies' survival and development strategy during a novel coronavirus epidemic. *Beijing: UIBE Press*.
- Lucchetti, R., & Sterlacchini, A. (2004). The Adoption of ICT among SMEs: Evidence from an Italian Survey. *Small Business Economics*, Vol 23, , str. 151-168.
- Masood, T., & Sonntag, P. (October 2020). Industry 4.0: Adoption challenges and benefits for SMEs. *Computers in Industry, Volume 121*. doi:10.1016/j.compind.2020.103261
- Oliveira, T., & Rosario, M. (01 2011). Literature Review of Information Technology Adoption Models at Firm Level. *The Electronic Journal Information Systems Evaluation Volume 14 Issue 1* , str. 110-121.
- Orehovački, T. (2013). Metodologija vrjednovanja kvalitete u korištenju aplikacijama Web 2.0. *Doktorska dizertacija*, str. 136-144.
- Park, E., & Kim, K. (2014). An Integrated Adoption Model of Mobile Cloud Services: Exploration of Key Determinants and Extension of Technology Acceptance Model. *Telematics and Informatics*, str. 376-385.
- Piri Rajh, S. (2012). Usporedba strukturnih modela percipirane vrijednosti. *Market-Tržište*, 117-133.
- Poepplbuss, J., & Roeglinger, M. (June 2011). What makes a useful maturity model? A framework of general design principles for maturity models and its demonstration in business process management. *Conference: European Conference on Information Systems (ECIS)At: Helsinki, FinlandVolume: 19*.
- Rantapuska, T., & Ihanainen, O. (DOI: 10.1108/17410390810911195. October 2008). Knowledge use in ICT investment decision making of SMEs. *Journal of Enterprise Information Management* 21(6), str. 585-596.

- Richie, B., & Brindley, C. (2005). ICT adoption by SMEs: implications for relationships and management. *New Technology, Work and Employment*, Vol 20 No 3., str. pp. 205-217.
- Rijsdijk, S., & Hultink, E. (2003). "Honey, Have You Seen Our Hamster?" Consumer Evaluations of Autonomous Domestic Products. *The Journal of Product Innovation Management*, 20, str. 204–216.
- Roe, D. (November 2020). *What 8 Months of COVID-19 Has Taught Us About Digital Transformation*. Dohvaćeno iz <https://www.cmswire.com/digital-workplace/what-8-months-of-covid-19-has-taught-us-about-digital-transformation/>
- Rogers, E. M. (2003). *Diffusion of innovations, fifth edition*. New York: The free Press.
- Roselius, T. (1971). Consumer Rankings of Risk Reduction Methods. *Journal of Marketing* (35) 1, str. 56-61. doi:10.2307/1250565
- Sadler-Smith, E. (30. June 2016). Cognitive Style and the Management of Small and Medium-Sized Enterprises. *Organization Studies*. doi:10.1177/0170840604036914
- Salas, E., Rosen, M., & DiazGranados, D. (July 2010). Expertise-Based Intuition and Decision Making in Organizations. *Journal of Management*, str. 1-31. doi:<https://doi.org/10.1177/0149206309350084>
- Scott, S., & Bruce, R. (1995). Decision-Making Style: The Development and Assessment of a New Measure - Susanne G. Scott, Reginald A. Bruce, 1995. *Sage Journals*. doi:<https://doi.org/10.1177/0013164495055005017>
- Sikavica, P., & Bahtijarević-Šiber, F. (2004). *Menadžment*. Zagreb: MASMEDIA.
- Sikavica, P., Hunjak, T., Begičević Ređep, N., & Hernaus, T. (2014). *Poslovno odlučivanje*. Zagreb: Školska knjiga.
- Spicer, D., & Sadler-Smith, E. (2005). An examination of the general decision making style questionnaire in two UK samples. *Journal of Managerial Psychology*, str. 137-149. doi:10.1108/02683940510579777
- Spremić, M. (2017). *Digitalna transformacija poslovanja*. Zagreb: Sveučilište u Zagrebu, Ekonomski fakultet - Zagreb.
- Tan, M., & Teo, T. (2000). Factors Influencing the Adoption of Internet Banking. *Journal of the Association for Information Systems*, Vol. 1 No. 5., str. 1-42.
- Tanakinjal, G., Deans, K., & Gray, B. (2010). Third Screen Communication and the Adoption of Mobile Marketing: A Malaysia Perspective. *International Journal of Marketing Studies*, Vol. 2 No. 1, str. 36-47.
- Teichert, R. (2019). Digital Transformation Maturity: A Systematic Review of Literature. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, str. 1673-1687.
- Thong, J. Y. (1. March 1999). An Integrated Model of Information Systems Adoption in Small Businesses. *Journal of Management Information Systems* 15 (4), str. 187-214. doi:10.1080/07421222.1999.11518227
- Thong, J., & Yap, C. (1995). CEO characteristics, organizational characteristics and information technology adoption in small businesses. *Omega* 23(4), str. 429-442. doi:10.1016/0305-0483(95)00017-1
- Tornatzky, L., & Fleischer, M. (1990). *The Process of Technology Innovation*. Lexington, MA: Lexington Books.
- Turner, J., & Akinremi, T. (2020). *ERC Insight Paper- The business effects of pandemics*. Preuzeto April 2020 iz <https://www.enterpriseresearch.ac.uk/wp-content/uploads/2020/04/ERC-Insight-The-business-effects-of-pandemics-%E2%80%93-a-rapid-literature-review-Final.pdf>
- Visconti, M. A., & Cook, C. R. (1993). Software system documentation process maturity model. *Proceedings 21st ACM Computer Science Conference, India*.
- Weber, C. V., Curtis, B., & Gardiner, T. (2008). *Business Process Maturity Model (BPMM), Version 1.0*. Dohvaćeno iz www.omg.org/spec/BPMM/1.0/
- Wood, N., & Highhouse, S. (2014). Do self-reported decision styles relate with others' impressions of decision quality? *Personality and Individual Differences* 70, str. 224-228. doi:10.1016/j.paid.2014.06.036