Ivana Martinčević, PhD

Senior lecturer
University North, Croatia
E-mail: ivana.martincevic@unin.hr

Goran Kozina, PhD

Full Professor
University North, Croatia
E-mail: goran.kozina@unin.hr

THE RELATIONSHIP BETWEEN TECHNOLOGICAL DYNAMICS OF NEW TECHNOLOGIES AND ABSORPTIVE CAPACITY OF EXPORT COMPANIES OF THE REPUBLIC OF CROATIA

UDC / UDK: 005.71:004
JEL classification / JEL klasifikacija: F60, O14, O33
DOI: 10.17818/EMIP/2020/2.6
Preliminary communication / Prethodno priopćenje
Received / Primljeno: September 30, 2020 / 30. rujna 2020.
Accepted for publishing / Prihvaćeno za tisak: December 7, 2020 / 7. prosinca 2020.

Abstract

Information and communication and digital technologies provide numerous opportunities for companies so that companies can operate more easily and efficiently globally and, due to new technologies, gain a competitive advantage. New trends and technologies are creating great pressure in the market and companies are forced to look for new, faster and more efficient ways and models of doing business. Markets dictate the pace and are becoming more digital precisely due to technology that is advancing and evolving rapidly. With new technology, knowledge and innovations are the key factors to success. Many companies today are defined and described as knowledge companies that accumulate and develop existing knowledge but also adopt new. The aim of this paper was to explore and examine the ability of the organization to absorb knowledge (absorptive capacity) as the key factor in the process of acceptance of new technologies. The research was conducted in the Republic of Croatia and Croatian export companies (micro, small, medium and large) were included in the research. The research hypothesis "Technological dynamics of new technologies affect the absorptive capacity of acceptance of new technologies in export companies of the Republic of Croatia" was confirmed through conducted research. The research has proven that absorptive capacity plays a major role in the context of an organization's ability to recognize, acquire, transform, and use new knowledge and new technologies.

Keywords: information and communication technologies, digitalization, globalization, digital technologies, absorptive capacity, export, export companies

1. INTRODUCTION

Today, doing business without using new modern technology or without recognizing its importance and adoption in business, makes it impossible for a company to achieve recognition, good business results or a competitive advantage. Technological changes have enabled flexibility and simplicity in business, but also the strengthening of competition in the international market. It is technology with its rapid and daily growth and development that is one of the key factors that today ensure the company's recognition and it is aimed at achieving business goals (Martinčević, 2020). Digitalization and digital transformation of business allows both producers and consumers access to more information, and communication is faster, easier, two-way and interactive, which ultimately provides companies with proactivity, visibility, recognition and creates added value. In order for companies to be competitive on the market, they need to have the appropriate organizational competence, they need to be innovative, accumulate and develop existing knowledge, but also adopt new. Technological innovations that are available on the market and which the company is able to recognize, adopt and implement in its business are necessary for achieving innovation success. Assimilation and acquisition of new knowledge at the company level cannot exist without the existing knowledge of the organization. The learning capacity of the organization, i.e. the absorptive capacity, has an impact on the adoption of new technologies in the company. Choen and Levinthal (1990) were the first to define the absorptive capacity of the individual and the company, stating that the absorptive capacity is the ability of the company to identify, assimilate, and transform knowledge or acquire new knowledge from the environment into the company (emphasizing that it plays a key role in company level innovation). The aim of this paper is to examine and explore whether the company environment and technological dynamics of new technologies affect the absorptive capacity of the organization in terms of identification, assimilation and adoption of new technologies from the environment to the company. The survey was conducted in 2019 in the Republic of Croatia and it included Croatian export companies (micro, small, medium and large) through a randomly selected sample of 194 export companies of the Republic of Croatia. To test the set hypothesis, appropriate statistical methods and tests were applied as follows: (1) scale reliability testing, (2) assumption testing for regression analysis, (3) analysis to investigate relations (correlation and multiple regression). The aim of the research was to prove the existence of a positive correlation between the technological dynamics of new technologies and the absorptive capacity of the organization.

2. ABSORPTIVE CAPACITY AS A DETERMINANT OF ACCEPTANCE OF NEW TECHNOLOGIES

The concept of absorptive capacity was first developed and presented in 1965 by Adler, who conceptualized and presented absorptive capacity at the macro level to define the economic capacity to absorb and use external

information and resources. At the micro level (individual and company level), absorptive capacity was adjusted and conceptualized by the authors Cohen and Levinthal (1990). The main component of absorptive capacity is knowledge, internal and external knowledge, so we can say that knowledge or the effectiveness of knowledge is the main determinant of absorptive capacity. Cohen and Levinthal (1990) define absorptive capacity as the ability of a company to identify, assimilate, and transform knowledge or adopt new knowledge from the environment into the company. Knowledge is a key factor of competitive advantage; therefore, companies can achieve a competitive advantage through knowledge and innovation, through their assimilation and application. Authors Tu et al. (2006) argue that the absorptive capacity of an organization largely depends on its internal capabilities and the ability of organization to recognize and accumulate within the organization both new and existing knowledge and technologies. Recognition and acquisition of new knowledge is achieved by active research of the market, competition, research and evaluation in terms of evaluation of new technologies, which creates a quality basis for new knowledge and at the same time opens space for assimilation and acquisition of new knowledge (Cohen and Levinthal, 1990; Kostopoulos et al., 2011). According to Cohen and Levinthal (1990), absorptive capacity consists of three main determinants: (1) recognition of external value, (2) assimilation of external value, and (3) application of external value to achieve commercial goals. Precisely through the key determinants of absorptive capacity and with their cognition and adoption, some companies are able to adopt external knowledge and innovations faster than other companies and implement them in their business. Considering the listed components and determinants of absorptive capacity, we can claim that they have an impact on the business performance of the company (Cohen and Levinthal, 1990; Chen, et al. 2009). Along with Cohen and Levinthal (1990) as the pioneers of absorptive capacity research, the authors Zahra and George (2002) engage in absorptive capacity research and argue that it is a set of organizational capabilities by which firms acquire, assimilate, transform and use external knowledge to produce the dynamic ability of the company and to create innovation processes of a company. Through this research and through this paper, the absorptive capacity is viewed as one of the key determinants of the acceptance of new technologies. Research projects that are dealing with absorptive capacity in the context of the adoption of new technologies claim that the measure of the absorptive capacity from the aspect of acceptance and adoption of new technologies includes prior knowledge of the company (Liang et al. 2007), factors such as management's propensity to change and acceptance of new technologies (Teo et al. 2003 a, b), and the ability to identify and integrate external knowledge (Ettlie and Pavlou, 2006). Absorptive capacity itself and therefore the assimilation and acquisition of new knowledge and innovations cannot exist or function without the existing knowledge of the organization: the greater the internal knowledge of the organization, the greater the opportunities and potential for the adoption of new knowledge, innovation and even the technology from the environment (Roberts et al. 2012). We can argue that the absorptive capacity is the ability of the company to react quickly and accept changes from the environment (adoption of new knowledge and new technologies) in its own business. One of the

most important research projects in the territory of the Republic of Croatia dealing with the absorptive capacity of the company was conducted by the author Vlačić et al. (2019) exploring the impact of absorptive capacity on the performance of technologically highly developed export companies in the territory of the Republic of Croatia. The conducted research proves that Croatian export companies that are highly technologically oriented and belong to the category of large exporters have a higher level of absorptive capacity than those that are not highly technologically oriented (they have small exports accordingly) or those that are not exporters at all. Through this research, the absorptive capacity is correlated with the technological dynamics of new technologies, i.e. it is researched whether the technological dynamics of new technologies have an impact on the absorptive capacity of export companies in the Republic of Croatia as one of the key determinants of acceptance of new technologies.

3. TECHNOLOGICAL DYNAMICS OF NEW TECHNOLOGIES

Observing the constant and rapid growth and development of new technologies, we can say that technology is one of, if not the key prerequisite, for success and competitiveness in the market. "New forms of modern information and communication technologies, new tools and techniques, social media and networks (as communication, sales and promotional channels) available to companies today in the global market are one of the tools by which companies can create recognition and visibility, develop long-term relationships with customers and other stakeholders in foreign markets" (Martinčević, 2020:99). Technological growth and technological dynamics of new technologies and with them technological opportunities reflect the competitive advantage in the market but also the competitiveness of the company which is largely related to the absorptive capacity of the organization (Cohen and Levinthal, 1990). How fast technological progress and technological dynamics are is also shown by the research conducted by Nieto and Quevedo (2005) proving that scientific and technological knowledge is advancing and growing on a daily basis. Technological innovations, together with digitalization and globalization of business associated with them, open up new opportunities for companies. This can have an impact on increasing business performance. New technologies and digital business transformation caused and conditioned by the emergence of new digital technologies affect organizational capabilities and conditions to adapt their business with new trends in digital technologies. Digital business transformation involves the adoption and application of new modern digital technologies (e.g. social/collaborative, cloud, mobile and analytics) that affect existing business or change the way the company works and operates in the market (Matt et al., 2015; Fitzgerald et al., 2014). All this is reflected in the changing business models, business policies and culture of behavior of the organization itself. In accordance with the rapid technological development, companies today need to be flexible. Thus, we can talk about the necessary flexible information and communication technology (ICT) infrastructure. It is this flexible ICT infrastructure that reflects the ability of a company to create and establish a set of

technological resources that are the foundation and basis for the development of ICT applications (Liu et al., 2013). Through defined, compatible and flexible ICT infrastructure, the absorptive capacity of a company can be influenced and improved by increasing the reach of existing and new knowledge (Ray et al., 2005). Modern ICTs have a key task in the process of developing and maintaining the absorptive capacity of the company as one of the key factors that has an impact on the organizational performance of the company (Roberts et al., 2012; Kostopoulos, et al., 2011). The rapid spread of ICT provides companies with the conditions to strengthen their absorptive capacity if it is used properly (Roberts et al., 2012). The organizations need this aspect of the importance of the correlation between absorptive capacity and new modern ICTs as determinants and correlations; this enables competitiveness and increases organizational performance (Jansen et al., 2005). Companies need to be aware of the importance of new technologies, their capabilities and their technological dynamics. Through the adoption and application of new technologies, better connections and interactions can be achieved within the organization; new technology can be a means of gathering new knowledge and information; all this together can improve efficiency and effectiveness and the achieved absorptive capacity of the organization. Through the impact on the improvement of the achieved absorptive capacity, the level of external knowledge acquisition, assimilation, transformation and utilization of knowledge can be increased precisely through the application of new modern technologies (Jiménez-Barrionuevo et al., 2011). In Croatia, the most recent research projects that deal with the digital transformation of business have been conducted by Spremić et al. (2020), Ivančić et al. (2019) and Pejić Bach et al. (2018). Spremić et al. (2020) provide a theoretical background concerning digital trends such as digital transformation, digital platforms and digital service innovation in a field of ecosystems. Results indicate that the digital business model in the observed companies was implemented through digital platforms, which led to the creation of new digital services and resulted in revenue inflows and created new value in the ecosystem (Spremić et.al. 2020:40). Research by Ivančić et al. (2019) deals with the process of digital transformation and the technology adaptation. Results of the conducted research indicate that the important factors for successful digital transformation and technology adaptation are "the ability of an organization to change and operational excellence in the integration of external digital services with internal information technology support" (Ivančić et al. 2019:36). Research provided by Pejić Bach et al. (2018) deals with digital technologies and their importance in today's business and emphasizes the importance of the existence of digital transformation strategy in the process of digital business transformation.

4. LITERATURE REVIEW FOR FROM THE FIELD OF RESEARCH

Although extensive scientific research has been carried out in the filed od absorptive capacity, not much of it deals with absorptive capacity in the context of application of new technologies. In addition, there are not many studies that explore absorptive capacity in export companies and absorptive capacity as a key factor of

application of new technology. Due to the lack of research on the mentioned topics, the target population for this research were export companies in the Republic of Croatia. Since absorptive capacity is one of the main constructs of the research in the focus of this paper, the overview of the literature studied by the author of the paper on the subject of absorptive capacity is given below in Table 1.

Table 1

Literature overview

	Author / Year	Title of the article	Topic of research
1.	Vlačić, Dabić, Daim, Vlajčić (2018)	*Exploring the impact of the level of absorptive capacity in technology development firms*	Authors explore how the level of absorptive Capacity (ACAP) affects the performance of technology-driven businesses in Croatian exports companies.
2.	Baškarada, Koronios (2017)	*Strategies for maximizing organizational absorptive capacity*	Authors define strategies for maximizing the absorptive capacity in the organization.
3.	Perdomo - Charry, Barahona, Zuñiga-Collazos, (2017	*Absorptive Capacity (AC): knowledge generation and its evolution from variable to construct*	The research gives the review of definitions and development of the concept of absorptive capacity and gives the overview of the development and acceptance of new knowledge and technologies precisely through absorptive capacity.
4.	Filippetti, Frenz, Ietto-Gillies (2017)	*The impact of internationalization on innovation at countries' level: the role of absorptive capacity*	The research explores the impact of absorptive capacity on internationalization and innovation performance.
5.	Larrañeta, Galán González, Aguilar (2017)	*Early efforts to develop absorptive capacity and their performance implications: differences among corporate and independent ventures*	Authors explore the positive and negative effects of absorptive capacity when starting new business ventures.
6.	Schlagwein, Hu (2017)	*How and why organizations use social media: five use types and their relation to absorptive capacity,*	Authors analyze how the application of social media affects the absorptive capacity of a company.
7	Zhang, Zhao, Lyles, Guo (2015)	*Absorptive capacity and mass customization capability*	The research provides empirical evidence on the effects of absorptive capacity (AC) processes on mass customization capability (MCC).
8.	Bharati, Zhang, Chaudhury (2014)	*Social media assimilation in firms: Investigating the roles of absorptive capacity and institutional pressures*	Authors explore the relationship between institutional pressure and absorptive capacity in the adoption of new technologies.
9.	Aribi, Dupouët (2013)	*Absorptive capacity: a non-linear process*	Based on in-depth interviews with managers of selected companies, authors explore how the company absorbs new external knowledge.
10.	Malhotra, Gosain, El Sawy (2005)	*Absorptive Capacity Configurations in Supply Chains: Gearing for Partner-Enabled Market Knowledge Creation*	Authors use the concept of absorptive capacity to create a conceptual framework that creates new market knowledge between market partners.
11.	Zahra and George (2002)	*Absorptive Capacity: A Review, Reconceptualization, and Extension*	Through conducted research authors claim that higher level of absorptive capacity responds better to environmental changes.
12.	Cohen and Levinthal (1990)	*Absorptive capacity: A new perspective on learning and innovation*	Authors explore and claim that company's innovative ability is determined by its absorptive capacity.

Source: Author's work, 2020

5. RESULTS OF THE RESEARCH

5.1. Research construct

The starting point for the formation and testing of the construct *"absorptive capacity of new technology (AC)"* lies in the research of scientific literature that deals with the study of absorptive capacity in the literature described as the ability of companies to identify, assimilate and transform knowledge or adopt new knowledge. enterprise (emphasizing that absorptive capacity plays a key role in the adoption of innovation at the company level) (Cohen and Levinthal, 1990). The absorptive capacity of a company, i.e. the level of absorptive capacity of a company, shows to what extent the companies are able to implement innovations within their business processes and recognize innovations in the market. Research by several authors indicates that a company's absorptive capacity reflects its ability to respond to changes within its environment (Malhotra et al., 2005). Zahra and George (2002) argue that firms with higher levels of absorptive capacity respond better to environmental changes, find available solutions faster to take advantage of available innovations as soon as possible. The study by Zhang et al. (2015) explores and proves that the absorptive capacity significantly improves the ability of companies to adapt in the acquisition and assimilation of new knowledge, which ultimately leads to the application of new knowledge. The research conducted by Zhang et al. (2015) is the basis on which the questions for this research have been selected and formed. The construct that describes and defines the technological dynamics of new technologies (TECH_DYN) is the result of the intensity and speed of development of new technologies that in this study is placed in relation to the absorptive capacity. As far as is known, there is no research that relates the absorptive capacity to the application of new technology and its technological dynamics. The research hypothesis has been developed: *H1 "Technological dynamics of new technologies affect the absorptive capacity of acceptance of new technologies in export companies of the Republic of Croatia."* Respondents were asked to rate the importance of each parameter related to the technological dynamics of new technologies and to evaluate the parameter related to the absorptive capacity using the Likert scale from 1 to 5, where 1 means - strongly disagree and 5 means – strongly agree. Tables 2 and 3 show the constructs used to test the hypothesis.

Table 2

Construct of measuring technological dynamics of the industry (TECH_DYN)

Code	Particle	Modality
TECH_DYN1	Technological changes are creating new opportunities in our industry	Likert scale (1 - strongly disagree, 5 - strongly agree)
TECH_DYN2	Technology is changing rapidly in our industry	Likert scale (1 - strongly disagree, 5 - strongly agree)
TECH_DYN3	We expect growth in our industry over the next five years	Likert scale (1 - strongly disagree, 5 - strongly agree

Source: Author's work 2019

Table 3

Construct of measuring the absorptive capacity of the application of new technologies (AC)

Code	Particle	Modality
AC1	We regularly organize learning groups to discuss about consequences of new knowledge	Likert scale (1 - strongly disagree, 5 - strongly agree)
AC2	We have special mechanisms to solve conflicts when employees have different understandings and interpretations of new knowledge	Likert scale (1 - strongly disagree, 5 - strongly agree)
AC3	We have special procedures for employees to share knowledge and practical experiences	Likert scale (1 - strongly disagree, 5 - strongly agree)
AC4	We have special training programs that help employees grasp new knowledge	Likert scale (1 - strongly disagree, 5 - strongly agree)
AC5	Our employees frequently make product and process improvement suggestions based on new knowledge	Likert scale (1 - strongly disagree, 5 - strongly agree)
AC6	We periodically review our long-term forecasting (e.g. market trends and technology development) based on new knowledge	Likert scale (1 - strongly disagree, 5 - strongly agree)
AC7	We have systematic procedures for implementing new knowledge to develop new products	Likert scale (1 - strongly disagree, 5 - strongly agree)
AC8	We constantly consider how to better exploit knowledge	Likert scale (1 - strongly disagree, 5 - strongly agree)

Source: Author's work according to Zhang et al., 2015

5.2. Research sample

For the growth and development of the Croatian economy from the point of view of the international economy, it is necessary to increase exports (especially products with high added value). Export-oriented companies are companies that achieve greater and better business results and thus contribute to the growth and development of society as a whole. For this reason, the target population of the conducted research are the export companies of the Republic of Croatia (micro, small, medium and large). In the global and foreign markets, the acceptance and application of new technology are key factors for success. Therefore, Croatian exporting companies should explore and examine which factors may affect their greater and more intensive involvement in international trade. Today, companies cannot function without new technologies that provide them with recognizability but also a competitive advantage. For this reason, this research relates the technological dynamics of new technologies and the absorption capacity of the acceptance of new technologies. As we are aware, no research has been conducted in the territory of the Republic of Croatia that correlates the relationship between the technological dynamics of new technologies and their impact on the absorptive capacity of the acceptance of new technologies. For that reason, the research described in this paper was conducted. In order to successfully test the set research hypothesis, a primary sample survey was conducted using the structured survey questionnaire method. Communication

with the respondents during the implementation of the structured survey questionnaire method took place using an online survey questionnaire. The research was conducted in the Republic of Croatia, through a randomly selected sample of 194 exporting companies (micro, small, medium and large). The research and data were collected in 2019 electronically, by sending questionnaires to 500 randomly selected addresses, and 194 questionnaires were collected. According to the Croatian Chamber of Commerce, the register of Croatian exporters numbers 1,243 companies, which justifies sending questionnaires to randomly selected 500 addresses from the register, and the data collected from 194 companies is a relevant sample for this research. A representative sample is one that well represents the population to which it belongs, and is best achieved by random selection of members, which is the case with this research. The sample of this research was a non-probabilistic, intentional sample because the questionnaire based on which the data were collected was intended for and sent to the managers of export companies. To further understand the research, it is necessary to define and explain the characteristics of the sample companies. Table 4 shows the size of companies that were the part of the sample survey.

Table 4

Company size and number of employees

	Number of companies	**Structure in %**	**Cumulative %**
Micro company (less than 10 employees, annual turnover in the amount up to EUR 2,000,000.00)	73	38	38
Small company (less than 50 employees, annual turnover up to EUR 10,000,000.00)	48	25	63
Medium-sized company (less than 250 employees, annual turnover of up to EUR 50,000,000.00)	35	18	81
Large company (more than 250 employees, annual and turnover in the amount of more than EUR 50,000,000.00)	38	19	100
TOTAL	194	100,00	

Source: Author's work, 2019

5.3. Testing the research hypothesis

Appropriate statistical methods and tests were applied to test the set research hypothesis. The course of data analysis is as follows: (1) scale reliability testing, (2) assumption testing for regression analysis, (3) analysis to investigate relations (correlation and multiple regression). From the performed analyses, reliability and normality, input and output data, it was proven that the preconditions for the implementation of linear regression analysis were met. Input reliability testing was performed through Cronbach's Alpha coefficient, the value of which must be greater than 0.7. Table 5 indicates that the Cronbach's Alpha coefficient is greater than 0.7 thus proving good reliability and internal consistency of the data scale for testing hypothesis H1.

Table 5

Data reliability

Cronbach's Alpha	N of Items
0.861	11

Source: Author's work, 2020

Testing of assumptions for the implementation of regression analysis has been carried out by checking the normality, homogeneity of variance, the existence of outliers. Figure 1 presents the distribution of residuals throughout the histogram. The histogram demonstrates that the dependent variable AC (*The absorptive capacity of the application of new technologies)* follows the normal distribution quite well, with a slight asymmetry to the right, which is also confirmed by the appearance of the normal Q-Q Plot curve.

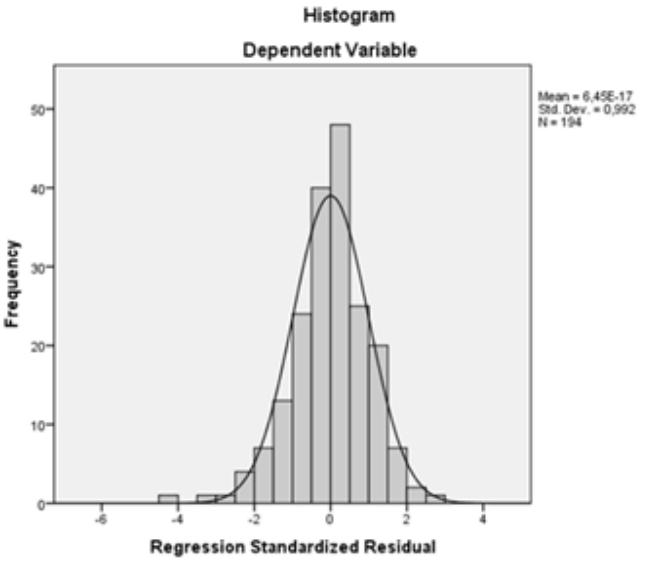

Figure 1 Histogram of dependent variable AC

Source: Author's work, 2020

Figure 2 indicates whether the residues are normally distributed through the Normal Q-Q Plot of the dependent variable AC (*The absorptive capacity of the application of new technologies)*. If the data is distributed approximately normally, the points will be at or near the diagonal line. The closer the data is to a straight line, the closer the distribution is to a normal one. According to Figure 2, the data for the dependent variable moves around a straight line, so we can claim that the distribution is approximately normal.

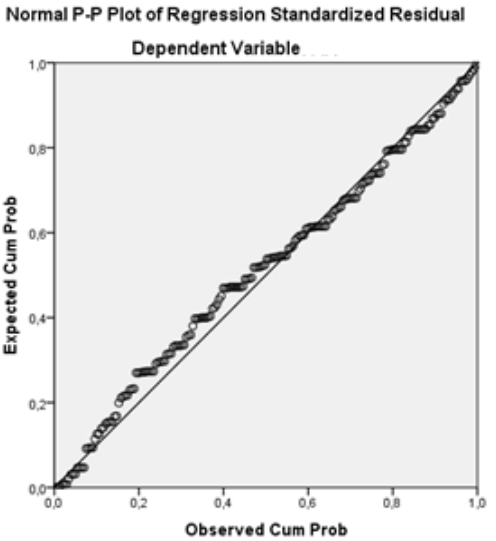

Figure 2 Normal Q-Q Plot of dependent variable AC

Source: Author's work, 2020

Figure 3 represents the scattering diagram, which displays the homogeneity of the variance. When there is homogeneity of the variances, the points are randomly arranged in an approximately rectangular shape and accumulate around the direction. Most of the points are approximately symmetrically arranged around that horizontal line, and the points do not accumulate anywhere. From the scatter diagram it can be seen that there are no non-typical points (points outside the range -3 / + 3).

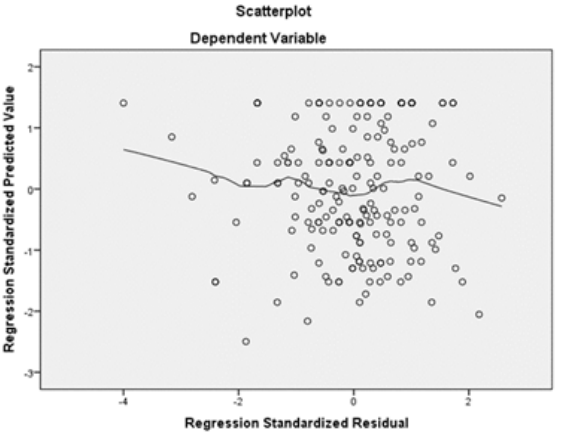

Figure 3 Scatterplot of dependent variable AC

Source: Author's work, 2020

From the performed analyses, reliability and normality, input and output data, it was proven that the preconditions for the implementation of linear regression analysis were met. One of the prerequisites for performing regression analysis is the existence of a linear relationship between the variables. In this case, the dependence of one phenomenon on two or more independent phenomena is examined, which justifies the method of testing hypothesis H1 by multiple regression and correlation. The research aimed to investigate and prove whether the technological dynamics of new technologies affect the absorptive capacity of acceptance of new technologies in export companies of the Republic of Croatia. The research hypothesis consists of two constructs. The first construct is "*Technological dynamics of new technologies"* (Table 1) while the second construct is "*The absorptive capacity of the application of new technologies"* (Table 2). In order to test the set hypothesis H1, the following relations were set: independent variable TECH_DYN "Technological dynamics of new technologies" (variables TECH_DYN1, TECH_DYN2, TECH_DYN3) and dependent variable AC "The absorptive capacity of the application of new technologies" (variables AC1 AC2, AC3, AC4, AC5, AC6, AC7, AC8). Regression was tested by testing the relationship and correlation of each independent variable with each of the dependent variables. The research includes the relationship between three (3) independent and eight (8) dependent variables, of which the correlations were confirmed by mutual testing through regression analysis and shown in the continuation of the paper.

Table 6 presents the representativeness indicators of the regression model, with the dependent variables AC1 AC2, AC3, AC4, AC5, AC6, AC7 and AC8. Table 6 suggests that the coefficient of determination indicates that the model interpreted 5.4% of the variance deviation from the dependent variable AC1 (*We regularly organize learning groups to discuss about consequences of new knowledge).* For the dependent variable AC2 (*We have special mechanisms to solve conflicts when employees have different understandings and interpretations of new knowledge)*, the coefficient of determination indicates that the model interpreted 7.4 % of the variance deviation from the dependent variable (Table 6). Next, for the dependent variable AC3 *(We have special procedures for employees to share knowledge and practical experiences)*, the coefficient of determination indicates that the model interpreted 13.8% of the variance deviation from the dependent variable (Table 6). The coefficient of determination indicates that the model interpreted 10.2% of the variance deviation from the dependent variable AC4 *(We have special training programs that help employees grasp new knowledge*) (Table 6). For the dependent variable AC5 (*Our employees frequently make product and process improvement suggestions based on new knowledge)*, the coefficient of determination indicates that the model interpreted 14% of the variance deviation from the dependent variable (Table 6). The coefficient of determination indicates that the model interpreted 16% of the variance deviation from the dependent variable AC6 *(We periodically*

review our long-term forecasting (e.g. market trends and technology development)) (Table 6). Then, for dependent variable AC7 (*We have systematic procedures for implementing new knowledge to develop new products)*, the coefficient of determination indicates that the model interpreted 7.8% of the variance deviation from the dependent variable, while for dependent variable AC8 (*We constantly consider how to better exploit knowledge)* the coefficient of determination indicates that the model interpreted 24.6% of the variance deviation from the dependent variable (Table 6).

Table 6

Representativeness indicators of the regression model with the dependent variables

Variables	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
AC1	1	0.233	0.054	0.039	1.074
AC2	1	0.273	0.074	0.060	1.065
AC3	1	0.371	0.138	0.124	1.179
AC4	1	0.320	0.102	0.088	1.136
AC5	1	0.374	0.140	0.126	1.090
AC6	1	0.400	0.160	0.147	1.022
AC7	1	0.278	0.078	0.063	1.183
AC8	1	0.496	0.246	0.234	0.986

Source: Author's work, 2020

Table 7 represents Anova's analysis of the regression model with the dependent variables AC1, AC2, AC3, AC4, AC5, AC6, AC7 and AC8. Anova test is statistically significant with 1% probability, which can be concluded that at least one of the independent variables has a statistically significant impact on the dependent variables. Table 7 indicates that the Anova test is statistically significant with a 1% probability, suggesting that at least one of the independent variables has a statistically significant effect on the dependent variables AC2, AC3, AC4, AC5, AC6, AC7 and AC8, while the Anova test is statistically significant with a 5% probability, suggesting that at least one of the independent variables has a statistically significant effect on the dependent variable AC1.

Table 7

Anova analysis of the regression model of dependent variables

Variables	Model		Sum of Squares	df	Mean Square	F - value	Sig.
Dependent Variable AC1	1	Regression	12.523	3	4.174	3.622	0.014**
		Residual	218.982	190	1.153		
		Total	231.505	193			
Dependent Variable AC2	1	Regression	17.295	3	5.765	5.084	0.002***
		Residual	215.452	190	1.134		
		Total	232.747	193			
Dependent Variable AC3	1	Regression	42.122	3	14.041	10.102	0.000***
		Residual	264.064	190	1.390		
		Total	306.186	193			
Dependent Variable AC4	1	Regression	27.976	3	9.325	7.232	0.000***
		Residual	245.013	190	1.290		
		Total	272.990	193			
Dependent Variable AC5	1	Regression	36.674	3	12.225	10.285	0.000***
		Residual	225.846	190	1.189		
		Total	262.521	193			
Dependent Variable AC6	1	Regression	37.890	3	12.630	12.094	0.000***
		Residual	198.424	190	1.044		
		Total	236.314	193			
Dependent Variable AC7	1	Regression	22.362	3	7.454	5.322	0.002***
		Residual	266.118	190	1.401		
		Total	288.479	193			
Dependent Variable AC8	1	Regression	60.117	3	20.039	20.622	0.000***
		Residual	184.625	190	0.972		
		Total	244.742	193			

Note: ***1%, significance, **5% significance

Source: Author's work, 2020

Table 8 represents the estimation of the parameters of the regression model with the dependent variables AC1, AC2, AC3, AC4, AC5, AC6, AC7 and AC8. Table 8 indicates that one independent variable has a statistically significant effect on the dependent variable AC1 *(We regularly organize learning groups to discuss about consequences of new knowledge).* Independent variable TECH_DYN1 *(Technological changes are creating new opportunities in our industry)* has a statistically significant positive impact on the dependent variable AC1 with 5% probability. For dependent variable AC2 (*We have special mechanisms to solve conflicts when employees have different understandings and interpretations of new knowledge)* Table 8 represents that one independent variable has a statistically significant effect on the dependent variable AC2. Independent variable TECH_DYN1 *(Technological changes are creating new opportunities in our industry)* has a statistically significant positive impact on the dependent variable AC2 with 10% probability. Further, Table 8 represents that one independent variable has a statistically significant effect on the dependent variable AC3 *(We have special procedures for employees to share knowledge and practical*

experiences). Independent variable TECH_DYN2 (*Technology is changing rapidly in our industry)* has a statistically significant positive impact on the dependent variable AC3 with 10% probability. For dependent variable AC4 *(We have special training programs that help employees grasp new knowledge)* Table 8 indicates that one independent variable has a statistically significant effect on the dependent variable AC4. Independent variable TECH_DYN2 (*Technology is changing rapidly in our industry)* has a statistically significant positive impact on the dependent variable AC4 with 10% probability. Next, for dependent variable AC5 *(Our employees frequently make product and process improvement suggestions based on new knowledge)* Table 8 represent that two independent variables have a statistically significant effect on the dependent variable AC6. Independent variable TECH_DYN2 (*Technology is changing rapidly in our industry)* has a statistically significant positive impact on the dependent variable AC6 with 5% probability, while TECH_DYN3 *(We expect growth in our industry over the next five years)* has a statistically significant positive impact on the dependent variable AC6 with 10% probability. Table 8 indicates that one independent variable has a statistically significant effect on the dependent variable AC6 *(We periodically review our long-term forecasting (e.g. market trends and technology development)).* Independent variable TECH_DYN1 *(Technological changes are creating new opportunities in our industry)* has a statistically significant positive impact on the dependent variable AC6 with 5% probability. For dependent variable AC7 *(We have systematic procedures for implementing new knowledge to develop new products),* the research indicates that no independent variables have impact on the dependent variable AC7 shown in Table 8. And for the last variable AC8 *(We constantly consider how to better exploit knowledge)* Table 8 suggests that two independent variables have a statistically significant effect on the dependent variable AC8. Independent variable TECH_DYN1 *(Technological changes are creating new opportunities in our industry)* has a statistically significant positive impact on the dependent variable AC8 with 5% probability, while independent variable TECH_DYN2 (*Technology is changing rapidly in our industry)* has a statistically significant positive impact on the dependent variable AC8 with 1% probability.

Table 8

Estimation of regression model parameters for dependent variables

Variables	Model		Unstandardized Coefficients		Standardized Coefficients	t - value	Sig.
			B	Std. Error	Beta		
Dependent variable AC1	1	(Constant)	2.405	0.291		8.255	0.000
		TECH_DYN1	0.246	0.104	0.246	2.360	0.019**
		TECH_DYN2	0.053	0.095	0.061	0.559	0.577
		TECH_DYN3	-0.107	0.098	-0.108	-1.083	0.280
Dependent variable AC2	1	(Constant)	1.886	0.289		6.525	0.000
		TECH_DYN1	0.197	0.103	0.197	1.911	0.058*
		TECH_DYN2	-0.059	0.094	-0.067	-.623	0.534
		TECH_DYN3	0.154	0.098	0.157	1.583	0.115
Dependent variable AC3	1	(Constant)	1.717	0.320		5.367	0.000
		TECH_DYN1	0.123	0.114	0.107	1.076	0.283
		TECH_DYN2	0.174	0.104	0.172	1.664	0.098*
		TECH_DYN3	0.157	0.108	0.139	1.457	0.147
Dependent variable AC4	1	(Constant)	1.862	0.308		6.041	0.000
		TECH_DYN1	0.171	0.110	0.158	1.555	0.122
		TECH_DYN2	0.195	0.101	0.205	1.943	0.054*
		TECH_DYN3	-0.024	0.104	-0.022	-0.227	0.821
Dependent variable AC5	1	(Constant)	1.918	0.296		6.482	0.000
		TECH_DYN1	-0.029	0.106	-0.028	-0.279	0.781
		TECH_DYN2	0.226	0.096	0.242	2.339	0.020**
		TECH_DYN3	0.196	0.100	0.188	1.967	0.051*
Dependent variable AC6	1	(Constant)	1.885	0.277		6.796	0.000
		TECH_DYN1	0.238	0.099	0.235	2.400	0.017**
		TECH_DYN2	0.080	0.090	0.090	0.881	0.380
		TECH_DYN3	0.123	0.094	0.124	1.310	0.192
Dependent variable AC7	1	(Constant)	2.295	0.321		7.144	0.000
		TECH_DYN1	0.139	0.115	0.125	1.215	0.226
		TECH_DYN2	0.067	0.105	0.069	0.642	0.522
		TECH_DYN3	0.133	0.108	0.121	1.227	0.221
Dependent variable AC8	1	(Constant)	1.537	0.268		5.745	0.000
		TECH_DYN1	0.196	0.096	0.191	2.055	0.041**
		TECH_DYN2	0.279	0.087	0.311	3.203	0.002***
		TECH_DYN3	0.042	0.090	0.042	.470	0.639

Note: ***1% significance **5%, significance, *10% significance

Source: Author's work, 2020.

5.4. Discussion of results and scientific contribution of the conducted research

The results of the research show that the technological dynamics of new technologies affect the absorptive capacity of acceptance and application of new technologies in export companies of the Republic of Croatia, which proves the hypothesis of the research. It can be seen that new technologies create pressure on companies on a daily basis through almost all forms of impact on business operations. The absorptive capacity of the company as the ability of the company

to learn and accept new knowledge, recognize and create innovations has a positive impact and a key role in recognizing new knowledge and new technologies in the market. The higher the absorptive capacity of the company, the greater the ability of the company in the context of recognizing and adopting new knowledge and innovations. Through the conducted research, we can claim that the export companies of the Republic of Croatia have a satisfactory or high level of absorptive capacity in the context of recognizing, adopting and accumulating relevant knowledge and new technologies. Accordingly, with a higher level of absorptive capacity comes a greater ability for companies to acquire, assimilate, transform and use external knowledge in order to produce a dynamic ability or create innovation processes and consequently create added value of the company. Through the regression analysis, seven of the eight dependent variables that show the level of absorptive capacity of Croatian export companies are correlated with the independent variable, technological dynamics of new technologies, where the intensity of the correlation through the set variables is visible. Table 9 represents the independent variables and their influence on the dependent AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, the coefficient of determination and the proportion of statistically significant particles. It can be concluded that the independent variables that indicate *Technological dynamics of new technology (*TECH_DYN1, TECH_DYN2, TECH_DYN3*)* are statistically significantly related to the dependent variables. It can be seen that all three independent variables have impact on seven dependent variables. The obtained research results confirm that the set hypothesis is accepted.

Table 9

Testing the hypothesis H1

Dependent variable	**AC**							
Independent variables	1	2	3	4	5	6	7	8
TECH_DYN 1	(+)5%	(+)10%	-	-	-	(+)5%	-	(+)5%
TECH_DYN 2	-	-	(+)10%	(+)10%	(+)5%	-	-	(+)1%
TECH_DYN 3	-	-	-	-	(+)10%	-	-	
Coefficient of determination	5.4%	7.4%	13.8%	10.2%	14%	16%	7.8 %	24.6%
Proportion of statistically significant particles	1/3 33.33 %	1/3 33.33 %	1/3 33.33 %	1/3 33.33 %	2/3 66.66 %	1/3 33.33 %	0/3 0%	2/3 66.66 %

Source: Author's work, 2020

Absorptive capacity is necessary for companies to recognize new external knowledge. This study confirmed that market pressure and technological dynamics of new technologies affect the export companies of the Republic of

Croatia in a process of recognition of new technology and its effect on absorptive capacity. It is necessary for companies to develop and reach a high level of absorptive capacity in order to be able to respond to market needs, identify and adopt new knowledge. Accordingly, the impact of the market and the emergence of new technologies on the company and its absorptive capacity goes in the direction of implementation and use of new technologies and all in the context of creating added value. As far as is known, a similar or the same research has not been conducted in the Republic of Croatia. The paper analyzes the relationship between technological dynamics of new technologies and absorptive capacity of new technologies of Croatian export companies (micro, small, medium and large). Based on the results of the research, it is possible to highlight the scientific contribution of the paper. The obtained results can be used to expand the current scientific knowledge on the concept of absorptive capacity, i.e. the impact of absorptive capacity on the acceptance of new technologies. The intention and goal of this research was to make managers of Croatian export companies aware of the importance of the concept of absorptive capacity as well as of the intensity and rapid growth and development of new technologies. The idea of this paper was to bring Croatian export companies closer in regard to the importance of achieving and maintaining an appropriate level of absorptive capacity within the company as a key factor in embracing new technologies in today's global environment and market which ultimately leads to sustainable competitive advantage in foreign markets. In accordance with all the above, it can be concluded that the concept of absorptive capacity and technological dynamics of new technologies are factors that are present in the internal and external environment of the company and as such should not be neglected. Although the concept of absorptive capacity is not a new phenomenon, with the growth and development of new technology it takes on increasing importance; therefore, it needs to be strongly and systematically developed further. By analyzing the relevant scientific sources and the results of the research, it can be concluded that a strategic approach to the concept of absorptive capacity provides the management of export companies with a number of advantages and benefits and could be the basis for quality management in foreign markets.

5.5. Limitations and recommendations for further research

After a detailed presentation of the relations between individual independent variables and dependent variables, it is necessary to point out the limitations of this research and give recommendations for future research. Depending on the purpose and goal of the research in future, the number of independent variables in research can be reduced or increased, but also changed. Regression analysis was used to examine and assess the relationship between the technological dynamics of new technologies and the absorptive capacity of the acceptance of new technologies in Croatian export companies. The sample included micro, small, medium and large companies that are in the register of Croatian exporters. A better overview of the researched issues would be obtained

if the sample included only micro and small companies and separately medium and large companies. In this way, micro and small companies and medium and large companies would be observed and compared separately, because the concept of absorptive capacity and technological dynamics of new technologies may have a different impact on certain categories. A more detailed insight into the concept of absorptive capacity of acceptance of new technologies and technological dynamics of new technologies by Croatian export companies would be obtained by conducting in-depth interviews with competent persons (managers of the Croatian export companies).

In addition to the above limitations, it is possible to provide recommendations for further research. It is possible to include in the research data for export companies from other countries of the European Union (EU) or from neighboring countries in order to be able to compare data by specific areas. Likewise, through further research, it would be useful to examine what other elements have an impact on the absorptive capacity of new technology acceptance by export companies. Accordingly, it would be desirable through future analyses to examine the opinion of internal stakeholders of the organization (employees) on the importance and achievement of an appropriate level of absorptive capacity as a factor of the acceptance of new technologies. In addition to the influence of technological dynamics of new technologies on the absorptive capacity, it would be interesting to investigate how the way and the degree of development of information and communication technologies (ICT) affect the business processes of the company and consequently the competitiveness and business result.

6. CONCLUSION

Companies that can achieve and that achieve a higher level of absorptive capacity are able to adopt external knowledge and innovations earlier than others and implement them in their business. It is necessary for companies to be organizationally competent to be able to develop internal knowledge and, accordingly, find and acquire in an easier manner new external knowledge. Today, technology is a key factor of success and competitiveness in the market. Absorptive capacity plays a major role in the context of an organization's ability to recognize, acquire, transform, and use new knowledge and new technologies. The conducted research confirmed that the technological dynamics of new technologies affects the absorptive capacity of acceptance and application of new technologies in export companies of the Republic of Croatia. The existence of the absorptive capacity of a company is necessary in order for it to recognize new external knowledge and innovations – when the market and technological dynamics of new technologies create pressure on the absorptive capacity, it needs to be recognized at the right time and accordingly implemented in business processes.

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Dr. sc. Ivana Martinčević
Viša predavačica
Sveučilište Sjever, Hrvatska
E-mail: ivana.martincevic@unin.hr

Dr. sc. Goran Kozina
Redoviti profesor
Sveučilište Sjever, Hrvatska
E-mail: goran.kozina@unin.hr

ODNOS TEHNOLOŠKE DINAMIKE NOVIH TEHNOLOGIJA I APSORPCIJSKOG KAPACITETA IZVOZNIH PODUZEĆA REPUBLIKE HRVATSKE

Sažetak

Informacijske i komunikacijske digitalne tehnologije pružaju brojne mogućnosti poduzećima u smislu lakšeg i učinkovitijeg rada na globalnoj razini te, zahvaljujući novim tehnologijama, stjecanja konkurentske prednosti. Novi trendovi i tehnologije stvaraju velik pritisak na tržištu te su poduzeća prisiljena tražiti nove, brže i učinkovitije načine i modele poslovanja. Tržišta diktiraju tempo i postaju sve digitalnija upravo zahvaljujući tehnologiji koja brzo napreduje i razvija se. Novom tehnologijom znanje i inovacije ključni su čimbenici uspjeha. Mnoga se poduzeća danas definiraju i opisuju kao poduzeća temeljena na znanju, koje akumuliraju i razvijaju, ali i usvajaju novo. Cilj ovog rada bio je istražiti i ispitati sposobnost organizacije da apsorbira znanje (apsorpcijski kapacitet) kao ključni čimbenik u procesu prihvaćanja novih tehnologija. Istraživanje je provedeno u Republici Hrvatskoj i uključivalo je hrvatske izvozne tvrtke (mikro-, male, srednje i velike). Provedenim istraživanjem potvrđena je hipoteza istraživanja: „Tehnološka dinamika novih tehnologija utječe na apsorpcijski kapacitet prihvaćanja novih tehnologija u izvoznim poduzećima Republike Hrvatske“. Istraživanje je dokazalo da apsorpcijski kapacitet igra glavnu ulogu u kontekstu sposobnosti organizacije da prepozna, stekne, preobrazi i upotrijebi novo znanje i nove tehnologije.

Ključne riječi: informacijske i komunikacijske tehnologije, digitalizacija, globalizacija, digitalne tehnologije, apsorpcijski kapacitet, izvoz, izvozna poduzeća.

JEL klasifikacija: F60, O14, O33.