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**Article**

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## ICT AS THE FACILITATOR OF ENTREPRENEURIAL ACTIVITY: AN EMPIRICAL INVESTIGATION

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### Abstract

Internet and the related information and communications technologies (the ICTs) are profoundly shaping economic transactions of all kinds. They are also expected to open up entrepreneurial opportunities and reduce the competitive advantage of large firms, thus making room for small and young firms. The EU policy makers have already started to introduce policy initiatives for better use of ICT into the actions to support entrepreneurship, such as promoting digital entrepreneurship. At the moment, however, we have scarce empirical evidence about the impact of ICT on entrepreneurial activity. Our study provides such evidence, by investigating the relationship between ICT use and start-up rates, using longitudinal industry level data for Slovenia. The results of the regression analysis show that entry rates are higher in industries that are characterized by higher ICT use, thus providing support to the government policy efforts.

**Keywords:** digital entrepreneurship, entrepreneurial activity, ICT use, internet, start-up rate

**JEL Classification:** L26, M13, O33

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### Introduction

Internet and the related information and communications technologies (the ICTs) are becoming a core infrastructure of the economy and are profoundly shaping economic transactions of all kinds, including production, sales, distribution and consumption (OECD, 2012). As a result of widespread changes, we are now talking about digital economy being everywhere. Its' importance is increasingly hard to miss: half of all productivity growth derives from investment in ICT; Internet traffic is doubling every 2–3 years; by 2015 there will be 25 billion wirelessly connected devices globally; and there are more than 4 million ICT workers across many sectors in Europe and their number is growing by 3 per cent annually despite the crisis (Expert Group on Taxation of the Digital Economy, 2014). In the

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analysis of the main factors leading to the shift from what has been characterized as managed economy towards the entrepreneurial economy, Thurik and others identify the shock of the ICT revolution as the one triggering this process in the late 1980's and early 1990's (Thurik, Stam and Audretsch, 2013). Given the trends, we can expect that the ICT will have an even more significant impact on business environment in the future, opening up entrepreneurial opportunities and reducing the competitive advantage of large firms, thus making room for small and young firms. At the moment, however, we have scarce empirical evidence about the impact of ICT on entrepreneurial activity.

This issue is of relevance for the government policy. We can already observe EU policy interventions introducing "digital entrepreneurship" initiatives into the Entrepreneurship 2020 Action plan (European Commission, 2013) and given the increased interest in industrial policies (Warwick, 2013) we can expect additional policy efforts. However, in the times of restricted government budgets the policy makers need the empirical evidence to justify public sector interventions and here the question of whether ICT use does indeed facilitate entrepreneurship comes to the fore. Our study provides such evidence, by examining ICT as a determinant of entrepreneurial activity on the level of industries.

Understanding the relationship between ICT adoption and usage and entrepreneurial activity can, we believe, also contribute to the existing literature on the role of context within which entrepreneurial activity occurs. In the entrepreneurship research, the influence of context on outcomes of entrepreneurial action has long been acknowledged but is mainly taken for granted when it comes to empirical studies. The research has been dominated by the focus on individual or the firm whereas how these micro processes have been regulated by the context remains a major gap in the literature (Autio, et al., 2014). The research stream on the effect of country context on the entrepreneurial dynamics is in its infancy and there is a strong lack of studies recognizing that the regional context as well as the differences across industries can also be important (Autio, et al., 2014, Fritsch and Falck, 2007, Verheul, Carree and Santarelli, 2009). Variations in entrepreneurship across industries are to a large extent connected to differences in technology. By studying the effects of ICT use on entrepreneurship in Slovenia we hope to add to this field of research, with a first empirical study, to our knowledge, to connect these two variables on the industry level (see Cumming and Johan, 2010, for a study examining the relationship between the Internet and entrepreneurship on the regional level).

The structure of the paper is as follows. The first part is devoted to a brief outline of theoretical arguments for the link between ICT and entrepreneurship. This is followed by a description of research setup that is devoted to the modelling framework as well as to the description of the data and of the methodology that was used. We conclude by reviewing the results, identifying the limitations of the study and briefly discussing the implications of the results for government policy.

## **1. Review of the literature**

There are many channels through which ICT can have an effect on entrepreneurial activity. We suggest summing them up in two groups. First of all, ICT use can facilitate and encourage the creation of new entrepreneurial opportunities that can be exploited through new firm formation as well as through innovation activities of existing firms. And secondly, the use of ICT can diminish the transaction costs of a number of firm activities,

thereby reducing the entry costs and the disadvantages that young and small firms experience in comparison with large, existing firms that benefit from economies of scale.

In the digital economy, the previous technological innovations in the field of information and communication, such as personal computers and telecommunications via fibre, cable or wireless are being developed further: they enhance mobility in many different dimensions (for example through e-commerce across borders), they help creating value through the use of data ("big data" that can generate value in marketing, for example), and they allow the creation of network effects (for example through interactions of many groups or persons through a platform, creating externalities and thus private value) (Expert Group on Taxation of the Digital Economy, 2014). ICT has thus become one of the key technological infrastructures where existing technologies continue to rapidly develop and novel technologies are being constantly introduced, fostering the emergence of new entrepreneurial opportunities. Research of a number of nascent technologies has shown that they create opportunities for new ventures. As Thurik and others (2013) sum up, the periods of radical technological change are characterized by arrival of many new firms, since new technologies create new markets and destroy market positions of incumbents. In addition, in the early stages of new markets the price elasticity is low due to the novelty of the product therefore the small size of the entrant is less of a disadvantage. Knowledge-spillover theory of entrepreneurship also elaborates on the interdependence of entrepreneurship and technology, identifying new firms as channels for knowledge spillovers and commercialization of knowledge from the source that created it (Acs, et al., 2012). Not always will innovation create opportunities for new firms as opposed to established ones; this relation will be determined by the technological regime prevailing in the industry (Alba, Álvarez-Coque and Mas-Verdu, 2013; Marsili, 2002). For example, a study by Revilla and Fernandez (2012) has shown that environments characterized by high levels of technological opportunity, more frequent use of industrial property rights and less cumulative knowledge are the ones that favour small firms.

Entrepreneurial opportunities found on new geographical markets can also be considered a type of innovation. ICT can help the firms diminish the costs of entry into new geographical markets and the transaction costs connected to reaching out to them. E-commerce is creating new opportunities for small firms, by making the availability of products and the prices more transparent. E-commerce is increasingly important; online cross-border trade in the EU accounts for around 8,7 percent of all offline trade for the same goods within EU (Martens, 2013). Internet facilitates trade by reducing the search costs and it seems that the online markets provide both trust and information (Lendle, et al., 2012), all of which is important for SMEs trying to enter new markets. Not only this, there is a growing evidence that many new firms adopt the e-business format to be global right from the inception (the so-called "born globals") (Loane, McNaughton and Bell, 2004).

Internet technology has also been increasingly integrated into marketing activities. The internet can be used for strengthening customer service and support functions as well as for establishing direct contact with the customers which can even eliminate traditional market intermediaries (Lohrke, Franklin and Frownfelter-Lohrke, 2006). The internet may facilitate the gathering of market intelligence (Borges, Hoppen and Luce, 2009) and the build-up of valuable customer-related information (for example by web-based market surveys and customer satisfaction measurements) as well as the adjustments of the

marketing mix based on internet-related information (Prasad, Ramamurthy and Naidu, 2001). It also makes the innovative marketing strategies easier (Martin and Matlay, 2003).

The technology can also have an effect on innovation activities. ICT tools and access to Internet have dropped the marginal cost of communication and created a worldwide platform for firms to cooperate, irrespective of their size (Thurik, Stam and Audretsch, 2013). This can be of large importance for small and young firms with limited resources available for cooperation in innovation. Evidence suggests that for small firms the marginal effects of technological cooperation is significantly higher than for large firms (Nieto and Santamaría, 2010). And last, but not the least, ICT use can impact entrepreneurship through simplifying procedures for business registration and licensing, by facilitating access to training or professional services in financing and marketing, or through intellectual property rights support (UNCTAD, 2011).

To sum up, inexpensive access to internet combined with other ICT tools that are often affordable and easy to use can contribute to a drop in fixed component of transaction costs of various kinds which is advantageous for the small firms that do not enjoy the scale effects. Also, technological change connected to ICT fosters the creation of new opportunities. Thus we set up the following hypothesis: *in industries with higher ICT use the entrepreneurial activity will be higher.*

## **2. Research methodology**

### **2.1. Data on entrepreneurial activity and ICT use**

A number of measures of entrepreneurial activity are in use. This can be ascribed to the fact that no unique definition of entrepreneurship exists as well as to the fact that various new sources of data became available in time. Researchers can choose between two basic sources of data (Stenholm, Acs and Wuebker, 2013): self-reports of randomly selected individuals (as used in the Global Entrepreneurship Monitor); or the records from the official business registers, the examples of which include the World Bank's GES, EIM data, Eurobarometer, Eurostat, and Observatory of European Small and Medium-sized Businesses. Apart from different sources of data, two approaches are usual, one taking a "static" and other a "dynamic" perspective. Examples of static indicators include the business ownership rate, self-employment and the number of small and medium-sized enterprises, whereas the dynamic perspective concentrates on capturing nascent and startup activity (Audretsch, Grilo and Thurik, 2007). An often used measure following the dynamic perspective is the net entry rate, measuring entry and exit rates of firms. However, the studies frequently focus on start-ups only.

The entry of new firms in the industry indicates that new ventures are created to pursue unexploited entrepreneurial opportunities, thus making the start-ups a good measure of entrepreneurial activity that we are trying to capture. This measure is not without disadvantages though, since it focuses on the newness of the organization pursuing the opportunity and leaves aside the existing firms pursuing new opportunities which are also relevant for entrepreneurial activity (Dahlqvist and Wiklund, 2012). However, this measure is nevertheless still widely used and has been shown to be a good proxy for commercialisation of new knowledge where new ideas are introduced to the market through creation of new firms (Acs, et al., 2012).

There is a number of ways to calculate a start-up rate. When start-up rates are calculated according to labour market approach, the number of start-ups per period is divided by the number of persons in the workforce at the beginning of the respective period (Fritsch and Mueller, 2007). This approach assumes that a single firm represents one self-employed individual and that the members of the workforce are faced with a decision to either work as paid employees or start their own venture. The resulting start-up rates may then be interpreted as a propensity of a member of the workforce to start his or her own business. Another approach calculates the indicator in terms of the number of firms, standardizing the number of entrants relative to the number of establishments already in existence (ecological approach) (Armington and Acs, 2002). As shown by Verheul and others (2009) both approaches can give very similar results when used in the analysis.

In our study, we will measure the entrepreneurial activity on the industry level with the entry rate, calculated as a number of new entrants in year  $t$  relative to the number of existing firms in the industry in the previous year ( $t-1$ ). The source of data are firm-level statistics provided by the Statistical Office of the Republic of Slovenia that are based on a business register data and record all business entities that are in operation. The data are published yearly and allow the identification of start-ups in the industry. The Global Entrepreneurship Monitor data could not be used for the purposes of our study since they are not published on the industry level. This is not seen as a disadvantage, however; statistical business registers are widely used as a starting point for internationally comparable data on entrepreneurship (see OECD, 2011, for an example).

When measuring ICT use this study relies on the conclusions and recommendations of the ESSLait (formerly ESSLimit-ICT Impacts) Project, an international project involving 15 European statistical offices, the Statistical Office of the Republic of Slovenia being one of them. The project aimed at linking microdata from various sources in order to analyse the impact of ICT on European businesses (Eurostat, 2014). One of the stepping stones in the analysis was to assess the various indicators that measure the main variable of interest, i.e. the ICT use, and to establish new methods for producing indicators. The project has found that the impact of simpler usages of ICT at the firm level, such as having a website and having an internet access, is diminishing as their levels are reaching saturation where a large majority of firms already engages in this kind of ICT use (Hagsten, Polder et al., 2013). With the spread of ICT use these indicators are losing their relevance, therefore it is more appropriate to use measures where the saturation is not yet as pronounced. One such variable is the proportion of employees in the firm with access to broadband internet (BROADpct), a composite indicator that is based on two measures included in the yearly survey on ICT usage in firms, performed by national statistical offices: share of workers with access to Internet and a dummy for the firm having broadband Internet. Broadband-enabled employees were thus used in this study as the variable capturing the ICT use of the firm. This measure allows us to capture a wide array of the uses of ICT by the firms that we have pointed out in the literature review, like e-commerce, information search, marketing-related activities, and innovation cooperation.

## 2.2. Modelling and data considerations

In order to analyse and discuss the role of ICT use in entrepreneurial activity on industry level, we need to focus on the determinants of the level of entry rates. Audretsch and others

(2007) propose a framework for the determinants of entrepreneurship that integrates different strands of literature into a comprehensive model. Their approach to analysing new business formation processes is built on the perspective of potential founder of the business who evaluates the costs and benefits of the two alternatives: whether to remain in employment (or unemployment) or to start one's own business. The determinants that are relevant for this subjective evaluation can be grouped into those that shape the demand for entrepreneurship on the one hand and those influencing the supply of entrepreneurs on the other. Demand side determinants refer to the developments that create entrepreneurial opportunities that can be exploited by individuals, the two main sources being technology developments and shifts in demand. The supply of the entrepreneurs is determined by developments that have to do with individual characteristics of potential entrepreneurs, their abilities, resources, attitudes towards risk and their preferences between income and leisure. The demographics and culture are important here. Demand as well as supply-side of entrepreneurship can be influenced by various government policies, such as R&D policies, income policies, policies affecting the age and structure of population, education system that fosters entrepreneurial culture, etc. Some of the government policies can be considered a third group of determinants of entrepreneurship, since they can have an effect on the choice of the potential entrepreneur between entrepreneurship and the outside options (taxation and bankruptcy policy are two such examples).

This comprehensive model will guide the choice of variables included in our empirical study. Considering that the investigation is limited to the industry level, it naturally neglects those determinants that do not vary much among industries. We consider most of the government policies with a possible effect on entrepreneurship to be of such nature. An overview of the entrepreneurship policy in Slovenia between 2004-2009 (Jaklič, 2012) has namely shown that most of the measures were directed at the existing firms whereas the ones aimed at start-ups reached only a small number of recipients (in 2004, for example, 41 start-up projects were co-financed, whereas in 2009, where the number of supported projects has peaked, there was 91 of them).

The following variables will thus be included in the empirical model to examine the determinants of industry entry rates:

- *Innovation activity*. Technological changes are an important source of entrepreneurial opportunities, allowing people to create new resource combinations that exploit this technological change (Shane, 2003). Industry life cycle studies have shown that nascent technologies create opportunities for new ventures, since younger technical fields are more likely to be associated with new firm formation as a mode of exploitation of new inventions (Shane, 2001). Also, early stages of industry life cycle can be accompanied by high rates of entry due to imitation and bandwagon effect (Autio, et al., 2014). Another aspect of the role of technological change in entrepreneurial activity is that of the role of small and large firms in innovation activity in an industry. As Fritsch and Falck (2007) point out, a technological regime in an industry can be called "entrepreneurial" if a high share of innovative activity is performed by small firms, thus implying that entrants have a relatively good chance to compete successfully towards the large firms. In an industry where the incumbent large firms have the innovation advantage and small firms play only a minor role, entry barriers for new firms might be larger and higher innovation intensity might be associated with lower entry rates. Given the limitations of available data that does not distinguish between small and large firms, the proportion of firms that have introduced a product innovation will be used as a proxy for the intensity of innovation activity in an

industry. Data on innovation activity are gathered bi-annually by the Statistical Office of the Republic of Slovenia through the Community Innovation Survey (assumption is made that in the year between the surveys the innovation status of the firm corresponds to that of the next available year).

- *ICT use.* As one of the important elements of technological change, ICT use is considered a separate source of entrepreneurial activity in our model. As explained in greater detail in the literature review section, industries with higher ICT use can be expected to have higher entry rates, since ICT can be a source of entrepreneurial opportunities as well as can diminish the disadvantages of small and young firms and lowers the entry costs. A variable used to capture these effects in our model is the broadband-enabled employees.

- *Change of domestic demand.* Entrepreneurial activity can be driven or restricted by demand. Economic growth will increase the domestic demand and is thus expected to increase the number of entrepreneurial opportunities. However, we can expect another, competing effect occurring due to business cycle fluctuation. A study based on German data that include the period of economic crisis that began in 2008 has shown that unemployment rates have positively influenced entry rates into self-employment, thus providing the evidence that entrepreneurs can also stabilize the economy in the business cycle (Fritsch, Kritikos and Pijnenburg, 2014). In order to account for the impact of overall domestic demand and business cycle as well as other time-specific factors that have an influence at macro level (such as economic policy changes that affect all industries), we include time dummies in our model.

- *Opportunities on EU markets.* Slovenia is a small market economy that exported 74% of its GDP in 2013 therefore it is important to consider the demand on international markets as an additional determinant of entrepreneurship. To this effect we include in the model the average industry output growth, where average is calculated for a set of EU countries. This variable is used as a proxy for the demand for the industries' products on these markets (75% of Slovenia's export goes to the EU). It can also be used as an indication of new business opportunities in a specific industry, a trend that can reflect itself on the domestic market once new products, processes and business models are transferred from abroad by the entrepreneurs. High output growth of an industry on the EU markets thus indicates the growing international demand and opening up of entrepreneurial opportunities in this industry and should be associated with high entry rates. Industry level data published by EU KLEMS project (EU KLEMS, 2013) for 10 EU countries were used to construct this variable. It measures the average per cent change of industry output for selected EU countries (where the countries' total output is used as a weight when calculating the average output growth).

We will therefore estimate the model that takes the following form:

$$ENT = f(INN, BROADpct, OUTPUT\_EU, D_{Y1} \dots D_{Y6}) \quad (1)$$

where ENT is industries' entry rate, INN is proportion of firms in the industry with product innovation, BROADpct is an average proportion of broadband-enabled employees in an industry, OUTPUT\_EU is average EU output growth of an industry, and  $D_Y$  denote year dummies.



**2.3. Methodology and the sample**

We have estimated Equation (1) using data for 26 industries over the period 2004-2010. Industry classification based on EUKLEMS definitions was used (see EU KLEMS, 2013), corresponding to the classification used in the Esslait project. Given the availability of the data for the relevant variables, some of the industries were excluded from the analysis; however the resulting dataset includes most of the industries in manufacturing and market services.<sup>†</sup> Outliers in data sets can have large impacts on the OLS estimates, especially in small samples, therefore it is important to identify them and to re-estimate the model with the suspected outliers excluded (Gujarati, 2003). In our case the analysis of outliers using 4 different criteria has identified the values belonging to some of the industries in some of the years as problematic. After excluding the outliers, the final size of the unbalanced panel contains 166 observations. Table no. 1 presents summary statistics (means and standard deviations) for all variables included in the empirical analysis.

**Table no. 1: Summary statistics**

<b>Variable</b>	<b>Description</b>	<b>Mean</b>	<b>SD</b>
ENT	Entry rate	0.0203	0.0094
INN	% of firms that have introduced a product innovation	0.3554	0.1522
BROADpct	% of broadband-enabled employees	0.4272	0.2113
OUTPUT_EU	Average EU output growth of an industry	0.0136	0.0621

Note: Average values are presented for a 7-year period; n=166.

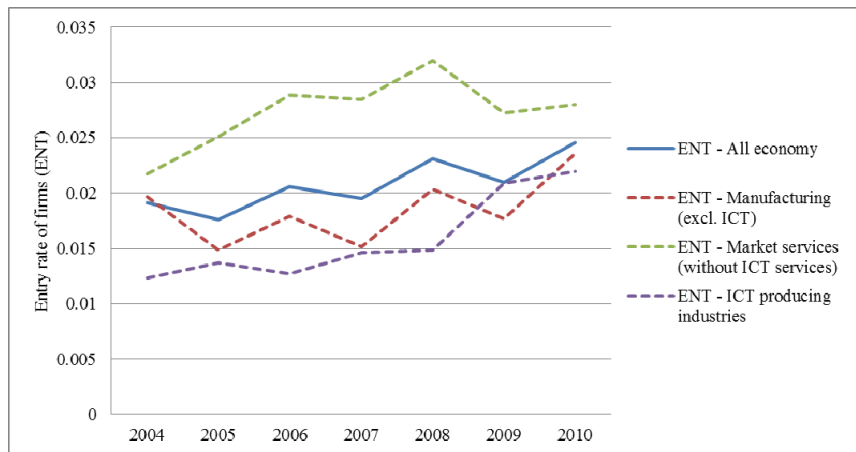
*Source: Statistical office of the Republic of Slovenia, own calculations.*

The model has been estimated as a pooled regression. Using this sample, the regression did not pass the Jarque-Bera and Shapiro-Wilk test on normality of residuals. Quantile regression can correct for this problem (see, for example, Dimelis and Louri, 2002) therefore we will estimate the regression with both, robust OLS regression and quantile regression.

**3. Results and discussion**

The development of entry rates between 2004 and 2010 shows an overall trend towards an increasing number of entrants as compared to the operating firms (Figure no. 1). By grouping the industry data into three sectors, we can, first, observe the differences in the levels of entry between them and second, we can observe the divergence in the responses to economic crisis (signified by the negative economic growth rate in 2009). Following the approach of the Esslait project, EUKLEMS alternative industry hierarchy was used to separate the ICT producing sector from the industries belonging to Market Services (exclusive of ICT services) and Manufacturing (exclusive of ICT producing industries). All through this period, the level of entry rate was the highest in services industries and it is this sector that was also experiencing the largest drop in entry rate at the peak of economic crisis.

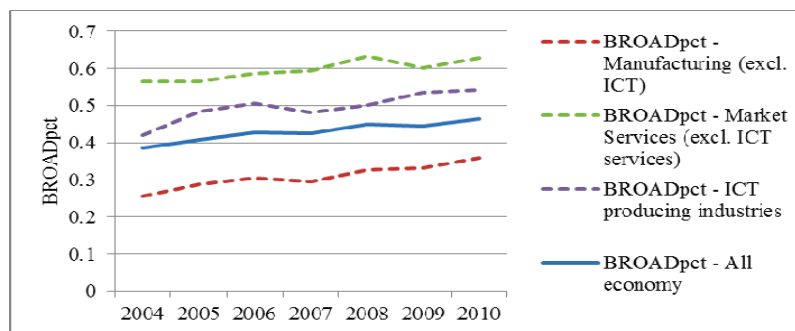
<sup>†</sup> The following industries are not included in the analysis: agriculture, forestry and fishing; mining and quarrying; electricity, gas and water supply; construction; real estate activities; financial services; public administration and defence; education; health and social work.



**Figure no. 1: Entrepreneurial activity as measured by entry rate of firms, by industry (Slovenia, 2004-2010)**

*Source: Statistical office of the Republic of Slovenia, own calculations.*

ICT use in this same period has also strengthened (Figure no. 2). Whereas in 2004 38 % of employees had access to fast internet on average, if we look at the whole economy, by 2010 this proportion has increased to 46%. Again, the level of ICT use as measured by this variable is, not surprisingly, the highest in services sector, whereas the manufacturing sector is least intensive in ICT use.



**Figure no. 2: ICT use as measured by proportion of broadband-enabled employees, by industry (Slovenia, 2004-2010)**

*Source: Statistical office of the Republic of Slovenia, own calculations.*

The estimations of the determinants of entry rates are presented in Table no. 2. The left part of the results shows the estimations for the robust OLS regression whereas the results on the right refer to the quartile regression. Both sets of results lead to the same conclusions. The estimations of the determinants of industry entry rates largely confirm the expectations. The main three explanatory variables are statistically significant as well as the time dummies for the last three years in the dataset. We find empirical support for our hypothesis that industries with higher ICT use experience higher entry rates. According to the estimates, the share of employees with access to fast internet has a highly significant and positive effect on industry entry rate, confirming that ICT use plays a role in the entry of new ventures.

**Table no. 2: Estimation results for the determinants of entry rates**

	<b>Robust OLS regression</b>	<b>Quantile regression</b>
INN	-0.0079** (0.0036)	-0.0087** (0.0037)
BROADpct	0.0036*** (0.0034)	0.0126*** (0.0027)
OUTPUT_EU	0.0323* (0.0191)	0.0311** (0.0138)
Y2005	-0.0015 (0.0019)	-0.0007 (0.0021)
Y2006	-0.0000 (0.0026)	-0.0025 (0.0020)
Y2007	-0.0009 (0.0026)	-0.0009 (0.0020)
Y2008	0.0050** (0.0024)	0.0054** (0.0020)
Y2009	0.0063 (0.0040)	0.0062** (0.0028)
Y2010	0.0050** (0.0025)	0.0060*** (0.0020)
Constant	0.0160*** (0.0023)	0.0137*** (0.0020)
R <sup>2</sup> / Pseudo R <sup>2</sup>	0.167	0.1978
F-value	5.04	
No. of obs.	166	166

Note: Standard errors between brackets. \*\*\*, \*\* and \* refer to significance levels of 1%, 5% and 10%, respectively.

*Source: Statistical office of the Republic of Slovenia, own calculations.*

Average EU output growth of an industry also has a positive effect (statistically significant at the 10% level in the OLS regression and 5% level in the quartile regression). This suggests that the international demand and opening up of entrepreneurial opportunities in the industry on EU markets are conducive for entry rates in the same industry in Slovenia. This result is in accordance with the findings of Fritsch and Falck (2007) that conclude on the basis of West Germany data that the industry GDP growth rate is of significant importance for new businesses set up. The impact of innovation activity in the industry is negative indicating lower entry rates of new firms in industries with higher share of innovative firms. This result is not unexpected since we have already noted that two competing effects might be relevant here, one connected to the entrepreneurial opportunities opening up with innovations and technological change happening in the industry, and another with the balance between the role of small and new versus large incumbent firms in innovative activity, as pointed out by Fritsch and Falck (2007). Our results suggest that incumbents have innovation advantage and create entry barriers for new firms. And lastly, the estimates for the year dummies indicate that in the period connected to the economic crisis (years 2008-2010) the average industry entry rate was higher compared to the beginning of the period that was studied in the analysis (year 2004). This suggests that the business cycle and the worsening economic conditions at that time might

have a positive effect on entrepreneurial activity, similar to what was found in the German study (Fritsch, Kritikos and Pijnenburg, 2014).

### **Conclusions**

This paper has investigated the relationship between ICT use and entrepreneurial activity across industries. We examined the impact of a range of factors on industry entry rates, controlling for the importance of innovation activity, changes in domestic demand, and opportunities on EU markets. Our results show that entry rates are higher in industries that are characterized by a stronger ICT use. These results give support to the assumption that ICT represents a key technological infrastructure that creates new entrepreneurial opportunities and diminishes the disadvantages of small and young firms through lowering the transaction costs. There are two main contributions of this paper. First, to the best of our knowledge this paper is a first empirical study of the relationship between ICT use and entrepreneurial activity on the industry level. Although Thurik and others (2013) provide a persuasive set of arguments for the importance of ICT for the shift from managed to entrepreneurial economy they do not provide any references or empirical evidence to this effect. Some empirical evidence can be found on the effects of internet on regional entrepreneurship, leading to a conclusion that the internet has its potential benefits but may also result in additional costs for firms in small remote communities (Cumming and Johan, 2010), but this line of research focuses on entrepreneurship on the regional level. Our study supplies the evidence on the role of ICT on the industry level and contributes to the literature on the role of context in entrepreneurial actions. And second, the paper contributes empirical evidence needed by the policy makers to justify public sector interventions and help them shaping the government policy.

From a policy perspective, our paper gives support to the efforts of policy makers that are recently introducing a number of policy initiatives addressing the ICT use, for example by promoting digital entrepreneurship under the umbrella of Entrepreneurship 2020 Action Plan. These initiatives are not necessarily a part of a set of instruments applied by the entrepreneurship policy; however, judged by our results, the encouragement of a more widespread use of ICT might achieve its aims too, through facilitating entrepreneurial activity. Some of the European Commission policy initiatives addressing the ICT use actually target micro and young enterprises, for example Startup Europe platform that aims at web and ICT start-ups who need support services such as advice, networking and legal assistance (Commission, 2014). However, initiatives focusing on new and small firms are still rare and would deserve closer attention of the policy makers. Audretsch and Thurik (2001) advocate the government policy that is enabling in nature, focusing on education, increasing the skills and human capital of workers, facilitating the mobility of workers and their ability to start a new firm. The results of our study suggest that including the elements of ICT use into the policy initiatives in these areas might encourage entrepreneurial activity. Further empirical studies are needed on this topic, especially given its relevance to the policy makers.

This study's findings should be interpreted with its limitations in mind. The empirical model did not control for government policy changes that were aimed at specific industries and could have had an effect on entrepreneurial activity on the industry level. Even though a brief look into the policy measures aimed at encouraging entrepreneurship in the 2004-2010 period did not identify the initiatives that would target specific industries in a relevant

manner, this can only be considered as a partial approach. Another improvement to the study would be to use more appropriate data for capturing the “entrepreneurial technological regime” suggested by Fritsch and Falck (2007) to be relevant for start-ups at the industry level. Our study has used the share of innovative firms in an industry to this effect. However, if entrants have a better chance to compete successfully in the industries where a high share of innovative activities is already conducted by small firms, then the variable that measures this concept should be focusing on innovative activity of small firms only.

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