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DO BETTER PERFORMING COMPANIES POSSESS MORE INTANGIBLE ASSETS: CASE OF SLOVENIA*

GORDANA LALOVIĆ¹

MATJAŽ KOMAN²

ABSTRACT: *Drawing on the intangible resource-based view of the firm, we investigate the difference between high and low performing companies regarding their profile of core intangible resources. The results obtained indicate that on average better performing companies hold higher share of intangible capital on majority of analysed intangible resources and thus may have developed more core competences and capabilities needed for superior performance. The paper contributes to the previous literature as it highlights the existence of intangible resources within the population of firms with common characteristics, which favourably distinguish superior firms from less successful one. For the managers and policy makers gaining a clear understanding of core intangible resources with potential of sustainable competitive advantage that determine high performing firms and their tendency to invest in intangible assets can be of crucial importance as it offers some insights for policy design.*

Keywords: *intangibles, firm performance*

JEL Classification: D22, L25, O30, E22

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INTRODUCTION

Historical roots of research on intellectual capital (IC) starts in 1990s. Initial work mainly focused on raising awareness about the existence of intangible assets and their value within the organizations (Itami, 1991; Brooking, 1996; Roos, Roos, Dragonetti and Edvinsson, 1997; Stewart, 1997) followed by the first classification models (Marr, Gray and Neely, 2003). A change in investment structure with the increased investment in intangible capital indicated a transition of industrial economy towards knowledge-based economy. Further research, thus, formulated the concept of knowledge-based organization (Nonaka, 1991; Spender and Grant, 1996; Teece, 1998; Teece, 2000) and focused on the management of knowledge assets, which are often referred to as IC or

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intangible/invisible assets (Alcaniz, Gomez-Bezares and Roslender, 2011). They are considered a key driver of business' growth, profitability and competitiveness (Bose and Oh, 2003; Kaufmann and Schneider, 2004; Cohen and Kaimenakis, 2007; Zeghal and Maaloul, 2011; Sydler, Haefliger, and Pruksa, 2014). Canals (2001) emphasized that with the development of knowledge-based society intangible resources increasingly came in the forefront exceeding the contribution of tangible assets in the process of value creation (Guthrie, 2001)³.

The notion of IC is linked to the firms' ability to generate and apply potential of the knowledge embedded in many of IC definitions (Kaufmann and Schneider, 2004). Galbraith (1969), who first used the term, described IC as "a bundle of assets in a process of value creation". In order to better understand how IC contributes to the value creation many scholars tried to give the definition of IC and shed light on its measurement and management process (Boj et al., 2014). Even though many authors tried to define the term in accurate manner the literature review revealed that there is no broadly accepted definition. According to Brooking (1997) IC refers to intangible assets that can potentially enhance corporate performance in case that appropriate combination of intangible assets, financial resources, and good relationship with stakeholders exists (Abdullah and Sofian, 2012).

The notion that IC has the impact on business performance is consistent with the resource-based view (RBV) theory, which advocates that a company should identify and manage its intangible resources effectively in order to achieve the above average performance (Penrose, 1959, 1980; Kristandl and Bontis, 2007; Raja Adzrin, Abu Thahir, and Maisarah, 2009; Lewicka, 2011)⁴. In order to maintain above average profitability, firm needs to build sustainable competitive advantages (SCA) by creation of intangible strategic resources (Ahmad and Mushraf, 2011; Sydler et al., 2014). Therefore, firms should analyse the resources and competences they possess in order to discover which of them can be considered superior and distinctive (Camelo-Ordaz et al., 2003). In identification of their core intangible resources and consequently in conceptualization of strategically significant competences and capabilities of the firm, IC components can be helpful.

In this paper we analyse the correlation between the size and different sources of intangible capital and performance of Slovenian manufacturing companies using the cluster analysis. Obtained results show than on average better performing companies hold

3 Corrado, Charles, Hulten, and Sichel (2005) estimated that investment in intangibles averaged US\$1.1 trillion between 1998 and 2000 (1.2 times tangible capital investment) or 12% of GDP, and showed that an important part of the US productivity acceleration since the mid-1990s can be attributed to growth in intangible assets. Other country studies estimated the contribution of previously unmeasured intangible capital to multifactor productivity (MFP) growth of 14% in UK (Marrano, Haskel and Wallis, 2009) and 3% in Finland (Jalava et al., 2007) over a period between the mid-1990s and early 2000s. Estimated contribution of all intangibles to MFP growth in Japan and in France is 19% (Fukao et al., 2008), 18% in Germany, and 9% in Spain (Hao et al., 2008).

4 Nevertheless many companies are still facing a lot of difficulties with the IC management (Dzinkowski, 2000) due to intangible nature of IC. Therefore its identification and measurement becomes difficult as it is hard to measure IC by financial figures. As a result, only 20% of firm's knowledge is actually used because firms lack appropriate IC measurement system (Chen, Zhu and Xie, 2004).

higher share of intangible capital on almost all analysed intangible resources and thus may have developed more competences and capabilities needed for superior performance. By comparing the resource profile of superior firm performers we highlight their tendency to invest in intangible assets of the firm and the existence of those intangible resources that favourably distinguish them from less successful firms.

For the managers and policy makers gaining a clear understanding of core intangible resources that determine superior firm performers and their tendency to invest in intangible assets can be of crucial importance as it offers some insights for policy design. Understanding companies' core intangible resources with SCA potential allows firms to define appropriate corporate strategies that offer them the best economic returns. The paper contributes to the previous literature as it highlights the existence of intangible resources within the population of firms with common characteristics, which favourably distinguish superior firms from less successful one. In general, the findings of the study evinced different profiles in the core intangible resources of high- and low-performance firms contributing to the theoretical insights of the resource-based view of the firm. A comparative analysis, which shows the resource differential between the studied firms, is one of the learning experiences in organization science and strategic management.

The structure of the paper is as follows. The study begins with brief presentation of IC definitions and its classifications. The next section introduces RBV of the firm as the basis for hypothesis development. Given the high importance of core intangible resources in their contribution to superior performance by development of strategic capabilities and creation of sustainable competitive advantages, the resource profile of Slovenian superior companies is examined and compared to less successful firms. Discussion and conclusion are presented in final section.

1. INTANGIBLE RESOURCES AND THEIR ROLE IN IMPROVING BUSINESS PERFORMANCE

1.1. What is intangible resource and where it comes from - definition and the origins of IC

The Kaufmann and Schneider (2004) and Choong (2008) reviewed main definitions of IC and intangibles in general, and pointed to the use of different terms by different scholars from different economic fields, which refer to the same subject. Invisible assets (Itami, 1991), intellectual capital (Brooking, 1997; Stewart, 1997), immaterial capital (Sveiby, 1997), intangibles (Lev, 2001) are the most recurrent terms, with intangible assets being the most often used term by accountants and accounting standards. Today the term IC is usually used in management and legal literature, intangible asset in accounting literature field, while the term knowledge asset by economists. The difference exists mainly in different perspective adopted referring to the immateriality of IC elements, their "invisibility", their relation to knowledge and/or information, and to the role of intangibles as generative resources (Moldaschl and Fischer, 2004).

Finally, due to different viewpoints of various interest groups different approaches on IC classification exist and consequently different ways of categorisation and different lists of intangibles are offered. A three-categorization model of Edvinsson and Malone (1997) is often presented where IC is identified at the level of individuals, the organizational level and the level of relationship that the firm has with its suppliers, customers and other stakeholders in general (Marzo, 2013)⁵. Beside Edvinsson and Malone's classification commonly known as pioneering one is also classification of Sveiby (1997), who divided IC competences into internal capital (patents, concepts, computer and administrative systems) and external capital (customer segmentation, market growth, efficiency and stability).

What seems to be shared by all authors is that IC is non-tangible (and non-financial) asset based on the knowledge, which span human, intra-organizational and inter-organizational level of the firm. In our study we will refer to the definition of Turk (2000) who defines IC as firms' knowledge included in its operations; it could be capitalized or not (like intellectual property); it impacts firms' operating profit and its value; and it exists as human, relational and organizational capital. In his definition Turk also follows the Edvinsson and Malone's IC classification where human capital is defined as combined knowledge, skill, innovativeness and ability of employees to meet the task at hand; organizational (structural) capital refers to organizational capability that supports employee's productivity like hardware, software, databases, organizational structure, patents, trademarks; and relational (customer) capital consists of relationships developed with the key customers (Bronzetti, Mazzotta, Puntillo, Silvestri and Veltri, 2011). In the study we will use IC term interchangeably with the term intangible assets or intangible capital.

1.2. IC elements and their contribution to organizational efficiency

Due to the IC role in reduction of companies operating costs we provide description of individual IC elements and their contribution to organizational efficiency.

Human capital is considered the most important resource of the company especially in relation to firm's future value creation (Gadau, 2012). It is also a foundation of IC and the basic element in performing other functions of IC (Chen, Zhu and Xie, 2004). Several authors suggested that in order to effectively generate and derive benefits from intangible capital a firm has to possess high quality human resources (Galor and Moav, 2004), which represent the collection of employees' skills and abilities (Bontis and Fitz-enz, 2002) that can be leveraged to further extend intangible asset base of the firm (Arrighetti, Landini and Lasagni, 2014).

⁵ Due to different approaches in IC measurement accountant tried to establish accounting standards to provide stakeholders with a more comprehensive picture of firms' IC expressed in terms of traditional monetary data (Petty and Guthrie, 2000). Therefore, accounting literature uses classification of intellectual capital into four categories of assets (Gadau, 2012): market assets, substructure assets, assets as intellectual property, human values. Intangibles can be also classified according to the degree of how difficult is to establish ownership or control rights over intangible assets (Blair and Wallman, 2000).

Basically human capital refers to individual abilities, know-how, skills, expertise, experience, and leadership abilities of employees and managers which increase their professional qualification and contribution to the firm (Edvinsson and Malone, 1997; Fernandez, Montes and Vazquez, 2000). Together with teamwork and learning capacity, loyalty, training and education, these attributes comprise employees' competences (Chen et al., 2004); whereas employees' attitude includes the motivation of the employees for the work and satisfaction from work (Sydler et al., 2014; Inkinen, 2015). Creativity of employees enables them to be innovative and is one of the most important factors in developing IC of the firm (Chen et al., 2004). The competences, attitude and creativity of employees can result in outstanding products and in improvement of production efficiency. Employees' competences are transformed into capital through HRM practices like annual performance appraisals, work-life balance programs or health improvement programs, which can effect and enhance not only organizational performance (e.g. productivity, quality and innovation) of the firm but also social performance in terms of lower employee turnover and absenteeism or an increase of job satisfaction (Abhayawansa and Abeyssekera, 2008).

Human capital is people dependent knowledge which is not a property of the firm. Thus it is very important for the company to establish and to enforce the relationship with its workers in order to keep this value within the company (Bronzetti et al., 2011). In this respect knowledge transfer among employees is important factor of knowledge keeping within the firm⁶.

Organizational (structural) capital, also called internal capital, refers mainly to the internal organization that supports human capital to perform and create value or wealth for the firm (Edvinsson and Malone, 1997; Sveiby, 1997; Bollen, Vergauwen and Schnieders, 2005). It represents the human capital substructure (Gadau, 2012) and could also be defined as human resource supportive infrastructure (Benevene and Cortini, 2010) as it allows efficient operation of a firm, which helps adaptation to novel situations (Youndt and Snell, 2004).

It is people independent intangible resource that remains when employees leave the company. Thus, one of its functions is to reduce firm's dependence on a particular individual or group of individuals, and easing incorporation and coordination of new employees (Fernandez et al., 2000). It includes corporate culture, policies, distribution networks, and other "organisational capabilities" developed to meet requirements of the market, such as patents, trademarks, licences, quality and improvement processes, organizational processes, IT systems, or R&D activities that have been or will be implemented in order to improve the effectiveness and profitability of the firm (Dzinkowski, 2000; Moon and Kym, 2006; St-Pierre and Audet, 2011; Sydler et al., 2014).

⁶ Fernandez, Montes and Vazquez, (2000) offer some of possible solutions how to keep knowledge of individual employees within the firm by limiting the freedom of personel movement for a certain period of time in case that worker received a specialized training needed for specific job performance or rewarding the employees for the remaining in the firm in the form of compensations for long service to the firm or high pensions which the employees lose in case that they leave the firm.

Among others, database of clients, suppliers and competitors also provides competitive advantage as it is important information source which reflects firms' internal structure of relations.

Most of organizational knowledge is not formally written in any of companies' documents but resides in organizational routines, principles and values that make up firm's corporate culture, which is a product of employees' interaction and collective learning - assets that enable productivity and enhance human capital (Fernandez et al., 2000). Organizational capital is supporting infrastructure of human and relational capital in their contribution to firm performance since it enables creative and innovative activities within the firm (Bozbura, 2004). Together with human capital organizational capital enables companies to generate and utilize relational capital in a coordinated way (Chen et al., 2004).

Relational (customer) capital, also called external capital, represents ability of the firm to relate with various stakeholders, such as customers, suppliers, investors, members of the community, society, and the knowledge embedded in and derived from these relationships (Canibano, Garcia-Ayuso, and Sanchez, 2000; Grasenick and Low, 2004; Green and Ryan, 2005; Abdullah and Sofian, 2012). It includes the perceptions of external stakeholders of the firm itself, such as corporate image, brand recognition, and similar (Przysuski, Lalapet and Swaneveld, 2004).

Relational capital not only that incorporates the network of relations with its stakeholders but it also integrates potential assets obtained through these networks (Burt, 1992; Wang, Yen and Liu, 2014) such as: customer and brand loyalties (Park and Luo, 2001), access to quality raw materials, better service, faster and more reliable suppliers' delivery (Peng and Luo, 2000), reduced possibility of opportunistic behaviour of business partners (Pisano, 1989), and development of new knowledge and competences with greater exchange of information, skills and know-how (Walker, Kogut and Shan, 1997; Kale, Singh and Perlmutter, 2000) due to enhanced evolution of partner's relationships (Gulati, 1995). Cooperation with customers, suppliers and competitors not only provide the access to their knowledge and resources but also enables the sharing of risks and provides necessary flexibility needed in changing environment (Fernandez et al., 2000). A good relationship with company's stakeholders implies improvement in firm's trust and reputation and consequently an increase of relational capital (Bronzetti et al., 2011).

Relational capital facilitates cooperation among team members and shapes collective actions (Chua, Lim, Soh, and Sia, 2012). Therefore, it can help employees to collaborate with others, leading to better individual performance. The higher level of relational capital induces better planning and problem solving, enhances customer benefits by better identification and satisfaction of their needs, which in turn increases production and efficiency of service delivery and thus reduces organizational costs (Youndt and Snell, 2004; Kijek and Kijek, 2008). Relational capital is among all components of IC the most directly related to firm's performance but cannot be developed without the support of human and structural capital (Chen et al., 2004).

Therefore, intangible capital is the knowledge of the firm embedded in the skills and experience of its employees, its policies, procedures and routines, and its relationships with its customers, suppliers, and other stakeholders of the firm (Bharadwaj, 2000; Grant, 1996).

2. RESEARCH ANALYSIS

2.1. Literature review and hypothesis development

Resource based theory (Barney, 1991) and competence-based theory (Hamel and Prahalad, 1990) recognize the resources and competences as a source of competitive advantage of the firm (Bowman and Toms, 2010; Bronzzeti et al., 2011). In order to be the source of sustainable competitive advantage resources must be rare, unique, inimitable, durable, idiosyncratic, and non-substitutable, i.e. not easily replaceable by another resource (Peng, 2001; Fahy, 2002). Such resources are considered to be core or strategic as they distinguish a firm from a strategic point of view (Leonard-Barton, 1992). Since intangible capital is the only source that fulfil all conditions required to be considered the source of firms' sustainable competitive advantage (Sanchez, Chaminade and Olea, 2000), many authors used RBV in analysing firms' intangible capital (e.g. Fernandez et al., 2000; Sveiby, 2001; Riahi-Belkaoui, 2003; Herremans and Isaac, 2004; Marr, Schiuma and Neely, 2004; Reed, Lubatkin and Srinivasan, 2006).

In general, development of firms' intangible capital is closely linked to the firm's history (path-dependency) and causal ambiguity (making it hard for other firms to imitate or to recreate due to unique historical evolution of each company). Many of firms' intangible resources are externalities derived from their activities (Arrow, 1974). Due to their complex relations of complementarity and causal connections among intangibles themselves and among intangibles and other resources of the firm, intangible resources are hard to understand and replicate. Thus availability of intangible resources in organized market is lowered precisely because of their co-specialization with other resources of the firm, which reduces their value outside the firm and impedes the knowledge of its individual creation (Grant, 1991). The more numerous and more complex these connections are, harder it is to understand and imitate intangible resources of the firm (Reed and DeFillippi, 1990; Fernandez et al., 2000)⁷. This idiosyncratic character of intangible resources makes them an important factor of firms' differentiation.

Compared to tangible assets intangibles contribute significantly more to firm's success (Galbreath, 2005) as they have more potential for creation of firm's sustainable competitive advantage and to enable the firm to sustain higher levels of profit (Bowmana and Toms,

⁷ Among the reasons why resorces and competences might be difficult to imitate we can find: complexity of core competences because of the ability of company to internaly and externaly link activities and processes in such a way that they deliver value to the customer; path dependency of competence development, which are culturally embedded; causal ambiguity where competitors cannot comprehend the significance of firm's characteristics that may be based on tacit knowledge or the linkage of processes and activities that create core competences (Foundations of strategic capability, 2015).

2010). From the perspective of RBV, sustainable competitive advantage of the firm depends on the exploitation of relationships between different complementary intangible resources that generate value synergies (Powell and Dent-Micallef, 1997). The synergy effect is obtained with the use of intangible resources that are accumulated in one part of the firm and are simultaneously used in other parts without additional expense or at low cost. This simultaneous use of intangibles is possible due to their knowledge nature, which enables synergies: it can be used at the same time in different forms, it doesn't deteriorate with the use but its value increases with the use as opposed to tangible material resources which depreciate with the use, and it is possible to obtain even more knowledge with the combination of its parts. Because of their capability to generate synergies, the possession of intangible resources is of great importance for firms' growth (Fernandez et al., 2000). Companies that are able to generate superior core resources may be capable to use them in order to develop sustainable competitive advantages of the firm (Srivastava et al., 1998; Lippman and Rumelt, 2003).

Hamel and Prahalad (1990) argue that superiority of better performing companies over their competitors stems from their core competences and the way they are deployed, which implies that firms possess different profiles of resources (Carmeli, 2001). Intangible resources decisively contribute to the heterogeneity of resources with their unique characteristics (lasting, specialised and non-marketable) and superiority (scarce and difficult to imitate). They may exist at different levels within the firm: employees, teams, functions, processes, or the organization as a whole (Villalonga, 2004). Type, nature and magnitude of these resources determine a company's profitability (Amit and Schoemaker, 1993). Thus, in explaining why some firms are more competitive and perform better than others resource based theorists (Wernerfelt, 1984; Barney, 1991; Grant, 1991; Peteraf, 1993; Amit and Schoemaker, 1993; Collis, 1994) emphasize the role of internal, firm-specific factors and their effect on performance.

Many authors investigated link between *different measures of performance and intangible capital* like: sales (Lev, Radhakrishnan and Zhang, 2009), return on equity (Appuhami, 2007), sales variation, productivity and return on assets (St-Pierre and Audet, 2011), cash flows (Herremans, Isaac and Bays, 2008), business profitability and productivity (Kamath, 2008), efficiency and the net value added over total asset (Riahi-Belkaoui, 2003). Authors often show significant contribution of intangible capital to firms' market value (Sougiannis, 1994; Lev and Sougiannis, 1996; Al-Horani, Pope and Stark, 2003; Eberhart, Maxwell and Siddique, 2004; Hall, Jaffe and Trajtenberg, 2005; Greenhalgh and Rogers, 2006; Anagnostopoulou and Levis, 2008; Sandner and Block, 2011). Some authors also found a positive contribution of intangible capital to both firm- and industry-level productivity (Oliner, Sichel and Stiroh, 2007; and O'Mahony and Vecchi, 2009; Marrocu, Paci and Pontis, 2012). Carmeli and Tishler (2004) and Riahi-Belkaoui (2003) showed the positive relationship between intangible capital and firm's future performance. St-Pierre and Audet (2011) listed some of the studies where we can find a positive relationship between intangible capital and firm performance as well as between the growth rate of intangible capital and firm performance (Cohen and Kaimenakis, 2007; Tan, Plowman and Hancock, 2007; and Tovstiga and Tulugurova, 2009).

Some authors investigated relationship between *firm's performance and certain type of intangible capital* finding significant positive correlation between: human capital and profitability and productivity of firms (Kamath, 2008), human and organizational capital and investors' capital gains on shares (Appuhami, 2007), organizational and relational capital and firm performance, reflected through reduction of operational costs and new product development (Bontis, 1998; Bontis, Keow and Richardson, 2000). Others showed significant positive correlation between firm performance and certain elements of organizational and relational capital like: R&D and innovation (Capon, Farley and Hoenig, 1990; Lev and Sougiannis, 1996; Deng, Lev and Narin, 1999), advertising (Chan, Lakonishok and Sougiannis, 2001), customer satisfaction (Luo, 2007; Aksoy, Cooil, Groening, Keiningham and Yalcin, 2008) and companies' image (Deephhouse, 2000; Roberts and Dowling, 2002).

But authors also showed that no single intangible capital can create value on its own (Gupta and Roos, 2001) but the *combination and interaction between different types of intangible capital* is the one that yields a sustainable competitive advantage and enhance firm performance (Chen, Cheng and Hwang, 2005; Fernstrom, 2005; Cohen and Kaimenakis, 2007; Inkinen, 2015). Hence, Nazari (2010) revealed that human capital is significantly associated with organizational capital and positively influences firm's performance. Other authors showed that human capital has positive influence on relational capital, whereas both components in turn influence organizational capital (Bontis et al., 2000; Chen et al., 2004). Another study by Hsu and Fang (2009) provided evidence that combined effect of human and relational capital improves organizational learning and new product development performance. Huang and Hsueh (2007) found that interaction of human and relational capital, especially employees' training, has a strong impact on firm performance. Later on Inkinen (2015) confirmed that employees, the organisational supporting structures or the established relations that the firms possess has only little value separately but combined they represent a strong performance driver. Other studies also documented the support of human capital to other dimensions of intangible capital which in turn directly influence firm performance (Cabrita and Bontis, 2008; Kim, Kim, Park, Lee and Jee, 2012). Wang and Chang (2005) observed that the influence of human capital on performance is indirect as it influences innovation capital, process capital and customer capital, which in turn are the main determinants of firm performance.

In accordance with the resource based view of the firm and above stated empirical arguments concerning the relationship between different dimensions of intangible capital and firm performance we believe that better performing companies possess more beneficial intangible resources that help them to be more competitive and to perform better than others. Thus, we hypothesize that better performing companies possess higher share of human, relational and organizational capital.

H1: Better performing companies possess higher share of human capital.

H2: Better performing companies possess higher share of relational capital.

H2: Better performing companies possess higher share of organizational capital.

2.2. Methodology and data

In our research we have focused on larger Slovenian manufacturing firms with more than 100 employees due to the lack of record keeping regarding some of intangible assets in smaller Slovenian firms since they do not have established organizational structure to collect these data. Therefore, in many cases smaller companies could not provide requested data. In contrast to smaller companies, large firms are more capable to exploit economies of scale in intangible asset accumulation, can be more effective in protection of their intangible assets and thus have a greater incentive to invest. They are also more capable to support the uncertainty related with investment in intangible asset compared to small firms (Arrighetti et al., 2014). In addition, large firms are also more inclined to a more thorough disclosure of information on intangible assets (Bozzolan, Favotto, and Ricceri, 2003).

The surveyed companies run businesses in different industries. As the resource-based theory is concerned with resource-based advantages rather than monopoly-based the use of a sample with a variety of industries is appropriate (Fahy, 2002).

Primary data were collected within the basic research project »Analysis of firm-level investment in tangible and intangible capital from the perspective of future competitive advantages of Slovene firms, code J5-4169«. To collect data on various resource constructs we used questionnaires, which focus on broader classification of intangibles and address different aspects of intangibles (HRM, interest groups in the company, information technology, innovation, relational capital, branding and brand capital)⁸. Instead of investigating single aspects, we used a comprehensive framework covering different aspects of intangible capital in order to capture the entire intangible capital structure of the firm and to provide better understanding of its “immaterial” parts by investigating their relative importance. The respondents were asked to evaluate different intangible resources by answering the set of “yes/no” questions, where each set covers one field of study. Affirmative answers to the questions reflect increased complexity of specific category and the tendency of a firm to achieve higher level of productivity. In the questionnaires we used cascade type of questions based on the work of Miyagawa et al. (2010). The use of cascade technique ensured data quality and reliability. Questionnaires comprised also some Likert scale questions using a 1 to 4 scale. In the questionnaires we also included some standard questions asking for specific piece of information like market share, number of competitors, patents, sales, expenditure for employees’ training, IT, R&D activities, and marketing activities. With the following questionnaires we identified the type of intangible resources that companies possess as well as the processes run in the companies:

⁸ Project was performed at the Faculty of Economics University of Ljubljana in the period from 2011 to 2014, by the research group led by prof. dr. Janez Prašnikar and financed by the Slovenian Research Agency. Authors of individual questionnaires are: associate professor dr. Tjaša Redek for R&D capital, assistant professor dr. Matjaž Koman and mag. Gordana Lalović for the field of relational and IT capital, associate professor dr. Nada Zupan and teaching assistant dr. Daša Farčnik for HRM capital, full professors dr. Janez Prašnikar and dr. Damjan Voje for social capital, full professor dr. Vesna Žabkar for the field of marketing. Results of the study are published in the book edited by prof. dr. Janez Prašnikar with the title *The role of intangible assets in exiting the crisis* (2010).

- HRM questionnaire focused on different aspects of human capital, like: training and transfer of knowledge within an organization; HRM practices like performance feedback, programs for work-life balance, employee health improvement programs, employee motivation and satisfaction; and organizational flexibility in respect to teamwork, process of continuous improvements, internal communication of employees and implementation of new business practices and methods.
- With the social capital questionnaire we investigated ownership structure of the firms as well as the process of negotiations between managers and employees in terms of their bargaining power, the role of unions within the process along with the employees' participation in decision making, risk and profit sharing.
- With IT questionnaire we measured different IT dimensions, from investment in and development of IT system, its use for customers' central database, sales analysis, or sales projections, and the role of informatics in current activities, business reorganization, or for achieving competitive advantage.
- With R&D questionnaire we focused primarily on: R&D activity in companies, characteristics of product and process innovation, and company competences and capabilities relative to competition.
- Marketing questionnaire investigated the level of development of brand management based on the existence of three aspects: brand development, brand measurement, and brand investments.
- We measured relational capital using a questionnaire that focus on firm's customers, competitors and suppliers, analysing different dimensions of relational capital like: relationship with customers and suppliers, their impact on business decisions and product development, monitoring of customers and acquiring new one as well as acquiring information on competitors and their influence on business operations.

Based on the review of the literature we defined categories of intangibles according to Edvinsson and Malone's categorisation of organizational, relational and human capital with related intangible items that are most frequently discussed in literature and investigated within respective questionnaires. Therefore, in the **HRM capital category** we included intangible constructs, like: employees' co-operation and teamwork capacity, knowledge transfer, system for employees' motivation, HRM practices, like: annual performance appraisals, work-life balance, health and occupation programmes. We included union activity within the human capital category as it is reflection of employees' relations. **Organizational capital category** comprises intangible constructs: corporate culture, board and ownership structure, customer/supplier support, R&D activities, quality and improvement process, patents. **Relational capital category** consists of next intangible constructs: corporate image, brand recognition, brand value, new customers, customers' loyalty and long-term relationship with customers, their impact on product development and business decisions, customers' grievances, customers' share of sales, suppliers'

relationship and their influence on product development, competition and competitors' influence on business decisions. We also examined investment of Slovenian companies in human resource management (HRM), marketing activities, information technology (IT) and research and development (R&D) as investment in these areas is considered to be most important for companies to increase their intellectual base as suggested by Youndt et al. (2004). Table 1 in Appendix shows detailed classification of intangible capital in human, organizational and relational categories with related intangible items.

We sent the questionnaires to 364 Slovenian manufacturing companies. In order to encourage companies to participate in the study, we guaranteed complete confidentiality of data. The questionnaires were answered by CEOs, marketing and sales managers as well as HRM managers who were able to adequately assess the firm's resource base with respect to its performance. All participants held high-level managerial positions, thus the potential for significant data biases was diminished.

We received 102 questionnaires, a response rate of 28 per cent. In the research study we included 93 manufacturing companies that had fulfilled most of the questionnaires on different type of intangible capital. Hierarchical cluster analysis excluded 5 companies as potential outliers, so our results are based on 88 companies. Twenty six firms were identified as high performing companies based on their financial indicators, while sixty two of them as low performing companies. Secondary data was retrieved from annual financial reports for a year 2009, composed by The Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES).

2.3. Results and discussion

2.3.1. Firm performance and intangible core resources of the companies

Literature review indicates that there is no widely accepted consensus about definition, dimensionality and measurement of the firm performance concept. Many studies measure firm performance with a single indicator representing this concept as unidimensional (Glick, Washburn and Miller, 2005). Others suggest that in case of several dimensions, those most relevant to the research should be chosen (Richard, Devinney, Yip and Johnson, 2009). Thus, we measured firm performance based on accounting information contained in financial statements. In order to define high performing companies we used performance indicators useful in predicting the capacity of the firm to generate profit, productivity and growth from the use of its current resources. We measured profitability by using ROA, ROE, EBIT, and EBITDA financial indicators. Since size of the company and profitability are interdependent, we used sales indicators as a measure of size most closely related to profitability and growth while we used value added per employee as a measure of productivity. These indicators have been identified also as factors for which empirical studies found to be important drivers of firm's disclosure policy⁹. A widely held

9 See Alsaeed (2006) for an extensive summary of studies examining relationship between information

view is that indebted firms have an incentive to voluntarily increase the level of corporate disclosure in order to fulfil information needs of investors (Al-Shammari, 2007; Alsaeed, 2006). Therefore, we also included other measures of financial performance like indicators of indebtedness and liquidity.

Size of a company is a trait that is related to the tendency of firm to invest in intangible assets (Arrighetti et al., 2014) and to disclose information on intangible investments. In our analysis company size was measured by total assets, as has been done in other studies on voluntary disclosure (Depoers, 2000; Ho and Wong, 2001). Additionally, we used a measure of company's size with respect to the number of employees. Therefore, we divided companies into 5 groups: size 1 (from 0 to 50), size 2 (from 50 to 250), size 3 (from 250 to 500), size 4 (from 500 to 1000), size 5 (above 1000). Therefore, the full set of performance measures that we used is: ROA, ROE, EBIT, EBITDA, value added per employee, ROS, sales growth, sales profit, leverage, net debt, liquidity, size with respect to total assets and to employees' number.

To identify high performing companies, we performed an agglomerative hierarchical cluster analysis in SPSS 15. In order to identify eventual outliers we first used hierarchical cluster analysis with nearest neighbour method. After excluding identified outliers we used two step cluster analysis for classification of firms into groups based on their financial indicators calculated from firms' accounting data. We used t-test to find differences between groups.

The cluster analysis revealed two distinct clusters of companies with different performance indicators. The differences between the groups of firms are statistically significant at 5% level (t-test). Compared to companies in cluster 2 (low performing companies), companies in cluster 1 (high performing companies) are characterised as being more successful as they show better performance based on identified financial indicators. Results presented in Table 1 show that high performing companies are bigger regarding the size of total assets and characterized by negative debt, high profitability and productivity, with better operational efficiency and growth potential¹⁰. Sales growth, liquidity and size of the company regarding the number of employees are not of significant difference¹¹.

disclosure and performance.

10 For more accurate explanation of financial indicators it would be needed to compare them over time in order to see their trend, and compare them to other companies in the industry.

11 We also performed cluster analysis based only on financial indicators (EBIT, EBITDA, TOTAL ASSETS, and ROE) and got very similar results.

Table 1: *Clusters of companies based on identified financial indicators*

Financial indicators	Cluster 1 (n=26) High performing companies		Cluster 2 (n=62) Low performing companies		P-value
	mean	SD	mean	SD	
ROA	0.05	0,038	0.02	0.020	0.000
ROE	0.07	0.062	0.02	0.067	0.002
EBIT	3,299,936	3,055,350	329,891	436,864	0.000
EBITDA	7,622,810	6,210,806	2,063,429	1,610,871	0.000
VALUE ADDED PER EMPLOYEE	98,901	138,160	28,228	20,208	0.000
ROS (%)	7.42	11,13	0.98	1.719	0.000
SALES GROWTH (%)	-18.69	14.74	-18.53	22.98	0.974
SALES PROFIT	77,420,077	75,988,908	31,536,585	24,025,388	0.000
LEVERAGE	0.38	0.193	0.57	0.206	0.000
NETO DEBT	-0.10	0.268	0.17	0.262	0.000
LIQUIDITY	1.92	2.05	1.36	0.84	0.075
SIZE WITH RESPECT TO TOTAL ASSET	115,985,341	124,535,457	36,659,710	33,321,828	0.000
SIZE WITH RESPECT TO EMPLOYEES' NUMBER	2,65	1,093	3,00	1,215	0.213

Note. SD stands for Standard Deviation.

Source: AJPES (2015) and own calculations.

2.3.2. *Companies' characteristics by company clusters and type of intangible capital*

To reveal the difference between the groups of companies regarding their internal organizational characteristics and corresponding share of intangible capital we applied questions from the questionnaires on identified clusters of firms. For each of the two clusters, mean values or the share of positive answers to each individual question and standard deviations are provided with data on the statistical significance of differences between the clusters. Results presented in Table A1 in Appendix show that in most cases the share of intangible capital is higher for high performing companies.

When we explore these two groups in more detail we found significant differences regarding their internal organizational characteristics mainly with respect to the level of investment in human and relational capital, which is higher for high performing firms. In relation to human capital most of differences occur regarding the perceptions about training and knowledge transfer, teamwork and implementation of some HRM practices, which are all elements associated with better performance (Capelli and Neumark, 2001; Siebers

et al., 2008; Bloom and Van Reenen, 2010). As regards relational capital of firms, high performing companies have more developed CRM and brand management capabilities¹² as well as corporate image, which also contribute to better firm performance according to previous research evidence (Srivastava et al., 1998; Sulait, 2007; Morgan, Slotegraaf, and Vorhies, 2009). High performing companies also invest more in IT maintenance, which enables the creation of knowledge and its better utilization (Youndt, Subramaniam and Snell, 2004). Below we report and discuss mainly the results which are statistically significant between two clusters.

2.3.2.1. *Human capital*

The statistically significant results for two clusters with respect to human capital are presented in Table 2, which shows that the group of high performing companies possesses higher share of human capital primarily in terms of developing of employees' core competences like teamwork skills and employees' abilities to share their knowledge with others, as well as in terms of employing HRM practices, which transfer employees' competences into capital.

Within the group of high performing companies *teamwork*, is considered to be a common form of employee cooperation on different levels of organization. All of more successful companies state that there is a great need for employees to work in work groups and in different teams in individual department while majority of them (84.6 percent) claims that there is a strong presence of forming interdepartmental teams reflecting increased organizational flexibility. This is in line with the research done in Slovenia by Zupan, Farčnik, Fišer, Kodarin and Valenčič (2010) who found a significant correlation between organizational flexibility¹³ and productivity of 66 Slovenian manufacturing companies. In addition, the result is in line with other studies showing the importance of employee co-operation and department integration for development of intangible capital (Nahapiet and Goshal, 1998; Van den Bossche et al., 2006; Wang et al., 2014) and in prevention of its loss in case that employee leaves the company. This is achieved with the transformation of individual knowledge into shared cognition and "know-how" embodied within the team (Fernandez et al., 2000; Wang et al., 2014). Important factor of knowledge keeping within the firm in majority of high performing companies (71.4 percent versus 24.3 percent of low performers) is also *knowledge transfer*, which high performing companies systematically promote among their employees as they believe they would have no problem finding skilled replacement in case of employee departure. Teamwork and

12 Brand management capabilities concern the processes and activities that enable a firm to develop, support, and maintain strong brands (Aaker, 1994; Hulland, Wade and Antia, 2007) while CRM capabilities underlie a firm's ability to create and manage close and strong relationships with customers (Rust, Ambler, Carpenter, Kumar and Srivastava, 2004).

13 measured as a sum of scores for qualitative questions regarding teamwork, organizational change implementation, process of continuous improvements, specificity of job descriptions, internal communication, informal means of communication, flexibility as a company value, and implementation of new business practices and methods

department integration contribute not only to increased productivity and performance (Maranno and Haskel, 2006; Boning, Ichniowski and Shaw, 2007; Bloom and Van Reenen, 2010; Berg, Appelbaum, Bailey and Kalleberg, 2000; Dunlop and Weil, 2000; Hamilton, Nickerson, and Owan, 2003; Bartel, 2004) but also to increased disclosure of information and building loyalty to the firm (Starbuck, 1992).

Majority of more successful firms employ a range of *HRM practices like* annual performance appraisals, work-life balance programs and health improvement programs. They are using annual performance appraisals to provide employees with targeted feedback on their past performance and guidance to the achievement of work-related objectives, which facilitate employee learning and development (78.5 percent) and lead to higher operating performances (Forzza and Salvador, 2000). Special programs and policies aimed at improvement of work-life balance of employees (38.4 percent) and health improvement (76.9 percent) can increase job satisfaction and employees' commitment to the company leading to increased productivity and reduction in absenteeism, presenteeism and employee turnover (Center for organizational excellence of American psychological Association, 2015). A multidisciplinary literature review on the relationship between HRM practices and performance reveals that studies predominantly reported positive effect of individual HRM practices on performance or productivity (Siebers et al., 2008; Bloom and Van Reenen, 2010).

In relation to human capital, group of low performing companies significantly differ from high performing companies regarding employees' organization in unions. Our results show that higher degree of employees in less successful firms (74.5%) is organized in unions¹⁴. This result is in line with the view that organizing employees in unions could lead to decreased productivity because of misallocation of work, restrictive work practices, the threat of adversarial industrial relations, which lowers trust and cooperation and causes the firm to invest less (Metcalf, 2002; Ehrenberg and Smith, 2012)¹⁵.

High performing companies also invest more in human capital by providing employee training, which is confirmed by their significantly higher yearly costs of training per employee (in average 135.971 EUR compared to 46.484 EUR of low performing group of companies). According to results of Koch and McGrath's research (1996) firms that systematically train and develop their workers are more likely to enjoy the rewards of a more productive workforce than those that do not. As shown by Nerdrum and Erikson (2001) investment in education and training increases professional skills and competences of employees, which results in better individual and organizational performance and leads to higher performance rates and human and organizational capital increase (Youndt et al., 2004).

14 Similar result is obtained in the study done by Prašnikar, Voje, Dolžan Lesjak, Gjibexhi and Raičević (2010), which show that mainly less productive companies have employees organized in one union.

15 Literature provide also an alternative view, which states that organized unions could increase productivity because employees are more satisfied as they have bigger role in decision making process, higher wage and are more eager to work (Voje, 2010). Unions may play a monitoring role on behalf of employer, make managers less lethargic and stop exploitation of labour (Metcalf, 2003).

Table 2: *The share of human capital in high and low performing Slovenian manufacturing companies*

HUMAN CAPITAL	Cluster 1 (26)			Cluster 2 (62)			Sign.
	N	* share of companies in %	SD	N	* share of companies in %	SD	
1. TEAMWORK							
Cooperation in different teams in individual department (not exclusively performing tasks in the same workplace) is a common form of employees' operation.	26	100	0.000	59	69.4	0.464	0.001
There is a strong presence of employees' cooperation between different departments and forming of interdepartmental teams.	26	84.6	0.368	59	61.0	0.492	0.031
2. KNOWLEDGE TRANSFER							
Successors for most of key employees exist.	14	71.4	0.469	41	24.3	0.435	0.001
3. HRM PRACTICES:							
3.1. ANNUAL PERFORMANCE APPRAISALS							
Annual performance-review meetings are conducted effectively and thus significantly contribute to improved performance.	14	78.5	0.426	41	39.0	0.494	0.010
3.2. WORK-LIFE BALANCE							
Special programs aimed at improving work-life balance of employees exist in the company.	13	38.4	0.506	40	12.5	0.335	0.038
3.3. HEALTH AND OCCUPATION PROGRAMMS							
Special programs for improving employee health (other than those required by law) exist in the company.	13	76.9	0.439	41	46.3	0.505	0.055
4. UNION ACTIVITY							
Exactly one union organization exists in the firm.	26	50.0	0.510	59	74.5	0.439	0.026
* In the table we replaced mean values of binary data by the share of companies as an incidence of a specific intangible capital aspect/practice.							
	N	mean	SD	N	mean	SD	Sign.
5. INVESTMENT IN EMPLOYEE TRAINING							
Total costs for employees' training per year in EUR.	6	135.971	159.910	25	46.484	40.712	0.015

Source: FELU (2011-2014) and own calculations.

2.3.2.2. Organizational capital

Groups of firms significantly differ regarding their ownership structure (see Table 3). On average, higher share of firms within the group of high performing companies (34.6 percent) are firms with foreign ownership. This result is in line with a range of international studies which show that firms with foreign ownership perform better than domestic-owned firms (Doms and Jensen, 1995; Chhibber and Majumdar, 1999; Barbosa and Louri, 2005). Superior group of companies also invest more in IT maintenance, salaries of IT personnel or IT licence costs.

Table 3: *The share of organizational capital in high and low performing Slovenian manufacturing companies*

	Cluster 1 (26)			Cluster 2 (62)			Sign.
ORGANIZATIONAL CAPITAL	N	share of companies in %	SD	N	share of companies in %	SD	
1. OWNERSHIP STRUCTURE							
The dominant ownership share is in possession of foreign owners.	26	34.6	0.485	59	13.5	0.345	0.025
* In the table we replaced mean values of binary data by the share of companies as an incidence of a specific intangible capital aspect/practice.							
2. IT INVESTMENT	N	mean	SD	N	mean	SD	Sign.
Percentage of total IT cost not used for software or hardware investment but for other things like licence costs, IT personnel salaries, IT maintenance,...	11	30.518	27.816	37	8.307	15.895	0.001

Source: FELU (2011-2014) and own calculations.

When examining *R&D activities* in companies focusing on the characteristics of product and process innovation, even though the difference between the groups is *not statistically significant*, results show that intensity of R&D activities is higher for high performing companies as they show slightly better performance regarding introduction of new products (94% introduced new products in last five years versus 90% of low performers). Both groups gave the highest relevance to improvement of existing products as the most important type of innovation followed by introducing new product lines, expending existing product lines, repositioning and introducing globally new products. Low performing companies gave higher importance to repositioning in front of introducing new product lines. High performers gave higher loadings on importance to all of individual innovation types.

In average higher share of high performers (81% versus 73% of low performers) introduced *process innovation* in terms of production process improvement (81% versus 67%) and improvement of support services like maintenance, sales, IT, accounting and

other processes in the company (69% versus 67%)¹⁶. Though, low performers show better performance regarding average number of introduced *patents* even though the group of superior companies increases the number of introduced patents every year as well as investment in R&D in contrast to low performing companies whose *R&D investments* decreases by years. Investment in R&D is considered to be fundamental in creation of new knowledge. As shown by Youndt et al. (2004) history of greater R&D investments leads to greater capacity to absorb new knowledge, which should in turn lead to higher level of human capital. In order to protect new knowledge companies create integrated knowledge embodied in their processes, routines and products, which in turn increase the level of organizational capital.

2.3.2.3. Relational capital

Based on our results the group of high performing companies possesses higher share of relational capital in terms of the firms' ability to relate with its customers and manage their perceptions regarding brand recognition and corporate image (see Table 4).

Firms from this group appear to be more developed in terms of marketing capabilities particularly *customer relationship management capabilities*, which underlie a firm's ability to create and manage close and strong relationships with customers in order to improve long-term customers' loyalty, which directly contribute to firm performance (Srivastava et al., 1998, 2001; Morgan et al., 2009) *as well as brand management and measurement capabilities* in terms of processes and activities that enable a firm to develop, support, and maintain strong brands and corporate image. According to Žabkar, Dimitrieska, Dimitrova, and Ivanovska (2010) brand management activities are considered to contribute to companies' productivity as they proved an association between the level of brand management and the productivity level with the empirical data in the study of fifty-nine medium-sized and large manufacturing companies in Slovenia.

Our results show that 63.1 percent of high performing companies claim they have developed brand architecture (i.e. organized system of brands) while a customer loyalty program exists in 25% of more successful companies. Latter is in accordance with the study of Fernandez et al. (2000) who showed that firms with former loyal customers achieve superior results in relation to their competitors with lower unit costs and a higher market share. Our results also show that 50% of more successful companies evaluate corporate image by measuring perceptions of the company among different publics in terms of quality of management, product or service quality, innovativeness and financial position, compared to only 21% of less successful companies. This is in line with the research of many marketing scholars who emphasized the impact of reputation on firm success

16 Similar results can be found in the study done by Redek, Kopriva, Mihelič and Simič (2010) on the sample of 61 companies operating in 23 industries, which showed that companies as the most important types of innovation reported: improving existing products, introducing new product lines, expanding existing product lines, and repositioning products. Also three quarters of the studied companies improved their processes in terms of improved production processes, logistics and distribution, and supporting processes.

(Aaker, 1991; Keller, 1993; Srivastava et al., 1998, 2001). Namely by developing corporate image high performing companies also send signals about their key characteristics, future actions and behaviour. They inform external stakeholders about the firm's trustworthiness, credibility and quality (Galbreath, 2005) and shape the response of customers, suppliers and competitors (Teece, Pisano and Shuen, 1997). Schwaiger (2004) displays many positive effects of strong corporate image which helps firms in acquiring and retention of best employees and customers because of increased confidence in their products and services. Also companies with strong corporate image have better access to capital markets, which decreases capital costs and lowers procurement rates. Thus a firms' profitability increases with better reputation.

The group of high performing companies also invest significantly more in marketing activities. In average marketing investment increases with the years in contrast to low performing group whose investment in marketing activities decreases.

Table 4: *The share of relational capital in high and low performing Slovenian manufacturing companies*

RELATIONAL CAPITAL	Cluster 1 (26)			Cluster 2 (62)			Sign.
	N	share of companies in %	SD	N	share of companies in %	SD	
1. CUSTOMERS' RELATIONSHIP MANAGEMENT							
Customer loyalty program exists in the company.	4	25.0	0.500	19	0	0.000	0.025
2. BRAND MANAGEMENT							
Company has developed brand architecture (organized system of brands, e.g. monolithic/unitary, endorsed/hybrid, freestanding/diversified).	19	63.1	0.496	46	32.6	0.474	0.023
3. CORPORATE IMAGE							
Company measures perceptions of the company among different publics in terms of quality of management, product or service quality, innovativeness and financial position.	18	50.0	0.514	47	21.2	0.414	0.023
* In the table we replaced mean values of binary data by the share of companies as an incidence of a specific intangible capital aspect/practice.							
4. MARKETING EXPENDITURES	N	mean	SD	N	mean	SD	Sign.
The share of sales in 2007 set aside for activities to increase the value of brands (including external costs of advertising and marketing activities of advertising agencies, media).	17	0.046	0.072	35	0.011	0.015	0.008

The share of sales in 2008 set aside for activities to increase the value of brands (including external costs of advertising and marketing activities of advertising agencies, media).	17	0.051	0.095	37	0.010	0.014	0.012
The share of sales in 2009 set aside for activities to increase the value of brands (including external costs of advertising and marketing activities of advertising agencies, media).	16	0.055	0.097	37	0.008	0.010	0.005

Source: FELU (2011-2014) and own calculations.

Based on the answers provided in the questionnaires we can also reveal some of the firms' characteristics regarding the business environment in which group of firms operate as well as their relationship with customers and suppliers even though the difference between the groups is *not statistically significant*.

High performing companies operate in more competitive business environment since they have, on average, larger number of major competitors compared to the group of low performing companies (11 versus 6.79). Some authors stress that sharpening the competition in markets leads to the accumulation of intangible resources as firms in such environment resort to less imitable intangible assets in order to enhance their distinctive know-how and product differentiation (Petrick, Scherer, Brodzinski, Quinn and Ainina, 1999; Arrighetti et al., 2014). However, from 2008 to 2009 they faced higher increase in market share (10% versus 1% in average) with the decrease in number of competitors (for 1.33 in average).

Results imply that high performers have more developed supply-chain relational capabilities, which in turn may improve customer service and firm performance. Supply-chain relational capabilities include adoption of long-term relationship with suppliers, collaborative communication, supplier involvement in development of new product, and use of cross-functional teams, which in turn foster knowledge development and exchange, facilitate joint problem solving, promote cooperation, and reduce transaction costs (Lado, Paulraj and Chen, 2011). Regarding the relationship with suppliers we can see that both groups of companies exchange information with their suppliers. While all of high performing companies regularly visit their major suppliers this applies to 82% of low performers. Also higher share of high performing companies have relations with suppliers that influenced development of new products (83% compared to 76% of low performers).

Regarding low performing companies results show on bigger customers' impact on their business decisions. A higher share of low performing companies stated that customers directly influenced the fundamental companies' business decisions (43% compared to 33% of high performers) and dictated the choice of their suppliers (17% versus 8% among high performers). The higher share of low performers also have a long-term contract with most important customers (22% versus 17% of high performing companies) and make long-

term contracts with their new customers (43% versus 17%). Also, low performers inform top management about opinions, comments and complaints from their customers and take them into accounts when making decisions in greater extend compared to high performers (84% versus 75% respectively). These results imply that low performing companies are more customer responsive, which is mainly a characteristics of market driven companies (Barlow Hills and Shikhar, 2003), that collect information on their customers to assess their future needs but do not attempt to create or change customers' behaviour¹⁷. Similar result was also gained by Koman, Filić, Flerin, and Jurišević (2010) who confirmed that less productive companies closely monitor their customers and engage them in product development. However, our results show that higher share of high performing companies is more successful in obtaining new customers since 58% of them succeed to obtain at least 10 percent of new customers each year (versus 43% of low performers).

3. CONCLUSION

The aim of the study was to investigate how firms' human, relational and organizational capital form distinct profile of resources in order to better understand core resources (i.e., most valuable, rare, inimitable and non-substitutable) that may generate sustainable competitive advantages and lead to superior performance. Therefore, the resource profile of Slovenian better performing companies was examined and compared to low performing manufacturing companies. We also examined whether investment in human resource management (HRM), marketing activities, information technology (IT) and research and development (R&D) differs between identified resource profiles of Slovenian companies as investment in these areas is considered to be most important for companies to increase their intangible asset base as suggested by Youndt et al. (2004).

In particular, we find that relatively smaller group of superior performing companies hold significantly more intangible capital resources that provide them with the base for constructing their respective and different competitive advantages. This group of companies invest significantly more in development of human, relational and organizational capabilities in terms of employees' training, marketing activities and maintenance of IT system.

For the companies in the studied sample following core intangible resources that favourably differentiate better performing companies from lower performing companies stand out:

1. Human capital capabilities like: development of employees' co-operation and teamwork capacity with promotion of knowledge sharing, as well as employing HRM practices supported by investment in employees, which are fundamental drivers of knowledge development and development of firms' enhanced relationship with their employees in order to keep this knowledge within the company. They are all factors that increase intangible asset base and hence positively influence firm performance.

¹⁷ In contrast market-driving firms set the needs and desires of their customers and thus change their behaviour and attitudes (Narver, Slater and MacLachlan, 2000; Kumar, Scheer and Kotler, 2000).

2. Organizational capabilities like investment in IT enable companies to increase the use of their knowledge resources and enhance cooperation and knowledge sharing among employees.
3. From the resource-based view, relational capabilities like development of customer relationship management and brand management as well as corporate reputation building are recognized as important strategic assets capable for generating sustainable firm performance.

Based on this study, our findings suggest that high performing companies are strategically oriented towards development of those core capabilities and competences that are not dependent on individual employees' knowledge but are residing in the organization. Due to established working conditions that foster employees' cooperation and knowledge sharing companies enhance teamwork and increase interdependence among their employees and therefore keep the knowledge within the firm. Companies provide employees with targeted feedback and guidance to help them learn and develop. These HRM activities are considered to directly affect the level of human capital. At the same time as employees learn and increase their human capital they create organizational knowledge, which is foundation for organizational learning and knowledge accumulation. Intensive employees' training also contribute to the adoption and sharing of companies' common values, which consequently have a strong impact on development of organizational capital.

Essential in the management of firm resources is also building and maintaining a good reputation of the firm with strong brand and close relationships with customers. Better cooperation of firm's employees and closer relationship with firm's customers improves the efficiency and effectiveness of resource utilization while their interaction further extends intangible asset base of the firm due to the synergistic effect of intangible resources, which leads to greater success of the firm.

Therefore, findings of the study suggest that managers should put a considerable attention to the analysis and identification of companies' core intangible resources and their functions within the firm. This allows managers not only to concentrate their efforts on understanding firms' strengths and weaknesses and to allocate resources efficiently to those intangible assets that may translate into competences and capabilities on which the company builds its sustained competitive advantages but also to generate the synergies which are more capable of generating sustain economic rents. Thus, our results are in accordance with previous results which suggest that firms need to increase their overall level of intangible capital in order to improve firm performance (Chen et al., 2004) since companies with higher share of intangible capital are able to attain significantly better firm performance than less reach companies (Youndt et al., 2004).

In this study we investigated only individual dimensions of intangible capital but many authors suggest strong interdependence between these categories of intangible capital in creation, development and utilization of firms' knowledge. Therefore, firms should be aware that it is not sufficient only to possess a resource as intangible resources enhance firm

performance through their interaction with other resources. Since intangible resources exhibit complementarities and enhance firm performance through their interactions it is hard to empirically identify unique resources and attribute superior performance to specific assets. Therefore the exploration of these interactions between and among intangible resources and their contribution to the success of the firm is a challenge for future research.

APPENDIX
Table A1:

	Cluster 1 (26)		Cluster 2 (62)		Sign.
	N	mean	N	mean	SD
HRM CAPITAL					
EMPLOYEE TRAINING					
Organized training of employees based on identified needs of the company exists.	14	1.00	41	0.95	0.218
More than half of employees is involved in training programs annually.	14	0.43	41	0.59	0.499
We measure training effectiveness also with other methods not only conducting a survey at the end of a training program.	14	0.71	41	0.49	0.506
KNOWLEDGE TRANSFER					
Company provide regular on the job training (e.g. apprenticeship, mentorship, job rotation).	14	1.00	41	0.95	0.218
Company systematically induce knowledge transfer among employees.	14	0.93	41	0.73	0.449
Successors for most of key employees exists.	14	0.714	41	0.243	0.435
PERFORMANCE FEEDBACK					
Company provides regular performance feedback to its employees.	14	0.64	41	0.63	0.488
Annual performance-review meetings are conducted for at least key employees.	14	0.86	41	0.66	0.480
Annual performance-review meetings are conducted effectively and thus significantly contribute to improved performance.	14	0.785	41	0.390	0.494
MOTIVATION SYSTEM					
A system for promotions based on employee performance exists.	14	0.57	41	0.73	0.449
We use other forms of motivation apart from promotion and pay for performance.	14	0.71	41	0.68	0.471
System for motivation employees is developed in all organizational units.	14	0.71	41	0.63	0.488

The share of sales in 2009 set aside for activities to increase the value of brands (including external costs of advertising and marketing activities of advertising agencies, media).	16	0.055	0.097	37	0.008	0.010	0.005
	CUSTOMERS						
	NEW CUSTOMERS						
	12	1.00	0.000	37	0.92	0.277	0.319
	12	0.58	0.515	37	0.43	0.502	0.373
In the period 2006-2008, we were mainly making long-term contracts with our new customers.	12	0.17	0.389	37	0.43	0.502	0.101
In the period 2006-2008, we were monitoring the behaviour of our customers with the CRM system.	4	0.00	0.000	17	0.06	0.243	0.640
LOYALTY OF CUSTOMERS							
In the period 2006-2008, interested buyers of our products were informed via e-mail and/or other information channels.	4	0.75	0.500	19	0.74	0.452	0.959
In the period 2006-2008, interested buyers of our products were able to get access to our products through various distribution channels (Internet, catalogs ...).	4	0.75	0.500	19	0.79	0.419	0.869
Customer loyalty program exists in the company.	4	0.250	0.500	19	0.000	0.000	0.025
In the period 2006-2008, we carried out activities at all times in order to attract new customers.	4	1.00	0.000	18	0.83	0.383	0.404
In the period 2006-2008, our customer loyalty program was increasing on average at 10% (in value).	4	0.00	0.000	18	0.06	0.236	0.649
In the period 2006-2008, the majority of the new members in loyalty program were active.	4	0.00	0.000	18	0.00	0.000	-
CUSTOMERS LONGTERM RELATIONSHIP							
In the period 2006-2008, we had long-term contract with at least one of the most important customers.	12	0.92	0.289	37	0.95	0.229	0.720
In the period 2006-2008, we had long-term contract with majority of the most important customers.	12	0.58	0.515	37	0.68	0.475	0.569
In the period 2006-2008, we had long-term contract with all most important customers.	12	0.17	0.389	37	0.22	0.417	0.718

CUSTOMERS IMPACT					
In period 2006-2008, we regularly meet with our customers in order to find about their needs and to plan needed changes.	12	1.00	0.000	37	0.95 0.229 0.421
In period 2006-2008, consumer representatives of our products were engaged in the process of the development of new product	12	0.92	0.289	37	0.78 0.417 0.312
In the period 2006-2008, our customers were at least indirectly influencing the decisions in our company.	12	1.00	0.000	37	0.86 0.347 0.186
In the period 2006-2008, our customers were directly influencing the fundamental decisions in our company.	12	0.33	0.492	37	0.43 0.502 0.554
In the period 2006-2008, our customers were dictating us the choice of our suppliers.	12	0.08	0.289	36	0.17 0.378 0.489
CUSTOMERS GRIVIVENCES					
In the period 2006-2008, we collected and nalyased opinions, comments and complaints of our customers.	4	1.00	0.000	19	0.95 0.229 0.657
In the period 2006-2008, the top management was informed with opinions, comments and complaints from our customers.	4	0.75	0.500	19	0.84 0.375 0.676
In the period 2006-2008, top management was taking into accounts the opinions, comments and complaints from our customers when making decisions	4	0.75	0.500	19	0.84 0.375 0.676
CUSTOMERS SHARE OF SALES					
The share of sales (based on the value of sales through B2B) of the largest customer in 2006	9	23.411	11.066	28	27.395 22.462 0.614
The share of sales (based on the value of sales through B2B) of the largest customer in 2007	9	23.400	10.442	30	26.207 21.788 0.712
The share of sales (based on the value of sales through B2B) of the largest customer in 2008	10	21.830	11.630	32	21.835 18.928 0.999
The share of sales (based on the value of sales through B2B) of the largest customer in 2009	10	22.830	13.982	34	26.032 22.323 0.671
The share of sales (based on the value of sales through B2B) of the second largest customer in 2009	10	9.720	4.635	35	11.821 6.789 0.365
SUPPLIERS RELATIONSHIP AND THEIR INFLENCE					
In the period 2006-2006, we exchange information with our suppliers.	12	1.00	0.000	38	1.00 0.000 -
In the period 2006-2008, we regularly visited our major suppliers	12	1.00	0.000	38	0.82 0.393 0.133
In 2006-2008, relations with suppliers promote the development of new products or services in our company.	12	0.83	0.389	38	0.76 0.431 0.618

COMPETITION AND COMPETITORS INFLUENCE							
Number of major competitors in your core activities in 2009	11	11.00	16.882	28	6.79	4.003	0.217
Your market share in your core business in 2009	11	33.55	30.566	29	21.66	18.716	0.143
Market share of three largest firms in your core business in 2009	11	45.27	26.154	28	50.96	23.549	0.704
Number of major competitors in your core activities in 2006-2008	9	12.33	21.994	23	5.00	3.908	0.126
Your market share in your core business in 2006-2008	9	23.11	32.502	24	20.21	21.553	0.767
Market share of three largest firms in your core business in 2006-2008	10	51.60	26.559	22	44.64	33.842	0.571
In the period 2006-2008, the activities of our major competitors had an impact on our business.	12	0.833	0.389	36	0.805	0.401	0.835
In period 2006-2008, our company has aggressively responded to the strategic moves of our main competitors.	13	0.538	0.519	36	0.583	0.500	0.785
In the period 2006-2008, at least one company in our core business had more than 20% market share.	12	0.833	0.389	36	0.583	0.500	0.122
ORGANIZATIONAL CAPITAL							
IT INVESTMENT							
In 2009 company invested in information technology at least 1% revenue.	13	0.384	0.506	39	0.538	0.505	0.346
In 2009 company invested in information technology at least 2% revenue.	13	0.000	0.000	39	0.339	0.347	0.181
In 2009 company invested in information technology at least 3% revenue.	13	0.000	0.000	39	0.025	0.160	0.569
Percentage of revenue invested in IT in 2009.	11	1.000	0.730	36	1.120	1.015	0.724
Percentage of total IT cost used for hardware.	11	29.418	14.311	31	35.048	20.350	0.404
Percentage of total IT cost used for software.	11	39.972	25.283	31	49.764	22.991	0.244
Percentage of total IT cost used for other things like licence costs, IT personnel salaries, IT maintenance,...	11	30.518	27.816	37	8.307	15.895	0.001
CORPORATE CULTURE							
There are formally declared values of our company	13	0.69	0.480	40	0.65	0.483	0.785
Flexibility and implementing organizational change are explicitly stated as company values	13	0.54	0.519	40	0.60	0.496	0.702
Majority of employees acts in accordance with formally declared company values	13	0.54	0.519	40	0.55	0.504	0.943

BOARD AND OWNERSHIP STRUCTURE The company is privately owned. The private owner has more than 50 percent share of ownership (dominant ownership share). The dominant ownership share is in possession of foreign owners. Are the workers' representatives in your firm members of the governing bodies (for example the supervisory board and its committees) and are involved in the decision making process?	26	0.92	0.272	59	0.95	0.222	0.643
	26	0.73	0.452	59	0.73	0.448	0.985
	26	0.346	0.485	59	0.135	0.345	0.025
	26	0.50	0.510	59	0.53	0.504	0.831
CUSTOMER/SUPPLIER SUPPORT Reduced reaction time for customer or supplier demands is important (on the scale from 1 to 4).	12	2.92	0.289	40	2.83	0.501	0.550
QUALITY PROCESS Improved capability for developing new products or procedures. Improved quality of products or services. Reduced labour costs per unit. Improved communication or information exchange internally or with other companies or institutions.	13	2.538	0.660	40	2.725	0.599	0.346
	13	2.923	0.277	40	2.825	0.446	0.460
	13	2.769	0.439	40	2.750	0.494	0.901
	13	2.307	0.855	40	2.450	0.639	0.524
IMPROVEMENT PROCESS Formal continuous improvement process exists. Are there more than half of employees involved in a formal continuous improvement process. Improvement as a result of this formal process significantly contributes to company performance.	14	0.785	0.426	41	0.756	0.435	0.826
	15	0.600	0.507	41	0.536	0.505	0.679
	14	0.571	0.514	41	0.609	0.494	0.805
R&D ACTIVITIES New_products_past_years Repositioning Improving_existing_products (from 1 to 3) Extensions_of_lines (from 1 to 3) New_lines (from 1 to 3) Globally_new_products (from 1 to 3)	16	0.937	0.250	51	0.901	0.300	0.670
	16	1.358	1.164	51	2.187	0.834	0.317
	16	2.437	0.814	51	2.392	0.723	0.832
	16	2.125	1.025	51	1.921	0.717	0.377
	16	2.250	1.065	51	2.176	0.932	0.791
	16	1.000	1.211	51	1.470	1.138	0.160

Introduce_process_innovatio		16	0.81	0.403	51	0.73	0.451	0.493
Improve_production_process		16	0.81	0.403	51	0.67	0.476	0.273
Improve_logistics		16	0.44	0.512	51	0.57	0.500	0.366
Improve_support_services		16	0.69	0.479	51	0.67	0.476	0.879
PATENTS								
Patents_in_2009		16	0.812	1.905	51	0.980	2.881	0.828
Patents_in_2008		16	0.687	1.580	51	0.882	2.754	0.789
Patents_in_2007		16	0.437	1.263	51	0.803	3.816	0.708
Patents_in_2006		16	0.375	1.258	51	0.980	4.292	0.581
R&D EXPENDITURES								
In 2009 R&D expenditure amounted to at least 1% of revenue.		16	0.750	0.447	51	0.882	0.325	0.201
In 2009 R&D expenditure amounted to at least 2% of revenue.		16	0.437	0.512	51	0.588	0.497	0.297
In 2009 R&D expenditure amounted to at least 3% of revenue.		16	0.312	0.479	51	0.431	0.500	0.405
R&D expenditure in 2006.	12	9.367.021,50	27.944.155,976	32	1.544.253,69	3.397.671,200	0.581	
R&D expenditure in 2007.	13	8.506.338,23	25.457.239,856	33	1.397.582,00	3.391.118,038	0.708	
R&D expenditure in 2008.	13	9.574.801,31	29.718.841,704	34	1.370.427,15	2.789.384,922	0.789	
R&D expenditure in 2009.	14	9.771.409,93	31.481.598,431	33	1.272.009,85	2.257.518,075	0.828	

Source: FELU (2011-2014) and own calculations.

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THEORETICAL FRAMEWORK FOR THE STUDY OF INTANGIBLE INVESTMENT INTO INNOVATIVE CAPITAL IN RESOURCE LIMITED ENVIRONMENT: A CASE FOR SYNCHRONOUS INNOVATIONS?

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ABSTRACT: *Innovation intensity in firms depends on resource availability, primarily financial and human resource constraints. The paper proposes a theoretical framework for investment into innovative capital in the case of limited resources. By relying on the fragmented literature on innovation under resource constraints, the model proposes a comprehensive theoretical framework, which answers 3 questions: (1) Which innovation types are more relevant in resource limited environment and why, (2) which resources do they need and why at which stage of the innovation process, (3) what processes companies should embrace in order to kick-off the innovation activity (where should they start from), to successfully embark eventually all types of innovation, and how synchronous innovations explain the transition from one type of innovation to another.*

Key-words: *intangible capital, innovation, developing countries, resource constraints, synchronous innovations*

JEL classification: O31, O32, O33

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1. INTRODUCTION

Innovation has been long argued to be important for increasing value added, stimulating firms' progress along the value-chain, enhancing its productivity and profitability, stimulating knowledge spillover effects, and economic growth at large (Henderson & Cockburn, 1996). Innovation today also represents a major pillar of knowledge-based (OECD, 2012) intangible capital (Corrado et al., 2005; Corrado et al., 2009; van Ark et al., 2012), which can contribute up to one third of productivity growth (e.g. Corrado et al., 2009; van Ark et al., 2009; Fukao et al., 2009; Prašnikar, 2010). Empirical research shows that innovative capital and economic competencies usually represent around 80% or more of all knowledge capital (e.g. Corrado et al., 2009; van Ark et al., 2012), acknowledging their role in economic growth and in the development of the firms.

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Schumpeter (1942) defines innovation as introduction of new goods, new methods of production, the opening of new markets, the conquest of new sources of supply and carrying out of a new organization of industry. The Frascati Manual (2002) and Oslo Manual (2005) further define product innovations as significant improvements of the product with regards to technical specification, components, materials, incorporated software or other functional characteristic. Process innovations comprise significant improvements of the production process (e.g. production techniques, equipment or software, logistics, accounting, maintenance, etc.). Subtypes of market and marketing innovation include better addressing of customer's needs, opening new markets, newly positioning a firms product on the market, product design, product placement, product promotion, product pricing. Organizational innovation represent the introduction of new or significantly improved management systems, implementation of new organizational methods such as implementing of new business practices, new methods for distributing responsibilities, decision-making, new division of work, new concepts for structuring of activities and establishing new external relations, like collaboration or outsourcing (Oslo Manual, 2005).

Innovation is a multi-stage process whereby organizations transform ideas into new or improved products, services or processes, in order to advance, compete and differentiate themselves successfully in their marketplace (Baregheh, Rowley & Sambrook, 2009). Investment into innovative capital can lower costs, strengthen firms' market position (Utterback & Abernathy, 1975) and even help firms establish themselves as market leaders (Porter, 1990). Especially radical innovations are a major source of competitive advantage and long-term survival (Chandy & Tellis, 1998), while any innovative capital investment, including those that lead to incremental changes, helps firms build competitive strength and increase value added (Katilia & Shane, 2005; Nohria & Gulati, 1996).

Innovation intensity in firms depends on resource availability (Klein & Knight, 2005), which includes financial resource availability, learning orientation, management support, and positive innovation climate or general attitude towards innovation. These resources are systematically divided into several categories: financial, physical, legal, human, relational, organizational and informational resources (Hunt, 2000).

The lack of any of these resources could be an important inhibitor to innovation (Savignac, 2006; Hewitt- Dundas, 2006; Hall & Lerner, 2009), which primarily laggard firms in the developed and often (in comparative manner) the majority of firms from the developing countries face. The lack of any of these resources can also intensify the lack availability of other resources and lead to a "vicious laggard spiral". But as Steve Jobs (1998) noticed also the literature suggests that firms can (partially) overcome a lack of specific resource. For example, the lack of financial resources forces the companies to think more creatively (Amabile et al. 1996; Katilia & Shane, 2005; Bicen & Johnson, 2014), and maximize the output by a recombination of the resources those firms already possess (Fleming, 2001). Alternatively, firms can shift from primarily research to also design and development (Forbes & Wield, 2000), improve its production processes, significantly depart from the current marketing practices and introduce a new ways of organization of work. Forbes

and Wield (2000) argue that due to a lack of specific resources, the latter (and not radical product innovation) often become one of the main factors for increased firm productivity in developing countries. Similar notion is also true for laggard firms in developed economies.

This paper proposes a theoretical model for the study and promotion of innovation under the resource constraints. The model answers 3 key questions: (1) Which innovation types are more relevant in resource limited environment and why, (2) which resources do they need and why at which stage of the innovation process, (3) what process companies should embrace in order to kick-off the innovation activity (where should they start from), and successfully embark eventually all types of innovation. In short, the paper studies, how different types of innovation activity are limited due to a limited access to different types of resources (most commonly financial), discusses the consequences of this limitation and proposes possible solutions.

Methodologically, the paper derives from an intense literature review, which links important theoretical concepts as well as providing an overview of the existing fragmented arguments in the literature by the recent bibliographic analysis study. The main strand of literature, supported by numerous views, lead into the development of a comprehensive model of innovation under the resource constraints with strong practical implications.

The paper aims at making several contributions to the literature. First, the paper aims to bridge the often existing gap between the economic and business literature. For example, the literature stressing the role of innovation for aggregate growth and development, and literature dealing with specific innovation types and the processes, are often neglecting the fact that they are in fact studying the same phenomenon. Comprehensive approach that acknowledges and incorporates both economic and business literature premises can provide a thorough and a more complete model. This model is such an attempt as it derives both from development as well as management literature. Second, the paper follows the premise that although innovations are important for firms at large, firms often face resource limitations which constrain innovative activity regardless whether they come from developing or developed countries (Forbes & Wiled, 2000). To contribute to the resolution of this problem, the paper proposes a model of innovation in resource limited environment. By doing so, the paper also attempts to contribute to the otherwise very limited spectrum of literature of resource-limited innovation (Katilia & Shane, 2005) and synchronous innovation (Damanpour, 2014) and to the best of our knowledge is the first comprehensive model for the study and explanation of innovation in such cases. The paper also links the literature about the role of intangible or knowledge capital with the literature about the impact of resource availability (Fukao et al., 2009; Corrado et al., 2009) and to the best of our knowledge is the first such attempt. Furthermore, due to the fact that resource limitation is more stringent in comparatively laggard firms or countries, the model attempts to on the one hand explain part of the causes for the lag and on the other hand suggests solutions and by doing so attempts to contribute both to theoretical as well as practical literature. Last, the paper attempts several other practical implications for business. By applying the conclusions in practice at the firm level, the paper provides

a practical basis on which managers can build structures and systems that stimulate innovation activities.

In continuing, first innovative capital is defined, with a particular focus on the resources needed in order to innovate. The core of the paper represents a discussion about the factors that determine each type of innovation and how these determinants gain or lose importance for total innovative activity, if the firm is facing financial constraints. Also by introducing the synchronous innovation the link between different types of innovation trajectory is explained, and the effects of the resources constraints are elaborated. The model comprehensively covers all of the possible innovation activities that can emerge on a firm level, and analyses how the innovation trajectory of the firms is developed based on the influence of the resource constraints. The paper concludes with a discussion and challenges for future research.

2. THEORETICAL BACKGROUND

Innovative activities are essential to future growth of the firm and productivity increase (e.g. van Ark et al., 2009), but there is a difference in the mechanisms and nature of innovation in leaders and followers (Forbes & Wield, 2000), regardless whether these are countries or firms. The developed firms and economies are those that define the technological frontier and move it forward. According to the data, the developed economies (where also the majority of leading firms are located) account for 94.7 % of global R&D expenditure (2014 Global R&D Funding Forecast, 2013). Their primarily focus is on developing new products, but also they are creating organizational practices that are enhancing their capabilities to assimilate and exploit externally available information (Cohen & Levinthal, 1990). The intensity and the nature of the innovation activity depend on the resources availability of the firm, a notion, which is analyzed by the resource-based view of the firm. In order to build a comprehensive model that explains innovation activities in resource limited environment it is important to first deeply understand the nature of the innovation types and the resources required. In this theoretical background, the paper addressed the problem of resource availability and examines the existing literature in order to link innovation and its specific subtypes to the required types of resources and categorize the resources by importance. Methodologically, to ensure completeness, this literature review will on the one hand rely on classical approach and on the other an automated bibliographic analysis.² The following research questions will be addressed in this segment:

2 A comprehensive review process was used, based on the exact word matches and stemmed words. In total 90 papers were selected based on the number of citation and year of publication, all from each different subtype of innovation, and also for knowledge management, and financial constraints. The frequency of the word “innovation”, among this papers occur for more than 14 000 times, which suggest that the papers selected are in line with the nature of the problem that we are arguing. The second more frequent word with 5840 references is “managing”, which is what we are trying to advance in this paper, the managing of the innovation trajectory of the firm. In the annex tables the most frequent words are displayed. We can conclude that the sample of papers is innovation orientated, with the management of innovation on the focus. Also all types of innovation like product, process, marketing and organizational innovation are equally covered. (5648, 4786, 5620, 4331). Also the most important niche of all is the usage of the word knowledge, with its

- (1) Which resources are required for specific innovation types;
- (2) Which resources are comparatively more important for specific innovation types and
- (3) How can the lack of a specific resource relevant for a specific innovation type be overcome

2.1 Innovation resources

Innovation intensity in firms generally depends on resource availability (Katila & Shane 2005; Klein & Knight, 2005), which includes financial resource availability, learning orientation, management support, and positive innovation climate or general attitude towards innovation. These resources are systematically divided into several categories: financial, physical, legal, human, relational, organizational and informational resources (Hunt, 2000).

Most commonly, the financial resources are perceived as being the central problem. The internal funding, which often represents the major source of innovation funding (Hall & Lerner, 2009), since the financial systems are less developed (OECD, 2012). Due to the laggard nature and often low profit margins, caused by their positions within global value chains, the internal resources are limited. Access to external finance is especially problematic due to the underdeveloped financial systems, conservative approaches in the financial sector and lack of venture capital (EBRD Transition Report, 2015), which is particularly problematic for laggard firms.

But for the discussion in continuing, the resource-based view of the firm adds an important dimension that links these “categories” into a much more interdependent “whole”. According to the resource-based view, firms’ structure, nature, behavior and performance can be explained based on firms’ resources, which in fact comprise a bundle of idiosyncratic resources and capabilities. The primary task of management is to maximize the firms’ value through the optimal deployment of existing resources and capabilities while developing the firm’s resource base for the future (Barney, 1991; Grant 1996).

Upgraded by the knowledge-based theory, the resource based view of the firm adds an important category. It suggests that learning, closely related also to firms’ competencies, capabilities and genetic material (Nelson & Winter, 1982) and knowledge dissemination within the firms, is one of the key determinants of innovation. Innovation in the view of resource-based and knowledge-based is a result of a cumulative learning. But it is important to stress the close relationship between the knowledge and human capital: knowledge is created and exists within individuals and the organizations exist to integrate that knowledge and canalize it toward new products and process (Grant, 1996). The key

synonym like learning etc., because this paper is an effort to establish the organizational innovation as the foundation for other innovation types to occur. (Annex 2 Most frequent words). Software NVivo9 was used to analyze selected documents during the methodological stage of data collection, coding, formulation of categories and content and interpretation.

role of the management team is to use the knowledge of the firm and market to define and shape expansion paths (Penrose, 1959) that transform firm's resources into profitable innovation trajectories (Table 3) and further growth.

Following the above discussion, to study the required resources for the innovation and discuss the nature of innovation in resource limited environment, the paper focus on financial and human resources, and in continuing relies on the Hunt's (2000) definitions and categorization of resources. According to Table 1, and the overall frequency of synonyms for human resources (Annex 2) it is reasonable to expect that the main types of resources necessary for innovation activity are human resources and the financial resources are just a positive moderator that (Mishina, Pollock & Porac, 2004) that support the innovation activity of the firm. Each innovation type requires a specific set of resources, but human and financial are the fundamental ones, without which innovation is impossible to occur. Nonetheless, we will argue that the comparative importance of the two sources differs for specific innovation types. In continuing the innovation resources are discussed in more detail, followed by a discussion of the role of limitations for each innovation type and possible solutions.

Table 1 presents an analysis of the comparative importance of human resources and human-capital related resources (knowledge, learning, also management) for different innovation types. NVivo11 software was used to analyze or extract key-terms that describe different aspects of human capital. After separation of the papers regard their type of innovation coverage, the synonyms for human resources and financial resources were taken into account, for estimating the importance of the given resource in different types of innovation (Annex 1). Based on theoretical background and frequency estimation of this sample, Table 1 is provided, which summaries the importance of human and financial resources in given innovation types.

Table 1: *Key-word search results: Relative frequency of different types of human resources³ and financial resources⁴ in % of total key-word count (4929 key-words in 90 papers)*

Total word count 4929	Number of papers: 90	Word frequency of different types of human resource				Word frequency of different types of financial resource		
		Management	Knowledge	Learning	Human resources	Internal finance	External finance	Finance
	Subtype of innovation				Total			Total
	Technical specifications							
Product	Components or materials used	5,2	3,1	2,8	11,1	1,5	0,2	1,7
Process	Technology of production	21,4	10,1	9,8	41,4	2,9	0,3	3,2
Marketing	Product design, placement, promotion and pricing	13,7	8,6	8,0	30,3	4,3	4,5	8,8
	Better addressing of customer needs							
	Opening new markets							
	Business practices							
	Workplace organizations							
Organizational	New methods for distributing responsibilities	24,8	39,5	11,0	53,4	3,0	0,6	3,6
	Total	40,3	21,9	20,5	82,7	11,6	5,7	17,3

The results support the notions in the literature that knowledge and related components of human capital or activities that are directly dependent on human capital (such as management) do have a strong relationship with innovation. On average, management stands out most, among the search words, which were widely chosen, followed by knowledge and learning. Interestingly, the comparative importance of these terms differs among innovation types. Knowledge is most commonly linked to organizational innovation, followed by marketing innovation. Management is extremely important also for process innovation. Interestingly, learning, which could be interpreted as a summary word for continuous competence build-up is relatively equally important across categories, with much less variation than knowledge (accumulated situation).

The fact that human capital and related components as well as their combination are important, but in different extent, for different innovation types has been also stressed by a number of authors. Human resources are highly valuable, ambiguous therefore hard to imitate or replicate, and they are part of a more complex social phenomena which give them the advantage to be the main pillar of competitive advantage of the firm (Barney,

3 Key words used for identification of human resources: management, knowledge, learning, studying, capabilities, people, creativity

4 Key words used for identification of financial resources: for external financial resources: banks, loan, borrowing; and for internal financial resources: cash, profitability, liquidity

1991). Therefore human capital is seen as one of the types of resources that can help a firm to differentiate itself on the market. Improvements in human capital are the foundation of other types of innovation to occur (Table 3). Laggard firms are usually more orientated to non-technological innovations. That means that types like process, marketing and organizational innovation are more common, mostly because they required more human resources than financial resources (Table 1). Regarding the importance of the human and financial resources we are suggesting the first proposition:

Proposition 1: Human resources and financial resources are the fundamental ones, without which innovation is impossible to occur.

Financial resources are acting like a moderator in the innovation activity especially when product innovation are pursued (Mishina, Pollock & Porac, 2004). Results in Table 1 speak in favor of that. Out of 90 analyzed papers, with in total identified replication of the selected key-words being almost 5000, the financial resources (external and internal) emerged only in 17.3 percent of cases. Interestingly, they are comparatively more important for marketing innovation. Financing of R&D provides a potentially higher product development, which is associated with higher accumulation of financial and also human resources requirements. The interaction between financial and human resources is well noticed by their implication on growth of the firm (Mishina, Pollock & Porac, 2004) and the overall innovation activity. Their interdependences and mutual advantageous conjunction are important for the overall innovation activity of the firm. This results of the comparatively lower importance of financial resources is also in line with Klein and Knight (2005), who claim that the successful implementation of innovation requires first financial resource availability, but above all also learning orientation, management support, and positive innovation climate or general attitude towards innovation. Better financial system improves the probability of successful innovation (King & Levine, 1993), firstly by evaluating of the entrepreneurs idea and second by funding the idea.

Table 2: *Categorization of innovation resources*

Innovation type	Subtype of innovation	Relevant resources		Selected papers from the sample
		Financial resources	Human resource	
Product Innovation				
	Technical specifications	High	High	Utterback & Abernathy (1975); Ashok et al., (1986); Doygherty (1992); Brown & Eisenhardt (1995); Tushman & O'Reilly (1996); deCastro (2015);
	Components or materials used	High	High	Handerson & (1990); Dorothy (1992);
Process Innovation				
	Technology of production	Medium - High	High	Cohen & Levinthal (1989); Schroeder (1990); Attwell (1992); Katilia & Shane (2005);
Marketing Innovation				
	Product design, placement, promotion and pricing	Medium - High	High	Danneels (2002); Forbes & Wield (2000);
Market Innovation				
	Better addressing of customer needs	Medium - High	Medium - High	Thomke & von Hippel (2002); Matthing, Sanden & Edvardsson 2004; Katilia & Shane (2005);
	Opening new markets	Medium - High	High	Levitt (1960); Storbacka & Nenonen (2015); Kjellberg et.al. (2015);
Organizational Innovation				
	Business practices	Low - Medium	High	Slater & Narver (1995); Nohria & Gulati (1996); Grant (1996); Alavi et.al. (2001); Benner & Tushman (2003); Bloom & van Reenen (2007); Armbruster et.al. (2008);
	Workplace organizations	Low - Medium	High	Ettlie 1988; Ettlie & Reza (1992); Nonaka (1994); Amiabile et.al. (1996); Grant (1996); Alavi et.al. (2001); Benner & Tushman (2003); Mishina, Pollock & Porac, (2004); Overvest & Veldman (2008); Crossan & Apaydin (2010); Troilo, Luca & Atuahene-Gima (2013);
	New methods for distributing responsibilities	Medium	High	Damanpour (1991); Levinthal (1993); Baum & Locke (2004);

In sum, both human and financial resources are important. Table 2 provides an overview of selected references, linking different innovation subtypes with the resource requirements. Based on the results of the literature overview and supported by both theoretical as well as empirical estimates of resources availability and innovation types, it can be expected that human resources (with related categories of knowledge, learning, capabilities, management attitude, creativity) are comparatively (in relation to financial resources) especially important

for organizational innovation, slightly less, yet still a lot for marketing innovation. A number of authors stressed the linkages between these two innovation types and human capital, from Levitt (1960), Grant (1996), Bloom & van Reenen (2007), Troilo, Luca & Atuahene-Gima, (2013) and many others. On the other hand, when speaking about product and process innovation, financial resources are gaining comparative importance. This is not diminishing the role of human capital, which is still extremely important with high importance, but the development and implementation of process changes, product development requires significantly larger financial input, which is also acknowledged in the literature (Cohen & Levinthal, 1989; Katilia & Shane, 2005, and other). Based on the importance of the certain resources in the innovation process, we are suggesting the second proposition:

Proposition 2: Human resources is highly important for organizational, marketing, process and product innovation to occur but financial resources are gaining importance as the firm progress in the value chain.

2.2 Innovation under the resource constraints

Although firms at large optimize and resources are limited in general, when speaking about the resource limited environment this must be understood primarily in comparative manner with regards to industry or competition. In resource limited environment innovation is different and as we will argue is even more dependent on human resources than in general.

First, innovation in resource limited environment is less commonly radical, and is more commonly incremental, which is true for all types of innovation (Forbes & Wield, 2000), including product innovation. Namely, data shows that the firms that invest most into R&D and contribute most new technologies are strong (multinational) firms which come either from North America, Europe (Germany) and Japan (Global R&D funding forecast , 2014). These are the companies and countries that shape the technological frontier. Technology frontiers research centers are more exploratory oriented. Units that engage in exploratory innovation pursue new knowledge and develop new products and services for emerging customers or markets (Benner & Tushman, 2003). They possess financial resources and human capital to do so.

Laggard firms (those are also normally more resource constrained) are pursuing exploitative innovation, build on existing knowledge and extend existing products and services for existing customers. The latter approach is used, or is more often used in resource limited environment due to the fact that financial resources needed are relatively smaller, compared to the explorative innovation. In resource limited environment improvements are cumulative so that each invention incorporates and builds on features that came before, similar to the concept of frugal innovation (Radjou & Prabhu, 2015). Therefore, optimizing the usage of the current technology within the firm's constraints is an approach more often used. Edquist and Hommen (1999) also emphasized that firms never innovate in isolation but by interaction more or less closely with other organizations

through complex relations that are often characterized by reciprocity and feedback mechanism in several loops, which emphasizes the learning process.

The level of success of process innovation in resource limited environment depends on the adoption capacity of the firm (Karahanna, Straub & Chervany, 1999), adoptability of the technology (Levin, 1988) and diffusion of the new information about the production process (Davies, 1979). These determinants are firm specific and knowledge dependent. Knowledge resources are part of dynamic capabilities of the firm (Teece, Pisano & Shunen, 1997) which are crucial for the renewal of the firm competences in changing environments. Their intensity is moderated by the size of the firm, finance, the investing human capital of the firm (Mansfield, 1963). Primarily technology and marketing competences are seen as crucial for development of new products and processes (Rajkovic, 2009). While companies often focus on production processes, Dougherty (1992) stressed that improving the processes in the firm should also more profoundly link technology and customer's needs (Danneels, 2002), which is also considered as another (human capital related) resource – integrative capability (Henderson & Cockburn, 1996). Implementation of a process innovation can increase the likelihood of improving the performances of the firm. (Utterback & Abernathy, 1975).

Marketing innovation is very important for firms that are operating in resource limited environment. Promotion and design trends usually arise in developed countries, and represent benchmark for the laggard firms. Therefore if firms closely follow the strategy of their competitors they can significantly departure from their current promotion practices or improve the design of their product, which will affect their profitability. Financial resources do help also in marketing innovation, but are not essential. Knowledge, learning and attitudes are more important as well as their efficient combination (see Klein & Knight, 2005, Katila and Shane, 2005). Here, companies must rely on combining low-level learning on a long term with high-level learning that occur in sequences can produce new approaches and identification of customer needs, product strategies regard the design, pricing, promotion and placement. Continuously collecting information about target-customers' needs and competitor capabilities is part of adaptive learning that improve adaptive capacity of the firm on the current market and stimulate marketing innovation. Through interaction with customers and competitors, firms in resource limited environment are adapting to the new information that are gathered, and innovating new marketing practices that will provide competitive advantage for the firm.

Markets evolve in a perpetual reciprocal process as various actors introduce new ideas in the form of new or modified business model elements that influence the market practice actors engage in (Storbacka and Nenonen, 2015). In order to succeed, firms need to use their routinized capabilities or absorb those of the already established firms to help them acquire and assemble resource-capabilities that other new entrants may have not yet mastered (Bhide, 1992). Utilizing these human related resources at optimal level will produce competitive advantage in the short run. Even though in the short run non-financial resources could help to establish themselves as a market leaders (Mishina, Pollock & Porac, 2004), financial resources should be invested in market analyzing activities.

Companies can reduce the need for such resources by leveraging more on its human related resources – in this case primarily adaptive learning, relying on trends, practices and information easily observed either from other firms or customers.

Organizational innovations depends of the organizational structure and its flexibility, management skills, implementation of a new business practices, improving workplace organization and new methods for distributing responsibilities (Table 2). The adoption of organizational changes or organizational innovation depends on the dynamics of the environment and organizational climate. Laggard firms are, also in this case, exposed to the new practices from the leaders, and they can choose which practices to adopt. Depending on the entrepreneurship capabilities of the managers (again human capital related), different organizational innovations are implemented and depend on the organizational characteristics of the firm; different performance improvements are achieved.

Given the multilevel nature of organizational innovation, the same variables that initiate organizational innovation are the ones that hinder their implementation on another level. These ambidextrous organizations are composed of multiple tightly coupled subunits that are themselves loosely coupled with each other (Benner & Tushman, 2003). Centralization negatively affects exploratory innovation, whereas formalization positively influence exploitative innovation (Jansen, van Den Bosch & Volberda, 2006). To be effective, ambidextrous senior teams must develop processes for establishing new, forward looking cognitive models for exploration units, while allowing backward-looking experimental learning to rapidly unfold for exploitation units (Gavetti & Levinthal, 2000).

When speaking about the resources, the notion of learning requires special focus. Innovation is largely dependent on ideas that come from the outside knowledge that is absorbed, technology which is transferred and adapted, etc., concepts which are closely related to learning (Slater & Narver, 1995). Several models in the literature have dealt with this issue. Forbes and Wield (2000) stress that for the laggard firms, the future and the technology (could also be viewed as knowledge) frontier are given outside (and can be absorbed). Open innovation approach is in the literature highly popular and refers to both inward and outward flows of knowledge and ideas (see e.g. Chesbrough, 2003; Chesbrough, 2007) and is as such closely related to learning. Also empirical results show that laggard firms are more likely absorbing rather than sharing (inward rather than outward open innovation) and are focusing more on process than product innovation (Redek & Farčnik, 2015, Farčnik & Redek, 2015).

Following the discussion of the innovation resources at large and innovation under the resource limitation, the following proposition can be made:

Proposition 3: Non-technological types of innovation are more common for resource limited environment.

As was evident from the literature overview (Tables 1 and 2) and the preceding discussion of innovation under the resource constraints, it is clear that not all innovation types are

equally resource demanding. Also, it was shown that human resources are more important for some innovation types. Third, financial resources are usually a bigger problem for laggard firms, which embark more on incremental and exploitative innovation. Firms in resource-limited environment would consequently logically pursue first those that can be supported by the available resources. Following the preceding discussion, it is primarily clear that organizational innovation are least financial-resources intense, while on the other hand product innovation (more radical) are most.

Firms that do face constraints initially have to answer two questions: which innovation types are more important in such cases and where to start, or even further, which sub-type could be the starting point. A firm would rationally, when limited in terms of resources, start with activities which are not comparatively resource intense, but do have value added. Namely, according to Hunt & Morgan (2000) innovation activities can be determined by the relative costs of the resources with the produced value of the usage of those resources.

3. A MODEL OF INNOVATION UNDER THE RESOURCE CONSTRAINTS

Relying on classification of innovation (Table 2) and the discussion about the required resources (Table 1), we propose a model of innovation under resource limited environment. The model is presented by a matrix, which explores the trajectories of innovation activity in laggard firms.

The proposed model answers several questions that are relevant for firms under the resource constraints:

- 1) Which innovation types are more relevant/important?
- 2) What process or innovation type they should embrace first (where should they start from), and,
- 3) Which resources do they need and why at a specific stage of the innovation process.

By developing a 3x3 matrix, which links financial, human resource intensity and value added of different innovation types and an extended discussion of constraint, the proposed model shows the following answers to questions (1)-(3): (1) organizational innovation, followed by a progress from organizational towards marketing and progress from organizational towards process innovation are under resource constraints initially more important than product innovations, (2) organizational innovations consequently represent a starting point or a core innovation type that eventually facilitates and stimulates other innovation types, and (3) primarily knowledge and managerial aptitude towards innovation represent an important resource.

To build a model of innovation in resource limited environment, we rely on two theoretical constructs, crossing the relative costs of the fundamental resources with the relative produced value (Table 3). By merging them and applying them to innovation issue, we develop the model in two steps, (1) sequence and (2) explanation, which is visualized in Figure 1.

3.1 A discussion of resources requirements and innovation types' sequence

When companies have scarce resources, also scarce human and scarce knowledge resources (according to resource-based theory) they are likely to rely primarily on organizational innovation (Lam, 2004). With progress, marketing and process innovations gain importance (Slater & Narver, 1995), while product innovation, which require most human and other resources come to the forefront last. It must also be acknowledge that innovation (all types) also impact productivity and increase value added and thereby help loosen the resource constraint. As a consequence of both the resource limitations and the impact of different innovation types on value added, a specific sequencing of innovation could be anticipated.

Table 3: *Innovation stages in laggard firms*

Relation between resource intensity and produced value				
Relative Resource Costs (financial and human resources)		Low	Medium	High
	Low	Organizational Innovations	Organizational Innovations toward Marketing Innovations	Marketing Innovations
	Medium	Organizational Innovations toward Process Innovations	Organizational Innovations toward Product Innovations	Marketing Innovations toward Product Innovations
	High	Process Innovations	Process Innovations toward Product Innovations	Product Innovations

The initial development and usage of the existing knowledge in the firm form the foundation for other types of innovation to occur. Organizational innovations also represent an introduction of new or significantly improved management systems, new types of collaborations with other business, research organizations or customers, outsourcing or subcontracting of business activities in production and changes to the management structure can stimulate increasing performances of the firm (Oslo Manual, 2005). Such improvements in organizational structure can also impact innovation at large.

According to Baldrige & Burnham (1975) structural characteristic of the organization such as size and complexity affect the organization's innovation activity. The more flexible the structure the more organization is open to new approaches to solve problems. Good practices from other firms are adopted (Prašnikar, 2010), by which new ways of work organization is taking place. Therefore organizational improvements are the center of the innovation activity in laggard firms (Lam, 2004). They are the starting point for increasing the performance of the firm. This is basically the first stage of the innovation activity. Here, as we can see in Table 3, resources with low and medium relative costs are used and the expected value that is produced (Jansen, van Den Bosch & Volberda, 2006) is also low to medium. Increasing knowledge in certain activity increase the likelihood of rewards for engaging in that activity, thereby further increasing the willingness for knowledge creation.

The organizational innovation stimulates on one hand learning on the other hand also increases resource availability. Firms that are pursuing marketing innovation will have to improve or would be expected to enhance their organizational capabilities toward marketing innovation, either by conceiving a separate department for marketing and accumulate external knowledge in that area or outsourcing their marketing department and accumulate expertise knowledge. By doing so, they are laying the foundations for other types of innovation to occur. At this point it is important to introduce the idea of synchronous or interdependent innovation (Damanpour, 2014). While some authors feel that the concept is especially relevant for technological innovation (Damanpur, 2014), others agree that this concept is equally important for non-technological innovations where innovations are much more interdependent (Armbruster et al.; Kargaonkar, 2011). In the context of the above discussion, the concept of synchronous corresponds well into the resource limited innovation.

Proposition 4: Firms are leveraging towards human resources in resource limited environment whenever they are available, embarking first on using the human capital in organizational innovation, followed by other innovation types, where the path depends on the strategy of the firm the current resources availability and mindset of the manager.

In continuing, a model of innovation activity under the resource constraint is proposed, following the discussion regarding the limitations of resources and possible interconnection of innovation types.

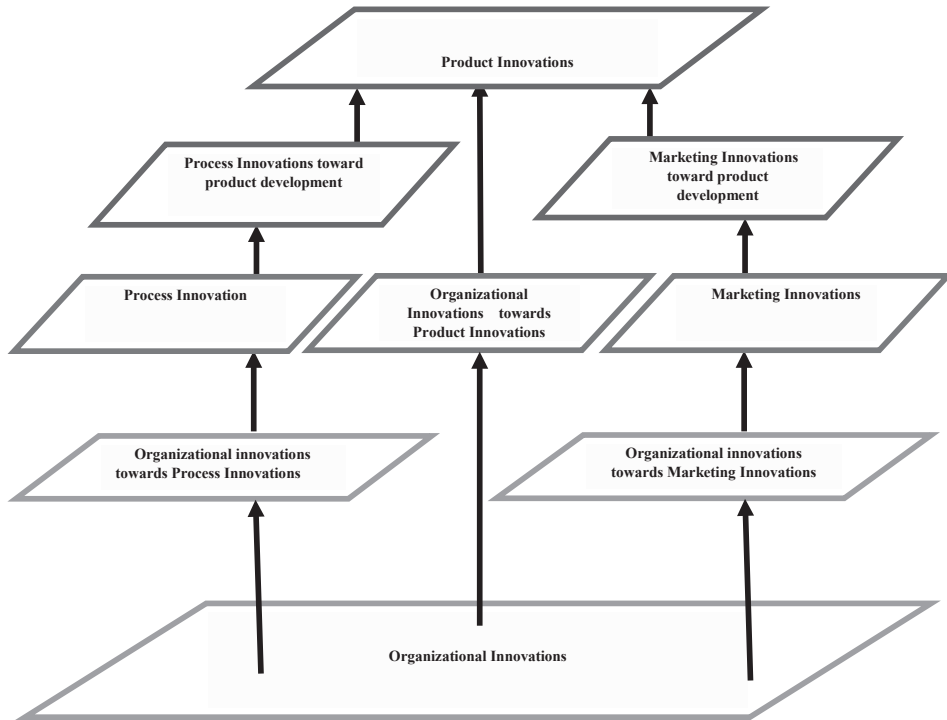
3.2. Model of innovation in resource limited environment

Aforementioned types of innovation and synchronous types of innovation are structured into Figure 1, based on the preceding discussion a model of innovation in resource limited environment is proposed.

The model developed from here is derived from the matrix (Table 3), imply that the most relevant types of innovations for laggard firms are non-technological innovations like

organizational, marketing and also process innovation. Those are the types of innovations that are more dependent on human resources and consume less financial resources. Product innovation in laggard firms is characterized by incremental improvements, (Troilo, Luca & Atuahene-Gima, 2013), which are more resource demanding and therefore less reachable.

Figure 1: *Proposed model of innovation under resource constraints*



Human and financial resources are the main contributors for innovation activity of the firm (Table 1). Depending on the current resource limitations, mostly financial, the firm are leveraging toward their human resources (Mishina, Pollock & Porac, 2004) in order to improve the value crated and level up the innovation activity towards types of innovation that are producing higher value added. Therefore the foundation for overall innovation activity of the firm depends on the bundle of knowledge-based resources that are created, absorbed, adopt and implemented within the firm (Wiklund & Shepherd, 2005). These are in particular important for organizational innovation.

Organizational innovation are representing the core of the model for initiating improvement within the organization. Given the resources needed to initiate an innovation activity, it is expected, firms to start investing into this segment of innovative capital by

which they will enhance their organization creativity (Amabile, 1988; Woodman, Sawyer & Griffin., 1993) and therefore organizational capabilities. As they are progressing in the process, the value that is created by organizational innovation will provide more finance to support their further organizational improvements that eventually will lead toward introducing a new type of innovation activity, like marketing or process innovations. Depend on the innovation type pursued, and entrepreneur mindset for further development, there are few innovation trajectories that can emerge (Figure 1).

From organizational innovation toward marketing innovation. Let us embark on this discussion based on an example. Outsourcing is an example of organizational innovation. If the firm outsources some of the activities, like the market analytic department, they will acquire a significant amount of specialized external knowledge that can lead to increasing understanding of the market, significantly improved method of advertising, promotion or even improved pricing strategies. This synchronous type of innovation (Georgantzias & Shapiro, 1993; Damanpour, 2014) where the collaboration with other business, due to exposing to external expertise, can change the product placement on the market and open new sales channels (Slater & Narver, 1995). Laggard firms can also benefit from being exposed to the new findings, or new practices, created by other firms. They can choose which ones from a wide range of organizational improvements to adopt. Therefore, the complexity of the decision process is reduced to selection from limited number of new practices. The importance of organizational innovation for marketing innovation and their interdependence is confirmed also by the literature review. The frequency of the words that are synonyms for organizational innovation in the group of papers that are dealing with marketing innovation, are supporting this notion of this type of synchronous innovation⁵. (Annex 1) With regards to the resources required, the marketing innovation is of medium value to the firm with regards to value added, but is also of lower resource intensity in comparison to other types. Its relative value for the company is consequently high or marketing innovation are important for stimulating other types (Table 3).

From organizational innovation towards process innovation. Synchronous type of innovation (Georgantzias & Shapiro, 1993; Damanpour, 2014) where organizational improvements, which are part of the subtypes of organizational innovation, like introduction to new types of collaboration with other business, research organizations or consumers can lead to development of other types of innovation, like process innovation. Here, organizational innovation for example stimulates knowledge transfer and open innovation. The accumulation of external knowledge, adopted and adapted to local needs can lead to significantly improvements in the process of production that was initially encouraged by enabling collaboration with other business (Redek & Farčnik, 2015). The process of adopting new practices requires a certain amount of learning in order to implement the new practices (Senge, 1990). By increasing stimulating this higher order learnings, firms from developing countries are entering in a higher phase of the innovation activity. The frequently usage of synonyms that are typical for organizational

⁵ Synonyms for organizational innovation (management (674), knowledge (425), learning (699)), are among the 20 most frequent words used in the papers related to marketing innovation

in the group of papers that are dealing with process innovation, are supporting this notion of synchronous innovation type. (Annex 1)⁶ With regards to the contribution of process innovation to the firm – process innovation are more resource demanding, both with regards to human as well as financial, but also can bring on average more value added (not necessarily) (Table 3).

From organizational innovation toward product innovation. Organizational improvements can lead also to product innovation or are closely linked to product innovation in a synchronous manner, linking product innovation with organizational, marketing and process innovation. If the ultimate goal of the firm is to develop something new, then the increased abilities of the production process (Danneels, 2008), and increased awareness for the customer needs, eventually will lead to development of a new product. It all depends on the firm strategy, attitude toward innovation (Bicen & Johnson, 2014) and current resources availability. In resource limited environment the improvements are cumulative so that each invention incorporates and builds on features (or improvements) that came before. This is the transition from second to third stage in innovation process where the costs of the resources are relatively high but also the produced value is high (Figure 1). Frequently usage of the words synonyms for organizational innovation in the group of papers that are dealing with product innovation, are supporting this notion of synchronous innovation type⁷. (Annex 1) Product innovation are most demanding with respect to inputs, but potentially also generate most value added, depending on the new product/service performance (Table 3).

Marketing innovations are usually more financially demanding compared to organizational innovation but also the value that they produced is significantly higher. Firms that possessed marketing capabilities have superior financial performances compared to those focusing solely on operation capabilities (Kamboj, Goyal & Rahman 2015). If they want to keep the pace with the competition they have to adopt the marketing methods used in the more competitive firms or adopt practices of firms from developed countries. Innovation ideas and motivation arise through learning from and with customers (Thomke & Hippel, 2002), competition and from the influence of technology or the environment (Matthing, Sanden & Edvardsson 2004). Improving marketing skills of the employees and stimulating high-level learning in the organization will enhance the understanding of the market, which will eventually lead to increased performances of the firm (Kamboj, Goyal & Rahman 2015).

Marketing innovation towards product improvements. Understanding the customer needs by implementing new marketing methods can lead to the development of new products. This again is an example of synchronous or interdependent innovation (Georgantzis & Shapiro, 1993; Damanpour, 2014). Increased skills in product design can add value for the customers (Forbes & Wild). The development is generally perceived as

6 Synonyms for organizational innovation (management (1056), studying (483)), are among the 20 most frequent words used in the papers related to process innovation

7 Synonyms for organizational innovation (management (255), knowledge (155)), are among the 20 most frequent words used in the papers related to product innovation

financially (very) demanding, but it is not necessarily so, because knowledge, learning, creativity and attitudes are often more important. This for example implies that the higher integration between the R&D and the marketing department (Gupta & Wilemon, 1986), should lead to improved product, which would increase firm revenues. It is also important to note that when fewer firms (lack of competition) operate in the market, more resources are. This is often the case in developing countries available (e.g. monopoly rents, examples of Albania, BIH, see Prašnikar & Knežević Cvelbar, 2012). Under this condition instead of flexibility, firms need the routinized capabilities of established firms to help them acquire and assemble resource-capabilities that new firms have not yet mastered (Bhide, 1992). Words that are synonyms for marketing innovation are frequently used in the group of papers that are dealing with product innovation, are supporting this type of synchronous innovation⁸. (Annex 1) From the perspective of resource requirements, the synchronous approach allows the firm to leverage the product development (with high potential value added) on existing human capital, which makes the innovation process less resource intense than independent efforts for new product development (Table 3).

Process innovations. As firm's competences and knowledge base increases, process innovations become more important and more viable. The costs for implementing process innovation are relatively higher and therefore higher produced value is expected. The costs are mostly related to the knowledge creation and technology adoption (Damanpour & Gopalakrishnan, 1998), diffusion (Attewell, 1992) because in order to improve the production process, higher level of learning and knowledge should be applied. Given their resources limitations, the combinations that are allowed are often finite and small relative to what the firm might desire or what competitors are doing. In addition, properties of the resources that the firms already own are well known therefore the output can be easily predicted. These two factors significantly impact the potential for process innovation. But again firms can leverage a lot on human capital (Table 1), primarily through learning by doing, inventors in a short amount of time will get to the optimal combination of components. Process innovation in performance maximizing strategy is expected to be more original, not necessarily more complex or sophisticated technologically (Utterback & Abernathy, 1975). Process innovation can also be understood as a process of increasing productivity by adopting new technical specifications, or change in the components and material of the product, which are based on acquired new knowledge. In resource limited environment technological improvements are cumulative so that each invention incorporates and builds on features that came before. Firms adopt complex technology knowledge at the moment they obtain sufficient technical know-how to implement and operate it successfully (Attewell, 1992). Awareness of the technology boundary and the limitation of currently available resources describe the natural trajectory for technology progression. By doing so, the firms are moving toward innovations types that are consider as more resource demanding but also they are providing higher value added (Table 3). In terms of process innovation, also the interdependence with other innovation types is relevant (as was mentioned).

⁸ Synonyms for marketing innovation (marketing (242)), are among the 20 most frequent words used in the papers related to product innovation

From process innovations toward product innovation. Synchronous type of innovation (Georgantzis & Shapiro, 1993; Damanpour, 2014) is also important in case of product innovation. Innovation effort is often (when already more advanced) concentrated on a limited number of distinct, identifiable problems with predominant orientation for extension of the range of application for technology that we already possessed. Experimentation with new components and new combinations leads also to new product specifications (Fleming, 2001; Pisano & Shih, 2009, 2012). Namely, as Pisano and Shih (2012) stress some product innovation are directly linked to the production process and in such cases especially, process changes (regardless of whether it is technology, material, etc.) can stimulate product change and lead to a significant increase in value added. Namely, Pisano and Shih (2012) show that examples of such products are often also high-value added high-end products (e.g. fashion, design). The frequency of the synonyms for process innovation in the group of papers that are dealing with product innovation, are one additional clue, that support this notion of synchronous innovation type⁹. (Annex 1). With regards to the value created, such innovations carry a lot of potential, although they are also more resource demanding (Table 3).

Product Innovation. This type of innovation, in resource constrained environment, is often represented by incremental improvements of the products that the firm already produced. That's caused mostly because of the resources needed (Table 2) and the level of uncertainty. Product innovation is characterized by high risk, and also, it requires significant investment of time and human and financial resources (Troilo, Luca & Atuahene-Gima, 2013). It is expected that firm's organizational capabilities, marketing skills and process competences are on a higher level, so the firms can engage in this kind of innovation activity. An effective design requires that technological possibilities for a product are linked with market possibilities (Dougherty, 1992). The relative costs of the resources needed for product innovation are high, but also the expected produced value is high. Introduction of a new product, will initiate the need for new organizational improvements by which a new iterative process of improvement will begin.

Proposition 5: Synchronous types of innovation are derived one from another, evolving towards more value added types of innovation.

4. DISCUSSION

Based on the theoretical discussion of main concepts and the propositions, a model of innovation under the resource constraints was developed. The model shows that human and financial resources are fundamental ones, without which any type of innovation is impossible to occur. But the financial constraints (often externally-imposed) force firms impose a specific innovation trajectory. Organizational innovation is highly dependent on human resources, and it is the starting point that forms the foundation for other types of

⁹ Synonyms for process innovation (technology (173)), are among the 20 most frequent words used in the papers related to product innovation

innovation to emerge. When firms face financial constraints, they are leveraging towards human resources whenever they are comparatively more available. Also, the notion of synchronous types of innovation is explaining the transition between different types of innovation. Regarding the types of innovation, process, marketing and organizational innovations are more important than product innovation, while incremental innovation dominate over radical.

For all types of innovation a certain mix from financial and human resources is needed. Product innovation required high level of both human and financial resources, while organization innovations are less dependent on financial resources. Therefore, organizational innovation like changing business practices, organization of work and distribution, investing into human resources at large as well as primarily changing managerial attitudes and organization turns out to be the starting element of promoting innovation. In this endogenous process of interaction, the learning enhances the innovation capabilities and allows the company to efficiently climb along the value chain.

Contributions to the literature. The article makes several contributions to the literature. The most important contribution is the development of the model that explains or suggests an innovation trajectory under resource constraints that helps the firm successfully overcome the constraint. Second, there are not many papers related to the role of limited resources in the literature yet, primarily this is one of the first, that specifically and methodologically overviews the link between innovation types, limited resources and the role of the intangible capital for mitigating those limitations. So far, papers have primarily investigated financial constraints regard the total innovation activity of the firm regardless of the subtype of innovation or focused on a specific innovation type. Therefore, the paper provides a comprehensive approach. Third, the article presents a literature review about the role of limited resources in the innovation process, regard different type of innovation and sub-innovation. The paper also deepens the discussion about the intangible capital in the laggard firms. So far, the literature has focused primarily on measuring the levels and impacts, but has done limited work on explaining the “whys” (e.g. Hao & Manole, 2008; Prašnikar, ed., 2010; Prašnikar and Knežević Cvelbar, 2012; Prašnikar et al., 2012,). This paper provides an extensive summary of the literature regarding the reasons behind the comparatively low levels of intangible investment, focusing on innovative capital, in developing countries. Third, the paper by summarizing the factors proposes a model of innovation in firms from developing countries, incorporating also the limited resources idea, and the introduction of the synchronous types of innovation, which extends the innovation literature for developing countries (Forbes and Wield, 2000).

Practical implications. The paper makes several practical implications for the firms. First, by the identification of the fundamental resources needed for innovation and a specific innovation type, the findings can contribute towards increasing the awareness of the innovation potential of the firms. Even in those firms where innovation was perhaps neglected due to a misperception that innovation primarily requires significant financial input. Second, by stressing the resources needed for a specific innovation type, firms can assess the feasibility of specific innovation. Third, and most importantly, the paper stresses

that all firms can be innovative and that resource constraints can be overcome successfully. By relying on a specific trajectory of innovation, which allows to creatively combine and recombine the resources that they possess firms can be successful innovators even in cases of resource constraints and climb gradually towards more resource demanding innovation types. Here, a major role also synchronous innovation plays. The importance of the financial resources is relatively reduced and firms leverage towards human resources when these are comparatively more important. Enhancing the importance of the human resources can impact manager's mind set towards more organizational innovation, which will increase the propensity for further innovation.

Limitations and challenges for future research. The paper faced several limitations, which at the same time present challenges for future research. First, empirically testing of the proposed model in order to confirm the relationships proposed in the model will provide a deeper understanding of the strength of the impact of resources constraints on a distinct type of innovation. Second, the paper summarized the scarce and fragmented literature on innovation in limited resources environment. Increasing the sample size will enlarge the generalizability of the proposition made in this paper. Third, developing measures for grasping the effects from the synchronous type of innovation which is a major limitation and also challenging task for future researchers. Fourth, introducing of other types of resources constraints, e.g. legal (patent protection) or broader institutional, that affect the innovation, in addition to the fundamental ones would further strengthen the model.

5. CONCLUSION

Innovation capital is an increasingly important intangible asset, which in many countries represents the largest share of intangible/knowledge capital investment (van Ark et al., 2009, OECD, 2012), which is one of the major drivers of productivity. Innovations, either product, process, marketing or organizational, increase firm productivity and value added and improve the efficiency and efficacy of the organizational structure.

This paper dealt with the resource limited innovation, which is primarily relevant for laggard firms from developed or developing countries. Innovation activity in laggard economies or firms is affected by their resources' constraints, where the constraint refers to both financial as well as human resources. Innovation in such firms is due to their following nature not simpler, but is primarily different than that in market leaders or comparatively more developed firms.

This paper proposed a model, which shows how resource constrained firms may overcome the resource problem and gradually progress from the resource less demanding organizational innovation to more demanding innovation types. Also the synchronicity of innovation is shown to be important.

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Annex 1. Word frequency query results in different type of innovation

Word frequency query results							
Word frequency query results from papers related to product innovation				Word frequency query results from papers related to process innovation			
Word	Length	Count	Weighted Percentage (%)	Word	Length	Count	Weighted Percentage (%)
products	8	658	2.13	innovators	10	1576	1.11
development	11	410	1.33	process	7	1373	0.97
innovators	10	278	0.90	technology	10	1359	0.96
project	7	266	0.86	managing	8	1056	0.74
managing	8	255	0.83	adopts	6	873	0.61
markets	7	242	0.78	organizationally	16	837	0.59
design	6	197	0.64	organizing	10	799	0.56
successful	10	196	0.63	changing	8	680	0.48
researchers	11	188	0.61	research	8	672	0.47
team	4	187	0.61	model	5	664	0.47
organizing	10	181	0.59	using	5	654	0.46
process	7	175	0.57	product	7	623	0.44
technology	10	173	0.56	firm	4	615	0.43
systems	7	158	0.51	informs	7	578	0.41
knowledge	9	155	0.50	development	11	567	0.40
firms'	6	138	0.45	terms	5	530	0.37
capability	10	136	0.44	systems	7	517	0.36
problems	8	136	0.44	behaviors	9	500	0.35
communications	14	134	0.43	studying	8	483	0.34
people	6	132	0.43	theory	6	473	0.33

Word frequency query results							
Word frequency query results from papers related to marketing innovation				Word frequency query results from papers related to organizational innovation			
Word	Length	Count	Weighted Percentage (%)	Word	Length	Count	Weighted Percentage (%)
markets	7	2215	1.91	innovators'	11	2893	2.26
innovators	10	1790	1.54	organizational	14	1608	1.25
firms'	6	705	0.61	managing	8	1223	0.95
learning'	9	699	0.60	organization	12	1159	0.90
managers	8	674	0.58	process'	8	968	0.75
customized	10	665	0.57	knowledge'	10	869	0.68
products	8	665	0.57	firms'	6	675	0.53
services	8	551	0.47	markets	7	668	0.52
organs	6	543	0.47	research'	9	635	0.49
developments	12	523	0.45	products	8	627	0.49
processing	10	508	0.44	develops	8	545	0.42
research	8	458	0.39	model'	6	544	0.42
journal	7	431	0.37	learning	8	542	0.42
knowledge	9	425	0.37	technology	10	520	0.41
performing	10	419	0.36	performs	8	519	0.40
studying	8	393	0.34	study	5	481	0.37
effect	6	384	0.33	effects	7	422	0.33
using	5	384	0.33	informs	7	408	0.32
organizationally	16	373	0.32	creativity'	11	406	0.32
businesses	10	324	0.28	units	5	405	0.32

Annex 2. Word frequency query results across all sample

Word	Length	Count	Weighted Percentage (%)	Similar Words
innovators'	11	14441	1.84	innov, innovate, innovated, innovates, innovating, innovation, innovation', 'innovation, innovation', innovation", innovation'7ouma, innovations, innovations', innovations', innovative, innovativeness, innovativeness', innovativity, innovator, innovators, innovators'
managing	8	5840	0.74	manag, manage, manageable, managed, management, management', management', management", managements, manager, 'manager', managers, managers', 'managers, 'managers', managers', manages, managing, managing'
products'	9	5648	0.72	product, 'product, production, production', 'production, production', production", productions, productive, productively, productivity, productivity", productized, products, products'
market'	7	5620	0.72	market, market', 'market, market', marketability, marketable, marketed, marketer, marketers, marketers', marketing, markets, markets', 'markets, markets'
firms'	6	5150	0.66	firm, firm', 'firm, firms, firms', firms'
process'	8	4786	0.61	process, process', process', processed, processes, processes', 'processes, processes', processing
organizational'	15	4331	0.55	organiz, organizational, 'organizational, organizational', organizationally
technology'	11	4138	0.53	technologi, technological, 'technological, technological', technological", technologically, technologies, technologies', technologies', technology, technology', 'technology, technology'
research'	9	4090	0.52	research, research', research', research", researched, researcher, researchers, researchers', researchers', researches, researching
develops	8	3986	0.51	develop, developed, developer, developers, developing, development, development', development', developments, developments', develops
knowledgeable	13	3894	0.50	knowledge, knowledge', 'knowledge, 'knowledge', knowledge', knowledgeable, knowledgeable, knowledgeable

organs	6	3802	0.48	organ, organic, organic', organicity, organism, organisms, organization, organization', organization', organization'', organizations, organizations', 'organizations, organizations', organizations', organize, organized, organizers, organizes, organizing, 'organizing, organizing', organs
using	5	2600	0.33	use, use', used, 'used, useful, usefully, usefulness, uses, using
informs	7	2566	0.33	inform, informal, informality, informally, informant, informants, informants', informed, information, 'information, information', informational, informative, informed, informing, informs
study'	6	2509	0.32	studied, studies, studies', study, study', studying
performs	8	2486	0.32	perform, performance, performance', performance', performances, performativity, performed, performer, performers, performers', performing, performs
activity	8	2457	0.31	activ, activate, activated, activates, activating, activation, active, actively, activism, activities, activities', activity, 'activity, activity'
model'	6	2359	0.30	model, model', modeled, modeling, modelled, modelling, models, 'models, models'
effects'	8	2317	0.29	effect, effect', effect', effected, effective, effectively, effectiveness, effectiveness', effects, effects'
changing	8	2294	0.29	chang, change, change', change', changed, changes, changes', changing

AN EMPIRICAL STUDY ON THE EXISTENCE OF CONVERGENCE FOR ENERGY PER CAPITA

KENICHI SHIMAMOTO¹

ABSTRACT: *This paper focuses on energy which is a source of many serious environmental problems and examines the existence of convergence of energy per capita amongst countries in order to shed light on whether energy per capita has been growing and whether the trend is likely to change in the future. It was found that there was no evidence of convergence of energy per capita with any of the cases in the past for the world and Non-OECD countries while we found convergence of energy per capita for OECD countries. Concerning future prediction, there was no evidence of a compressed ergodic distribution of energy per capita for the world and Non-OECD countries, while a compressed distribution around the OECD average was seen for OECD countries.*

Keywords: *Convergence, Energy Per Capita, Inequality, World, OECD countries, Non OECD countries*

JEL Classification: Q40, Q56

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1. INTRODUCTION

Environmental problems are no longer regional issues contained to local areas but global issues. Global warming, thinning of the ozone layer, extinctions of certain species, over extraction of oil and natural gas and water pollution are all problems that cannot be solved by one country. Hardin (1968) had introduced an influential article, 'The Tragedy of Commons' where he explains that without any limitation to the access of natural resources and the environment, there is the possibility of 'free riding' and over exploitation of them. Currently there are some countries which consume far more natural resources or pollute far more than others, but the environmental damage this causes and the depletion of these resources will affect others as well. According to the World Bank (2003), 15 percent of the world's population living in high-income countries, emit 50 percent of the total carbon dioxide (CO₂), using 50 percent of the world's energy. Hedenus and Azar (2005) who study the trend in global resource inequalities find that the gap in consumption of commercial energy is increasing in absolute terms between the top and bottom 20 percent consumers. There is even a sixth of the world population that lacks access to modern energy and so a provision of sustainable energy and universal access is a focus for the United Nations and World Bank (United Nations, 2014; World Bank, 2013). The Paris Agreement, the outcome of the United Nations

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Framework Convention on Climate Change (COP21), recognises these different starting points so all parties will put forward their best efforts to reflect equity and the principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances (United Nations, 2015). Addressing environmental issues through environmental policies and regulations on specific indicators of environmental quality such as CO₂ is a challenge. If per capita emissions were found to diverge over time, this would affect the debate in achieving an agreement on climate change policies. In this way, understanding the distribution of per capita pollution may have important implications in designing environmental policies such as climate change policies, which leads to the need to study the existence of convergence or divergence of environmental indicators.

There are several studies that have undertaken this question on whether convergence can be observed with environmental quality indicators focusing on different pollutants. List (1999) uses SO₂ and NO_x data for regions in the US between 1929 and 1994 and finds convergence for both emissions. Bulte *et al.* (2007) also examines SO₂ and NO_x data to understand the role institutional context has on environmental convergence among US regions. They find that regulations, especially federal ones, have an impact on environmental convergence. Aldy (2007) examines production CO₂ per capita and consumption CO₂ per capita amongst the US states. He found that while production CO₂ per capita diverged, consumption CO₂ per capita converged due to the effect of increasing interstates' electricity trade over time. Brock and Taylor (2004, 2010) analyse CO₂ convergence among OECD countries, developing the Solow growth model (Solow, 1956) and including technological progress in abatement and pollution. They perform a cross-sectional analysis and find convergence for CO₂ emission. Empirical research by Strazicich and List (2003) also examine CO₂ among industrial countries and find that CO₂ emissions have converged. Stegman (2005) focuses on CO₂ per capita convergence for the world and OECD countries. As a result of taking into account intra-distribution dynamics, she finds that CO₂ per capita does not converge over the period between 1950 and 1999. Nguyen Van (2005) examines CO₂ per capita for both the world and industrial countries, and takes intra-distribution dynamics into account as well as the traditional average behaviour approach. The results indicated divergence for the world and convergence for industrial countries. Aldy (2006) also includes the intra-distribution dynamics approach and investigates whether CO₂ per capita converges over time for both the world and OECD countries. He further employs the Markov chain transition approach to forecast future distribution which predicts environmental convergence among OECD countries while environmental divergence among the world. Other than SO₂, NO_x and CO₂ which are used in the above studies, Alvarez *et al.* (2005) examine NO₂, CO and MVOC among European countries for short time periods, developing a neoclassical growth model augmented to incorporate the dynamics of a stock of pollutant. The results reveal environmental convergence for most of the air pollutants.

This paper applies commercial energy as a proxy for pollution. The consumption of energy does not only lead to the depletion of natural resources such as oil and natural gas², but

2 Energy consumption is closely related to population growth problems and depletion of nonrenewable resources through accelerating industrialization. This has been treated as a serious issue by many organizations such as the Club of Rome (Meadows *et al.*, 1972).

commercial energy is a chief source of a number of pollutants. It is also suited to observe past trends and future predictions of overall environmental trends and has been used in the past to examine environmental issues (e.g. Suri and Chapman, 1998; Medlock and Soligo, 2001). For example, energy is related to many pollutants such as SO₂ that causes acid rain and CO₂ which effects global warming. However, data gathering for each individual pollutant caused by energy use such as CO and suspended particulate matter (SPM) to be used in a panel data which requires long time periods and plenty of cross sections could prove to be difficult. It is also important to note that a decline in individual pollutants does not necessarily imply a decline in the overall pollution burden related to the production, distribution and consumption of energy. In most instances, it is only when energy consumption itself is reduced can it be considered that the environmental burden it represents has been addressed in a sustainable manner. This represents another reason to use total commercial energy itself (Suri and Chapman, 1998).

For these reasons, an important contribution of this paper is that by studying the convergence of energy, we gain a broad understanding of the existence of convergence over a number of main pollutants. The second contribution of this paper is that not only does it study the world and OCED countries such as in the studies by Aldy (2006), Stegman (2005) and Nyugen Van (2005), it also analyses Non-OECD countries. It aims to look at not only the possibility of a north and south convergence but whether there is a south and south convergence. Finally, by using a number of methods to study the representative behaviour and intra-distribution dynamics of energy per capita, this paper will observe the existence of energy convergence from many different angles and forecast future energy per capita distribution.

The remainder of this paper proceeds as follows: Section 2 provides a brief background concerning the growth rate of energy per capita at a country level. Section 3 explains the data description and the empirical methods that were used. Section 4 presents the results from the empirical studies and Section 5 provides concluding comments and discusses policy implications.

2. BACKGROUND

This section will provide a brief background on the growth rate of energy per capita relative to the world average at a country level. Table 1 compares the top 20 countries with the highest increase in its ratio of its energy per capita for that year to the average (relative energy per capita) of the world with the 20 countries with the lowest increase in relative energy per capita between 1971 and 2001. It takes into account the difference and ratio in relative energy per capita between 1971 and 2001 for each country and uses the log mean method to examine the increase rate of relative energy per capita. The majority of the countries with low increase in relative energy per capita were the less developed countries such as Korea Democratic Republic (North Korea), Congo Republic and Zambia, the highly developed countries such as Luxembourg, Denmark, the US and the former East European countries such as Romania, Czech Republic and Poland. The countries with the

highest increase in relative energy per capita were oil producing nations such as Saudi Arabia and the United Arab Emirates and the Newly Industrializing Economies (NIES) in East Asia and Europe such as Singapore, Korea Republic (South Korea), Portugal and Greece. The steep economic developments of the NIES are likely to have influenced the increase in relative energy per capita. This observation shows that there is a low increase in relative energy per capita amongst the highly developed countries but a high increase amongst the developed countries with relatively lower income per capita. Amongst developing countries, countries with high economic growth or oil producing countries show high increases in relative energy per capita, while less developed countries have low increases. From these observations, there is the possibility of a convergence in relative energy per capita amongst developed countries and a divergence within the developing countries. Based on these results, in the next section, we examine whether convergence can be found with energy per capita for the world, OECD and non-OECD countries.

Table 1: *The Highest Growth Countries and the Lowest Growth Countries of Relative Energy per Capita between 1971 and 2001*

Rank	Country	H.Growth	Rank	Country	L. Growth
1	Qatar	0.791	1	Luxembourg	-1.196
2	Singapore	0.607	2	Mozambique	-0.858
3	Brunei	0.567	3	Czech republic	-0.749
4	Saudi Arabia	0.514	4	Gabon	-0.703
5	United Arab Emirates	0.481	5	Romania	-0.665
6	Korea, Rep.	0.447	6	Korea, Dem. Rep.	-0.665
7	Iceland	0.441	7	Poland	-0.595
8	Trinidad and Tobago	0.354	8	Denmark	-0.585
9	Libya	0.341	9	United States	-0.544
10	Cyprus	0.322	10	Congo, Rep.	-0.531
11	Malaysia	0.280	11	Zimbabwe	-0.517
12	Portugal	0.279	12	Zambia	-0.514
13	Spain	0.254	13	Albania	-0.476
14	Greece	0.250	14	Peru	-0.473
15	Hong Kong, China	0.250	15	United Kingdom	-0.446
16	Iran, Islamic Rep.	0.214	16	Germany	-0.416
17	Thailand	0.170	17	Kuwait	-0.382
18	Malta	0.152	18	Kenya	-0.357
19	New Zealand	0.146	19	Bulgaria	-0.349
20	Algeria	0.144	20	Slovak Republic	-0.349

3. METHODOLOGY AND DATA

This paper conducts four types of analysis to assess the cross-sectional convergence of energy per capita over time for the world, Non-OECD countries and OECD countries. It first estimates a variety of deviations to measure the variability of energy per capita for the world, Non-OECD countries and OECD countries. The deviations examined are the standard deviation (*SD*), the average absolute deviation (*AD*) and the median absolute deviation (*MD*). The standard deviation is used with a normally distributed data set, since it represents the variability of the data around the centre and in the tails of the distribution. However, if the data does not exhibit a normal distribution, then the average absolute deviation or the median absolute deviation is used. Compared to the average absolute deviation, the median absolute deviation is less affected by observations which exhibit distribution in the tails of the distribution (Stegman 2005).³

Since these measures considered the variability in the tails of a distribution of the data set, this paper will next estimate the interquartile range (*IQR*) which attempts to measure variability in the centre of distribution of the data. The *IQR*₇₅₋₂₅ is the value of the 75th percentile minus the value of the 25th percentile. With the *IQR* being sensitive to the percentile points, this paper also estimates *IQR*₈₀₋₂₀ and *IQR*₉₀₋₁₀ which are represented by the value of the 80th percentile minus the value of 20th percentile and the value of the 90th percentile minus the value of 10th percentile respectively.

Next, this paper estimated the kernel densities⁴ of per capita energy in order to illustrate the energy trends since the deviations and *IQR*s described above, may not capture intra-distribution dynamics. A country's per capita energy is expressed as the natural logarithm of energy per capita relative to the sampled group average for each year (*e*). The Espanechikov kernel and Silverman's (1986) bandwidth choice rule to estimate the densities have been used. The Silverman bandwidth choice rule is often employed in density estimation. This produces a kernel density estimator function of

$$D(e) = \frac{1}{Nh} \sum_{i=1}^N K\left(\frac{e_i - e}{h}\right), \quad (1)$$

where $K = \frac{3(1 - 0.2e^2)}{4\sqrt{5}}$ if $|e| < \sqrt{5}$, and 0 otherwise,

$$h = \frac{0.9 \left(\min\left(s, \frac{Q}{1.349}\right) \right)}{\sqrt{5}}, \text{ and}$$

N represents the number of countries, *s* is standard deviation of the sample, and *Q* represents the *IQR*₇₅₋₂₅ for the sample. The Espanechikov kernel was used since it is

³ The definition of each deviation is shown in Appendix A.

⁴ Kernel density estimation is a non-parametric way in statistics to estimate the probability density function of a random variable.

the most efficient kernel function to minimize the mean integrated square error (Aldy, 2007).

The methods used above are related to nonparametric approaches. Next we will examine the convergence of energy per capita using the parametric approach often used in growth empirical literature called the β -convergence analysis. This technique was developed by Baumol (1986).

$$Eg_i = \alpha + \beta E_{0i} + \varepsilon_i, \quad (2)$$

where Eg_i represents the average annual growth rate of natural logarithm of energy per capita for each country i over the sample period between 1971-2001. α is a constant term, and β is the parameter that tests the existence of convergence. E_{0i} represents the natural logarithm of the initial level of energy per capita in country i . ε_i is the contemporaneous error term which is assumed independent and identically distributed (i.i.d.) with zero mean and finite variance. As used in economic growth studies, a negative sign of β will represent a convergence in energy per capita. $\beta = -(1 - \exp^{-\lambda\tau})$ where τ represents the length of the period of the study and λ is the convergence speed. λ can be estimated and its variance computed by applying the delta method once the estimate of β is available.

The above methods were used to examine the historical convergence of energy per capita. Next, this paper examines future energy per capita distribution. In order to forecast future distribution, the paper performs a Markov chain transition matrix analysis, which is a nonparametric method used in economic growth literature to evaluate income distribution. The transition matrix framework was applied to evaluate the distribution of per capita income in a study by Quah (1993). Following the work by Quah (1993), Aldy (2006, 2007) examines CO2 per capita for the US regions and the world/OECD. As used in these studies, the transition matrix framework is used to effectively map this year's distribution (Z_t) of each country's energy per capita relative to the sampled countries' average into next year's distribution (Z_{t+1}):

$$Z_{t+1} = M * Z_t \quad (3)$$

Though the mapping operator M can be assumed to follow any process, this paper assumes a first-order Markov process with time invariant transition probabilities as in the studies by Aldy (2006, 2007), Quah (1993) and Kremer et al. (2001). By repeating this expression T times it produces

$$Z_{t+T} = M^T * Z_t. \quad (4)$$

If $Z_{t+T} = Z_{t+T-1}$, the larger T becomes, this represents the long-run steady state (ergodic) distribution of relative energy per capita.

Following the studies by Aldy (2007) on environmental convergence and Quah (1993) and Kremer *et al.* (2001) on income convergence, the sampled countries (i.e. 108 countries in the world, 78 Non-OECD countries, and 30 OECD countries) are grouped according to the five categories of relative energy per capita. The five categories are: less than one-half of the observed group's average; between one-half and three-quarters of the observed group's average; between three-quarters of the observed group's average and the observed group's average; between the observed group's average and double the observed group's average; and greater than double the observed group's average. Then the one year transitions between categories are calculated to produce the transition matrices. In order to estimate the future distribution for the data set, the mapping operator is applied to the distribution in the last year of the data set. This approach illustrates the changes to the data over time with limited constraint, since the only changes to the structure of the data is in the construction of the five categories and the first-order Markov assumption. However, there are some limitations to this approach. Since this approach uses data of past distribution to forecast future distribution, significant events in the past such as changes to regulations or technological development may not be well depicted (Aldy, 2006, 2007). The other limitations is that though this approach can illustrate the characteristics of future distribution, further analysis is necessary to understand the reason for the changes in the distribution of energy per capita. As performed by Aldy (2006, 2007) we further analyse by comparing the ergodic distribution derived from transition probabilities based on various periods. On top of the one year Markov transition matrix we also performed a five year Markov transition matrix, since as explained by Kremer *et al.* (2001), transitions periods longer than one year reduces the impact on the estimated transition matrix for frequent fluctuation that occur near the border of the different groups at the beginning of the period. This means that it represents a closer picture of long-run dynamics than when annual data is used.

Concerning the data information, energy per capita used is commercial energy use from the World Development Indicators (World Bank, 2005). The data on energy per capita is collected from 108 countries. The countries are listed in Appendix B.

4. RESULTS

Historical Results

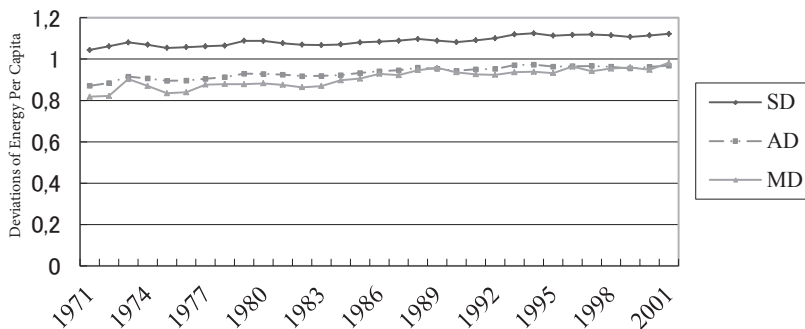
First, we examine the historical results of energy per capita. Figure 1 (a) contains estimates of each of the deviations over the period between 1971 and 2001 for the world. Figure 1 (a) shows that all of the measures slightly increase over the sampled period. These results suggest that the variability of the energy per capita data series slightly increases or there is insignificant change at the world level. We further divide the world into Non-OECD countries and OECD countries. Figure 1 (b) illustrates the results of Non-OECD countries. We find that all of the measures regarding deviations slightly increase over the sampled periods, and has a higher increase than seen in the world results. Overall, the results of Non-OECD countries indicate that the variability of the energy per capita data

series, slightly increases or have insignificant changes. The results for the OECD countries showed a different trend. Figure 1 (c) shows that all of the measures decreased over the time period between 1971 and 2001. The results present that the variability of the energy per capita data series decreases over the sample time period for the OECD countries, which implies that energy per capita for OECD converges.

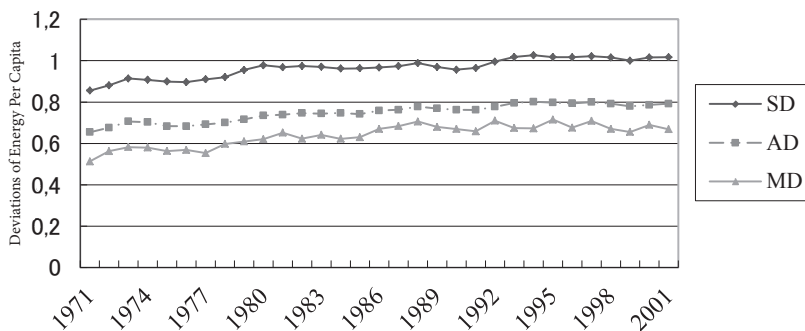
Figure 1: *Deviations of Energy Per Capita.*

(a) World (b) Non-OECD countries (c) OECD countries

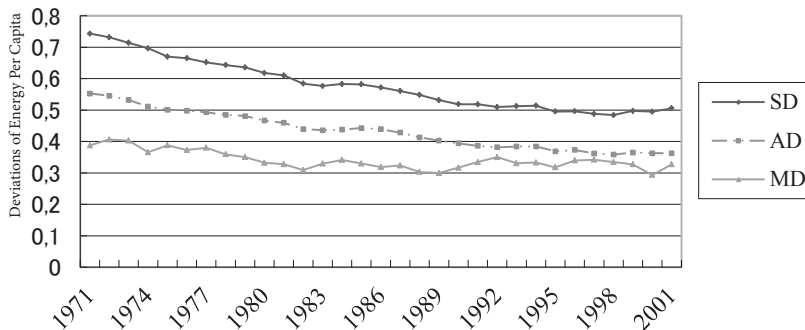
(a) World



(b) Non-OECD Countries



(c) OECD Countries

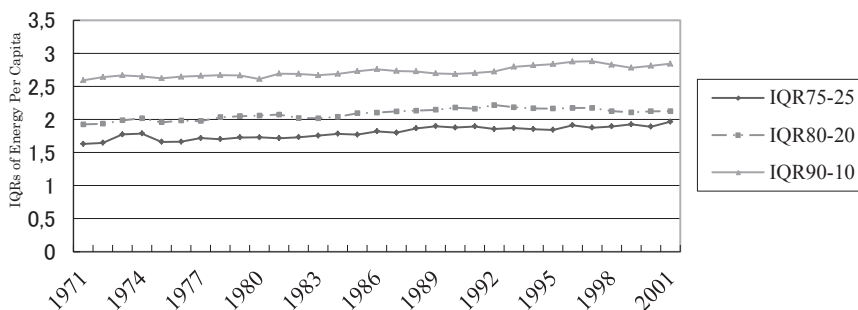


According to the analysis using the IQR, which focuses on the variability in the centre of the distribution of the data, Figure 2 (a) which represents the results of the world, shows that there is only a slight increase with all the IQR measures during the sample period. This means that there is very little evidence of convergence with energy per capita. Furthermore, the results of the IQR from observations towards the centre of the data showed a slightly stronger divergence of energy per capita. This implies that at a world level, the countries which are towards the centre of the data have a tendency to diverge concerning energy per capita. Concerning the results of the Non-OECD countries, Figure 2 (b) indicates that there was a slight increase which was slightly larger than the results at the world level. The increase was strongest with *IQR90-10* and there was a tendency to diverge the further the observations of the IQR were from the centre of the data. We were able to find from these results that Non-OECD countries that are located toward the tails of the data are more inclined to diverge concerning energy per capita. On the other hand, the results of the OECD countries shown in Figure 2 (c) illustrate a decrease with all of the IQR measures indicating evidence of convergence. The decrease is especially strong with *IQR90-10* which indicates that the OECD countries toward the tail of the data have a smaller difference in energy per capita. We found that these results of the IQR were consistent to the results of the deviation analysis and that energy per capita slightly diverges for the world and Non-OECD countries, but showed convergence for OECD countries.

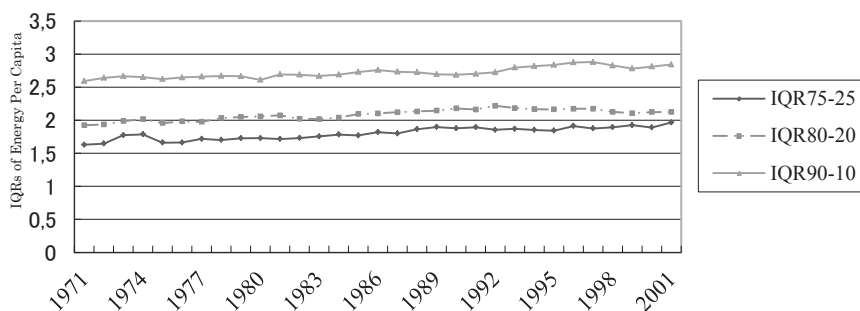
Figure 2: *IQRs of Energy Per Capita.*

(a) World (b) Non-OECD Countries (c) OECD Countries

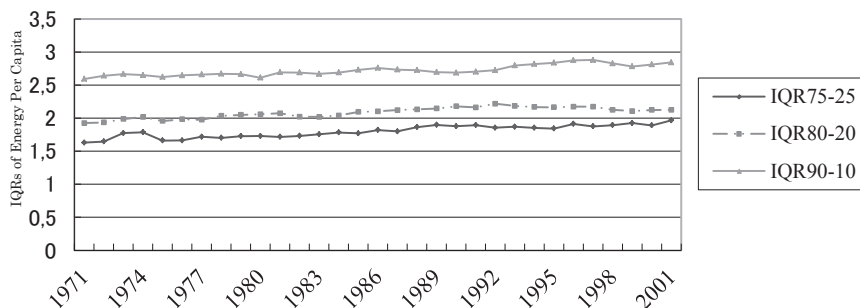
(a) World



(b) Non-OECD Countries



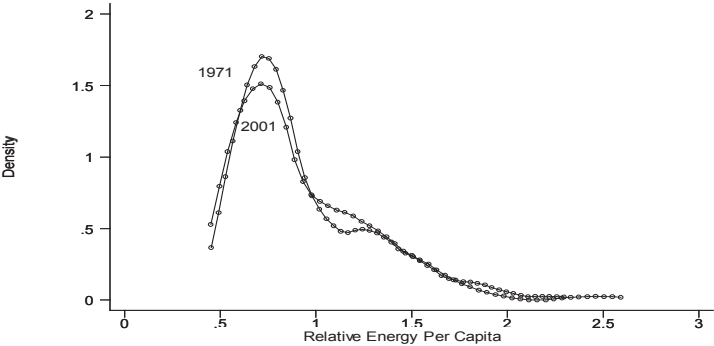
(c) OECD Countries



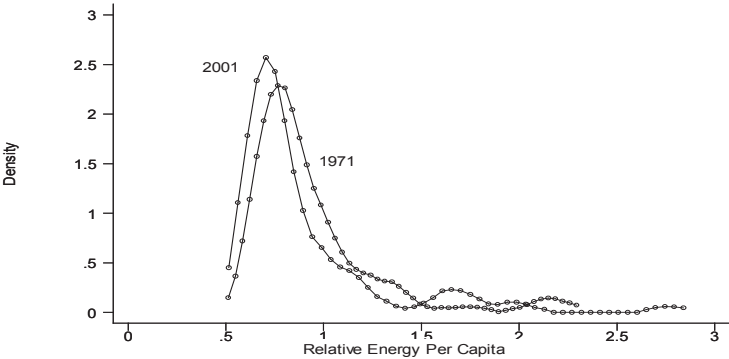
As described in Section 3, these deviations and IQRs do not characterize the cross-sectional distribution over time. Figure 3 illustrate comparison of the kernel densities between the beginning of the sample period (1971) and the end of the sample period (2001). Figure 3 (a) shows that for the distribution of world, relative energy per capita at 2001 is not meaningfully different from that of 1971 since the density of relative energy per capita around both mean (i.e. 1) and tails at 2001 are not different than those of 1971. As for the Non-OECD countries, Figure 3 (b) shows divergence of the relative energy per capita since the density of relative energy per capita around the mean at 2001 is lower than that of 1971 and the tails at 2001 are slightly thicker than those of 1971. With regards to the OECD countries, however, Figure 3 (c) shows that the relative energy per capita converge, since the density of relative energy per capita around the mean at 2001 is higher than that at 1971 and the tails at 2001 are thinner and shorter than those at 1971. These results support the results of the above deviations and IQRs analysis for OECD countries.

Figure 3: Comparison of Kernel Density Distribution of First Year with Last Year.
(a) World (b) Non-OECD Countries (c) OECD Countries

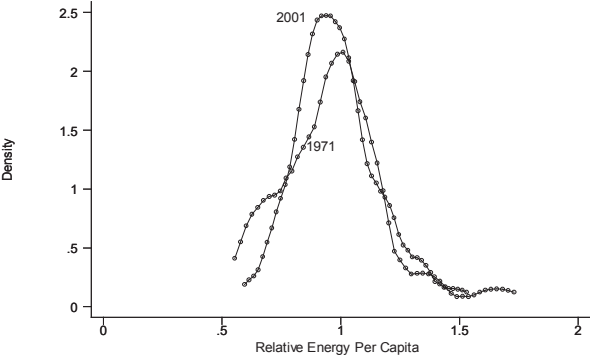
(a) World



(b) Non-OECD Countries



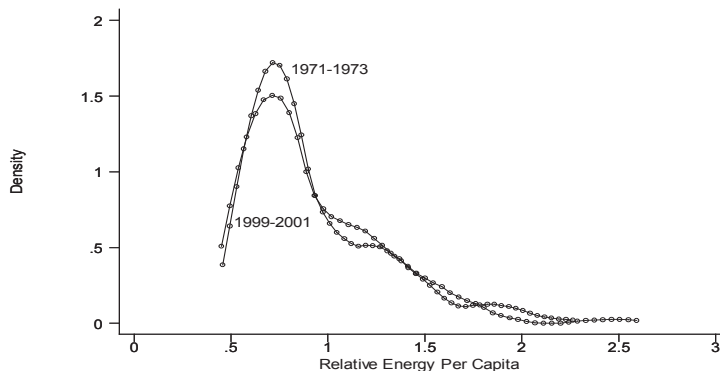
(c) OECD Countries



We next compare the kernel density distribution from observing the first several years of the sample period and the last several years. This will increase the number of observations and obtain a more robust result than comparing the first year of the sample period to the last year of the sample period. So we compared the kernel density distribution analysis for the period from 1971 to 1973 to the period from 1999 to 2001⁵. As shown in Figure 4 (a) which illustrates the result of the world analysis, there is little difference between the kernel density distributions for the period 1971 to 1973 to the distribution of the period 1999 to 2001. The result is consistent to the result found when comparing the distribution of the first and last year of the sample period and we can conclude that there is no evidence of convergence for relative energy per capita at the world level. These results are also in line with the previous results of the deviations, and IQRs. The results for Non-OECD countries are illustrated in Figure 4 (b). It shows that the result of the comparison between the kernel density distribution for the period of 1971 to 1973 and the period 1999 and 2001 was that the kernel density distribution was thicker in the centre for the period of 1971 to 1973. This result was consistent to the result of the comparison of the kernel density distribution for the first and last year of the sample period which is an indication that there is a divergence in relative energy per capita with Non-OECD countries. The results of the kernel density distribution for Non-OECD are consistent with the previous results of the deviations and IQRs. As indicated in Figure 4 (c), we find different results with the comparison of the kernel density distribution of the OECD countries. In this case, the kernel density distribution was thinner in the centre and thicker in the tails for the period of 1971 to 1973, indicating a convergence. This OECD result for the kernel density distribution also supports the previous results of the deviations and IQRs.

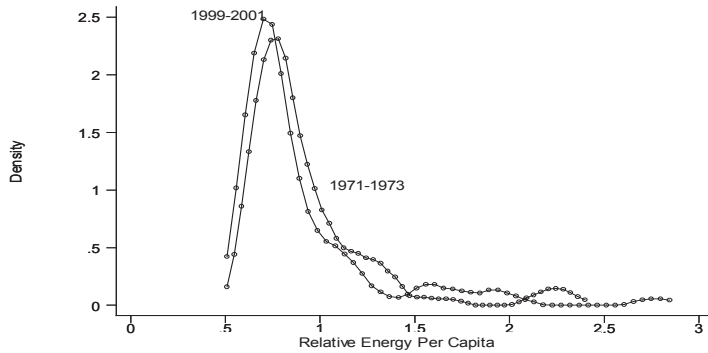
Figure 4: *Comparison of Kernel Density Distribution of First 3 Years with Last 3 Years.* (a) World (b) Non-OECD Countries (c) OECD Countries

(a) World

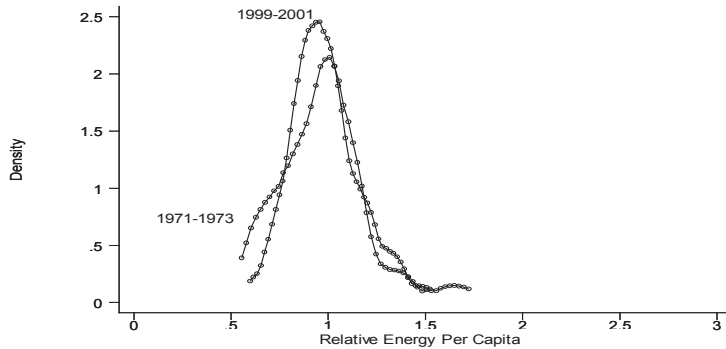


⁵ Comparison between the kernel density distribution of 1971 to 1980 and 1992 to 2001 and the comparison between 1971 to 1975 and 1997 to 2001 was also conducted for the world, Non-OECD countries and OECD countries and all showed similar results. These are available from the author upon request.

(b) Non-OECD Countries



(c) OECD Countries



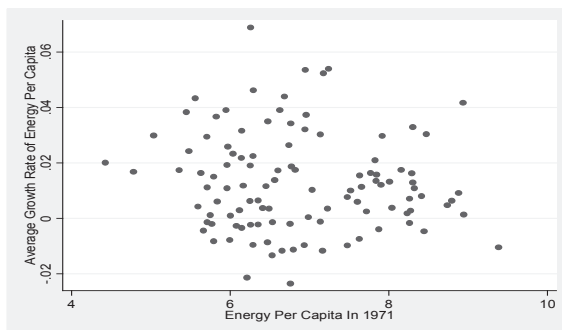
These results of the kernel density distribution are also supported by the β convergence analysis. According to Figure 5 (a) and (b), which represent the case for the world and Non-OECD countries respectively, the plots do not show any consistent relationship between the initial level of energy per capita and the average growth rate of energy per capita. We will examine this further in Table 2. The results of the cross-sectional econometric analysis for the world and Non-OECD, show significant heteroscedasticity when performing the Breusch-Pagan/Cook-Weisberg test. Hence, we use the OLS with robust standard error which is based on the Huber/White/sandwich estimator of variance. As a result, in both the world and Non-OECD countries, we find no significant evidence of convergence⁶. On the other hand, according to Figure 5 (c), convergence seems to occur for OECD countries.

⁶ We perform the estimations of standard errors by using the bootstrap and the jackknife method. The results concerning statistical significance of initial level of energy per capita are the same as those from robust standard error which is based on Huber/White/sandwich estimator of variance.

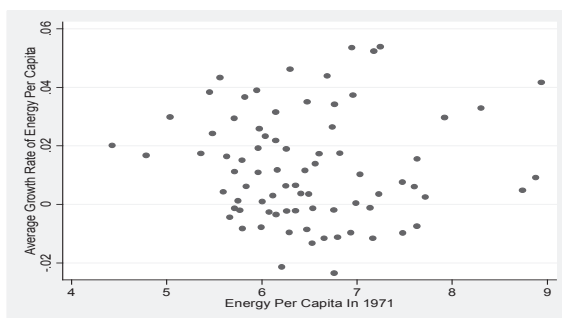
Figure 5: *Relationship between Initial Energy Per Capita and the Average Growth Rate of Energy Per Capita.*

(a) World (b) Non-OECD Countries (c) OECD Countries

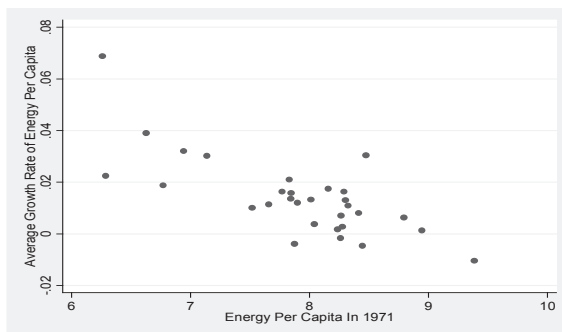
(a) World



(b) Non-OECD Countries



(c) OECD Countries



To confirm this, we performed the cross-sectional econometric analysis. Since we cannot reject the null hypothesis of constant variance, this time we use the OLS with normal standard error for OECD countries. The results in Table 2 suggest that countries with higher initial level of energy per capita have lower average growth rate of energy per capita at a significant level of one percent which implies that evidence of convergence among OECD countries has been found. The speed of the convergence which is represented by λ was 0.0005011.

Table 2: β Convergence Analysis of Energy Per Capita

	World		Non-OECD	OECD	
	OLS with Robust		OLS with Robust	OLS	
	S.E.		S.E.		
Energy per capita 1971 (β)	-0.0017074		-0.000084	-0.0154144	***
	(-1.28)		(-0.04)	(-5.88)	
α	0.0246195	**	0.0129504	0.1358455	***
	2.58		0.89	6.54	
λ	0.0000551		2.71E-06	0.0005011	***
	(1.28)		(0.04)	(5.84)	
Breusch-Pagan / Cook-Weisberg test	0.82		1.43	7.03	***
No. of Obs.	108		78	30	

Robust standard error is based on Huber/White/sandwich estimator of variance
T-statistics reported in parentheses.
*, ** and *** denote significance at 90%, 95% and 99% confidence levels, respectively.

Future Projections

We have examined the results regarding historical evaluation of energy per capita. Next, we will review future distribution of energy per capita. Table 3 (a) presents the Markov chain transition matrix for relative energy per capita over 1971 to 2001 and the estimated ergodic distribution for the world. For example, it shows that a country in the lowest category where energy per capita is less than one-half of the world average has approximately 99 percent probability of remaining in that category the following year and a country in the highest category where energy per capita is more than double the world average has approximately 97 percent probability of remaining in that category the following year. The high probabilities along the diagonal suggest a high degree of persistence in countries' relative energy per capita. The long-run steady state (ergodic) distribution of relative energy per capita shows that two third of the world would be expected to be in the lowest or highest category of relative energy per capita. Around one out of four countries would have energy per capita within the two categories which are around the world average (i.e. energy per capita between 0.75 and 2 of the world average), indicating that the estimated ergodic distribution was not compressed around the average.

Table 3: *Estimates of Transition Matrix and Ergodic Distribution (Energy Per Capita Relative to the Sampled Countries' Average): 1 Year Transitions.*

(a) World (b) Non-OECD Countries (c) OECD Countries

(a) World

Upper Endpoint					
Upper Endpoint	0.5	0.75	1	2	∞
0.5	0.987	0.013	0.000	0.000	0.000
0.75	0.098	0.816	0.082	0.004	0.000
1	0.000	0.103	0.787	0.109	0.000
2	0.000	0.000	0.030	0.948	0.022
∞	0.000	0.000	0.000	0.033	0.967
Ergodic	0.52	0.07	0.06	0.20	0.15

(b) Non-OECD Countries

Upper Endpoint					
Upper Endpoint	0.5	0.75	1	2	∞
0.5	0.978	0.022	0.000	0.000	0.000
0.75	0.118	0.835	0.047	0.000	0.000
1	0.000	0.169	0.761	0.070	0.000
2	0.000	0.000	0.050	0.921	0.030
∞	0.000	0.000	0.000	0.037	0.963
Ergodic	0.56	0.15	0.06	0.13	0.10

(c) OECD Countries

Upper Endpoint					
Upper Endpoint	0.5	0.75	1	2	∞
0.5	0.972	0.028	0.000	0.000	0.000
0.75	0.000	0.963	0.037	0.000	0.000
1	0.000	0.012	0.948	0.040	0.000
2	0.000	0.000	0.040	0.944	0.015
∞	0.000	0.000	0.000	0.120	0.880
Ergodic	0.15	0.15	0.29	0.36	0.05

Table 3 (b) presents the transition matrix over 1971 to 2001 and the estimated ergodic distribution for relative energy per capita of Non-OECD countries. The high probabilities along the diagonal suggest a high degree of persistence in countries' relative energy per capita. We find the triple-diagonal condition observed in studies on income convergence which means that the transition probabilities that are not on the three main diagonals are zero. This suggests that Non-OECD countries do not experience very substantial changes in their energy per capita relative to the Non-OECD countries' average. The ergodic distribution of relative energy per capita shows that around two third of the Non-OECD countries would be expected to be in the lowest or highest category of relative energy per capita. Around one out of five of the Non-OECD countries would have energy per capita within the two categories which are around the Non-OECD countries' average (i.e. relative energy per capita between 0.75 and 2 of Non-OECD countries' average), implying that the estimated ergodic distribution was not compressed around the average.

Table 3 (c) presents the transition matrix over 1971-2001 and the estimated ergodic distribution for relative energy per capita of OECD countries. The triple-diagonal condition is found once more, suggesting that OECD countries do not show meaningful changes in their energy per capita relative to the OECD countries' average as with the Non-OECD countries. The high probabilities along the diagonal suggest an extremely high degree of persistence in countries' relative energy per capita. The estimated ergodic distribution of relative energy per capita shows that one out of five of the OECD countries would be expected to be in the lowest or highest category of relative energy per capita. Around two third of OECD countries would have energy per capita within the two categories which are around the OECD countries' average (i.e. relative energy per capita between 0.75 and 2 of OECD countries' average) which indicates that the distribution is compressed around the average.

The estimated ergodic distribution is affected by the period that has been chosen to construct the transition matrix. The estimated ergodic distributions for the transition matrices for the world, Non-OECD and OECD samples for the following periods: 1971 to 2001; 1981 to 2001; and 1991 to 2001 are shown in Table 4. As for the world, the estimated ergodic distribution for transition matrices for all of the periods show a similar trend as seen in Table 4 (a). According to Table 4 (b), which show the results for Non-OECD countries, the estimated ergodic distribution for transition matrices based on more recent sample periods shows a slightly less compact distribution illustrated by a thicker tail. Table 4 (c) shows that in the case of the OECD countries, the relative energy per capita exhibits thinner tails of the estimated ergodic distribution over shorter periods. This suggests that the estimated ergodic distribution based on more recent sample periods shows a more compact distribution.

Table 4: Estimates of Ergodic Distributions based on Various Time Periods (*Energy Per Capita Relative to the Sampled Countries' Average*): 1 Year Transitions.

(a) World (b) Non-OECD Countries (c) OECD Countries

(a) World

Time Period	Upper Endpoint				
	0.5	0.75	1	2	∞
1971-2001	0.52	0.07	0.06	0.20	0.15
1981-2001	0.52	0.07	0.06	0.21	0.14
1991-2001	0.52	0.07	0.07	0.20	0.14

(b) Non-OECD Countries

Time Period	Upper Endpoint				
	0.5	0.75	1	2	∞
1971-2001	0.56	0.15	0.06	0.13	0.10
1981-2001	0.58	0.13	0.06	0.12	0.11
1991-2001	0.59	0.12	0.07	0.12	0.10

(c) OECD Countries

Time Period	Upper Endpoint				
	0.5	0.75	1	2	∞
1971-2001	0.15	0.15	0.29	0.36	0.05
1981-2001	0.13	0.18	0.30	0.35	0.04
1991-2001	0.08	0.21	0.34	0.33	0.04

Further to the previous one year Markov transition matrix we also performed a five year Markov transition matrix based on the period from 1971 to 2001, since as explained in Section 3, the transition periods longer than one year reduce the impact on the estimated transition matrix for frequent fluctuation. According to Table 5 (a), the world results of the five year transition matrix indicate that the countries in the lowest and highest category where energy per capita is less than one-half of the world average or more than double the world average and the category by the world average (between 1 and 2) have high probabilities along the diagonal. The other category by the world average (between 0.75 and 1) did not have a high probability. This means that half of the countries in this category are not likely to remain in this category in the following five years. Transition probabilities off the main diagonals that are not zero are increasing, implying that countries experiencing more than double or less than half of relative energy per capita increases over a five year period compared to a one year. Since the allocated time for relative energy per capita to change is longer in a five year period this is a reasonable outcome. The estimated ergodic distribution of the five year transitions had similar results to the estimated ergodic

distribution of the one year transitions and two third of the countries are located in the lowest and highest categories and one fourth in the two categories around the average resulting in a non compressed distribution.

Table 5: *Estimates of Transition Matrix and Ergodic Distribution (Energy Per Capita Relative to the Sampled Countries' Average): 5 Year Transitions.*

(a) World (b) Non-OECD Countries (c) OECD Countries

(a) World

Upper Endpoint	Upper Endpoint				
	0.5	0.75	1	2	∞
0.5	0.967	0.032	0.001	0.000	0.000
0.75	0.209	0.544	0.214	0.028	0.005
1	0.014	0.194	0.525	0.259	0.007
2	0.000	0.000	0.072	0.884	0.043
∞	0.000	0.000	0.000	0.078	0.922
Ergodic	0.52	0.07	0.06	0.20	0.15

(b) Non-OECD Countries

Upper Endpoint	Upper Endpoint				
	0.5	0.75	1	2	∞
0.5	0.956	0.044	0.000	0.000	0.000
0.75	0.290	0.604	0.104	0.003	0.000
1	0.025	0.320	0.434	0.221	0.000
2	0.004	0.038	0.106	0.787	0.065
∞	0.000	0.000	0.000	0.067	0.933
Ergodic	0.57	0.14	0.06	0.12	0.11

(c) OECD Countries

Upper Endpoint	Upper Endpoint				
	0.5	0.75	1	2	∞
0.5	0.856	0.144	0.000	0.000	0.000
0.75	0.000	0.889	0.111	0.000	0.000
1	0.000	0.043	0.900	0.057	0.000
2	0.000	0.000	0.095	0.880	0.025
∞	0.000	0.000	0.000	0.283	0.717
Ergodic	0.14	0.16	0.30	0.35	0.05

Concerning the Non-OECD countries, the results of the five year transition matrix in Table 5 (b) show high probabilities in the lowest category, highest category and the one by the average (between 1 and 2). There are some transition probabilities which are not zero appearing off the three main diagonals which suggest that some of the Non-OECD countries have shown a significant change in relative energy per capita over the five year periods. This can be explained with some Non-OECD countries having stronger economic growth rates compared to OECD countries which effect the growth of energy per capita. The estimated ergodic distribution of the five year transitions show similar results to the estimated ergodic distribution of the one year and two third of the countries are included in the lowest and highest categories and one fifth can be found in the two categories around the average which illustrates a distribution which is not compressed around the average.

For OECD countries, the results of the five year Markov transition matrix in Table 5 (c) are consistent to the one year and show high probabilities along the diagonal. The transition probabilities off the three main diagonals are also similar which indicates that there are no major changes to relative energy per capita even in the five year period. The estimated ergodic distribution of the five year transitions, like the estimated ergodic distribution for the one year transitions show one fifth of the countries in the lowest and highest categories and two third in the two categories around the average. This illustrates a compressed distribution around the average which was not evident in the estimated ergodic distributions for the world and Non- OECD countries.

Since the transition period can affect the results, in order to predict future distribution, we have based the estimated ergodic distribution for the five year transition matrices on the periods from 1981 to 2001 and from 1991 to 2001 and compared them with the ergodic distribution from 1971 to 2001. According to Table 6 (a), the results for the world were similar to the estimated ergodic distribution of the one year transitions and the distribution was not compressed with two third of the countries in the lowest and highest categories and one fourth in the two categories around the average. As illustrated in Table 6 (b) and (c), for both Non-OECD countries and OECD countries, the results of the estimated ergodic distribution were similar for the five year transition as for the one year transition. In other words, it did not exhibit a compressed ergodic distribution for Non-OECD countries, but did exhibit compressed ergodic distribution for OECD countries.

Table 6: *Estimates of Ergodic Distributions based on Various Time Periods (Energy Per Capita Relative to the Sampled Countries' Average): 5 Year Transitions.*

(a) World (b) Non-OECD Countries (c) OECD Countries

(a) World

Time Period	Upper Endpoint				
	0.5	0.75	1	2	∞
1971-2001	0.52	0.07	0.06	0.20	0.15
1981-2001	0.52	0.07	0.06	0.20	0.15
1991-2001	0.52	0.07	0.08	0.19	0.14

(b) Non-OECD Countries

Time Period	Upper Endpoint				
	0.5	0.75	1	2	∞
1971-2001	0.57	0.14	0.06	0.12	0.11
1981-2001	0.58	0.13	0.06	0.12	0.11
1991-2001	0.60	0.11	0.07	0.12	0.10

(c) OECD Countries

Time Period	Upper Endpoint				
	0.5	0.75	1	2	∞
1971-2001	0.14	0.16	0.30	0.35	0.05
1981-2001	0.11	0.19	0.31	0.35	0.04
1991-2001	0.08	0.21	0.35	0.33	0.03

5. CONCLUSIONS

With the absence of any limitation to the access to natural resources and the environment there is the possibility of 'free riding' and over exploitation of them. Currently certain countries pollute and exploit resources and other countries are affected through the environmental degradation and resource depletion of the global environment. For this reason, it is important to focus on the possibility of divergence of environmental quality indicators. In order to consider this issue, energy per capita can be used as a proxy for pollution and resource use. In order to examine this, this paper analysed both the existence of historical convergence of energy per capita and the forecast of future distribution. Concerning historical convergence, the energy per capita for each country is analysed and then the existence of energy convergence for the world, OECD and Non-OECD countries are examined. From the study of the energy per capita for each country, it was found that the highest growing countries were the NIES and oil producing countries and the countries with the lowest growth in energy per capita were the developed countries with the highest income per capita and less developed countries. If we study the world, Non-OECD, and OECD countries, it was found that for both the world and Non-OECD countries we find

no evidence of convergence for energy per capita with any of the measures used here—deviations, IQRs, kernel densities distribution and β convergence analysis. This implies that there was no evidence found of any improvement in “environmental inequality” among both the world and Non-OECD countries over the time period between 1971 and 2001. On the other hand, with OECD countries, we found that energy per capita converged with all of the measures used, which suggests movement towards “environmental equality” among OECD countries.

These results imply that it is required to take precautions concerning the absence of free access to natural resources and the environment which may cause certain countries to damage and exploit them affecting other countries and causing environmental inequality. Measures such as a polluters pay policy where optimal pollution tax or energy tax is introduced may be a possibility to address this inequality. This could be introduced as an environmental policy to countries with high level of growth in energy per capita such as BRICS and oil producing countries.

Concerning forecasting of future energy distributions, from the results of the Markov chain transition matrix, we find no evidence of a compressed ergodic distribution in energy per capita at the world level and with Non-OECD countries. On the other hand, OECD countries showed evidence of a compressed distribution around the average. This may be an indication that there are variances in environmental regulations and technological development for the world and Non-OECD countries but environmental regulation and technology is converging for OECD countries. If so, this could mean that in the future, a regional approach to improve the environment could be taken amongst OECD countries and gaining an agreement on policies such as climate change may become a possibility between OECD countries.

With policymakers continuing to discuss on ways to address climate change, the information on future distribution of environmental indicators will be beneficial. This paper studies the historical distribution of energy per capita and future predictions. Future studies using other indicators of pollution such as energy per unit of GDP would provide a broader understanding and studies within other regions such as Asia, Europe or Africa could also provide insight for policymakers.

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Appendix A – Definition of Deviations

The following three deviations define the standard deviation (SD), average absolute deviation (AD), and median standard deviation (MD)

$$SD = \sqrt{\frac{\sum_{i=1}^N (Y_i - \bar{Y})^2}{N-1}} \quad (A1)$$

where i denote country, and N is the number of countries. Y_i is the natural logarithm of energy per capita of country i . \bar{Y} represents the average natural logarithm of energy per capita of the observed group.

$$AD = \frac{\sum_{i=1}^N (|Y_i - \bar{Y}|)}{N} \quad (A2)$$

where $|Y|$ is the absolute value of Y .

$$MD = median(|Y_i - Y^*|) \quad (A3)$$

where Y^* represents the median of the data.

Appendix B – Sampled Countries (Countries in **bold** are the OECD countries)

Albania; Algeria; Angola; Argentina; **Australia**; **Austria**; Bahrain; Bangladesh; **Belgium**; Benin; Bolivia; Brazil; Brunei; **Bulgaria**; Cameroon; **Canada**; Chile; China; Colombia; Congo Dem. Rep.; Congo, Rep.; Costa Rica; Cote d'Ivoire; Cuba; Cyprus; **Czech Republic**; **Denmark**; Dominican Republic; Ecuador; Egypt Arab Rep.; El Salvador; Ethiopia; **Finland**; **France**; Gabon; **Germany**; Ghana; **Greece**; Guatemala; Haiti; Honduras; Hong Kong, China; **Hungary**; **Iceland**; India; Indonesia; Iran Islamic Rep.; Iraq; **Ireland**; Israel; **Italy**; Jamaica; **Japan**; Jordan; Kenya; Korea, Dem. Rep.; **Korea Rep.**; Kuwait; Lebanon; Libya; **Luxembourg**; Malaysia; Malta; **Mexico**; Morocco; Mozambique; Myanmar; Nepal; **Netherlands**; **New Zealand**; Nicaragua; Nigeria; Norway; Pakistan; Panama; Paraguay; Peru; Philippines; **Poland**; **Portugal**; Qatar; Romania; Saudi Arabia; Senegal; Singapore; **Slovak Republic**; South Africa; **Spain**; Sri Lanka; Sudan; **Sweden**; **Switzerland**; Syrian Arab Republic; Tanzania; Thailand; Togo; Trinidad and Tobago; Tunisia; **Turkey**; United Arab Emirates; **United Kingdom**; **United States**; Uruguay; Venezuela RB; Vietnam; Yemen, Rep.; Zambia; Zimbabwe

EXPLORING RELATIONSHIPS AMONG NEED- AND SELF-RELATED ASPECTS OF TOURIST EXPERIENCE DRIVERS

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ABSTRACT: *This paper addresses some central, yet neglected, motivational issues of tourist experiences. Tourists' motives for seeking uniqueness to create memorable experiences are addressed as significant aspects of destination decision making. Thus, the aim of this paper is to explore the self-related antecedents of consumers' need for uniqueness in the tourism context. Results of a quantitative analysis among 192 young travelers in Slovenia using structural equation modeling show that their independent self-construal is positively related to consumers' need for uniqueness. However, there was no relationship found to be significant between the interdependent self-construal and any dimensions of consumers' need for uniqueness. The findings of the study provide deeper insights into underlying motives for tourism experiences and offer implications for tourism practice.*

Keywords: *consumer behavior, tourism, tourist experience, consumers' need for uniqueness, independent self-construal, interdependent self-construal*

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1 INTRODUCTION

Tourism as an important economic sector and a growing industry has been consistently increasing in importance, as international tourism has increased each year; thus, tourism destinations worldwide are continuously making efforts to reach tourists with various offers (World Tourism Organization, 2016). To increase tourists' satisfaction, destinations are focusing on strategies to emphasize destinations' attractiveness and competitive positions (Dmitrović et al., 2009). Moreover, in recent decades, the tourism and hospitality literature has acknowledged the emerging meaning of tourist experiences (Cohen, 1979; Quan & Wang, 2004), especially in the field of tourism marketing, and have connected its economic value (Pine & Gilmore, 1998) to not only tourism products and services but also destinations (Volo, 2010). Thus, to build involved relationships with tourists, destination marketers should provide positive experiences to tourists (Cetin & Bilgihan, 2016).

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In this vein, Williams (2006) claimed that the marketing strategies employed by tourist destinations should focus more on the customers than just the destination offer itself due to tourists' changing and diverse motivations and behaviors, since, as reported by several other authors (e.g., Kim, 2010; Pizam, 2010), tourism essentially offers and sells a range of experiences. As a result of these factors, customer experience management in tourism and hospitality has numerous challenges. As found by Hwang and Seo (2016), a large portion of studies remain conceptual and related to experiences measurement rather than with rigorous empirical studies that would provide insight into experiences antecedents that are managerially relevant. Among these drivers internal ones such as consumer motives are particularly neglected (Taheri, Farrington, Gori, Hogg, & O'Gorman, 2017). Hence, it is important to note that tourism offers are perceived differently by different tourist segments, depending on their specific needs (Wong & Wan, 2013).

In this paper, we follow the basic notion of uniqueness theory, which posits that individuals sometimes acquire a need for uniqueness motivation as they are uncomfortable when they feel too much similarity to others. They behave according to this feeling, which is reflected in their purchasing behavior (Snyder & Fromkin, 1977; 1980). In terms of consumption, need for uniqueness (NFU) can be satisfied not only through products and services, but also through experiences (Lynn & Harris, 1997a). What is more, in order to satisfy this uniqueness-seeking motivation, individuals strive to enhance their social and self-image (Tian, Bearden, & Hunter, 2001). Applying this notion to a tourism context, it can be assumed that the greater the similarity to others, the more tourists are motivated to satisfy their need for uniqueness and enhance/emphasize their selves when deciding where to travel and spend their leisure time. Since tourists connect their selves with the chosen destination in order to seek unique experiences (Wang & Hsu, 2010), the question arises whether, and how, tourist's actual experiences might satisfy this need for uniqueness and to what degree this is driven by their selves.

Considering this, a gap in tourism research exists in regard to underlying tourist motivations. Accordingly, these issues might pose new challenges for practitioners. Managerially, understanding tourism motivation and its determinant, the need for uniqueness can help them facilitate more memorable tourism experiences, while understanding different psychological motives could help marketers identify and attract different tourist segments.

The purpose of this paper is to respond to the identified imperatives and redress these gaps by investigating the influence of self-construal on consumers' need for uniqueness (CNFU) in a tourism context. Thus, the paper discusses and comprehensively explores (theoretically and empirically) relevant yet overlooked constructs, namely CNFU and self-construal. To obtain deeper insight into the self-related drivers of uniqueness-seeking motivation in terms of tourism experiences, more research should be done exploring the underlying psychological motivations of tourists in this regard. Firstly, the paper introduces the theoretical concepts of CNFU and self-construal. Further attention is given to empirical research, where the proposed conceptual model is empirically developed and confirmed. In line with the findings of the empirical study, we also indicate managerial

implications and provide some baselines for further research. Lastly, the limitations of the study are discussed.

2 THEORETICAL BACKGROUND

2.1 Consumers' Need for Uniqueness

The notion of the need for uniqueness is based on the theory of uniqueness. Social psychologists and uniqueness theorists (e.g., Snyder, 1992; Snyder & Fromkin, 1977, 1980) argued that individuals often find themselves in a social position in which they feel either too similar to or too different from others. Evidence points to a desire on the part of individuals to belong in their comfort zone, while still projecting a degree of uniqueness (He, Cong, Liu, & Zhou, 2010). Uniqueness theory's original theoretical concept is closely related to Brewer's (1991) Optimal Distinctiveness Theory (ODT), which posits that individuals have both a need to assimilate and a need to differentiate themselves from others. As such, they are always seeking to find a balance between the two (Ryu & Han, 2009). Ruvio (2008) stressed that everyone wants to feel unique to a certain degree without losing the sense that they are like everybody else (accepted as a part of a group while still sometimes wanting to be unlike others). In line with this notion, Snyder and Fromkin (1980) believe that people crave a feeling of uniqueness. In contemporary consumer behavior, Tian et al. (2001) conceptualized the concept of CNFU on the basis of the theory of uniqueness. As such, CNFU is simply the extension of NFU into the field of consumer behavior (Ruvio, 2008). Tian et al. (2001, p. 52) explained CNFU as "the trait of pursuing differentness relative to others through the acquisition, utilization, and disposition of consumer goods for the purpose of developing and enhancing one's self-image and social image". The authors conceptualized CNFU as a multidimensional construct including three dimensions. The first dimension, creative choice counter-conformity (CC), explains consumer purchase choices as differentiation between them and other consumers while at the same time maintaining a choice that is still within social norms (Tian et al., 2001). The second dimension of CNFU, unpopular choice counter-conformity (UC), is the most extreme dimension, as it reflects consumer choices that deviate from social norms (Tian et al., 2001) and thus are considered as not acceptable by others (Knight & Kim, 2007). Finally, avoidance of similarity (AS), the third dimension of CNFU, is the tendency of consumers to strive to be different from others by avoiding purchasing products that are commonplace and accepted by the general population (Tian et al., 2001).

Tian et al. (2001) explained CNFU as an individual difference, while others consider it a psychological trait (e.g., Zhan & He, 2012) or a mere trait (e.g., Gentina, Butori, & Heath, 2014). Regardless, all understand the CNFU concept as the motivation on the part of consumers to purchase a particular product or service that helps them satisfy their NFU and differentiate them from the masses. Moreover, researchers tend to agree that consumers may acquire and satisfy their need for uniqueness through different means in the context of consumption. Early studies based on uniqueness theory have demonstrated that the need for uniqueness can be satisfied by possessing rare products (e.g., Snyder,

1992; Lynn & Harris, 1997a; Tian et al., 2001), products with distinct product designs (e.g., Bloch, 1995), and new products (e.g., Lynn, 1991). More recent research has indicated that consumers can display their uniqueness through possessions of conspicuous products (e.g., Jang, Ko, Morris, & Chang, 2015), unique products (e.g., Lynn & Snyder, 2002; Simonson & Nowlis, 2000), products with distinct aesthetic characteristics (e.g., Mowen, Fang, & Scott, 2010), personalized products (e.g., Halepete, Littrell, & Park, 2009), and memorable acquisitions (e.g., Song & Lee, 2013). Consumers can even meet their need for uniqueness through the possession of products that can be used in a creative way (e.g., Tian et al., 2001).

With the increasing academic attention to CNFU over the last decade, a rich body of literature has come to exist regarding how CNFU is applied to several product types that do not specifically express uniqueness itself, but represent or signal consumer uniqueness in some way and enable consumers to differentiate themselves from others, even in regard to everyday products or services. However, little research has been devoted to the focus of CNFU in relation to the purchase behavior for services. Even less empirical evidence exists about the role of CNFU in terms of tourism with an emphasis on experiences, with a few exceptions (e.g., Ding & Keh, 2016; Liu, Chen, & He, 2015). To the best of our knowledge, no studies have explored how tourists' need for uniqueness may influence their destination choice driven by its self-related antecedents, despite a call from prior studies (e.g., Ruvio, 2008; Ruvio, Shoham, & Makovec Brenčič, 2008) for further research in this setting. Due to the general consensus about the intangibility of tourism, we argue that tourism experiences might satisfy consumers' need for uniqueness motivation, which is driven and fostered by their self-construal.

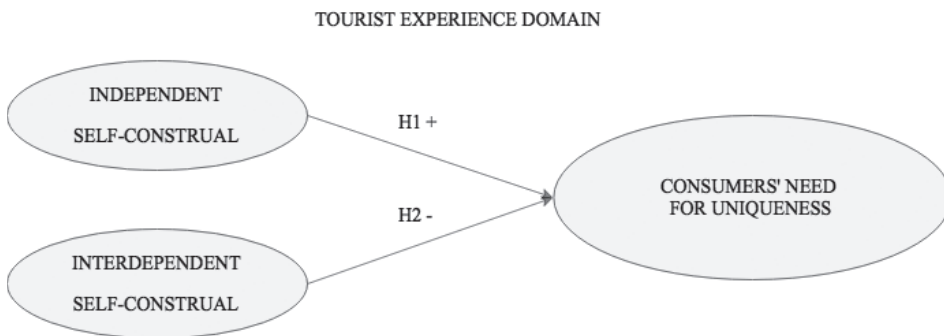
2.2 Self-construal

Academic attention in the field of psychology has long been paid to the research about the self (Cross & Madson, 1997), as well as in the field of consumer behavior following the notion that possessions can be considered as an extension of the self (Belk, 1988). In this vein, Tian et al. (2001) argued that drivers of CNFU can be found in the theory of consumption as an extension of self (Belk, 1988). In line with the research focus of this paper, we chose self-construal as a potential antecedent to CNFU as it refers to how individuals perceive themselves in relation to others (Cross, Bacon, & Morris, 2000; Lewis, Goto, & Kong, 2008; Markus & Kitayama, 1991). This might be in line with the concept that CNFU is a motivation manifested in comparison with others. More specifically, Agrawal and Maheswaran (2005, p. 841) defined the concept of self-construal as "the extent to which individuals view themselves either as an individuated entity or in relation to others." Accordingly, Markus and Kitayama (1991) conceptualized it through two separate facets. The authors argued that individuals hold a different self-construal (independent vs. interdependent) depending on their cultural background, while others have claimed that individuals can hold (at the same time) both self-construals, regardless of the cultural context (e.g., Matsumoto, 2003).

However, the literature agrees that individuals with a predominately independent self-construal hold a more “bounded, unitary, stable self” and are aware of their separation from others (Singelis, 1994, p. 581). Independents see themselves as separate from the group, as they want to be autonomous, unique, and independent (Markus & Kitayama, 1991). Contrarily, individuals with predominantly interdependent self-construal value connectedness with others, as they value group harmony and group belonging (Singelis, 1994). In addition, interdependents are prone to being concerned with identity, which depends on their relationship with others, as they put a lot of emphasis on the opinions of others (Markus & Kitayama, 1991), and thus follow the goals of their social group (Triandis, 1995).

Figure 1 presents the conceptual framework of this paper, which discusses and comprehensively explores (theoretically and empirically) two relevant yet overlooked constructs, namely CNFU and self-construal (independent and interdependent), which shape the tourist experiences domain. With this in mind, the central contention of this research is that self-construal plays a critical role as a relevant antecedent to CNFU in the domain of tourist experiences. Following the proposed framework, hypotheses development is discussed as follows.

Figure 1: *Conceptual framework of the impact of self-construal on CNFU in the tourist experience domain*



Note: For clarity, Figure 1 presents the CNFU concept as an overall concept, but in our research design it is conceptualized as a three-dimensional concept, namely CC (i.e., creative choice counter-conformity), UC (i.e., unpopular choice counter-conformity), and AS (i.e., avoidance of similarity).

2.3 Hypotheses development

CNFU motivates consumers to differentiate themselves from others with the aim of enhancing their social and self-image (Tian et al., 2001). Thus, in the current context, we follow the notion of Tian et al. (2001), who argued that antecedents of CNFU derive

from the theory of consumption as an extension of the self (Belk, 1988). As self-construal is considered a dimension of self that refers not only to the perception of one's self but his/herself in relation to others, we argue that in striving for a sense of uniqueness and specialness in relation to others, consumers' consumption is influenced by their self-construal. Applying this notion to tourism, we further follow Belk (1988), who stated that not only possessions but also experiences and even places can be considered as an extension of consumers' selves. In addition, although travel literature acknowledges that self-concept is an important driver of tourists' motivation and behavior, there is still scant research in this area (Cohen, Prayag, & Moital, 2014), especially regarding consumers' self-construal (Walker, Deng, & Dieser, 2001).

However, in consumer behavior literature, only a few studies have addressed the role of self-construal in uniqueness-seeking motivation. In particular, findings of a recent study in the case of scarce luxury fashion apparel, researchers found a positive relationship between independent self-construal and CNFU (Kastanakis & Balabanis, 2012, 2014). This implies that independents are inclined to obtain luxury products to satisfy their need for uniqueness in terms of all three facets of CNFU. In a similar vein, consumers with predominantly independent self-construal are motivated to seek uniqueness in their most important and most memorable product purchases (Song & Lee, 2013). Thus, the existing research evidence supports the conception of the role of independent self-construal in uniqueness-seeking motivation.

This is congruent with the main theoretical aspect of self-construal, as independents look for variety and uniqueness in their consumption (Markus & Kitayama, 1991; White & Argo, 2011) in order to differentiate themselves from other consumers (Markus & Kitayama, 1991; Zhang & Shrum, 2009). Considering the notion that consumers who are motivated to satisfy their need for uniqueness through products and services that are less conventional and counter-conform (Snyder, 1992; Tian et al., 2001) and less popular (Chan, Berger, & Van Boven, 2012), and that independents desire to be unique (Markus & Kitayama, 1991), they most likely have a higher need for uniqueness in comparison with others (in terms of all three facets of CNFU).

Moreover, it is important to note that meaningful tourism experiences play an important role in shaping tourists' self-identities (Noy, 2004), and some tourists like to be perceived by others through their travel experiences (Beerli, Meneses, & Gil, 2007). This implies that tourists who want to be independent, unique, and who value their originality most likely do not always follow the masses when choosing their vacation destinations. Thus, it can be expected that tourists who satisfy their need for uniqueness motivation through their travel experiences want to express and differentiate themselves in comparison with others, regardless of the CNFU facet. Reflecting this view, the following hypothesis is proposed:

H1 (H1a-H1c): Independent self-construal is positively related to CNFU (i.e., creative choice counter-conformity, unpopular choice counter-conformity, and avoidance of similarity).

As aforementioned, consumers with predominantly interdependent self-construal are willing to conform to group norms and value group harmony (Markus & Kitayama, 1991; White & Argo, 2011). Empirical evidence shows that interdependent self-construal is positively related to CNFU when consumers are purchasing what is most important and memorable to them (Song & Lee, 2013). On the contrary, Kastanakis and Balabanis (2012) expected a negative effect of interdependent self-construal on all three aspects of CNFU in the domain of luxury fashion. But in their context, they failed to prove the proposed negative relationship. Thus, it seems that there is some inconsistency in the extant research. It is important to note, however, that since its appearance in the consumer behavior literature, NFU is operationalized through different measures. In our research setting, we follow Kastanakis and Balabanis (2012, 2014), who conceptualized CNFU through three dimensions of uniqueness-seeking motivation. Indeed, if we adapt the previous findings to the context of tourism, we argue that interdependents do not strive to differentiate themselves from others, as they do not want to stand out from the crowd. When choosing a vacation destination, the more interdependents want to be similar to others by adapting to group harmony, the less they acquire NFU as they search for travel experiences, which are considered as acceptable and regular within their social group. In order to assimilate with others, they are not inclined to emphasize their individuality, as they feel comfortable with their existing selves and would rather stay within their regular travel habits. Thus, the following hypothesis is proposed:

H2 (H2a-H2c): Interdependent self-construal is negatively related to CNFU (i.e., creative choice counter-conformity, unpopular choice counter-conformity, and avoidance of similarity).

3 RESEARCH METHODOLOGY

3.1 Sample

The proposed model presented in Figure 1 was tested among undergraduate students from a Slovenian university. In total, 196 students were invited to participate in the survey, of which four students refused to participate. Thus, the final sample includes a total of 192 respondents (27.1% male and 72.9% female). All the completed questionnaires were usable, as the respondents were kindly asked to fill out the questionnaire to its end. Students represent a good sample for behavioral literature (e.g., Tian et al., 2001) since traits such as CNFU are not supposed to be influenced by, for example, income and social status.

3.2 Instrument

The respondents participated in a self-administered online survey. The questionnaire was developed based on the review of the literature and consisted of three parts, each part presenting the questions regarding the three constructs in a conceptualized model (i.e.,

CNFU, independent self-construal and interdependent self-construal). More specifically, CNFU was operationalized as a three-dimensional construct (i.e., CC, UC, and AS) using the CNFU-S shortened scale by Ruvio et al. (2008), each dimension consisting of four items. For the purpose of this study, items were adapted to the destination choice context. Participants were asked to rate each of the items regarding their most memorable vacation destination choice. The first dimension measuring creative choice counter-conformity (CC) included items such as “*I actively seek to develop my personal uniqueness by choosing special destinations.*” The second dimension measuring unpopular choice counter-conformity (UC) included items such as “*I enjoy challenging people’s tastes by visiting a specific destination even though my friends and/or family do not approve.*” The third dimension measuring avoidance of similarity (AS) included items such as “*When a destination I already visited becomes popular among the general population, I do not like to visit it anymore.*” In addition, two dimensions of self-construal (i.e., independent and interdependent) were measured using Singelis’s (1994) scale, combined with D’Amico and Scrima’s (2016) shortened version (SCS) of the scale. Ten items were used to measure independent self-construal (e.g., “*I enjoy being unique and different from others in many respects*”) and nine items to measure interdependent self-construal (e.g., “*I will sacrifice my self-interest for the benefit of the group I am in*”). All the items were measured on 7-point Likert scale (1-strongly disagree, 7-strongly agree).

3.3 Results and hypotheses testing

Since the theory for all the measurement items for each considered construct was already established and adapted from previous research work (Kastanakis & Balabanis, 2012, 2014), there was no need to explore the factor structure to test the measurement model. Thus, to test the measurement model, first, separate confirmatory factor analyses (CFA) were conducted to assess the validity and reliability of the items measured following Kastanakis and Balabanis (2014). CFA analyses were employed with LISREL 8.80 using the Maximum Likelihood estimation method. Due to high error variances, one item was eliminated for the CC dimensions of the CNFU construct, six items for independent self-construal, and five items for interdependent self-construal. Thus, 19 items were left which still allowed us to continue with the analysis.

After assessing the separate constructs, CFA analysis was employed to test the overall measurement model. The results of the measurement model have acceptable fit indices ($\chi^2=161.69$; $df=142$; $\chi^2/df=1.138$; $p=0.123$; $RMSEA=0.027$; $GFI=0.918$; $CFI=0.986$; $NNFI=0.983$ $SRMR=0.05$). Table 1 presents the measurement constructs along with the values of mean and standard deviation, average variance extracted (AVE), composite reliability (CR) and Cronbach’s alpha coefficients. The values for CR and Cronbach’s alpha are all above the cut-off value 0.6 - therefore, internal consistency is accepted (Fornell & Larcker, 1981). Additionally, the constructs’ reliability was assessed with AVE. Following Fornell and Larcker’s (1981) suggested cut-off value for AVE (i.e., 0.5), all sub-dimensions of the CNFU construct have good reliability (above or very close to 0.5), except the independent self-construal and interdependent self-construal, which have an AVE less

than 0.5. However, we decided to continue with the analysis following several authors (e.g., Bodlaj, 2010; Chen & Huang, 2016; Flynn & Goldsmith, 2017), retaining the constructs with AVEs less than 0.5 but more than 0.4. In particular, if we take into account that this is a first-time study in the present cultural environment, we considered both self-construals as adequate for further analysis. Moreover, as all the factor loadings for all items are statistically significant, convergent validity is still supported (Anderson & Gerbing, 1988).

Table 1: *Descriptive statistics, average variance extracted, composite reliability and Cronbach's alpha coefficients*

	Mean (M)	Standard Deviation (SD)	Average variance extracted (AVE)	Composite reliability (CR)	Cronbach's alpha
Independent self-construal	5.46	0.944	0.404	0.718	0.657
Interdependent self-construal	5.26	0.868	0.417	0.734	0.714
CNFU (CC)	5.02	0.942	0.485	0.620	0.710
CNFU (UC)	3.93	1.228	0.531	0.811	0.790
CNFU (AS)	3.62	1.469	0.674	0.891	0.889

Table 2 shows the correlation matrix to provide additional insight into the relationships between proposed constructs. In addition, discriminant validity was evaluated following Hair, Black, Babin, and Anderson (2010). The AVE values for each construct were higher than the squared correlations between each pair of constructs. Based on the results, discriminant validity was achieved (Fornell & Larcker, 1981), which additionally confirms our decision to continue with the analysis. Thus, we argue that the constructs are suitable for further analysis in this setting.

Table 2: *Correlation matrix*

	1.	2.	3.	4.	5.
1. CNFU (CC)	1	0.239	0.191	0.270	0.097
2. CNFU (UC)		1	0.290	0.024	-0.062
3. CNFU (AS)			1	0.156	-0.039
4. Independent self-construal				1	0.000
5. Interdependent self-construal					1

After assessing the measurement model, structural equation modeling was employed in order to examine the hypothesized relationships in the final model. Table 3 shows the

results for the final structural model, where the structural relationships are presented, including independent self-construal, interdependent self-construal and all three dimensions of CNFU. The goodness-of-fit statistics for the overall structural model are acceptable ($\chi^2=183.87$; $df=145$; $\chi^2/df=1.26$; $p=0.016$; $RMSEA=0.037$; $GFI=0.908$; $CFI=0.969$; $NNFI=0.964$; $SRMR=0.08$).

As proposed in H1, the results of the study show that independent self-construal has a positive and significant effect on two dimensions of CNFU, namely CC ($\beta=0.327$) and AS ($\beta=0.196$) - thus H1a and H1c are supported. However, the findings of the study do not support the significant positive relationship between independent self-construal and UC (H1b not supported). Thus, H1 is partially supported. Moreover, although we assumed a significant negative effect of interdependent self-construal on each dimension of CNFU (H2a-H2c), the empirical evidence does not support the proposed relationship. Therefore, H2 is not supported.

Table 3: *Hypotheses testing and results*

Path	H	Proposed direction	Standardized coefficient	t-value	Hypotheses
Independent self-construal → Consumers' need for uniqueness (CC)	H1a	+	0.327*	3.074	Supported
Independent self-construal → Consumers' need for uniqueness (UC)	H1b	+	0.068	0.654	<i>Not supported</i>
Independent self-construal → Consumers' need for uniqueness (AS)	H1c	+	0.196*	1.979	Supported
Interdependent self-construal → Consumers' need for uniqueness (CC)	H2a	-	0.162	1.254	<i>Not supported</i>
Interdependent self-construal → Consumers' need for uniqueness (UC)	H2b	-	-0.094	-0.719	<i>Not supported</i>
Interdependent self-construal → Consumers' need for uniqueness (AS)	H2c	-	-0.053	-0.434	<i>Not supported</i>
R ² (CC)=0.085; R ² (UC)=0.007; R ² (AS)=0.031					

4 DISCUSSION

The findings of the research revealed that self-construal is a relevant self-related and psychological predictor of CNFU, but only in terms of independent self-construal. In particular, the strongest effect was found between independent self-construal and the first dimension of CNFU (i.e., creative choice counter-conformity – CC) – thus H1a is

supported. This is congruent with the notion of the origins of uniqueness theory, where authors (e.g., Snyder & Fromkin, 1977, 1980) have stressed that consumers only want to be moderately different from others in terms of consumption. Moreover, findings indicate that tourists with more predominantly independent self-construal strive to acquire their need for uniqueness in regard to vacation destination choice to a level that is still within acceptable social norms. This implies that they want to express their uniqueness, be unique and special, and want to create a personal unique image with their destination choice, but only to the extent that they still receive social approval. Motives may be found in social psychology and marketing, where research has long recognized the fact that others influence individuals' behavior (Ryu & Han, 2009). In addition, in modern society, individuals are keen, if not even somehow forced, to adapt to group harmony (Song & Lee, 2013). This can be explained by conformity in terms of the emergence of group norms (Burnkrant & Cousineau, 1975).

Another positive effect found in this study was between independent self-construal and the third dimension of CNFU (i.e., avoidance of similarity – AS) – thus H1c is supported. The findings indicated that some tourists desire to acquire their independent self and satisfy their uniqueness motives by choosing destinations unpopular among the general population. These research findings are congruent with findings of previous research conducted by Song and Lee (2013) and Kastanakis and Balabanis (2012, 2014). Although a positive relationship was expected between independent self-construal and all three aspects of CNFU, as was indicated in previous studies (Kastanakis & Balabanis, 2012, 2014; Song & Lee, 2013), we failed to prove a significant relationship between independent self-construal and the second dimension of CNFU (H1b), namely unpopular choice counter-conformity (UC). Therefore, H1 is partially supported. This means that tourists avoid seeking rebellious uniqueness when choosing their vacation destination, despite having independent self-construal. In particular, we argue that the reasons could depend upon the sample characteristics, as it seems that young travelers tend to avoid too strongly deviating from social norms. To some degree, this might be expected, as young people most often avoid social exclusion; therefore, they tend to not choose destinations that would affect or threaten their assimilation in their group.

Additionally, this study revealed that interdependent self-construal is not a relevant antecedent of any dimension of CNFU (H2a-H2c); therefore, no empirical evidence supported H2. More specifically, it means that tourists' interdependent self-construal does not influence their need for uniqueness motivation when they choose their vacation destination. This is in line with the findings of Kastanakis and Balabanis (2012), who also proposed that there is a negative relationship between interdependent self-construal and all three facets of CNFU using the same measure as we did but did not support the significant relationship. However, there are inconsistencies in the previous studies, since, to the contrary, Song and Lee (2013) proved that interdependents also acquire a need for uniqueness motivation. Yet, in their study the authors measured the concept of CNFU as unidimensional, using a desire for unique consumer products (DUCP) scale (Lynn & Harris, 1997b) rather than the three-dimensional shortened version of the CNFU-S scale (Ruvio et al., 2008) as did we and Kastanakis and Balabanis (2012). The inconsistency in

the existing research findings could depend on the conceptualization and measurement of CNFU, as DUCP measures the desire for unique products, while CNFU assesses the desire to feel different from others in terms of uniqueness. However, it seems that in satisfying uniqueness-seeking motivation by young travelers, their interdependent self-construal does not play a significant role. This might be a result of the sample frame of this study. As reported by several other authors (e.g., Gazley & Watling, 2015; Sirgy & Su, 2000), public self-image influences young travelers' travel behavior. Thus, future research might consider the moderating influence of specific groups with which young travelers compare each other in order to enhance their interdependent self-construal in uniqueness-seeking motivation.

CONCLUSION

To conclude, the results of the study show that independent self-construal is a relevant antecedent to CNFU, namely in terms of its two dimensions (i.e., CC and AS). Despite the fact that we expected a significant negative influence of interdependent self-construal on each dimension of CNFU, empirical evidence showed that there is no significant relationship between the constructs.

This study contributes importantly toward understanding the concept of CNFU in relation to self-related constructs, namely in the tourism experiences domain when tourists choose their vacation destinations. Hence, the findings indicate important managerial implications for destination marketers. As tourism experiences mostly depend on tourists' motivation (Cetin & Bilgihan, 2016), they can satisfy tourists' need for uniqueness motivation, which is, based on these research findings, driven by their independent self-construal. Thus, these consumer segments could represent a specific and separate target group for particular destinations, since in order to be different from others, tourists strive to satisfy their need for uniqueness to enhance their independent self. More specifically, it means that tourists (in this case young travelers) with an independent self-construal acquire a need for uniqueness since they want to stand out from the crowd in order to feel special and different from others.

In particular, when offering experiences, destination practitioners could highlight uniqueness seeking motives, which help them to emphasize their individuality and originality. As the destination choice by specific tourists segments is driven by a desire to experience something special (Uriely, 2005), tourists who acquire a need for uniqueness motivation can represent a relevant target group, for example in one-to-one marketing. In addition, tourism and hospitality practitioners could implement their marketing strategies by underlying the uniqueness-seeking motivation in both designing and promoting products and services that offer memorable experiences to their visitors. For instance, specialized travel agencies, customized tourism products and services, and small boutique destinations have great potential to offer special experiences that help to differentiate tourists from the masses in order to enrich their "self".

The idea also relates to the notion that tourists connect with places (Hidalgo & Hernandez, 2001) and their selves could influence their choice of vacation destination (Beerli et al., 2007). As our study further consolidates, the tourists' independent self-construal could be triggered when a destination is being described and promoted. Kwon and Mattila (2015) even argued that tourists' self-construal can be, at least temporarily, manipulated through different marketing activities. In terms of promotional activities of destinations, practitioners could attract independents by incorporating promotional messages in their communication strategies such as "be original/unique" or "enjoy your uniqueness and be different from others, "chose your destination in your own way", etc., in order to enhance their selves. Consequently, by offering experiences, which could manage to satisfy their need for specialness, tourists feel that their selves are enhanced when they choose a particular destination and thereby expresses their individuality and independence. Thus, destination managers could solicit tourists with independent self-construal when trying to promote and sell experiences within their destination offer.

The study also contributes to the theoretical knowledge of CNFU in terms of testing the psychological antecedent (i.e., self-construal) in the tourism context. What is more, the concept of CNFU was tested using the shortened CNFU-S scale developed and proposed by Ruvio et al. (2008). Given the fact that the CNFU concept is still a relatively new phenomenon in consumer behavior literature, having been examined most extensively in the last decade, the important contribution is in testing the proposed relationship using CNFU as a three-dimensional concept rather than as unidimensional, which has been the case in the majority of extant studies. To our knowledge, only Kastanakis and Balabanis (2014) used the shortened version of the CNFU-S scale in relation to both dimensions of self-construal, yet only in the UK sample in terms of luxury fashion.

Despite the fact that this study offers several important insights, several limitations should be addressed. Although student samples are appropriate for theoretical predictions (Calder, Phillips, & Tybout, 1981), they limit the generalizability of the research findings. In respect to its representativeness, in further studies sampling should be different from the convenience sample. Another limitation is the lower AVE value for independent and interdependent self-construal. The reasons behind this are discussed in the analysis section of the paper, and thus the conclusions of this study should be considered with caution. The study examines a relatively narrow set of experiences/drivers, which were not found to explain a large share of variance, so it is likely that other factors affect tourist experiences as well. According to Hwang and Seo (2016), tourist experience is considered to be a multidimensional concept influenced by a variety of factors, both internal (e.g., knowledge, personality, familiarity, past experience, etc.) and external (e.g., product quality, physical characteristics, social environment etc.). Thus, in future research, a replicated and extended model could be tested by considering other relevant psychological, self- and social- related antecedents and behavior, such as experience-related consequences. Future research involving tourists from other cultures would also be useful in confirming the results of this research, as well as including various age groups.

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THE ROLE OF LEADER-FOLLOWER DEFENSIVE PESSIMISM (IN)CONGRUENCE IN FOSTERING PERCEPTIONS OF FOLLOWERS' ISOLATION

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ABSTRACT: *This field study examines the joint effect of leaders' and followers' different cognitive characteristics (i.e., defensive pessimism) on followers' isolation. We examine the interplay between leaders' defensive pessimism and followers' defensive pessimism in fostering perceptions of followers' isolation. Data from 291 working professionals are analyzed following a series of hierarchical linear modeling and polynomial regression analyses. Polynomial regression analysis indicates that when both leaders and followers are in agreement in their defensive pessimism, the level of followers' perceived isolation is lower than when leaders' and followers' defensive pessimism deviate from each other (i.e., high-low and low-high leader-follower defensive pessimism). However, when followers' defensive pessimism is higher than leaders' defensive pessimism, followers' perceived isolation also is higher. By suggesting that followers' perception of leaders' defensive pessimism may be more complex than previously recognized, we conclude that studies of leadership need to develop a much deeper understanding of leader-follower congruence in cognitive styles in order to decrease followers' isolation in the workplace.*

Key words: *defensive pessimism, leader, follower, perceived isolation*

JEL Classification: M12

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1. INTRODUCTION

The “Don’t worry, be happy” message does not help everyone equally; on the contrary, forcing some people to think positively or to calm down, or even encouraging them, will make them perform worse. Norem & Cantor (1986a) defined defensive pessimism as a coping strategy which results in setting unrealistically low expectations for an upcoming event in an attempt to harness anxiety so that performance is not weakened or damaged. However, defensive pessimism does not undermine performance as a result of this negative approach (Norem & Cantor, 1986a). When followers’ expectations are not congruent with leaders’ behavior, followers tend to evaluate them negatively. Consequently, a lack

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of mutual understanding and empowerment (Wong & Giessner, 2018), will result in increased perceived followers' isolation. Perceived isolation is defined by loneliness and a perceived lack of social support (Cornwell & Waite, 2009). In this study we conceptualize perceived isolation as a psychological construct that describes followers' perceptions of isolation from the leader and co-workers. Previous research has linked isolation with higher morbidity and mortality (Berkman et al., 2000; Brummett et al., 2001; Uchino, Cacioppo, & Kiecolt-Glaser 1996), depression (Heikkinen & Kauppinen 2004), cognitive decline (Barnes et al., 2004), and feelings of loneliness (Dean et al., 1992; Hawkey et al., 2006; Kraus et al., 1993; Thoits & Hewitt, 2001). Similarly, followers' perceived workplace isolation leads to reduced organizational identification (Kirkman et al., 2002; Wiesenfeld, Raghuram, & Garud, 2001) and consequently to reduced identification with the leader.

However, the question arises as to whether leader-follower defensive pessimism (in) congruence interacts with followers' perceived isolation, and what impact a leader's defensive pessimism has on followers' perceived isolation. According to implicit leadership theory (ILT), leaders can act as role models (Lord, Foti, & De Vader, 1984), therefore by default followers' defensive pessimism and perceived isolation are dependent on leaders' characteristics (i.e., defensive pessimism). Implicit leadership theory states that individuals emerge as leaders to the extent that they fit observers' predetermined prototypes of the characteristics that leaders are supposed to have (Lord & Maher, 1991).

People are perceived as leaders based on the perceived congruence of their actual characteristics and the prototype (i.e., schema) of a preconceived leader category (Rush & Russell, 1988). Moreover, leadership by definition implies that a leader influences one or more followers (Yukl, 2012), and leader characteristics may be a key issue in understanding how leaders influence followers and why leaders with equal skills and competences sometimes succeed and sometimes fail (George & Bettenhausen, 1990). Theories of leadership emergence, such as implicit leadership theory (Lord & Maher, 1991), address this phenomenon. ILT is a process formed early in life and influenced by interactions with previous leaders, role models (e.g., parents), or other authority figures (Keller, 2003; Shondrick, Dinh, & Lord, 2010).

This study explores the joint effect of leader and follower defensive pessimism in fostering perceptions of followers' isolation based on their (in)congruence of different cognitive styles. Drawing upon the literature on cognitive styles (i.e., defensive pessimism) and on research on dyadic interaction (Norem & Illingworth, 1993; Sanna, 1996; Spencer & Norem, 1996), we examine the effects of (in)congruence in leader-follower defensive pessimism in fostering perceptions of followers' isolation. Research has shown that regardless of their own outlook on life, most individuals would prefer to engage in a relationship with an optimist rather than with a pessimist (Dicke, 1998). However, one of the domains which remains unclear is the nature of interaction in leader-follower relationships with regard to their cognitive styles (i.e., defensive pessimism) and its impact on followers' perceived isolation. Therefore this study investigates the role of leader-follower cognitive style (i.e., defensive pessimism) in dyadic relationships and its influence on followers' perceived isolation as an outcome.

By hypothesizing and testing these relationships, we make three important contributions. First, we contribute to the literature on cognitive styles by conceptualizing and showing the need for leaders to be congruent with followers in their cognitive styles in order to decrease followers' perceived isolation. Followers are often neglected in the leadership research. However, this study includes leaders' and followers' cognitive styles in the model by acknowledging various outcomes that may occur (i.e., when a leader is either higher or lower in defensive pessimism than a follower). Therefore we contribute to understanding the complex effects that may result from (in)congruence in leader-follower cognitive styles, and particularly its influence on followers' perceived isolation.

Second, we build on the idea of a too-much-of-a-good-thing effect (Grant & Schwartz, 2011), which suggests that having too much of a characteristic (i.e., defensive pessimism) in a leader-follower relationship is not necessarily a good thing. While pessimism has been associated with lower levels of performance (Bandura, 1982), defensive pessimists' negative outlook can also be linked with several positive outcomes (Norem & Cantor, 1986a, 1986b). Considering potential negative outcomes of performance, defensive pessimism acts as a strategy for self-motivation, whereby defensive pessimists' low expectations act as self-protection by limiting the negative effects of anxiety and stress (Norem & Cantor, 1986b). It has been shown that defensive pessimism does not necessarily lead to negative outcomes and that its effects on performance depend on defensive pessimists' negative approach (Norem & Cantor, 1986a; Norem & Cantor, 1986b; Norem & Illingworth, 1993; Sanna, 1996). However, thus far, no attention has been paid to understanding why having the wrong dyadic relationship between leaders and followers can foster followers' perceived isolation. By explaining specific mechanisms of this interaction based on characteristics of the leader-follower relationship founded in their cognitive styles, we contribute to the theory and research on leader-follower relationship fit.

Marshall, Michaels, & Mulki (2007) showed that employees can develop isolation perceptions in a traditional office in which they are in proximity to their leader and other co-workers if the leader and co-workers are not able to provide work support that the follower needs. Even though professional isolation has been identified in the telework literature as a potential threat to the effectiveness of virtual work settings (Cooper & Kurland, 2002; Kurland & Egan, 1999), there is a call for considering theoretical and empirical frameworks of leader distance (Antonakis & Atwater, 2002) and thus of followers' perceived isolation in both traditional and virtual work-based settings. Building on previous findings, our third contribution is to investigate the role of leader-follower (in)congruence in cognitive styles in fostering followers' perceived isolation. By doing so, this research also contributes the theoretical mechanisms for perceived isolation theory development.

2. THEORY AND HYPOTHESES

Leadership is an individual and group process. Leaders and followers mutually influence each other's perceptions and behavior (Humphrey, 2002). Implicit leadership theory has

been defined as a cognitive structure (prototypes) identifying the characteristics that depict a leader (Lord, Foti, & De Vader, 1984; Lord & Maher, 1991). These schemas are formed early on in life and influenced by prior experiences, socialization processes, and role models such as parents (Epitropaki & Martin, 2004; Keller, 2003; Kenney, Schwartz-Kenney, & Blascovich, 1996). ILT also can be formed as a result of followers' previous experiences with the leader, i.e., expectations of the leader (Shondrick et al., 2010) by creating self-perceptions of current leadership. Hall and Lord (1995) stated that self-interpretation is crucial when indicating a leadership sense-making function. In other words, in order to understand how individuals view others, we need to understand how individuals perceive self and others at the same time.

Implicit leadership theory strives to explain personal characteristics and attributes that followers expect from their leaders (Ling, Chia, & Fang, 2000); therefore it might be the case that followers will prefer leaders who match their own self-perceived characteristics and attributes. Additionally, implicit leadership theory helps us to understand whether and under what conditions individuals are willing to follow a leader (Uhl-Bien et al., 2014). Those schemas that are built of followers' beliefs about leadership behavior will give the attributions to the leader and create an evaluation such as a good or bad leader (Uhl-Bien et al., 2014). Moreover, even when little or ambiguous information is provided about the leader's behavior, followers match the leader's behavior to preexisting leader categories or prototypes they hold in memory (Eden & Leviathan, 1975; Lord, 1985). On the other hand, incongruence between followers' prototype and the actual leader's characteristics will result in followers' low satisfaction or/and higher rates of turnover (Engle & Lord, 1997; Hunt, Boal, & Sorenson, 1990). Reis, Collins, & Berscheid (2000) suggested that individuals prefer to socialize with similar others (e.g., personality dimensions). Similarly, the cognition about another person has an important influence on the nature and development of a relationship between individuals (Reis et al., 2000). Because defensive pessimism stems from the "doing" side of the personality (Cantor, 1990), in this study we controlled for conscientiousness and agreeableness, defined as being on the "having" side of the personality. However, we assume that individuals (i.e., leaders and followers) will prefer to socialize with like-minded others (i.e., similar levels of defensive pessimism), although under specific conditions (i.e., followers' isolation) this relationship may be changed. In other words, we state that under high followers' perceived isolation, in order to decrease followers' isolation the relationship will require leaders who maintain a more open and positive attitude toward future expectations.

Defensive pessimism refers to a cognitive strategy in which one sets unrealistically low expectations for future performance even if one has done well in similar situations in the past (Norem & Cantor, 1986b). Most individuals who are followers of the positive-thinking doctrine regard pessimism as a fault, which usually comes with attributes such as giving up easily, fear, no hope, disappointment, self-pity, regrets, and doubt in everything (Aspinwall & Richter, 1999; Landier & Thesmar, 2009; Scheier, Weintraub, & Carver, 1986; Seligman, 2011). However, defensive pessimism differs from optimism, and thus from pessimism, by its connection to a goal, domain specificity, and temporal frame (Carver & Scheier, 2001). Therefore, unlike "simple pessimism," defensive pessimism is defined

as “good pessimism” in which a negative outlook is associated with good outcomes (Norem & Cantor, 1986a, 1986b; Showers, 1986). Consistently, the strategy works as a motivator while increasing effort in order to avoid negative outcomes, and it serves as self-protective function in order to keep anxiety under control (Norem & Cantor, 1986a; Showers & Cantor, 1984). Therefore defensive pessimism is recognized as a mindset with advantages used in everyday situations by many of us. Still, in real-life situations, people prefer optimism to pessimism, assuming that by default optimism comes with friendliness and social warmth, whereas pessimism is most often linked to depression. But that is not necessarily so. Defensive pessimists are prone to be cautious, with a strong urge to prepare for the worst even though they were successful in similar situations before. Moreover, defensive pessimists tend to be persistent in preparing for an upcoming event and working through all challenges, which eventually leads to successful outcomes (Lei & Duan, 2016). Similarly, defensive pessimists have been linked to a desire for success and a fear of failure (Norem & Cantor, 1986a), as well as to goal conflict, greater stress, and anxiety (Norem, 2008).

However, too much of a coping strategy such as defensive optimism (Scheier, Weintraub, & Carver, 1986) and defensive pessimism (Norem & Illingworth, 1993; Sanna, 1996) does not necessarily mean that employees will maintain their happiness in the long run. Followers can develop isolation perception in a traditional office where they are in proximity to their leader and other co-workers if their leader and co-workers are not able to provide the work support that the followers may need (Marshall, Michaels, & Mulki, 2007). Perceived isolation is a state of mind or belief that one is out of touch with the leader and co-workers in the workplace (Diekema, 1992). Mulki et al. (2008) argued that perceptions of workplace isolation negatively affect trust in leaders and co-workers. Nonetheless, a feeling of belonging to a group or having a good connection with the leader reduces anxiety, contributes to performance, and enables followers to reach goals that otherwise would have been very difficult or impossible to attain (Beehr et al., 2000; Jex & Thomas, 2003). Furthermore, Jones et al. (2005) stated that availability of supervisory and team support is critical to successful performance. Professional isolation has been recognized in a wide variety of disciplines, including economics (Edwards, 1979), psychology (Rousseau, 1995), and communication science (Sproull & Kiesler, 1991), but research has not focused on its interplay with other states of mind such as defensive pessimism.

Napier & Ferris (1993) stated that isolation includes perceptual congruence (i.e., mutual understanding) and latitude (i.e., the degree of follower empowerment). In addition, they argued that less isolation leads to higher performance and lower follower turnover. Similarly, from the followers’ perspective, leader and team presence makes the relationship more natural and intimate, which also improves the identification effect with leader and organization. Therefore, building on implicit leadership theory, we argue that when followers have a similar cognitive style as do leaders, followers’ perceived isolation will be lower and thus more in balance with the leader. This is because followers will perceive leaders as closer and more likable, because they share similar values, beliefs and attitudes. Furthermore, when followers’ have similar expectations as their leader (team), the followers’ perception of isolation from the leader and the team becomes lower, and

identification with their leader becomes higher (Challagalla, Shervani, & Huber, 2000; Wiesenfeld, Raghuram, & Garud, 2001). In the case of discrepancy in leader-follower shared perceptions of values, beliefs, and attitudes, the perceived isolation will be higher. We thus hypothesize:

Hypothesis 1: Perceived isolation is higher when leaders' and followers' defensive pessimism deviate from each other (i.e., high-low and low-high leader-follower defensive pessimism) than when they are in agreement.

The idea of an inverted-U curve (Grant & Schwartz, 2011) suggests that having too much or too little of characteristics, virtues, or strengths is not necessarily a good thing. J.D. Brown & Marshall (2001) explained that high levels of optimism lead to underestimation of risks and thus to poor preparation and therefore poor performance. The alternative to optimism is pessimism, and thus the same logic of the inverted-U curve can be applied to pessimism as well. Similarly, high conscientiousness is positively related to job performance (Barrick & Mount, 1991; Hurtz & Donovan, 2000), whereas after some point conscientiousness may no longer be helpful to task performance but may make individuals rigid, inflexible, and non-productive compulsive perfectionists (Le et al., 2011). Furthermore, emotional stability indicates the extent to which people are calm, steady under pressure, and less likely to experience negative emotional states, including anxiety, depression, and anger (Costa & McCrae, 1992).

However, Le et al. (2011) suggested that emotional stability is likely to be curvilinearly related to task performance. Similarly, defensive pessimism is a cognitive strategy that helps people to manage their anxiety (Norem, 2008) and eventually helps them to achieve their goals. Defensive pessimists report high levels of anxiety and neuroticism, they often report more negative moods, and they have negative expectations of future tasks/situations (Cantor et al., 1987; Norem, 2001; Norem & Cantor, 1986a; Norem & Illingworth, 1993; Sanna, 1996). On the other hand, individuals who use strategic optimism do not like to reflect on upcoming events; they have high expectations for their performance (Spencer & Norem, 1996). Those individuals are self-confident that they will be able to repeat their past success and therefore they do not feel anxious (Spencer & Norem, 1996). However, as with other psychological processes (i.e., conscientiousness, emotional stability, optimism, etc.), having too much defensive pessimism could put it in “overdrive,” leading to negative consequences.

Markus, Smith, & Moreland (1985) argued that people usually use the same categories when describing others and themselves. Furthermore, Schneider & Blankmeyer (1983) stated that an individual who forms a self-schema for leadership is prone to interpret actions of others (i.e., leader) in terms of their own. Similarly, “the effects of congruence in implicit theories should be greater for perceivers who are schematic with respect to an implicit theory” (Engle & Lord, 1997). Thus, leadership depends on both leader and follower (Graen & Scandura, 1987; Hollander & Offermann, 1990), and a follower's self-concept is an important predictor of the followers' behavior and perception of the leader (Lord, Brown, & Freiberg, 1999). Moreover, how followers' perceive leaders becomes even

more important because leadership has been associated with organizationally relevant outcomes such as follower attitudes, performance, or motivation (Kelloway et al., 2012). Avey, Avolio, & Luthans (2011) showed that when leaders demonstrated the features of psychological capital (i.e., hope, optimism, resilience, and self-esteem), follower positivity and performance were enhanced. Similarly, leader and follower positivity resulted in followers reporting more trust in leaders (Norman, Avolio, & Luthans, 2010). Subsequently, individuals that demonstrate positive energy are more successful (Cross, Baker, & Parker, 2003), and attributes such as self-efficacy, optimism, hope, and resiliency are better predictors of individual motivation and commitment at work than is job satisfaction (Luthans & Youssef, 2007; Luthans & Jensen, 2005). In the same vein, we argue that followers who are able to experience more joy, a positive attitude toward future, and less stress and anxiety will also feel less isolated and more identified with their leader (team).

Schaefer & Moos (1998) stated that social support (i.e., support from the leader and co-workers) may be a precondition of personal growth because of its influence on coping behavior and encouraging successful adaptation to life crises. Looking for social support improves social resources by fostering understanding between people and reducing the individual's feelings of isolation and loneliness (Prati & Pietrantonio, 2009). It has been found that optimism predicts several aspects of subjective well-being, such as that optimism is negatively related to depression (Vickers & Vogeltanz, 2000), positively linked to self-esteem (Chang & Sanna, 2001), and is a more effective way of using problem-focused coping strategies and emotional regulation (Taylor & Armor, 1996).

Social support is also connected to well-being, depression, and physical and psychological functioning through certain cognitive mechanisms and coping strategies (Kahn, Hessling, & Russell, 2003; Cohen & Wills, 1985; Davis & Swan, 1999). Furthermore, it has been found that a higher level of optimism resulted in less stress and depression when mediated with social support (Brissette, Scheier, & Carver, 2002). In addition, optimism partially mediated the relationship between self-efficacy and perceived social support of well-being (Karademas, 2006). Similarly, social support was linked to high self-esteem, which resulted in increased optimism and was associated with decreased depression (Symister & Friend, 2003). Based on that, one could say that compared with a pessimistic outlook, an optimistic outlook may result in "less painful" perceived isolation grounded in a more-efficient problem-focused coping strategy, an effective means of emotional regulation, and higher self-esteem. However, professionally isolated workers tend to be less self-confident, which can undermine their job performance. Similarly, isolated workers are prone to anxiety (Baumeister & Tice, 1990) and loneliness (Jones, 1990), and tend to experience psychological or physical health problems (DeWall & Baumeister, 2006; Schneider, Hitlan, & Radhakrishnan, 2000).

Therefore, building on implicit leadership theory, this study assumes that followers' perceived isolation will be highest when a leader's defensive pessimism is lower than the followers' defensive pessimism. Accordingly, because of high levels of anxiety, stress, and nervousness (i.e., high level of defensive pessimism), followers' will feel less joy and pleasure

at their work place, which will increase their perceived isolation. The reason might be that less-pessimistic people maintain a greater level of confidence; show more persistence when faced different life challenges; and feel less stressful, anxious, and nervous than do pessimists, who tend to be doubtful and hesitant. Furthermore, less-pessimistic people have better social connections and thus larger social networks, tend to solve problems cooperatively, and are more likely to seek help in difficult situations. Optimists are also easier to approach, and in general are more likable, as well. Therefore, based on implicit leadership theory, we argue that high follower defensive pessimism interacts with leaders' positivity, which will lead to lower levels of followers' perceived isolation. This leads to our next hypothesis:

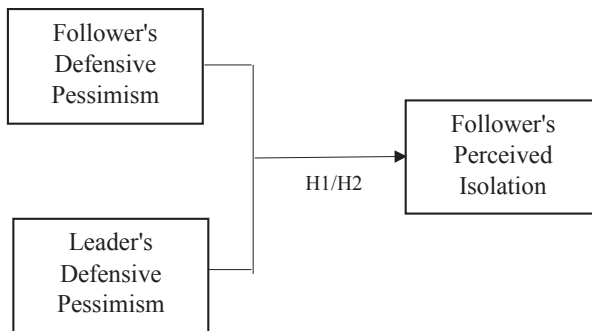
Hypothesis 2: Perceived isolation is higher when the leader-follower defensive pessimism discrepancy is such that follower defensive pessimism is higher than leader defensive pessimism than vice versa.

The conceptual 2x2 matrix of different conditions representing leader-follower defensive pessimism (in)congruence in fostering followers' perceived isolation, which overviews our hypotheses and expected outcomes of (in)congruence in leader-follower defensive pessimism is portrayed in Figure 1.

Figure 1: *Followers' perceived isolation in different leader-follower defensive pessimism conditions*

Leader Defensive Pessimism	High	Followers' High Perceived Isolation	Followers' Low Perceived Isolation
	Low	Followers' Low Perceived Isolation	Followers' High Perceived Isolation
		Low	High
		Follower Defensive Pessimism	

We conducted a field study to test our hypotheses. The field study examined the direct effect of dyadic leader-follower defensive pessimism (in)congruence on followers' perceived isolation, testing Hypotheses 1 and 2. Figure 2 presents our conceptual model.

Figure 2: *The conceptual model*

3. METHOD

3.1. Sample

A field study was conducted via an online survey among working professionals, in accordance with the suggestions recommended by Wong et al. (2008). The mandatory requirement was that participants were employed. The online survey was completed by 291 employed professionals; 65% of respondents were female and approximately 45% were younger than 35 years old. The majority of participants had acquired a master's level degree (44.4%) and most of them were from the U.S. (21.4%), Slovenia (19.1%), Bosnia and Herzegovina (10.6%), the UK (6.4%), and Australia (4.8%). Their main fields of employment were education (34%), finance (17.2%), the service industry (12.4%), health care (10%), and government (9.3%).

3.2. Measures

Five-point Likert-type scales ranging from 1 ("strongly disagree") to 5 ("strongly agree") were used in this study.

Follower's defensive pessimism. The defensive pessimism scale was adapted for the purposes of this study, where we used a seven-item scale from the Defensive Pessimism Questionnaire – DPQ (Norem, 2001). The DPQ contains several items designed to index the thinking process, as well as items designed to measure pessimism. A sample item would be "I go into these situations expecting the worst, even though I know I will probably do OK." ($\alpha = 0.40$).

Leader's defensive pessimism. Similarly to how follower defensive pessimism was assessed, the Defensive Pessimism Questionnaire – DPQ (Norem, 2001) scale was used. Because we wanted to assess how followers perceive their leaders, in the leader domain

the scale was adapted such that a sample item would be “He/she goes into these situations expecting the worst, even though he/she knows he/she will probably do OK.” ($\alpha = 0.43$).

Follower’s perceived isolation. The sense of being isolated was elicited by a three-item scale (Connaughton & Daly, 2004). Sample items are “I often feel disconnected from what is happening on my team or in my firm” and “Despite the fact that my leader and I are co-located I often feel isolated.” ($\alpha = 0.84$).

Control variables. We controlled for age, gender, employee education, and work domain. These control variables were reported by the employees. We also controlled for agreeableness and conscientiousness (i.e., Big Five personality traits), which have been indicated to have a strong positive relationship with optimism (Sharpe, Martin, & Roth, 2011). We used the Ten-Item Personality Inventory – (TIPI) scale developed by Gosling, Rentfrow, & Swann 2003, $\alpha_{\text{agreeableness}} = 0.40$; $\alpha_{\text{conscientiousness}} = 0.50$).

3.3. Data Collection Procedure

An online questionnaire of working professionals was conducted from March to May 2016. Participants were recruited via posts on social networking websites such as Facebook and LinkedIn. Potential participants also were targeted through various groups (e.g., Happiness at Work, Business Psychology at Work, Employee Engagement, Cognitive Neuroscience) and via personal contacts. The participants were notified that the aim of the research was to explore the dynamics that employees perceive at their work. After agreeing to participate, participants were directed to survey website. The survey took approximately 10 minutes on average to answer.

3.4. Data Analysis

Polynomial regression analysis with response surface modelling was applied to test the (in) congruence hypotheses (Edwards & Parry, 1993; Jansen & Kristof-Brown, 2005; Shanock et al., 2010).³ We centered all the scales before running the analyses, which reduces multicollinearity between the component measures (i.e., leader and follower defensive pessimism) and their associated higher-order terms (Aiken & West, 1991).

Hypothesis 1 predicted that the perceived isolation is higher when leaders’ and followers’ defensive pessimism deviate from each other (i.e., high-low and low-high leader-follower defensive pessimism) than when they are in agreement. This hypothesis suggests that the linear slope, which is given by $a_3 = b_1 - b_2$, of the surface along the incongruence line ($X = -Y$) should be significant and positive. Hypothesis 2 predicted that the perceived isolation is higher when follower defensive pessimism is higher than leader defensive

3 A simple regression model examining a predictive role of followers’ defensive pessimism indicated that this construct was positively related to followers’ perceived isolation ($\beta = 0.342$, $p < 0.05$).

pessimism than vice versa. This hypothesis will be supported if the curvilinear slope on the incongruence line ($X = -Y$) given by $a_4 = b_3 - b_4 + b_5$ – where b_3 is the β for follower-ratings squared, b_4 is the β for the cross-product of follower and leader ratings, and b_5 is the β for leader-ratings squared – is significant and positive.

4. RESULTS

Table 1 presents the descriptive statistics (means, standard deviations, and correlations) of all variables used in the study. We observed the factor structure of the focal variables using

confirmatory factor analysis procedures in AMOS software version 21. The expected three-factor solution (follower's defensive pessimism, leader's defensive pessimism, perceived isolation) displayed a good fit with the data [chi-square (86) = 187,976, CFI = 0.929, SRMR = 0.074, RMSEA = 0.064].⁴

Table 1: *Means, Standard Deviations, and Correlations*^{a, b, c}

Variable	Mean	SD	Alpha	1	2	3	4	5	6	7	8
1 Age	3.512	0.7850	n.a.	-							
2 Gender	1.656	0.4757	n.a.	-0.026	-						
3 Education	2.804	0.7962	n.a.	0.178**	-0.042	-					
4 Dyadic tenure	1.725	0.9720	n.a.	0.271**	0.071	0.042	-				
5 Agreeableness	3.517	0.7755	0.40	0.257**	0.175**	0.045	0.054	-			
6 Conscientiousness	3.931	0.7815	0.50	0.117	0.038	0.125	0.077	0.106	-		
7 Follower's defensive pessimism	3.354	0.4433	0.40	-0.295**	0.150*	-0.034	-0.038	-0.082	-0.057	-	
8 Leader's defensive pessimism	3.186	0.4345	0.43	-0.173**	0.168**	0.019	-0.019	0.046	-0.019	0.310**	-
9 Perceived isolation	2.413	0.9813	0.84	-0.015	0.047	0.088	-0.030	-0.115*	0.014	0.015	0.147*

^a n = 291

^b Age was classified into 5 classes: 1 = Less than 18, 2 = 18-24, 3 = 25-34, 4 = 35-54, 5 = 55 and over.

^c 1 = male, 2 = female

**p < 0.01, *p < 0.05

In terms of the correlations among the variables, follower age was positively related to education ($r = 0.178$, $p < 0.01$), dyadic tenure ($r = 0.271$, $p < 0.01$), conscientiousness ($r = 0.117$, $p < 0.05$), and agreeableness ($r = 0.257$, $p < 0.01$), and negatively related to follower's defensive pessimism ($r = -0.295$, $p < 0.01$) and leader's defensive pessimism ($r = -0.173$, $p < 0.01$). Education was positively related to conscientiousness ($r = 0.125$, $p < 0.05$). Gender

4 Within-construct items' (for example, items corresponding to the defensive pessimism scale with other items pertaining to the same scale) residuals were allowed to correlate. Without those modification indices, the results of the model fit are: chi-square (116) = 646,529, CFI = 0.633, SRMR = 0.1243, RMSEA = 0.126.

similarity was positively related to the subordinate's agreeableness ($r = 0.175$, $p < 0.01$), follower's defensive pessimism ($r = 0.150$, $p < 0.05$), and leader's defensive pessimism ($r = 0.168$, $p < 0.01$). Follower's defensive pessimism was positively related to leader's defensive pessimism ($r = 0.310$, $p < 0.01$).

Hypotheses testing. Hypothesis 1 predicted that when leaders' and followers' defensive pessimism deviated from each other, follower's perceived isolation would be higher than when they were in agreement. This relationship is expressed via an inverted U-shaped parabolic surface along the incongruence ($S = -L$) line. Table 2 shows the results from the polynomial regression analysis. The linear slope a_3 of the surface along the incongruence line ($X = -Y$) was positive and significant ($a_3 = .72$, $p < 0.01$). This indicates that the level of follower's perceived isolation is lower when the levels of the leader's and followers' defensive pessimism are similar, as illustrated in the response surface based on the estimated coefficients (Figure 3). Thus, Hypothesis 1 is supported.

Table 2: *Polynomial regression analyses results predicting follower's perceived isolation*

Dependent variable	Follower's perceived isolation
Constant	2.41 (0.47)**
Age	0.04 (0.08)
Gender	0.70 (0.13)
Education	0.07 (0.07)
Job tenure	-0.01 (0.06)
Agreeableness	-0.12 (0.07)
Conscientiousness	0.00 (0.07)
Follower's defensive pessimism	0.18 (0.14)*
Leader's defensive pessimism	-0.13 (0.14)*
Follower's defensive pessimism ²	0.08 (0.24)
Follower's defensive pessimism x leader's defensive pessimism	-0.22 (0.31)*
Leader's defensive pessimism ²	0.08 (0.18)
F	2.361
df	279
R ²	0.085
Congruence (follower's defensive pessimism = leader's defensive pessimism) line	
Slope	0.09 (0.12)
Curvature	-0.37 (0.37)
Incongruence (follower's defensive pessimism = -leader's defensive pessimism) line	
Slope	0.72 (0.25)**
Curvature	1.40 (0.42)**

Note. N = 291. * $p < 0.05$; ** $p < 0.01$; the items reported are standardized beta coefficients, standard errors are in parentheses.

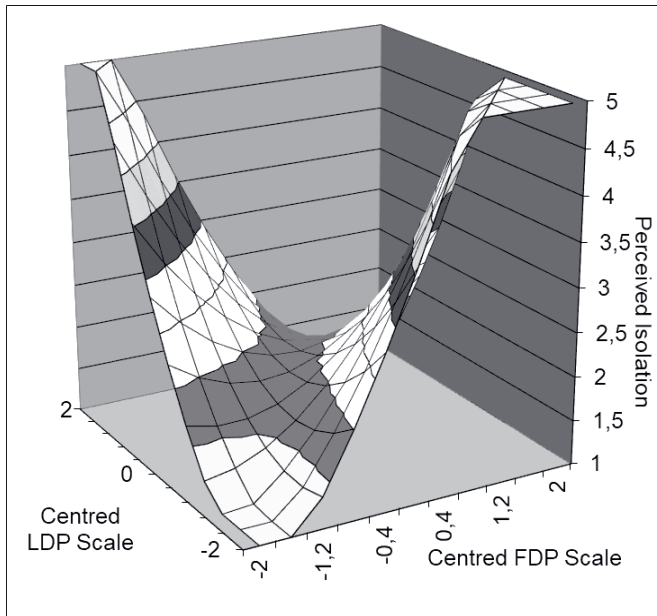


Figure 3: *Leader-follower defensive pessimism (in)congruence matrix based on polynomial regression analysis predicting follower's perceived isolation*

The asymmetric incongruence hypothesis (H2) posited that the follower's perceived isolation is higher when the follower's defensive pessimism is higher than the leader's [follower high–leader low], as opposed to when the follower's defensive pessimism is lower than the leader's (follower low–leader high). The curvilinear slope a_4 on the incongruence line ($X = -Y$), as shown in Table 2, was positive and significant ($a_4 = 1.40$, $p < 0.01$). This indicates a positive lateral shift of the level of perceived isolation toward the region where the follower's defensive pessimism is greater than the leader's. Thus, Hypothesis 2 is supported.

5. DISCUSSION

This study examined the role of leader–follower interplay in terms of their (in)congruence in defensive pessimism and followers' perceived isolation. The results of this study showed that the interaction of followers' and leaders' defensive pessimism plays a role in fostering followers' perceived isolation in the workplace. According to implicit leadership theory, leaders can act as role models (Lord, Foti, & De Vader, 1984), depending on perceived leader characteristics (Shondrick, Dinh, & Lord, 2010). Similarly, the importance of ILT theory has been found in the interactional relationship between leaders and followers (Hunt, Boal, & Sorenson, 1990). However, research into leadership theories has focused mainly on the characteristics related to the leader prototype (Epitropaki & Martin, 2005), whereas we argue that the followers' perceived isolation will depend not only on the

leaders' prototype, but also on whether leaders and followers share similar cognitive styles (i.e., defensive pessimism). Moreover, in order for leaders to be influential and perceived as leaders, it is important that there is a congruence between leaders' characteristics and followers' leader prototype (Lord, Brown, Harvey, & Hall, 2001). A congruence between leader characteristics and leader prototype characteristics will enable followers to be open to leaders' influence (Epitropaki & Martin, 2005; Medvedeff & Lord, 2007). On the other hand, incongruence between leaders' actual characteristics and followers' leader prototype will lead to followers' dissatisfaction (Engle & Lord, 1997). ILT enables individuals to make sense of another's intentions and behavior (Foti & Lord, 1987; Shondrick et al., 2010). We argued that different cognitive styles (in this case, defensive pessimism) might result in categorization differences, i.e., certain followers will prefer certain leader characteristics over others. Moreover, followers' perceived isolation was higher when leaders' and followers' defensive pessimism deviated from each other (i.e., high-low and low-high leader-follower defensive pessimism) than when they were in agreement (Hypothesis 1). Therefore, by investigating followers' perceptual processes as the underlying mechanism, the current study provides theoretical and empirical contributions to the literature of implicit leadership theory and isolation in the workplace.

However, we wanted to examine leader-follower dyadic relationship more closely by focusing on specific interaction between a leader's and his or her followers' defensive pessimism and the followers' perceived isolation. The idea of an inverted-U curve (Grant & Schwartz, 2011) suggested that having too much or too little of virtues and strengths is not necessarily a good thing. Nonetheless, the research has reported some pitfalls and disadvantages with regard to defensive pessimism in the long run (Cantor et al., 1987; Norem, 2001; Norem & Cantor, 1986a; Norem & Illingworth, 1993; Sanna, 1996). Similarly, we found that followers' perceived isolation was higher when the followers' defensive pessimism was higher than the leaders' defensive pessimism than vice versa (Hypothesis 2). However, high defensive pessimism (in leaders or followers) could mean too much pessimism, and thus stress, negative affection, anxiety, avoidance motivation, and need for too much of control. Therefore the findings also shed light on the complexity of implicit leadership theory, while acknowledging potential benefits of positive leadership theory and practice. Taken together, we found support for the relevance of leader-follower defensive pessimism (in)congruence in fostering follower's perceived isolation.

6. CONCLUSIONS

This study suggests that leader-follower (in)congruence is an important and complex process when predicting followers' perceived isolation. If leader-follower defensive pessimism is congruent in smaller amounts (either low or high), followers tend to feel less isolated. However, followers' perceived isolation is highest when followers score higher in defensive pessimism than do leaders. Given that leaders should strive to maintain followers who will not feel isolated and will be in tune with their leaders, this study suggests that leader-follower defensive pessimism congruence will reduce followers' isolation, thus induce the balance in their relationship. Therefore leaders should pay more attention

to follower's perceived isolation, because the excessive presence of followers' perceived isolation could be detrimental.

6.1. Theoretical contributions

This study contributes to the literature examining the role of individual differences at work in three distinct ways. The study contributes by explaining in more detail the “doing” sides of personalities in the workplace; previous research mostly has been concerned with the structural basis of individual differences that are “having” sides of personalities. This study explains how a coping mechanism such as defensive pessimism interacts with other concepts (i.e., followers' perceived isolation) in work settings.

First, defensive pessimism has been shown to be an adaptive and beneficial cognitive style for those who employ it (Norem, 2001). As noted, defensive pessimism does not appear to negatively affect an individual's performance (Norem & Cantor, 1986a). Similarly, research has showed that defensive pessimists set unrealistically low expectations in order to motivate and prepare themselves for potential failure (Norem & Cantor, 1986b). Building on those findings, we showed that similar expectations of future events in a dyadic leader-follower relationship even when defensive pessimism was high did not negatively influence followers' perceived isolation. However, followers who scored extremely high in defensive pessimism (i.e., the idea of a too-much-of-a-good-thing effect) felt more isolated than did followers' who scored lower in defensive pessimism. Therefore we contribute to positive leadership literature showing that leaders' optimistic attitudes could act as a trigger when reducing followers' stress, anxiety, and negative outcomes such as perceived isolation.

Defensive pessimists perform equally well as strategic optimists due to the motivational aspects of their preferred strategy (Norem & Cantor, 1986a, 1986b; Cantor & Norem, 1989). In line with this, one can say that the concept of defensive pessimism has made a shift in the well-known notion that pessimism is bad and optimism is good: defensive pessimism appears to be a beneficial, adaptive, and desired form of pessimism. However, the current study sheds light on the importance of congruence in cognitive styles (i.e., defensive pessimism) in a leader-follower dyadic relationship in terms of decreasing perceptions of followers' isolation. Previous theoretical and empirical research (e.g., Fuller & Marler, 2009; Li, Liang, & Crant, 2010) has shown that employees' personalities are beneficial for cultivating positive attitudes toward their jobs and organizations.

However, these studies have focused only on the leaders' role and thus prevented the possibility of examining leaders' individual characteristics as an important factor that interacts with followers' individual characteristics (i.e., defensive pessimism). Therefore, first we shed light on the importance of defensive pessimism as an individual difference in a work context, and second, while accounting for the role of leader-follower (in)congruence in their cognitive styles, this study represents an important extension of the existing personality and individual differences research in general. Previous work has emphasized the distinction between optimistic and defensively pessimistic strategies in persons

(Cantor et al., 1987; Norem & Cantor, 1986b), but no prior work has explicitly contrasted the seemingly adaptive strategy of defensive pessimism with other psychological processes associated with followers' perceived isolation in work settings.

Second, this study is also linked to the idea of a too-much-of-a-good-thing effect (Grant & Schwartz, 2011), which suggests that having too much of a positive characteristic such as defensive pessimism in a leader-follower relationship may reach a shift in phenomena to the point where positive effects eventually turn negative. Accordingly, having high levels of defensive pessimism on both sides, leaders and followers, might lead to high levels of anxiety and stress, which would take away from followers' joy at work and make them feel less supported and more isolated. In a similar vein, no attention has been paid to understanding why a suboptimal dyadic relationship between leaders' and followers' cognitive styles can foster followers' perceived isolation. Psychological factors, such as defensive pessimism, may be the main determinant of whether people work together well. In other words, self-concept affects not only how an individual behaves, but how individuals interact with each other within the team. Furthermore, when followers spend too much time on getting along with their leaders and co-workers, they probably will not have energy left for making progress or succeeding at work. When both leaders and followers were low (negative) in defensive pessimism, and therefore in accord at low levels of defensive pessimism, followers' perceived isolation was lower than when leaders' and followers' levels of defensive pessimism deviated from each other. However, the highest level of followers' isolation occurred when followers' defensive pessimism also was high, which supports the idea of the inverted Ucurve (Grant & Schwartz, 2011). Therefore this study suggests that followers' who score high in defensive pessimism and perceived isolation could diminish their negative thinking regarding isolation with leaders' positivity, which will result in decreased perceived isolation.

Defensive pessimism is a tool used to defend self-esteem, maintain motivation, and cope with stressful and potentially negative events (Cantor & Norem, 1989; Norem & Chang, 2002). Subsequently, this cognitive strategy helps people to feel more in control and reduce their anxiety (Norem & Illingworth, 1993). Moreover, individuals who employ defensive pessimism as a cognitive strategy despite their lower expectations and higher anxiety manage to function and perform just as well as optimists (Norem & Illingworth, 1993). Individuals who use defensive pessimism tend to proactively deal with the situation by acknowledging the possibility of low outcomes but at the same time working hard to prevent or diminish them (Showers & Ruben, 1990). In line with this, this study shows that perceived isolation is lower when a follower's defensive pessimism is lower than a leader's defensive pessimism. Therefore followers' perceived isolation decreased due to the fact that the leaders' defensive pessimism brought a balance to the leader-follower defensive pessimism relationship by managing the anxiety and fear of failure and by taking control regarding their expectations of future events. In other words, we showed the positive effects of leaders' defensive pessimism on followers' defensive pessimism, by which leaders were able to balance the relationship effectively by their thinking-through process and plan effective behavior for future events.

Third, this study sheds extra light on the isolation literature referring to the call for considering theoretical and empirical frameworks of professional isolation in the workplace and leader distance (Antonakis & Atwater, 2002; Golden, Veiga, & Dino, 2008). Building on the implicit leadership theory that is used by individuals to discern others as leaders based on characteristics (Lord & Maher, 1991; Shondrick, Dinh, & Lord, 2010), this study shows that when a leader's defensive pessimism was in agreement with a follower's defensive pessimism, and thus they perceived it at similar levels (i.e., low or high), the follower's perceived isolation decreased. Nonetheless, our results indicate that followers tend to feel more isolated when their defensive pessimism and perceived isolation, and thus their level of anxiety, stress, fear of failure, and disconnection from their leader and co-workers, were high. Followers' perceived isolation was higher when followers' defensive pessimism was high, whereas it was lower when their defensive pessimism was lower than the leader's defensive pessimism. A mechanism that may highlight this finding is that followers' positive expectations, beliefs, and attitude positively affect their perceptions, and thus decrease perceived isolation and increase motivational aspects in their behavior.

However, chronic optimism may result in ignoring negative information (Taylor & Brown, 1988); therefore, unlike defensive pessimists, optimists tend to avoid analysis, which makes them more stressed and less in control (Norem & Illingworth 1993). These individuals tend to respond to adversity with positive perceptions of themselves, including an unrealistic sense of personal control over the situation and overly optimistic expectations about the future (Taylor & Armor, 1996). Consequently, this may lead to greater followers' disappointment when the overly optimistic outcomes are not achieved. Therefore another finding of this study is the proposed balance in the leader-follower defensive pessimism relationship which leads to positive outcomes such as low followers' perceived isolation. Specifically, when followers' were low in defensive pessimism, leaders' high defensive pessimism created a balance with its positive effects in this relationship while probably making followers less unrealistic, less involved in future events, and less isolated. Revealing under what cognitive perspectives leaders and followers are likely to work effectively together might help when spotting the conflict points in a leader-follower relationship and thus allow them to develop their affinities. This all leads to superior levels of group achievement, which could not be achieved by individuals. Therefore this study makes a contribution in showing which mix of individual differences could achieve success and well-being in the workplace.

6.2. Practical implications

The results of this study suggest that followers' perceived isolation is higher when leaders' and followers' defensive pessimism deviate from each other than when they are in agreement. Still, when followers were high in defensive pessimism and leaders were low in defensive pessimism, a follower's perceived isolation was higher than vice versa. Both leaders and followers face unpredictable challenges in their day-to-day activities, and thus they tend to experience stress, anxiety, and pressure to an extent that depends on their coping style and state of mind. However, a psychologically healthy environment (i.e.,

environments with fewer potential occupational stressors) is correlated with increased employee well-being (pleasant emotional experience, happiness, job satisfaction) and health (state of complete physical, mental, and social well-being), which is the key to collective success (Danna & Griffin, 1999). The research has found that when leaders are stressed, negative, and maintain a pessimistic outlook, this effect transfers directly to followers, causing negative consequences (Schaubroeck et al., 2007) which finally may result in increased followers' perceived isolation.

Positive leadership focuses on the application of positive principles emerging from the positive organizational scholarship (Cameron et al., 2003) and positive psychology (Seligman, 1999). It promotes spectacular levels of achievement, strengths, capabilities, and human potential, and fosters human virtues (Cameron, 2012). In line with this, this study shows that positive leadership may change the perception of followers, decreasing their feelings of being isolated. Therefore the findings have the potential to contribute to the positive and proactive mental well-being of followers. Moreover, leaders must make an effort to create a meaningful environment (environment which promotes health and well-being) in which their employees will feel socially supported and therefore satisfied with their work environment. For example, work-related stress combined with the stress of defensive pessimists can lead to negative outcomes because of the overbalanced physical and mental demands placed on the human body and mind (Cooper & Cartwright, 1994). Line managers have recognized that well-being can potentially affect followers in negative ways. Workers experiencing poor well-being in the workplace may be less productive and more prone to be absent from work (Boyd, 1997). Therefore it may be crucial for leaders and followers to be in accordance in their defensive pessimism (e.g., future expectations, values, beliefs, and attitudes) or/and for leaders to promote positive leadership doctrine, because that would help leaders to improve their team effectiveness and to be more effective themselves. Similarly, congruence with the leader in cognitive styles could make followers more cognitively engaged, and thus open to new information about how to improve their achievement in the workplace. The positive spillover of cognitive congruence (i.e., defensive pessimism) would have an impact on managers as well, helping them to develop effective management practices in their work teams. All this would contribute to better solutions to the problems and perhaps to innovative problem-solving decisions. In addition, various interventions and health programs may be advantageous in promoting positivity and learning stress-reduction techniques (Conrad, 1988).

This study also focused on characteristics of leadership that are related to cognitions, beliefs, values, and expectations. A leader's positive expectations have been shown to be an important indicator (George, 1995) influencing a follower's cognitive style (i.e., defensive pessimism), and thus followers' perceived isolation. Therefore leaders who are less defensive-pessimistic oriented are more likely to create positivity in those they lead. This perspective contributes to the internal processes related to positive leadership development and use, as well as to developing the positivity of followers. Along with the results previously reported by Norem & Cantor (1986a, 1986b), this study showed that individuals who set low expectations can still use their anxiety in a productive way and prevent negative outcomes (i.e., high followers' perceived isolation). However, having

too much defensive pessimism (i.e., when leaders and followers were high in defensive pessimism) resulted in high followers' perceived isolation as a negative outcome, whereas when both leaders and followers were low (negative) in defensive pessimism, and therefore with according low levels of defensive pessimism, isolation also was lower than when leaders' and followers' defensive pessimism deviated from each other (i.e., high-low and low-high leader-follower defensive pessimism). Therefore organizations should strive to promote leaders' positive influence on followers' because it could affect followers' perceived isolation, which can increase or decrease group performance.

6.3. Limitations and Future Directions

Despite the aforementioned contributions, this study is not without limitations. They are mainly related to the self-reported nature of the data. The study variables were all self-reported; however, due to the study's focus on (in)congruence in followers' perceptions about themselves and their leaders and the effect of this (in)congruence on another individually perceived psychological state, i.e. isolation, this fact might not be so problematic. Nevertheless, in attempting to minimize the problem of common method variance, we used several techniques, such as ensuring that participants were not able to guess the aims of the study, ensuring respondent anonymity, using a large-scale study design in which we were able employ counterbalancing question order, and improving scale items by keeping questions simple and concise (Podsakoff et al., 2003).

Furthermore, the data that we gathered are cross-sectional in nature, thereby not enabling us to infer causality. As with several other psychological constructs, future field research into leader-follower defensive pessimism (in)congruence can benefit from a longitudinal study which could test the implications of causality in real life and examine a temporal dimension, i.e., how the interaction of defensive pessimism with perceived isolation can help leaders and followers to progress through their work. Furthermore, future research is warranted that implements an experimental design by manipulating leader-follower defensive pessimism (in)congruence. Another limitation was related to Cronbach's alpha. Noted, these indices are quite low, lower than the usual cut-off. However, as previously validated scales have been used, we have decided not to drop any items but rather add further explanation into this section regarding the low reliabilities of the used scales. These indeed indicate that the reliability of these scales in our sampled context is not at sufficient level, which is why future research should delve deeper into the issues related to the scales used for measuring these constructs.

Finally, this research focused only on the outcomes of defensive pessimism – i.e., examining how it can manifest in work through follower's perceived isolation. In addition to well-being outcomes (e.g., reducing follower's perceived isolation), job performance outcomes could perhaps be a fruitful topic for further research. Moreover, although this aspect is shown to be important, other work-contextual and interpersonal variables at various levels may also influence how followers perceive isolation in the workplace. For instance, other personality traits (e.g., locus of control, self-efficacy) may influence the

individual's perceived isolation, thus hypothesized relationships which were not part of this study.

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E / B / R

**POVZETKI V
SLOVENSKEM JEZIKU**

DO BETTER PERFORMING COMPANIES POSSESS MORE INTANGIBLE ASSETS: CASE OF SLOVENIA

ALI IMAJO BOLJ USPEŠNA PODJETJA VEČ NEOTIPLJIVEGA KAPITALA? PRIMER SLOVENIJE

GORDANA LALOVIĆ, MATJAŽ KOMAN

POVZETEK: V članku na podlagi teorije podjetja, ki temelji na razpolaganju z omejenimi viri, proučujemo razlike med uspešnimi in neuspešnimi podjetji v odvisnosti od velikosti neotipljivega kapitala. Dobljeni rezultati kažejo, da imajo boljša podjetja v povprečju večji delež neotipljivega kapitala na večini analiziranih neotipljivih virov. Na podlagi rezultatov ugotavljamo, da so uspešna podjetja strateško usmerjena v razvoj tistih temeljnih zmogljivosti in kompetenc, ki niso odvisne od znanja posameznikov, temveč prebivajo v organizaciji. Z vidika podjetja je torej ključno, da managerji vložijo več navora v analizo in identifikacijo ključnih neotipljivih virov v podjetju in proučijo vpliv njihovega delovanja v podjetju.

Ključne besede: neotipljiv kapital, poslovanje podjetja

THEORETICAL FRAMEWORK FOR THE STUDY OF INTANGIBLE INVESTMENT INTO INNOVATIVE CAPITAL IN RESOURCE LIMITED ENVIRONMENT: A CASE FOR SYNCHRONOUS INNOVATIONS?

TEORETIČNI OKVIR ZA PREUČEVANJE NEMATERIALNIH NALOŽB V INOVATIVNI KAPITAL V OKOLJU Z OMEJENIMI VIRI: PRIMER SINHRONIH INOVACIJ?

JOVAN TRAJKOVSKI

POVZETEK: Intenzivnost inovacij v podjetjih je odvisna od razpoložljivosti virov, predvsem finančnih in kadrovskih omejitev. V prispevku je predlagan teoretični okvir za vlaganje v inovativni kapital v primeru omejenih virov. Model temelji na razdrobljeni literaturi o inovacijah v okviru omejenih virov, ki ponujajo obsežen teoretični okvir, ki odgovarja na tri vprašanja: (1) katere vrste inovacij so bolj pomembne v okolju, omejenem z viri, in zakaj, (2) kateri viri se potrebujejo in zakaj ter na kateri stopnji inovacijskega procesa (3), katere postopke naj bi podjetja sprejela za začetek inovacijske dejavnosti (kje bi morali začeti), da bodo v celoti uspešne o vse vrste inovacij in kako sinhronske inovacije pojasnijo prehod iz ene vrste inovacij v drugo.

Ključne besede: neotipljiv kapital, inovacije, države v razvoju, omejitve virov, sinhrona inovacija

AN EMPIRICAL STUDY ON THE EXISTENCE OF CONVERGENCE FOR ENERGY PER CAPITA

EMPIRIČNA ŠTUDIJA O OBSTOJU KONVERGENCE ZA ENERGIJO NA PREBIVALCA

KENICHI SHIMAMOTO

POVZETEK: Članek se osredotoča na energijo, ki je vir številnih resnih okoljskih problemov, in preučuje obstoj konvergence energije na prebivalca med državami z namenom razjasnitve, ali raste poraba energije na prebivalca in ali se bo trend v prihodnosti verjetno spremenil. Ugotovljeno je bilo, da ni bilo nobenih dokazov o zbliževanju energije na prebivalca s katerim koli primerom v preteklosti za svetovne države in države, ki niso članice OECD, medtem ko smo našli konvergenco energije na prebivalca za države OECD. Kar zadeva napovedi za prihodnost, ni bilo dokazov o stisnjeni ergodični porazdelitvi energije na prebivalca za svet in države, ki niso članice OECD, medtem ko je bila za države OECD ugotovljena stisnjena porazdelitev okoli povprečja OECD.

Ključne besede: konvergenca, energija na prebivalca, neenakost, svet, OECD države

EXPLORING RELATIONSHIPS AMONG NEED- AND SELF-RELATED ASPECTS OF TOURIST EXPERIENCE DRIVERS

ODNOS MED SAMOPODOBO IN POTREBO PORABNIKOV PO EDINSTVENOSTI NA PRIMERU DOŽIVETIJ V TURIZMU

ŽANA ČIVRE, TOMAŽ KOLAR

POVZETEK: Članek proučuje motivacijske in osebnostne dejavnike doživetij v turizmu, ki predstavljajo pomembne vidike izbire destinacije. Namen prispevka je raziskati predhodnike potrebe porabnikov po edinstvenosti, ki izhajajo iz samopodobe, in sicer v kontekstu turizma. Rezultati kvantitativne raziskave (z uporabo modeliranja strukturnih enačb) na vzorcu 192-ih mladih slovenskih potnikov podpirajo predpostavko, da je neodvisno pojmovanje sebstva relevanten predhodnik potrebe porabnikov po edinstvenosti. Rezultati tudi kažejo, da med soodvisnim pojmovanjem sebstva in potrebe porabnikov po edinstvenosti ni statistično pomembne povezave. Na tej podlagi izsledki raziskave ponujajo pomembne praktične implikacije o tem, kako doživetja zadovoljujejo potrebe turistov po edinstvenosti.

Ključne besede: vedenje porabnikov, turizem, doživetja, potreba porabnikov po edinstvenosti, neodvisno pojmovanje sebstva, soodvisno pojmovanje sebstva

THE ROLE OF LEADER-FOLLOWER DEFENSIVE PESSIMISM (IN)CONGRUENCE IN FOSTERING PERCEPTIONS OF FOLLOWERS' ISOLATION

VLOGA VODJE IN SLEDILCA OBRAMBNEGA PESIMIZMA: (NE)SKLADNOST PRI SPODBUJANJU DOJEMANJA IZOLACIJE SLEDILCEV

ALDIJANA BUNJAK, MATEJ ČERNE

POVZETEK: Študija proučuje skupni učinek različnih kognitivnih značilnosti vodij in sledilcev (t.j. obrambnega pesimizma) na izolacijo sledilcev. Preučujemo medsebojni vpliv obrambnega pesimizma vodje in obrambnega pesimizma sledilcev pri spodbujanju zaznavanja izolacije privržencev. Podatki 291 strokovnjakov so analizirani po nizu hierarhičnih linearnih modelov in analiz polinialne regresije. Polinomska regresijska analiza nakazuje, da je, ko se vodje in sledilci strinjajo v obrambnem pesimizmu, stopnja zaznane izolacije slednjih je nižja kot tedaj, ko obrambni pesimizem vodij in sledilcev odstopa drug od drugega (tj. visok-nizek in nizek-visok obrambni pesimizem vodje-sledilca). Vendar, ko je obrambni pesimizem sledilcev višji od defenzivnega pesimizma vodje, je tudi privzeta izolacija slednjih višja. S tem, ko predlagamo, da je lahko bolj zapleteno zaznavanje vodje obrambnega pesimizma, kot je bilo prej priznано, zaključujemo, da morajo študije vodenja razviti veliko globlje razumevanje skladnosti vodje in sledilcev v kognitivnih stilih, da bi zmanjšali izolacijo sledilcev na delovnem mestu.

Ključne besede: obrambni pesimizem, vodja, sledilec, zaznana izolacija

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