EVALUATING ORGANIZATIONAL CHARACTERISTICS COMPLEMENTARY WITH ENTERPRISE SOFTWARE PRODUCTS

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Abstract. Implementation, deployment and maintenance of enterprise software pre-configured products are one of the key challenges managers need to address in order to stay competitive in the never ending search to find better ways of conducting business. In the literature there are discovered two general approaches through which managers can use for a successful implementation, deployment and maintenance of enterprise software products. First approach is based on the internal re-deployment of the managerial practices that are already used to manage other fields in the enterprise. Second – the deployment of "world-wide" industry "best practices" that international vendors of enterprise software and their local representatives sell as part of their pre-configured software products. This paper presents a novel model that enables enterprises to systematically evaluate the fit between their specific organizational characteristics and the organizational characteristics complementary with successful deployment of international pre-configured enterprise software products. The proposed model is tested through a comparison of two groups of enter-prises from the population of 1000 biggest enterprises in Slovenia. The first group mostly invests in local, while the second group mostly invests in international enterprise software products. The paper finds that on average there are significant and relevant differences in 44% of the examined organizational characteristics between the groups of enterprises that mostly invest in international or local enterprise software products. The model serves as a comprehensive organizational risk checklist for enterprises that are about to invest in enterprise software products.

Keywords: enterprise software investments, international enterprise software products, local enterprise software products, organizational characteristics, software products, pre-configured software products.

JEL Classification: M21, G11, G19.

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Introduction

The effects of wide use of IT as a general purpose technology in enterprises can only be compared to the effects the steam engine and electrical motor had on the creation of goods (Bresnahan, 2003). As a consequence, implementation, deployment and maintenance of enterprise software pre-configured products are one of the key challenges managers need to address in order to stay competitive in the never ending search to find better ways of conducting business (Bartel et al., 2007; Basu & Fernald, 2007; Dedrick et al., 2013; Kleis et al., 2012; Rezende da Costa et al., 2018; de Santana et al., 2018; Neubert & Van der Krogt, 2018; Potluri & Vajjhala, 2018). The enterprise software pre-configured products that most often support business related tasks and processes are Enterprise Resource Planning (ERP), Supplay Chain Management (SCM), Customer Relationship Management (CRM), Business Intelligence (BI), and Big Data Analytics (BDA) (Gronwald, 2017). The international literature describes two general approaches which managers can use for a successful implementation, deployment and maintenance of enterprise software products (Markus & Tanis, 2000; Shafique et al., 2019; Davidavičienė et al., 2018). First approach is based on the internal re-deployment of the managerial practices that are already used to manage other fields in the enterprise. Second approach, favored by the literature and the big international IT vendors (Markus & Tanis, 2000; Howcroft & Light, 2006; Microsoft Corporation, 2008, 2015, 2017; Oracle Corporation, 2008, 2013, 2017; SAP AG, 2008; SAP SE, 2015; Potluri & Vajjhala, 2018), is based on the deployment of "world-wide" industry "best practices" that international vendors of enterprise software and their local representatives sell as part of their pre-configured software products. Based on various empirical evidence published in the last decade one can't but acknowledge the success of big international vendors; the deployment of worldwide industry best practices integrated into international pre-configured enterprise software products established itself as the dominant way enterprises invest in IT in the world in general (Batenburg et al., 2006; Shaul & Tauber, 2013; Romero & Martínez-Román, 2015) as well as in Slovenia in particular (Slovenian Chamber of Commerce, 2004; Hovelja, 2008).

Researchers adjusted to the above mentioned development in the field by focusing their research on empirical analysis of the success of investments of pre-configured enterprise software products in the international markets and on the challenge of improving their deployment in terms of speed, cost and quality (Moon, 2007; Sudhaman & Thangavel, 2015). Despite all this focus and deployment failure rates, which remained higher than 50% in the last 15 years (Goyettea et al., 2014; Shaul & Tauber, 2013), the majority of research reports (Chen et al., 2018) show a positive relationship among the IT investment and the company's productivity and market value. The majority of cited research is however done in the USA, were the dominant international enterprise software vendors such as Microsoft, SAP, Oracle with their business partners also conduct the majority of their research on identifying the "best worldwide industry practices" (Microsoft Corporation, 2008; Oracle Corporation, 2008). Even SAP, as the only major non-American enterprise IT vendor, uses Fortune 500 companies as important key business partners in the development of its ERP product of "best practices" (SAP, 2004). These "best practices" are then augmented with local best practices designed to address local business customs (SAP, 2008). Thus one can objectively conclude

that most of "universal or worldwide industry best practices" actually originate from North America and to some extent Germany (Heinzelmann, 2017). Most of the published empirical research on the usefulness of these practices (Moon, 2007) and how ICT (Information and Communication Technology) investments contribute to enterprise's productivity (Liao et al., 2016) were likewise conducted in USA.

This paper advances the notion that the claim of worldwide or universal usefulness of the above described industry best practices incorporated into pre-configured enterprise software is empirically not yet sufficiently proven outside their countries of origin (Soh et al., 2000; Kyung-Kwon & Young-Gul, 2002; Hawking, 2007). Such position is in line with research that analyzed different factors of successful implementation of ERP and other technologies in different countries, like in Jordan (Mohammad, 2018), United Kingdom (Jayawickrama et al., 2017), India (Saravanan & Sundar, 2015), and domain areas, like in hospital (Garg & Agarwal, 2014), etc. For this reason, we do not refer to these best practices as universal or worldwide but as international pre-configured "best practices", since they are sold by dominant international IT vendors (Shaul & Tauber, 2013).

Based on the presented arguments one could reasonably claim that these best practices, are actually standard American and to a lesser extent German management practices used by their different industries. If one considers research findings on international effectiveness of general management practices in the last decades (Hofstede, 1980, 2003), the ability of these management practices to cross national borders without losing effectiveness and efficiency is questionable at best.

To gain new insights into the success of investments in enterprise software products, specifically the success of investments in international pre-configured enterprise software products outside of their countries of origin this paper compares the success of investments in enterprise software products for two groups of enterprises in Slovenia. One that invests in local pre-configured enterprise software products and one that invests in international pre-configured enterprise software products.

Such comparison can help us answer the following research questions:

RQ1: What **organizational characteristics**, if any, need to be deployed by the enterprises in order to improve the success of investments in international enterprise software products?

RQ2: Are there important **organizational differences between enterprises** that predominantly invest in international enterprise software products and enterprises that predominantly invest in local enterprise software products?

RQ3: Do investments in international enterprise software products deliver higher productivity growth compared to investments in local enterprise software products?

RQ4: Does the proposed approach for evaluating the risk of success/failure of the investment in international enterprise software products provide non-trivial information to enterprises?

To answer the above stated research questions the paper is organized as follows. The theoretical background section deals with the review of key literature from the studied area, needed to adequately address RQ1 and identify what type of organizational characteristics are needed to successfully use international enterprise software products. Based on this review the second section presents a new approach for evaluating the risk of investment in interna-

tional pre-configured enterprise software products. In the third section the paper presents the methodology and sample selection procedures of the empirical research that was done on the population of 1000 biggest enterprises in Slovenia. In the fourth section the results of the empirical study are presented. The fifth section discusses the key results from the perspective of the paper's research questions. The sixth section concludes the paper.

1. Theoretical background

The study of management of IT investments in enterprises has a long, well documented and well established history in the literature, with American researchers usually leading the way. The field gained prominence with the first studies of the productivity of the use of IT in the late eighties. These studies are best summarized with a saying attributed to Robert Solow: "We see computers everywhere but in the productivity statistics" (Paul, 1990). The resolutions of the major methodological issues through the nineties helped solve this IT productivity paradox at the turn of the century. Several very prominent studies showed how the use of IT affects enterprises' productivity and how IT was a major factor behind the global productivity growth since the early nineties (Basu & Fernald, 2007; Daveri, 2004; Inklaar et al., 2003; Mittal & Nault, 2009; OECD, 2004; Mithas & Rust, 2016). Nowadays, also a number of studies present methods of adopting different ERP systems in Small and Medium Sized Enterprises (SMEs), like Software as a Service (SaaS) in Seethamraju (2015), and assessing ERP post-implementation success in Hsu et al. (2015). The cited studies also formed the hypothesis that without appropriate management of IT investments in the enterprise the productivity benefits of the use of IT are low (if present at all). The hypothesis that mismanagement of IT in enterprises is one of the key organizational issues of today's management of course had/has its critics.

To explore the stated research questions, the paper proposes an approach for evaluating the fit between a specific enterprise and its organization and the required/complementary organizational characteristics for/with successful investments in international enterprise software products. However, before a new approach can be proposed, the review of the related works needs to answer the first research question (RQ1). RQ1 asks which organizational characteristics of the enterprise, if any, need to be deployed by the enterprise to improve the success of investments in international enterprise software products? In Table 1 the organizational characteristics that positively influence the success of investments in enterprise software products in USA are presented. Since US is the biggest market of international enterprise software vendors, where they (SAP, Oracle, Microsoft) have a dominant market position, we can state that the organizational characteristics identified as required for/complementary with successful investments in enterprise software products in USA (Table 1) are the ones that improve the success of investments in international enterprise software worldwide.

The above presented organizational characteristics generally fit well with successful investments in international software products because they facilitate the implementation of significant changes to the business and management related tasks and practices through the entire enterprises's value chain (Tagliavini et al., 2001) from R&D (technological research, product development…), through HRM (Recruitment, Training…), Production (Product

Table 1. Required/complementary organizational characteristics for successful investments in enterprise software products (ERP, CRM, …) in USA

Organizational dimensions	Organizational characteristics	Sources
Cultural characteristics of enterprise	Increasing the support employees receive from superiors, increasing the commitment of the employees, improved innovativeness, improved control, improved continuous learning	Brown & Leigh, 1996; Denison, 1997; Baker, 2002; Neal et al., 2000; Poku & Vlosky, 2002; Delobbe et al., 2002; Cameron, 2008; Ke & Wei, 2008.
Strategical characteristics of enterprise	Improving the sophistication of strategic planning/knowledge management, improving cost leadership, improving product differentiation, increasing the use of inter organisational synergies, increasing bargaining power in the supply chain	Porter & Millar, 1985; Bakos & Treacy, 1986; Henderson & Venkatraman, 1999; Kettinger et al., 1994; Gupta et al., 1997; Hedman & Kalling, 2001; Garg et al., 2002; Bergeron et al., 2002; Ko et al., 2008.
Structural characteristics of enterprise	Decreasing centralisation, increasing group/team based method of work, decreasing formalisation, decreasing vertical differentiation, decreasing specialisation, increasing professionalization, increasing goal oriented remuneration system, increasing communication with the environment	Damanpour, 1991; Hammer & Champy, 1993; Grover & Goslar, 1993; Swanson, 1994; Fichman & Kemerer, 1997; Fiedler et al., 1996, Fichman, 2000; Dewett & Jones, 2001; Bergeron et al., 2002; Brynjolfsson et al., 2002; Morton & Hu, 2008.

planning, Maintenance…), Logistics (Inventory management, Delivery of products…), Marketing and Sales (Advertising, After sale service…) to Infrastructure Activities (Financial management, Legal service…). These same organizational characteristics are on the other hand not required to facilitate investments in local enterprise software products, since the local enterprise software products fit the existing business and management related tasks and practices of local enterprises significantly better than the international ones. Hence the existing internal business and managerial practices of the value chain do not need to be changed considerably or at all when implementing local software, thereby shifting the focus of the implementation of local software products from organizational transformation to automation and informatization (Bresnahan, 2001).

On a theoretical level the identified organizational characteristics help advance the enterprise software risk implementation literature. Several risk models already point out that strategical, cultural and structural characteristics of the enterprise which facilitate organizational transformation are one of the most important sources of risks and thus critical success factors of successful deployment (Scott & Vessey, 2002; Yusuf et al., 2004; Ehie & Madsen, 2005; Aloini et al., 2007; Hakim & Hakim, 2010; Dey et al., 2013). However they mostly stop at the level of the organizational dimension itself (i.e. poor understanding of corporate culture, poor strategic vision, poor organizational structure) and don't focus on identification of specific organizational characteristics of an organizational dimension that are the actual risk factors. Thus our model can be of significant benefit to well established

risk management frameworks such as PRINCE2, PMBOK, the Australian Standard and the General Risk Management Framework (Aloini et al., 2012) with the timely identification of specific organizational risk factors in the risk assessment stage.

Additionally, the identified organizational characteristics can be used by multi-criteria decision-making (MCDM) approaches for ERP system selection if the MCDM approach in addition to the quantitative criteria also considers qualitative criteria (Temur & Bolat, 2018), e.g., Fuzzy analytic network process approach, Fuzzy quality function deployment approach, Fuzzy data envelopment analysis approach and other fuzzy or combined approaches (Brzozowski & Birfer, 2017; Hornos & Herrera-Viedma, 2018). In Zeng et al. (2017) authors propose a model to select an ERP system for Chinese small- and medium-sized enterprises. Integrating our qualitative evaluation of organizational characteristics in existing MCDM approaches shouldn't prove difficult, since in the last decades fuzzy derivatives of the classis approaches or combinations between fuzzy and non-fuzzy aproaches have been favored over the original more quantitative approaches (Enea & Piazza, 2004; Mohanty et al., 2005; Junior et al., 2014; Brzozowski & Birfer, 2017).

2. Proposed approach

The proposed approach for evaluating the success of the international enterprise software products is a process approach. As such it is in line with the literature recommendation of modelling IT deployment as a process instead of using a »black box« variance approach (Kohli & Sherer, 2002). The process approach requires that we first analyse the fit between the existing organizational characteristics of an enterprise and the pre-configured international enterprise software products (Haddara, 2014). Only then should one analyse the impact enterprise software products have on the success of enterprises. Such an approach will enable us to understand if the actual organisational characteristics match the organizational characteristics of enterprises that successfully use international pre-configured software products in USA and Germany. This will enable us to understand if there are general issues with the success of such investments or the issues only arise when there is a lack of fit between the required and actual organizational characteristics of an enterprise. To gain these insights the proposed approach presented in Figure 1 first forms two groups of enterprises based on their decision to pre-dominantly invest in pre-configured international enterprise software products or local enterprise software products. Then it compares these two groups in two stages. In the first stage the approach compares the cultural, strategical and structural organizational characteristics of the two groups against each other as well as against the key (complementary) organizational characteristics that are according to the literature required for productive use of international pre-packaged software products in US enterprises. In the second stage the approach then compares how successfully enterprises in each group are at translating investments in enterprise software products into economic success. Such a process approach follows the guidelines that good socio-technical models should consider (Kling & Lamb, 2000), builds on the knowledge of multiple iterations of Levitt and Scott-Morton models (Gimenez & Suarez, 2004) as well as on the knowledge of the Interaction model (Beath et al., 1995) and IT Business Value model (Gurbaxani et al., 2004).
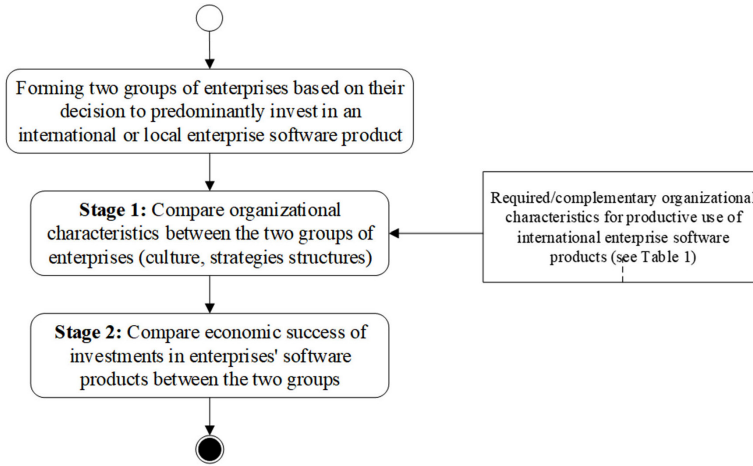
Figure 1. The proposed approach for evaluation of the success of the investments
in enterprise software products (ERP, CRM, …)

3. Method

In this section we address the methodology used to conduct the empirical test of the proposed model. Methodology is split into the three sections that address different methodological issues: survey preparation, method selection and survey execution.

3.1. Survey preparation

To answer the defined research questions of the paper the survey had to gather the data on the variables presented in Figure 1. Thus the survey had to collect the data if enterprises invest into local or international enterprise software products, the data on cultural, strategic and structural characteristics of enterprises and the data on different dimension of economic success of IT investments (IT use, added value per employee…). To collect the data about the type of enterprise software products enterprises invest in and their cultural, strategic and structural characteristic that influence the success of the investments in enterprise software products five point Likert scales (strongly agree, agree, neither agree nor disagree, disagree and strongly disagree) were used, because of their conceptual unambiguousness and widespread use. Other preparations of the survey can be found in (Hovelja et al., 2013).

3.2. Method selection

In accordance with the proposed approach and to answer the second research question (RQ2) which requires a comparison of enterprises that predominantly invest in international software products with those that predominantly invest in local software products a 2 level categorical variable with each level representing one of these two groups of enterprises needs to be established. This categorical variable was defined by recoding the 5 point Likert scale that measured the survey respondents agreement (from strongly agree to strongly disagree)

with the statement that their enterprise invests predominantly into international pre-configured software products. Its Likert values of 1 and 2 were recoded to represent the group of 25 enterprises that predominantly invest in local software products while the Likert values of 4 and 5 were recoded to represent the group of 24 enterprises that predominantly invest in international enterprise software products. The remaining 45 enterprises in the sample were unable to choose which enterprise software investment strategy they predominantly follow. By being strategically "stuck in the middle" their analysis didn't contribute greatly towards addressing the posed research questions. For this reason they were not included in the recoded 2 level categorical variable that was the basis for statistical comparison of organizational, economic and IT use characteristics between the group of enterprises that invest predominantly in local enterprise software products and the group of enterprises that invest predominantly in international enterprise software products. The 2 level categorical variable representing the two groups of enterprises that are of interest for the analysis can function as the only dependant variable for our chosen statistical method and all other variables can function as independent scale variables with distributions (skewness, kurtosis) that do not greatly differ from normality, which would make parametric testing problematic (Ozgur & Strasser, 2004; Barrett et al., 2005).

In situations with one 2 level categorical dependent variable and several scale independent variables the recommended statistical method of analysis is discriminant analysis (Barret et al., 2005). However it is generally best to have 4 or 5 times as many observations as independent variables for the discriminant analysis (Barfield et al., 2004). The size of the sample presented in this paper compared to the amount of independent variables analyzed unfortunately doesn't meet this requirement; hence instead of using a single multivariate analysis one has to consider using multiple univariate analyses (Huberty & Morris, 1989; Carlson, 2017). There are four situations in which such approach is appropriate (Huberty & Morris, 1989). One is when outcome variables are conceptually independent, second is when research conducted is exploratory in nature, third is when some or all of the outcome variables under current study have been previously studied in univariate contexts and fourth is when some evidence is needed to show that two groups of units are equivalent with respect to a number of descriptors (Huberty & Morris, 1989). In the presented dataset all four of these requirements are met. The independent variables are conceptually different (organizational variables, variables of economic success and variables of IT use), the research is exploratory in nature, it attempts to show that two groups of units are equivalent with respect to a number of descriptors that should differ according to the established theory and independent variables included in the dataset were previously almost exclusively studied in univariate contexts. For these reasons it is sensible to proceed by using multiple univariate analyses of the dataset. From the univariate tests that analyze one scale variable and one categorical variable Student's independent sample t-tests is the most widely used by the scientific community (Huberty & Morris, 1989; Sharma, 1996) and thus was selected as the statistical method of choice for this dataset. Because Student's t-tests analyze only the significance of the difference between the two tested groups' means and not the magnitude of the difference, we additionally calculate the effect size measure Cohen's delta for every t-test in order to address any

potential "probability pyramiding problems" with Type I error (Huberty & Morris, 1989). Thus we can state with a high degree of confidence that the selected statistical method will not influence the results. The decision to choose Cohen's delta as the analyzed effect size measure was based on the fact that from all effect size measures it is the one most commonly calculated and cited (Brand et al., 2010).

3.3. Survey execution

As the vast majority of other IT deployment studies in the literature (Bresnahan et al., 2002; Brynjolfsson et al., 2002; Mittal & Nault, 2009; Hsu et al., 2015) this study was also focused on the biggest non-financial enterprises in the country. The studied population was the top thousand enterprises in Slovenia, based on the creation of value added in a year. These enterprises created 40% of total added value in the country in 2003 and employed 31% (285.357) of the workforce. However even between them there were 38 enterprises that had fewer than 25 employees. These enterprises were removed from the studied population. The reason behind such decision lies in the probability that these enterprises significantly differ from their bigger counterparts in organizational and other characteristics. 48 other enterprises were additionally removed because they exhibited larger fluctuations in earnings and employment then +/–50%. Such major changes in all likelihood represent outliers and can't be considered results of a normal business year. From the IT departments of the remaining 914 enterprises that thus composed the studied population 94 appropriately completed surveys were received. The survey of top 1000 enterprises in Slovenia is a reoccurring survey that was first implemented in 2005 and last performed in 2016.

Based on personal and by phone communication with the IT managers involved in study it was found that the relatively low 10.28% response rate was mainly caused by the lack of time and/or knowledge needed to fill out the questionnaire. Tests of non-response bias were conducted to determine if the 94 "surveyed" enterprises adequately represent the studied population and can thus be thought of as a random sample from the studied population. These tests showed that there was no significant difference between the values known for the entire population and for the sample (number of employees, added value per enterprise, added value per employee, growth of added value) as long as the variable's sample relative standard deviation was smaller than 110%. Since the sample relative standard deviations of variables with unknown population data (organizational characteristics, IT use, and relative economic success of enterprises) where lower than 65%, it is reasonable to assume that non-response bias doesn't statistically significantly affect the variables relevant for this paper. Further tests also showed that the skewness and kurtosis for the studied variables did not exceed the ranges that would greatly violate the assumptions about the normal distribution of the variables, which would make parametric testing problematic (Sharma, 1996; Ozgur & Strasser, 2004, Barret et al., 2005). Thus it can be stated that the sample in all likelihood adequately represents the population and can thus be used to conduct parametric testing for the studied variables.

4. Results

Following the developed approach presented in Figure 1 we start the comparison between the groups of enterprises that predominantly invest into local and international enterprise software products by comparing their organizational characteristics. Table 2 presents the comparison of the cultural characteristics of the two groups of enterprises. Table 3 presents the comparison of strategic characteristics and Table 4 the comparison of structural characteristics.

Table 2. The comparison of cultural characteristics from Table 1 between the enterprises that predominantly invest in international enterprise software products and those that predominantly invest in local enterprise software products

Basic statistics for the international and local enterprise software product group of enterprises:					Independent Student's t-test and Cohen d effect size between groups:			
Local group = 1, International group = 2	N	Mean	Std. Deviation	F	Sig.	Sig. (2-tailed)/Cohen d	
Improved support of the employees by superiors	1	25	3.36	0.91	0.00	0.97	Equal variances assumed	0.05
	2	24	3.88	0.90			Cohen d	0.58
Improved commitment of the employees	1	25	3.48	0.71	3.27	0.08	Equal variances assumed	0.93
	2	24	3.50	0.98			Cohen d	0.02
Improved innovativeness	1	25	3.72	1.10	2.99	0.09	Equal variances assumed	0.33
	2	24	4.00	0.88			Cohen d	0.29
Improved control	1	25	3.00	0.82	0.03	0.87	Equal variances assumed	0.13
	2	24	3.33	0.70				0.45
Improved continuous learning	1	25	2.92	0.76	1.40	0.24	Equal variances not assumed	0.00
	2	24	3.63	0.82			Cohen d	0.91

The comparison of cultural characteristics between the enterprises that predominantly invest in international pre-configured software products and those that predominantly invest in local software products shows only one statistically significant difference with a large Cohen's delta effect size. Thus the only cultural characteristic that is statistically significantly and importantly better deployed in the enterprises that predominantly invest in international software products is improved continuous learning. Another cultural characteristic that was almost statistically significantly better deployed by the international enterprise software group was the characteristic of improved support of the employees by the superiors (P-value = 0.052) with a moderate Cohen's delta effect size. Other cultural characteristics didn't show

any relevant differences between the two studied groups of enterprises. Based on the Table 1 presented in section 2 and the established positive effects all five characteristics have on enterprise software products in the literature, we can state that international vendors and their local consulting partners were not very successful in improving key cultural risk factors that strongly impact the success of investments in international enterprise software products. The fact that organizational changes in this dimension require most effort and time of any organizational changes (Adler & Shenhar, 1990) can explain why such change is hard to achieve. However, one has also to start questioning the legitimacy of ERP packages as reflecting best practices that taken for granted (Liang & Xue, 2004). Another possible explanation is that in Slovenia enterprises often implement continuous learning as a key requirement of ISO standards. It would be reasonable for enterprise that decided to adopt the international ISO standards to invest into international pre-configured software products that support such standard and have the built-in know-how of how to deploy such standard. No matter which explanation one favors the fact remains that a successful deployment of international enterprise software product should require a change of all five cultural characteristics to be in line with the US empirical findings on required complementary cultural characteristic for productive use of enterprise software.

Table 3. The comparison of strategic characteristics between the enterprises that predominantly invest in pre-configured software products and those that predominantly invest in custom software products

Basic statistics for the international and local enterprise software product group of enterprises:					Independent Student's t-test and Cohen d effect size between groups:		
Local group = 1, International group = 2	N	Mean	Std. Deviation	F	Sig.	Sig. (2-tailed)/Cohen d	
Increased sophistication of strategic planning	1	25	3.44	1.08	3.36	0.07	Equal variances assumed	0.01
	2	24	4.13	0.74			Cohen d	0.75
Improving cost leadership	1	25	3.64	0.99	3.05	0.09	Equal variances assumed	0.04
	2	24	4.17	0.70			Cohen d	0.62
Improving product differentiation	1	25	3.92	0.91	1.81	0.19	Equal variances assumed	0.06
	2	24	4.33	0.56			Cohen d	0.56
Increasing the use of inter-organisational synergies	1	25	3.40	0.96	2.56	0.12	Equal variances assumed	0.05
	2	24	3.92	0.72			Cohen d	0.58
Increasing bargaining power in the supply chain	1	25	3.68	0.99	1.75	0.19	Equal variances assumed	0.04
	2	24	4.17	0.70			Cohen d	0.62

The comparison between the strategic characteristics of the two studied groups of enterprises presented in Table 3 exposes much greater differences then was the case for the cultural

characteristics. All five characteristics exhibit a moderate size Cohen's delta. Sophistication of strategic planning, cost leadership and bargaining power in the supply chain is additionally statistically significantly different between the two groups. Thus we can conclude that the enterprises who predominantly invest in international enterprise software products have a higher quality processes of strategic planning, bargaining and cost leadership than the enterprises that predominantly invest in local software products. Based on results presented in Table 3 we can state that the management of strategic risk factors i.e. improvement of organizational characteristics that are required complements for productive use of international enterprise software products (Table 1) is significantly more successful than for the cultural risk factors. The enterprises that open themselves to foreign best practices in this organizational dimension exhibit significant and relevant improvements of key strategic characteristics over

Table 4. The comparison of strategic characteristics between the enterprises that predominantly invest in pre-configured software products and those that predominantly invest in custom software products

Basic statistics for the international and local enterprise software product group of enterprises:				Independent Student's t-test and Cohen d effect size between groups:			
Local group = 1, International group = 2	N	Mean	Std. Deviation	F	Sig.	Sig. (2-tailed)/Cohen d	
Decreasing Centralization	1	25	3.16	0.90	0.08	0.78	Equal variances assumed	0.51
	2	24	3.33	0.92			Cohen d	0.20
Increasing group/team based method of work	1	25	2.92	0.86	1.08	0.30	Equal variances assumed	0.04
	2	24	3.46	0.88			Cohen d	0.63
Decreasing Formalization	1	25	2.80	0.96	0.43	0.52	Equal variances assumed	0.17
	2	24	3.17	0.87			Cohen d	0.41
Decreasing vertical differentiation	1	25	3.28	0.84	0.75	0.39	Equal variances assumed	0.54
	2	24	3.42	0.72			Cohen d	0.18
Decreasing Specialization	1	25	3.24	0.88	0.67	0.42	Equal variances assumed	0.06
	2	24	3.75	0.99			Cohen d	0.56
Increasing professionalization	1	25	2.84	0.94	0.02	0.90	Equal variances assumed	0.02
	2	24	3.46	0.88			Cohen d	0.69
Increasing goal oriented remuneration system	1	25	2.76	1.16	2.41	0.13	Equal variances assumed	0.09
	2	24	3.29	0.95			Cohen d	0.51
Increasing communication with the environment	1	25	2.96	0.93	1.26	0.27	Equal variances assumed	0.04
	2	24	3.54	1.02			Cohen d	0.61

the enterprises that limit themselves to redeploying internal best practices, when investing in local enterprise software products. Because of the lack of strategic alignment (Centobelli et al., 2018) in enterprises in Slovenia that invest in local enterprise software products, we can also conclude that there is a general lack of business sophistication which negatively affects their innovation capacity (Kirikkaleli & Ozun, 2019).

The comparison of structural characteristics of the two studied groups of enterprises presented in Table 4 reveals 5 characteristics with medium size Cohen's delta. Among these only the differences between groups for team based method of work, professionalization and communication with the environment are statistically significant, while the differences between groups for decreased specialization and increased goal oriented remuneration are not. Even more surprising is the fact that there is no significant and relevant difference between the international and local enterprise software investment group when it comes to establishing a flat hierarchical structure. The flattening of the hierarchical structure through decreased centralization, decreased formalization and decreased vertical differentiation is considered to be a key structural risk factor that needs to be addressed for a successful deployment of enterprise software products. It serves as a main indicator that an enterprise has transformed its organization into a process-oriented organic organization that brings managers closer to the customers and enables a more efficient and effective execution of work tasks in the IT age (Kim & Ramkaran, 2003). The lack of such process-oriented transformation leads to the conclusion that at its core even the group of enterprises that predominantly invest in international enterprise software products continue to function as classic Smith and Taylor type organizations with questionable long term sustainability (Chofreh et al., 2018). Thus we cannot speak of a successful management of structural risk factors that positively influence the success of investments in international enterprise software products.

Table 5. The comparison of indicators of IT use and of economic performance between the enterprises that predominantly invest in international and those that predominantly invest in local software products

Basic statistics for the international and local enterprise software product group of enterprises:					Independent Student's t-test and Cohen d effect size between groups:			
Local group = 1, International group = 2	N	Mean	Std. Deviation	F	Sig.	Sig. (2-tailed)/Cohen d	
Added Value per Employee 2003	1	25	33,550 €	25,230 €	0.525	0.472	Equal variances assumed	0.606
	2	24	37,840 €	32,319 €			Cohen d	0.15
Added Value per Employee 2004	1	25	35,061 €	24,381 €	1.142	0.291	Equal variances assumed	0.467
	2	24	41,285 €	34,377 €			Cohen d	0.21
Growth of Added value in 2004	1	25	109.14%	17.37%	2.073	0.157	Equal variances assumed	0.647
	2	24	107.03%	14.46%			Cohen d	0.13
Growth of Added value per employee in 2004	1	25	106.76%	16.94%	0.486	0.489	Equal variances assumed	0.388
	2	24	110.92%	16.44%			Cohen d	0.25

Basic statistics for the international and local enterprise software product group of enterprises:				Independent Student's t-test and Cohen d effect size between groups:			
Local group = 1, International group = 2	N	Mean	Std. Deviation	F	Sig.	Sig. (2-tailed)/Cohen d	
Growth of Added value in 2004 relative to the industry	1	25	3.44	0.506	5.326	0.026	Equal variances not assumed	0.981
	2	24	3.43	0.895			Cohen d	0.01
Growth of Added Value between 2000–2004 relative to the industry	1	25	3.68	0.802	0.137	0.713	Equal variances assumed	0.401
	2	24	3.47	0.845			Cohen d	0.25
Maximum potential IT use	1	25	61.76%	18.81%	0.053	0.819	Equal variances assumed	0.664
	2	24	64.17%	19.68%			Cohen d	0.13
Actual IT use	1	25	49.16%	17.85%	0.003	0.954	Equal variances assumed	0.509
	2	24	52.76%	19.97%			Cohen d	0.19
IT utilization rate	1	25	79.39%	11.45%	2.009	0.163	Equal variances assumed	0.604
	2	24	81.49%	16.49%			Cohen d	0.15

Table 5 confirms such assessment and furthermore lets us state that the current risk management of organizational characteristics that positively impact the success of investment in international enterprise software products is not sufficient to produce relevant and significant differences in indicators of IT use and economic success between the two studied groups of enterprises. International software vendors and their local business partners marketing claims that international enterprise software products will enable enterprises to achieve a competitive edge, spur growth of added value and significantly raise the productivity of their employees (IDC, 2007) thus the studied data doesn't support. In fact, the decision of enterprises to predominantly invest in international vs. local enterprise software products does not appear to lead to any relevant and significant differences in IT use or economic success of enterprises. Based on the empirical results from other countries to achieve such gains the current quality of the deployment of international enterprise software products would need to be significantly improved by raising the quality and quantity of ICT professionals in local business partners of international enterprise software vendors, as well as in the the top 1000 enterprises themselves (Taştan & Gönel, 2020).

5. Discussion

The results of the empirical study enable us to answer all four research questions that were formulated at the beginning of this paper.

In accordance with the international literature we identified 18 organizational characteristics in 3 organizational dimensions (culture, strategy and structure) that are required complements for successful investments in international enterprise software products (RQ1). These characteristics are presented in Table 1 while Tables 2, 3 and 4 empirically compare the average value and distribution of these characteristics for the two studied groups of enterprises (groups of enterprises that predominantly invest in international vs. local international enterprise software products). While the empirical comparison found two (out of five) relevant and significant differences in the cultural dimension, three (out of five) relevant and significant differences in the strategic dimension and three (out of eight) relevant and significant differences in structural dimension the remaining ten organizational characteristics didn't show relevant and significant differences between the studied groups. Thus we can conclude that investments in international enterprise software products were accompanied by only 44% (8 out of 18) of those organizational characteristics that the literature finds as required for/complementary with successful investments in international enterprise software products (RQ2).

According to the results presented in Table 5 we can't reject the hypothesis that there are no relevant and statistically significant differences in efficiency of IT use or economic performance between the groups of enterprises that predominantly invest in pre-configured software products and those that predominantly invest in local software products (RQ3). However such results cannot be definitely interpreted as a failure of international enterprise software products to generate added value in enterprises outside of their country/culture (USA/Anglo-Saxon) of origin (Hofstede, 1980, 2003), since the quality of the deployment of required complementary organizational characteristics by the local IT consultants did not achieve the standards expected in the reviewed international literature. Such unsuccessful deployment of complementary organizational characteristics can probably be explained with the way enterprises in Slovenia select local consultants that should help them implement the international enterprise software products. This is generally not a meritocratic selection process but is a process based on personal connections and political influences (Podobnik, 2004; Slovenian Press Agency, 2011). As a transition economy with significant corruption problems that is attempting to adopt the German coordinated market economy the market of local IT consultants is on average not capable of producing successful deployments of complementary organizational characteristics for successful use of enterprise software products.

Likewise, we can conclude that investments in local enterprise software products that should exhibit a better fit with the existing organizational characteristics of enterprises in Slovenia do not perform any better or worse than investments in international software products. Nevertheless such findings go against the widely established perception that international enterprise software products are universally best at delivering competitive advantage, spurring added value growth and significantly raising the productivity of employees, even though such view is strongly promoted by the large majority of the top 50 IT vendors in Slovenia (Slovenian Chamber of Commerce, 2004; IDC, 2007). Accordingly local IT vendors are increasingly switching from selling locally developed enterprise software products to selling software from the big international vendors such as SAP, IBM, ORACLE and/or Microsoft (Slovenian Chamber of Commerce, 2004; IDC, 2007). Such trends aren't surprising if one

takes into account the natural ability of large international vendors to define perceptions in small markets.

The analysis of the results of the empirical study showed that the proposed approach was able to identify the quality of deployment of complementary organizational characteristics required for successful investments in international enterprise software products. Thus any enterprise can use our model and our scales to evaluate the quality of these organizational characteristics in their enterprise and compare them with means and standard deviations for the two studied group of enterprises in our paper. If the quality values of their organizational characteristics are not statistically significantly higher than the means of values of the group that predominantly invests in local enterprise software products and they still decide to invest in international software products, they are taking on significant risks that these investments will fail. Our model also enables them to see which of the 18 complementary organizational characteristics are problematic, which can help them direct the effort in improving their quality. Additionally, our model enables them to evaluate how successful the deployment of international enterprise software product by local consultants was, since a before-after analysis of the organizational characteristics in the model provides a clear assessment of how much each characteristic was improved. By identifying if and where the lack of improvement is present, the proposed model again enables managers to develop specific actions to address the individual organizational issues. In this way the proposed approach provides managers with non-trivial information that helps them evaluate the risks of investments in international enterprise software products and helps them improve the quality of the deployment of the required organizational characteristics for successful investments in international enterprise software products (RQ4). Even if we assume that the results (means and standard deviations) in themselves are not generalizable to different countries, the proposed approach would remain useful for enterprises since the model retains its ability to identify the quality of the deployment of complementary organizational characteristics required for successful investments in international enterprise software products. Enterprises would thus still be able to better evaluate the risk of such investments by analyzing their own differences between low and high values of complementary organizational characteristics to identify and monitor the low value organizational characteristics that pose significant risks to successful investments.

Conclusions

The paper presents and empirically tests a novel approach for monitoring and evaluating the success of the investments in international enterprise software products (ERP, SCM, CRM, …). The approach enables the enterprises to better understand, evaluate and manage the deployment of international enterprise software products, thus hopefully increasing the success of such investments.

In order to develop a viable approach for monitoring and evaluating the success of the deployment of pre-configured best practices the paper had to successfully respond to four main research questions. To respond to the first research question (RQ1) a comprehensive review of related work was conducted in order to form a list of those organizational characteristics that are complementary with/required for a successful investments in international enter-

prise software products. This list of organizational characteristics formed the basis on which the proposed approach was built. To respond to the remaining three research questions, the approach was tested on a representative sample of 1000 biggest enterprises in Slovenia, where we compared the organizational characteristics and economic success of the group of enterprises that predominantly invest in international software products and the group of enterprises that predominantly invest in local enterprise software products. Such comparison allowed us to answer the second research question (RQ2) and state that on average there are significant and relevant differences between the two groups in 44% of the examined organizational characteristics. The fact that there are not larger organizational differences between the two groups is in all likelihood also the main reason why the deployment of international enterprise software products doesn't bring measurable improvements to productivity growth compared to investments in local software products (RQ3). Because the proposed approach evaluates the quality of deployment of complementary/required organizational characteristic for successful investments in international enterprise software products any enterprise can use the model to analyze their own organizational risks when conducting such investments. Additionally, the proposed approach can be used for specific before-after analysis to ascertain if and were the unsolved organizational issues for successful deployment of international enterprise software products are. We hope that the proposed approach will provide valuable information to managers and increase the success of deployment of international enterprise software products all over the globe by improving the assessment of compatibility between the organizational characteristics of individual enterprises and international enterprise software products (RQ4).

Even though the empirical results support the viability of the proposed approach certain limitations still need to be addressed. Empirical tests of the proposed approach are for now limited to Slovenia. For this reason, it would be of benefit to conduct similar quantitative tests or qualitative studies in other countries. Of special interest would be to conduct such research were selection of local consultants that deploy the pre-configured software products is not based so much on personal and political connections but meritocracy.

Further work should thus concentrate on examining the usefulness of the proposed approach in different national environments. We believe that the proposed approach and the empirical results presented in this paper are a good foundation for such further research.

Author contributions

Tomaž Hovelja and Rok Rupnik were responsible for the study conducting in Slovenia, obtained results analysis, conducting discussion and conclusions. Olegas Vasilecas has developed a method schema and wrote the first draft of the article. Diana Kalibatiene was responsible for data interpretation, related works analysis. She has refined the text and prepared the paper for the submission to the journal.

Disclosure statement

Authors have no any competing financial, professional, or personal interests from other parties.

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