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The role of innovative work behaviour and knowledge-based dynamic capabilities in increasing the innovative performance of agricultural enterprises

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Abstract: The purpose of this study is to examine the interrelationships among the variables of the entrepreneurial orientation (EO) of agrarian management, innovative work behaviour (IWB) of employees, knowledge-based dynamic capabilities (KBDC) and innovative performance (IP) of agrarian enterprises. We analysed not only direct effects but also the possibilities of mediating these effects to increase the overall effect on IP. A questionnaire survey was used to collect data from managers of agribusinesses in Slovakia (175 respondents). We used the partial least squares structural equation modelling method and the appropriate software to test the theoretical research model and the proposed hypotheses to examine the relationships among the individual selected constructs in more depth. The findings point to the existence of a statistically significant relationship between EO and IP, which, however, is weaker than the overall effect of the involvement of mediation variables. Each mediation variable (IWB and KBDC) increases the overall effect separately, but their joint mediation action is of the greatest importance, when full mediation takes place. The strength of the relationship between the two main variables is also influenced by the size of the agrarian enterprise such that being larger has a negative moderation effect. Significant differences were also identified in the legal forms of business in favour of companies over agricultural co-operatives (ACs).

Keywords: agricultural management; agriculture; entrepreneurial orientation; innovation; organisational performance

Innovation is a key element of economic development and prosperity. In the management of agricultural systems, innovation is a determining factor in adapting to the new paradigm of the global economy, which is based on sustainable development and environmental protection for future generations. Enterprises that continually innovate achieve a higher level of organisational performance (Ogbonnaya and Valizade 2018). Moreover, it is widely accepted that firms' innovation capabilities are more closely linked to their internal intellectual capital of management and employees than to their fixed assets because of intellectual capital's uniqueness (Cabello-Medina et al. 2011). Innovation and innovative performance (IP) are currently one of the principal topics of debate in the management literature. The main purpose of our study is to identify management tools that increase the IP of agribusinesses and to examine their interrelationships and mechanism of cooperation.

The topic of our study is important for several reasons. The first of these is the challenges facing agribusinesses in developed countries today. These are challenges related to technological development, crisis phenomena,

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increasing food self-sufficiency of countries, growing societal expectations of agricultural products in terms of their safety and many others, all of which place increased demands on the IP of agricultural enterprises. The COVID-19 pandemic has heightened the perception of these challenges and pointed to the need for innovative crisis management to minimise the social and economic consequences of the crisis on agricultural and food systems (Laborde et al. 2020; Toffolutti et al. 2020; Darnhofer 2021). The second reason is the increased interest of agricultural managers in quality managerial knowledge in the field of innovation and the related need to present the relevant findings of scientific studies. At the same time, agribusinesses are increasingly aware of the need to open up to new ideas, share, work more flexibly and be networked, shifting from traditional to innovative business models in agriculture. Innovations allow them to respond flexibly to changing conditions and resource availability (Fleming et al. 2021). Huberty (2015) describes digital agriculture as a revolution in the economies of countries in terms of not only efficiency and sustainability but also much-needed regional and social prosperity.

Studies performed in the field of IP of agricultural enterprises have been devoted to the description of positive and negative consequences of innovation (Fleming et al. 2021), the presentation of 'smart farming', digitisation and other aspects of Industry 4.0 (Rose and Chilvers 2018; Rijswijk et al. 2019; Carolan 2020), and the institutional aspect of innovation in agriculture (Gardašević et al. 2020). However, innovation does not occur arbitrarily, and the internal incentives of agribusinesses themselves affect the nature, speed and amount of innovation. West (2014) and Berthet et al. (2018) point to the need to involve management tools in seamless innovation flows so that both external and internal stakeholders are involved, emphasising the importance of community and the responsibility of each actor. There is a large research gap in this area, which is the basis of this study's research model. Its purpose is to examine the interrelationships of the variables of entrepreneurial orientation (EO) of agrarian management, innovative work behaviour (IWB) of employees, knowledge-based dynamic capabilities (KBDC) and IP. We are interested not only in direct effects but also in the possibilities of mediating these effects to increase the overall effect on IP.

Literature review and hypothesis development. The purpose of this study is to analyse the possible effects of internal variables on the whole innovation activity of agricultural enterprises, not on only some of its dimensions. Therefore, we start from a broad understanding of IP, including product contribution, process innovation and administrative innovation, for a firm's economic performance (Jiménez-Jiménez and Sanz-Valle 2011; Kaya et al. 2020). Although innovation activities are diverse, from patents to research and development, it is generally accepted that IP can be understood as new products, new services and new administrative processes (Jiang and Li 2009). Damanpour and Aravind (2012) define IP in terms of new knowledge of management and new processes in business systems. Prange and Pinho (2017) add that IP means adapting all of a company's internal parameters to the challenges of the global environment.

EO presupposes the implementation of methods, practices and decision-making styles of managers to act entrepreneurially (i.e. innovative, proactive and with a certain risk). Shan et al. (2016) state that EO comes to the forefront of theoretical and empirical attention to find the context of its effect on the overall performance of the company, as well as its IP. The very aspect of innovation as one of the three main dimensions of EO determines its positive connection with the IP of companies. At the same time, EO can enable farmers to approach many of the challenges they face not only as rules (e.g. in the case of food safety) but also as market opportunities (Dias et al. 2021).

H_1: We assume that the EO of agrarian managers is positively related to the IP of agrarian enterprises.

Shan et al. (2016) highlight the need to examine the deeper context of EO and IP in view of the existing weaker direct correlations of these variables and the incomplete picture of this domain. Knowledge is an important factor that enters a direct relationship between EO and IP. However, their sharing in enterprises has shifted in recent studies to the level of KBDC, understood as knowledge-sensing capacity, knowledge-seizing capacity and knowledge-reconfiguring capacity. These items reflect knowledge acquisition, interpretation, deployment and reconfiguration (Wang et al. 2007; Zheng et al. 2011; Roberts and Grover 2012), with authors differing in the study of their mediation or moderation effects (Shan et al. 2016).

H_2: We assume that the relationship between EO and IP is mediated by KBDC.

The internal innovation potential of employees is reflected in the IWB, the support of which should be the basis for leading people in agricultural enterprises. De Jong and Den Hartog (2010) define IWBs as individual behaviours such as exploring, generating, championing and implementing creative ideas. The EO

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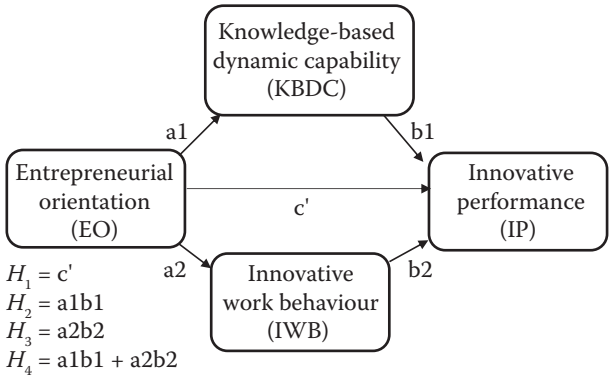

Figure 1. Theoretical model of the study

H – hypothesis; c' – direct effect; a1b1 – indirect effect through knowledge-based dynamic capability (KBDC); a2b2 – indirect effect through innovative work behaviour (IWB)

Source: Authors' own processing

of managers encourages employees to use IWBs, and the subsequent joint creation of innovative solutions, and creates conditions for it (Boğan and Dedeoğlu 2017), which can result in increased IP for companies. For innovation activities, IWB support and innovation climate play a vital role.

H_3: We assume that the relationship between EO and IP is mediated by IWB.

H_4: We assume that the relationship between EO and IP is mediated by KBDC and IWB.

The investigated model is shown in Figure 1.

MATERIAL AND METHODS

Sample and data collection. In this study, we used a questionnaire survey, which was implemented from 1 March to 5 April 2021. Managers of agricultural enterprises in Slovakia were addressed on the basis of INFOMA Business Trading's database, which contains data on 1 266 enterprises operating in Slovakia in the field of primary agricultural production. We sent a randomly selected 500 business managers an electronic request for cooperation and explained the purpose of the study, emphasising anonymity and the possibility of obtaining the study's results after their processing. By returning the completed questionnaire, the manager confirmed voluntary consent to participate in the study. A total of 175 farm managers were involved in the survey – 49% from agricultural co-operatives (ACs) and 51% from limited liability companies, which is a return of 35%. Companies with 10 to 49 employees constituted 53% of the sample, and companies with 50 to 249 employees constituted 47% of the sample. The production focus of the participating enterprises was combined production (54%) or crop production (46%). Enterprises were almost evenly distributed in terms of regions: Bratislava (18%), Nitra (17%), Trnava (14%), and other regions in the range from 9% to 12%. Business managers had an average management experience of 12.8 years, and 78% of them had a university degree. In addition to identification data, the questionnaire also contained selected variables ranked along a Likert scale (1 = almost never, 6 = almost always or 1 = strongly disagree, 6 = strongly agree). Each study variable was measured using items from established measures. As these measurement tools are not available in Slovak, we used some best practices for verifying the validity and methodological soundness of the constructs, as presented by Schaffer and Riordan (2003), in solving cross-cultural complexities. Some of the recommendations that were not feasible in our research area were listed in the research restrictions. For establishing semantic equivalence, we used back translation before administering an instrument. Bilingual experts translated the instrument from English to Slovak and then back again to English; subsequently, in the event of inconsistencies, the individual items were reworded to establish meaning. At the same time, we tried to use short, simple sentences and repeat nouns instead of using pronouns.

Measures. The EO variable was created based on managers' responses to the Miller/Covin and Slevin EO scale statements, which relate to the three dimensions of EO: innovativeness, proactiveness and risk-taking (Rauch et al. 2009; Seo 2019).

IWB was measured with a 10-item construct that was adopted from the study of De Jong and Den Hartog (2010). Participants were required to indicate how frequently they manifested the behaviours mentioned in the survey. Our measure includes items for all three dimensions – idea generation, idea championing and idea implementation.

IP was measured using a variable generated by Cabello-Medina et al. (2011). This variable contains three items focused on *i*) introduction of technologically new products developed by the company (totally or partially) into the market, *ii*) frequency of replacement of old products with others that have undergone significant change and *iii*) proportion of technologically new or improved products in the company's turnover. A 6-point scale was used, ranging from (1) for less than the competition to (6) for more than the competition. The reliability and validity of the scale was established in their study.

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KBDC, understood as knowledge-sensing capacity, knowledge-seizing capacity and knowledge-reconfiguring capacity, was measured through seven items reflecting knowledge acquisition, interpretation, deployment and reconfiguration (Wang et al. 2007; Zheng et al. 2011; Roberts and Grover 2012).

On the basis of existing studies, we chose as the control variables the legal form of the company, the size of the company in terms of the number of employees and the company's region because of their possible effect on the relationships examined. Jiménez-Jiménez and Sanz-Valle (2011) and Rauch et al. (2009) stated that the positive relationships of variables related to EO, knowledge sharing and IWBs are more intense in a group of firms that are smaller. At the same time, because of the specifics of the agricultural sector in Slovakia with the existence of traditional large ACs, there are opinions about higher efficiency and IP in newly emerging and more flexible companies.

Data analysis. To test our research model and proposed hypotheses and to understand the relationships among the selected constructs better, we used the partial least squares structural equation modelling method. This method makes it possible to test several hypotheses simultaneously within direct and indirect effects in a complex system (Ringle et al. 2020). We chose to use it for several reasons. The first is the relatively small sample size (n = 175). Other reasons are the complexity of the research model, the focus of the study on predicting dependent variables and the use of latent variable scores for predictive purposes. We used SmartPLS 3.3 software (Roldán and Sánchez-Franco 2012) to assess both the measurement model and the structural model. The advantage of this program is that it allows assessment of both models simultaneously. The questionnaire contained a set of 29 indicator variables. Because common method bias is a common and serious problem in research, we took several steps to alleviate it. The items in the questionnaire were randomly scattered and mixed, the scales of some answers were inverted, and at the same time we divided the questionnaire and presented each part in a different context so that the respondents were not affected by their previous answers and their idea of the results. We also calculated the variance inflation factor (VIF) indicator. The occurrence of a VIF greater than 3.3 is proposed as an indication of pathological collinearity and also as an indication that a model may be contaminated by common method bias. Therefore, if all VIFs resulting from a full collinearity test are equal to or lower than 3.3, the model can be considered free of common method bias (Kock 2015). After calculating the collinearity statistics in the software, we found that the inner VIF values were all lower than 3.3.

RESULTS AND DISCUSSION

Measurement model. We determined the fulfilment of all the common requirements by analysing reliability and validity. After removing some items that did not meet the factor outer loadings [KBDC2 and EO risk-taking (EORT) 8 and 9; for details see the electronic supplementary material (ESM); for ESM see the electronic version], we verified that the measurement model met the reliability requirement because all the standardised loadings were greater than 0.70 (Chin 2010). At the same time, the requirement of internal construct reliability was met. Cronbach's alpha was appropriate for all constructs (from 0.773 to 0.959). Composite reliability, which is considered to be the most liberal concept (Ringle et al. 2020), reached values in the range of 0.839 to 0.964 in our models. Another tool we used was rho_A, which was also satisfactory (range of 0.826 to 0.968); its value is recommended to be between Cronbach's alpha and composite reliability (Ringle et al. 2020). The convergent validity, measured using the average variance extracted, exceeded the level of 0.5 (Chin 2010) for all constructs, which means that the construct explained an average of at least 50% of its item's variance. We also subjected the model to discriminant validity analysis. Discriminant validity was assessed by means of the Fornell-Larcker criterion; Table S1 in ESM (for ESM see the electronic version) shows that the square root of the average variance extracted for the construct was greater than the inter-construct correlation. The heterotrait-monotrait ratio of correlations criterion (Ringle et al. 2020), which is measured as the mean value of the indicator correlations across constructs, was also satisfactory. The authors recommend a value lower than 0.85 to 0.90, depending on the similarity or difference of constructs. The single construct was higher than 0.90, so we also subjected the model to cross-loading, which is used in case of problems with discriminant validity. Through cross-loading, we verified the loading of factors into parent constructs. Discriminant validity was established. We do not provide values in the case of cross-loading because of the large volume of data. Construct reliability and discriminant validity model are in Table S1 in ESM (for ESM see the electronic version).

Structural model. The structural model reflects the paths hypothesised in the research framework.

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Table 1. Predictive capability, predictive relevance, SRMR and effects results

	Original sample	Sample mean	SD	*t*-statistics	*P*-values	Confidence interval	
						2.5%	97.5%
EO → IP (total effect)	0.737	0.738	0.036	20.468	0.000	0.660	0.805
EO → IP (direct effect)	0.149	0.144	0.074	2.006	0.045	0.012	0.303
EO → IWB	0.809	0.812	0.015	54.211	0.000	0.784	0.842
EO → KBDC	0.806	0.809	0.024	33.356	0.000	0.760	0.853
IWB → IP	0.239	0.237	0.094	2.554	0.011	0.064	0.433
KBDC → IP	0.490	0.496	0.084	5.867	0.000	0.333	0.651
EO → IP (total indirect effect)	0.588	0.594	0.051	11.472	0.000	0.484	0.682
EO → KBDC → IP (indirect effect)	0.395	0.401	0.067	5.891	0.000	0.267	0.528
EO → IWB → IP (indirect effect)	0.193	0.193	0.076	2.533	0.012	0.053	0.350
Mediation through KBDC							
EO → IP (total effect)	0.742	0.741	0.033	22.735	0.000	0.668	0.801
EO → IP (direct effect)	0.241	0.235	0.062	3.862	0.000	0.106	0.355
EO → KBDC	0.804	0.806	0.023	34.462	0.000	0.758	0.849
KBDC → IP	0.623	0.629	0.055	11.272	0.000	0.511	0.733
EO → KBDC → IP (indirect effect)	0.501	0.506	0.044	11.450	0.000	0.416	0.599
Mediation through IWB							
EO → IP (total effect)	0.744	0.744	0.035	20.967	0.000	0.671	0.805
EO → IP (direct effect)	0.351	0.352	0.079	4.429	0.000	0.190	0.498
EO → IWB	0.784	0.787	0.022	35.249	0.000	0.742	0.826
IWB → IP	0.501	0.499	0.075	6.670	0.000	0.361	0.643
EO → IWB → IP (indirect effect)	0.393	0.392	0.060	6.530	0.000	0.282	0.512

	R^2	Q^2 (= 1 – SSE/SSO)	
IP	0.677	0.516	SRMR = 0.100
IWB	0.618	0.389	d_ULS = 5.682
KBDC	0.584	0.207	d_G = 5.128
			Chi-square = 12009.302
			NFI = 0.567

EO – entrepreneurial orientation; IP – innovative performance; IWB – innovative work behaviour; KBDC – knowledge-based dynamic capabilities ($P < 0.05$); SRMR – standardised root mean square residual; SSE – sum of the squared errors; SSO – sum of the squared observations; d_ULS – squared Euclidean distance; d_G – geodesic distance; NFI – normed fit index

Source: Own processing based on SmartPLS (version 3.3)

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The goodness of the model is determined by the strength of each structural path as determined with the R^2 value for the dependent variable; the value R^2 should be equal to or greater than 0.1. The results in Table 1 show that all R^2 values are greater than 0.1. Hence, the predictive capability is established. Furthermore, Q^2 established the predictive relevance of the endogenous constructs. A Q^2 greater than 0 shows that the model has predictive relevance. The results show that there is significance in the prediction of the constructs. Furthermore, the model fit was assessed using the standardised root mean square residual, the value of which was 0.100. Standardised root mean square residual values should be less than or equal to 0.100 to indicate an acceptable model fit (Hair et al. 2017).

To assess the goodness of fit further, we tested direct relationships to ascertain the significance of the relationship. All direct effects were significant. The results revealed that EO had a significant effect on IP (β = 0.149, t = 2.006, P < 0.05), that EO had a significant effect on IWB (β = 0.809, t = 54.211, P < 0.05), that EO had a significant effect on KBDC (β = 0.806, t = 33.356, P < 0.05), that IWB had a significant effect on IP (β = 0.239, t = 2.554, P < 0.05) and that KBDC had a significant effect on IP (β = 0.490, t = 5.867, P < 0.05). H_1 proposed that EO was positively associated with IP. We therefore find that H_1 is supported.

Using the bootstrapping method, we also investigated the influence of the mediation variables – namely, IWB and KBDC (Bolin 2014). We developed three hypotheses: H_2 for mediation of KBDC between EO and IP (H_2 = a1b1; where: a1 – path between EO and KBDC; b1 – path between KBDC and IP), H_3 for mediation of IWB between EO and IP (H_3 = a2b2; where: a2 – path between EO and IWB; b2 – path between IWB and IP) and H_4 for mediation of both KBDC and IWB between EO and IP.

Table 1 lists all the results obtained, as well as path coefficients, other values [standard deviation (SD), t statistics, P values] and individual mediations. On the basis of the results, H_2 was also supported. The indirect effect of KBDC was significant (β = 0.501, t = 11.450, P < 0.05). This was an incomplete mediation, as the indirect effect on the overall effect was less than 80% (68% indirect effect, 32% direct effect). H_3 was supported. The indirect effect of IWB was significant (β = 0.393, t = 6.530, P < 0.05). It was also an incomplete mediation, as the share of the indirect effect in the total effect was less than 80% (53% indirect effect, 47% direct effect). H_4 was supported. This was the mediation of two mediators and means that only 20% of EO's direct effect (0.149) contributed to the overall effect of EO on IP (0.737). The remaining 80% of the total effect passed through KBDC (0.395), which was 54% of the total effect and 67% of the indirect effect, and through

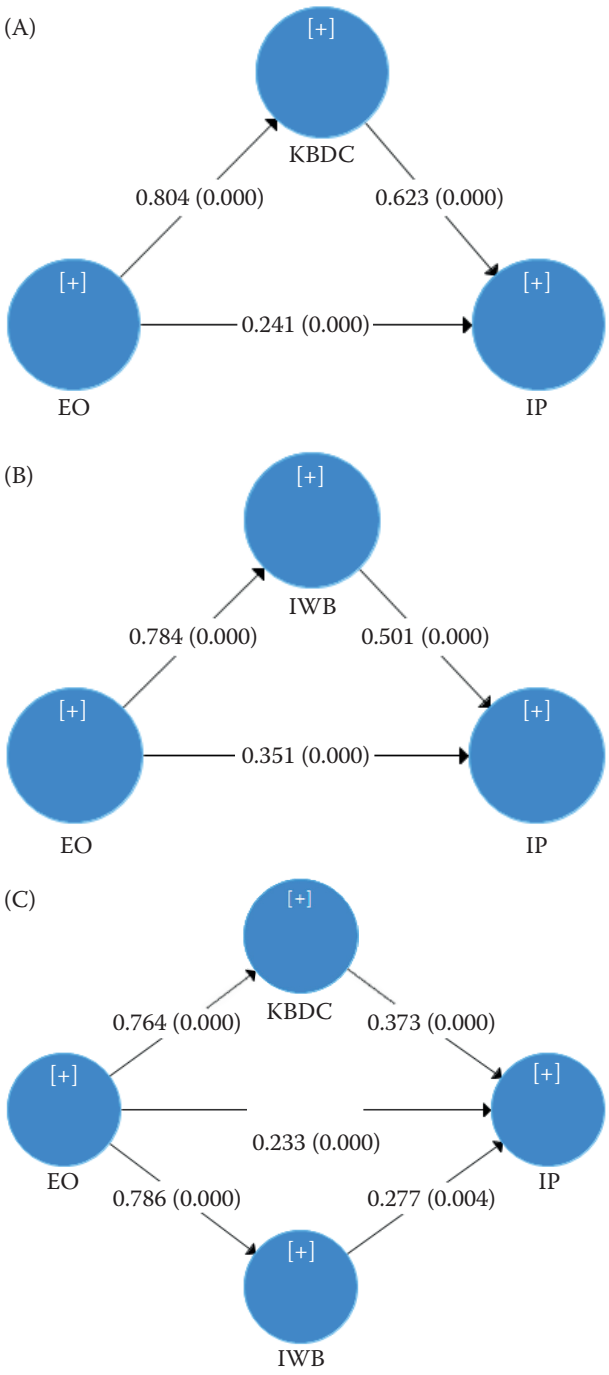

Figure 2 Mediation through (A) knowledge-based dynamic capability (KBDC), (B) innovative work behaviour (IWB) and (C) KBDC and IWB at the same time

EO – entrepreneurial orientation; IP – innovative performance

Source: Own processing based on SmartPLS (version 3.3)

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IWB (0.193), which was 46% of the total effect and 33% of the indirect effect.

The individual mediations are shown in Figure 2.

As part of our analysis, we also monitored the moderation effects on the direct relationship between EO and IP. Because of discussions about the mediation or moderation effect of KBDC, we also verified the moderation of this variable (Henseler et al. 2015). The moderation effect was not significant. We also monitored the moderating effect of the size of the company and the practice of managers on the direct relationship between EO and IP. The moderating effect was significant for both criteria. The size of the company was negative, which means that being smaller strengthened the relationship between EO and IP. In the practice of managers, the moderation effect was positive (i.e. higher practice strengthened the relationship between EO and IP) (Table S2 and Figure S1 in ESM; for ESM see the electronic version). Moderation effects are also shown in Figure 3.

Before performing multigroup analysis (MGA), we used measurement invariance of composite models (Henseler et al. 2015). The invariance conditions were partially met (partial measurement invariance), but the results allowed MGA to be performed. Significant differences were found only for the legal form criterion (Table 2). There were no significant differences in the education criterion.

Through the MGA, we found significant differences in the paths of EO-IP, EO-KBDC and EO-IWB in favour of the limited liability companies over the ACs.

Discussion. The results of the study show that the IP of agricultural enterprises is influenced by several factors. EO itself has a direct influence on the IP of companies. This effect, although statistically significant, is not high (β = 0.149), which is consistent with the findings of other studies on the positive but low correlations between the two variables (Dias et al. 2021). By confirming this finding in different conditions, we verified its validity. In line with investigators in other studies (Cabello-Medina et al. 2011; Shan et al. 2016), we further investigated the mechanism of the EO's action on the IP of a company, assuming that significant innovation potential was brought about by the internal innovation potential according to the form of supporting employees' IWB and KBDC. The findings point to the mediation effects of these two variables. The indirect effect of the KBDC variable was higher than that of the IWB variable (68% for KBDC and 53% for IWB). Both were statistically significant, and complete mediation occurred at the same time, with up to 80% of the effect

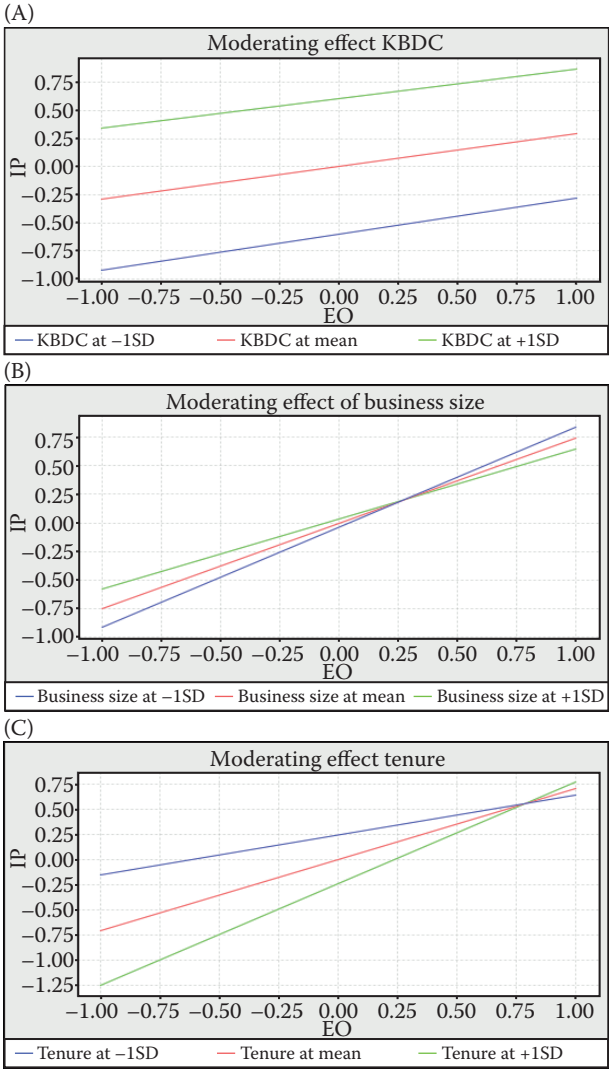

Figure 3. Moderation effect of (A) knowledge-based dynamic capability (KBDC), (B) of company size, (C) of managers' practice

EO – entrepreneurial orientation; IP – innovative performance

Source: Own processing based on SmartPLS (version 3.3)

transmitted by these two mediators but with a higher share of KBDC (67%). It follows from this finding that the business orientation of management is important in connection with the IP of companies, and the increase in the overall effect between EO and IP in mediation is demonstrable (direct action, β = 0.149; input of mediators, β = 0.737 to 0.744). The use of management tools in the form of KBDC and IWB thus significantly increases the overall effect, with the greatest indirect effect being due to the simultaneous action of both variables compared with the results of their individual actions. This finding points to the high potential for using these management tools, which, if de-

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Table 2. PLS-SEM/MGA for enterprise by legal form

Paths	Total effects-diff (legal form LLC – legal form AC)	*P*-value
EO → IP	0.201*	0.011
EO → KBDC	0.081*	0.046
KBDC → IP	1.326	0.094
EO → IWB	0.089*	0.048
IWB → IP	0.985	0.089

*Significant at the level $P < 0.05$; LLC – limited liability company; AC – agricultural co-operative; PLS-SEM – partial least squares structural equation modelling; MGA – multigroup analysis; EO – entrepreneurial orientation; IP – innovative performance; KBDC – knowledge-based dynamic capabilities; IWB – innovative work behaviour

Source: Own processing based on SmartPLS (version 3.3)

ployed by agricul-tural management in synergy, can significantly increase their innovation potential. Targeted use of knowledge combined with IWB support for employees appears to be an effective strategy for agricultural enterprises. Our findings contribute to the findings of further studies that firms' innovation capabilities are more closely linked to their intrinsic potential of management and employees than to their fixed assets because of their intellectual capital's uniqueness (Cabello-Medina et al. 2011). KBDC, as a variable entering into the relations between the EO and IP of a company, was declared and discussed in the studies both as a mediator and as a moderator. Our findings helped confirm its significant mediation effect, as the position of KBDC in the as a moderator was not significant and was even to a small extent negative. Our findings thus contribute to studies on the mediation effect of KBDC (Wang et al. 2007; Zheng et al. 2011; Roberts and Grover 2012). At the same time, we used this variable to incorporate current static research into the turbulent environment and explain how the business orientation of agrarian management is related to IP with a KBDC perspective. The relationship between EO and IP is also influenced by the size of the agrarian enterprise and the practice of agrarian managers. The moderating effect of size is significant and negative, meaning that smaller companies benefit more significantly from the business orientation of management and are better able to translate it into IP. The reason may be the direct contact of the management with the employees, which enables a more significant stimulation of their IWB. In larger companies, because of their more complicated organisational structures and more complex processes, the effect of EO management on IP is partially weakened. The moderating effect of managers' practice is significant and positive. The relationship between EO and IP was stronger with greater managerial practice. More experienced managers can work more effectively with the support of IWB and the use of employee knowledge. Our findings also pointed to significant differences in the paths of EO-IP, EO--KBDC and EO-IWB in favour of the limited liability companies over the ACs. In this case, we can assume that ACs that use the form of a limited liability company are more strongly situated in business than are ACs.

Limitations. Our study has several limitations. The first is a relatively small sample of respondents (n = 175) given the total number of agricultural enterprises in Slovakia. However, we covered all regions of Slovakia, which could support the generalisation of results for the Slovak agricultural sector. At the same time, given the reflection on global challenges, our study results can also support the generalisation of results within the agricultural sector of developed countries that have similar business conditions in the agribusiness sector and face similar problems not only with finance but mainly with management and labour (Ambrus 2020). We are also aware of a possible limitation arising from the fact that we considered only the relations among the variables in the modelled relations. To claim causality, we lacked two conditions – namely, temporal resolution and the exclusion of another possibility (this condition was partially fulfilled using controlled effects, but not completely, as our data were not experimental, but questionnaire based and constituted a convenience sample). Therefore, we have not addressed these issues. In the future, our research can be advanced to the level of investigating causality by using dynamic panel regression, which will allow us to take into account the existence of endogeneity and to describe more appropriately the ongoing process of adjustment over time than is the case with a static panel. A limitation of the research may also be the non-use of the pilot survey as one of the best practices for verifying the validity and methodological soundness of the constructs used. However, we used other recommendations that we considered sufficient. Although we used several steps to mitigate common method bias, we did not implement one – namely, obtaining data from various sources (e.g. asking not only managers but also employees). Consequently, future research may focus on other stakeholders' views on IP issues. Finally, in addition to the factors concerned in this study, there may be other factors that may affect the examined relationships. In the future,

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other theories can be combined, and a comprehensive analysis can be performed from various perspectives. Our model worked with sectional rather than longitudinal data, which may be unable to reflect the real causal relationship because of the time-lag effect, and the use of panel data could be the future direction.

CONCLUSION

In the context of sustainable agriculture and regarding paradigms such as multifunctional agriculture, bio-based and circular economies, agroecology, smart farming and so on, there is a growing need to understand and implement methods, tools and techniques supporting the IP of ACs and to enrich specific agricultural expertise with management study concepts. Researchers have identified the need to support the internal innovation potential of agrarian enterprises, not only by the EO of agrarian management but also and above all by a participatory approach through supporting the IWB of employees and the strengthening of KBDC.

Our study has both theoretical and practical implications. At the theoretical level, it contributes to the existing literature on the IP of ACs. First, by discussing the effect of the EO of agrarian managers, we can achieve a better understanding of its direct effect and overall combined effect on IP. Second, by presenting the importance of internal innovation potential in the form of support for the IWB of employees themselves and also KBDC, we can increase the overall effect between EO and IP. Third, the findings may deepen our understanding of the mechanisms of relationships leading to the IP of ACs in a global context because the challenges of contemporary agriculture are the same for developed countries and existing local specifics do not have a major effect on the variables.

On a practical level, our findings have important implications for agrarian managers. IP requires, in addition to the EO of managers, the support of employees' IWB and the sharing of knowledge in the company, which are sources of innovation. Another consequence is that the importance of developing KBDC in the context of the current digital and information era cannot be neglected, as these skills act not only as a direct source but also as a mediator of business orientation and IP. ACs should therefore support and make full use of KBDC, which means sensitivity even to small changes in the external environment, the ability to search for and interpret knowledge, and the ability to discover opportunities. Such an approach has the potential to increase the innovative activity of companies significantly, which is currently a key prerequisite for their competitiveness.

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