ZU – UNIVERSITY OF ZILINA
Faculty of Operation and Economics of Transport and Communications,
Department of Economics

GLOBALIZATION AND ITS SOCIO-ECONOMIC CONSEQUENCES

18th International Scientific Conference

Proceedings

(Part III. – Economic Progress in Post-Soviet Countries)

10th – 11th October 2018
Rajecke Teplice, Slovak Republic

ORGANIZED BY

ZU – UNIVERSITY OF ZILINA, Faculty of Operation and Economics of Transport and Communications, Department of Economics.

EDITED BY

prof. Ing. Tomas Kliestik, Ph.D.

TITLE

Globalization and Its Socio-Economic Consequences

ISSUED IN

Zilina, Slovakia, 2018, 1st edition

PAGES

2926

ISSUED BY

ZU – UNIVERSITY OF ZILINA

PRINTED IN

GEORG, Bajzova 11, 010 01 Zilina, Slovak Republic

NUMBER OF COPIES

80 (each part)

Not for sale

ISBN 978-80-8154-249-7

ISSN 2454-0943

WORLD COMPETITIVENESS OPPORTUNITIES IN NOWADAYS: KEY OF LATVIAN FISH PROCESSING SECTOR

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Abstract. Modern world economy undergoes changes, which are mostly related to globalization processes, uneven development of countries as well as increase in competition. The potential of countries development and welfare more and more is determined and influenced by competitiveness of national economy. Ensuring competitiveness has become one of the main goals in planning development of states, sectors and companies. In the world economy, competitiveness is set as one of conditions for economic recovery. In development of Latvia's economy, fish processing sector has always had a significant importance. Assessment of the competitiveness of fish processing sector and its promotion is a topical issue not only among scientists, but also institutions involved in establishment of the policy of fisheries sector and companies working in the sector. The aim of the study is to evaluate competitiveness of fish processing sector in Latvia, determining further development opportunities. Based on the author's developed methodology, the author evaluated and analysed the level of competitiveness in Latvian fish processing sector, identified ensuring spheres influencing competitiveness and provided suggestions for further development of the sector. Significance of the factors and their influence upon competitiveness was checked through causation analysis. Methodology offered by the author may be used in order to evaluate competitiveness of fisheries sectors not only in Latvia but also in other countries. The elaborated methodology can help the institutions and entrepreneurs, involved in establishment and implementation of fisheries policy, to work more successfully, to develop, plan and improve the common policy of the sector.

Keywords: competitiveness, fish processing sector, Latvia, strategy.

JEL Classification: O12, O21, Q22

1. Introduction

In Latvia's economy development fish processing sector has always had a significant importance, especially in development of the Baltic Sea and Riga Gulf coastline areas. It has not only ancient history and traditions, but also possesses the ability to produce competitive products on the world market. Fish processing is one of the few Latvia's economic sectors which almost completely meets the requirements in the local raw materials (Latvian State Institute of Agrarian Economics, 2014). However, the environmental pollution, adverse spawning conditions as well as intensive fishing and other factors have negative influence on the condition of fish stock; as a result, every year the number of fishing quotas and the amount of the available fish raw materials in the Baltic Sea reduces (Finance Ministry, 2003).

Consequently, companies use in their production the fish caught not only in the territorial waters of Latvia, but also in the international waters. In the recent years, also the freshwater fish bred in Latvia's waters are used. Fish processing companies specialized on production of many types: sterilized canned fish, unsterilized canned fish, smoked fish production, salted fish production, refrigerated fish production and frozen fish production, etc. Due to the embargo imposed by Russia, which affected 39% of fish processing companies, important markets were lost, consequently, the companies faced rapid decline in solvency. To improve the financial position, the companies partly (some companies even completely) stopped production and also dismissed employees for (un)definite period. In order to stabilize the situation, the government as well provided assistance in terms of compensations for partial repay of loan interest. Despite the lot markets, Latvia exports the products of its fish processing sector to more than 60 countries. Using the support opportunities provided by the EU funding instruments and participating in the EU Common fisheries policy creation, Latvian fish processing sector obtains wide possibilities to facilitate its competitiveness.

Assessment of the competitiveness of fish processing sector and its promotion is a topical issue not only among scientists, but also institutions involved in formation of the policy of fisheries industry and fish processing companies. The experience of economy's growth all over the world has proven that there are many different interrelated and mutually influencing factors impacting competitiveness; and consequently methodology for assessment of the competitiveness is not unequivocal. There is relatively few research on fish processing sector's competitiveness, thus raising problems in the process of assessment of competitiveness.

Research aim – to evaluate competitiveness of fish processing sector in Latvia, providing suggestions for further development of the sector. Research tasks: 1) to develop methodology for assessment of competitiveness; 2) to reflect competitiveness of fish processing in Latvia, determining the strategy to be implemented in future and the measures to be taken in its framework. The methodology for assessment of the competitiveness may be used for assessment of competitiveness of fisheries sectors not only in Latvia but also in other countries. The elaborated methodology can help the institutions and entrepreneurs, involved in establishment and implementation of fisheries policy, to work more successfully, to develop, plan and improve the common policy of the sector.

The author used qualitative and quantitative research methods in the research. In addition Microsoft Excel, Microsoft PowerPoint, XLSTAT Premium un IrfanView programme as well as www.google.com questionnaire creation tools were used to process and analyze the research results.

2. Materials and methods

After the Model of the Factors Influencing Competitiveness of the Fisheries Sector Cluster (Biuksane, 2016), the author developed the Fish Processing Competitiveness Index at the level of microeconomics. The Index is calculated from 6 sub-indexes: Sub-index of Availability and Quality of Production Factors, Sub-index of Production Competitiveness, Sub-index of Product Competitiveness, Sub-index of Marketing and Management Efficiency, Sub-index of Financial Stability and Sub-index of Cooperation, calculated from their relative scales and their indicators with normalized values (Biuksane & Judrupa, 2016).

The sub-indexes can have a different influence on competitiveness – it can happen that all the sub-indexes may have similar impact, or the very opposite – some of sub-indexes may have a greater influence on competitiveness than another. To find out the influence of sub-indexes, the relative weights of sub-indexes were established. The calculations were based on expert method and survey carried out 18.03.2016 – 21.06.2017 (Biuksane, 2017). 5 representatives from institutions involved in formation and implementation of Latvian fisheries policy took part in the interview. To obtain a more comprehensive opinion, the author also carried out a survey of companies working in the fisheries sector, where 36% of the companies provided the information. The relative weights of sub-indexes were calculated considering the opinion of both the experts and the companies.

To assess competitiveness, the author selected 22 indicators (Biuksane, 2016). The author performed normalization of the indicators on the basis using min-max normalization in values from -5 to 5.

The chosen normalization allows using indicators not with positive and negative values, but also allows keeping the correlation between the actual values of the indicators. It is relevant in order to obtain qualitative and significant results, and to avoid from normalization error and data interpretation problems.

In reliance upon the competitiveness level (C_L) and competitiveness growth rate (G_P) the author developed several strategies: penetration strategy ($C_{L(-0<)};G_{P(0\leq)}$), enlargement strategy ($C_{L(-0<)};G_{P(>0)}$), development strategy ($C_{L(>0)};G_{P(0\leq)}$) and improvement strategy ($C_{L(>0)};G_{P(>0)}$).

Strengthening of the spheres currently ensuring competitiveness should be carried out in priority sequence guided by the level of competitiveness and its development potential.

In the framework of causal relationship analysis, the author analyzed the importance of the factors influencing the competitiveness of fish processing sector and their impact on the competitiveness. To analyze causal relationships, the author used analysis of principal component and regression analysis.

In the framework of analysis of principal components, multicollinearity of indicators was verified, calculating the Pearson correlation coefficient. Analysis reliability was verified using Cronbach's alpha coefficient – tool for internal consistency analysis developed by the American psychologist Cronbach J.L. in 1951 (Cronbach, 1951). Sampling adequacy was determined through Kaiser-Meyer-Olkin Test (Kaiser, 1960). It is recommended also to conduct Bartlett's Sphericity Test to verify statistical significance, which may be used only if the ratio of number of cases n to the number of variables p is smaller than value 5 (Bartlett, 1950). Since the precondition of Bartlett's Sphericity Test application is not met, the author does not have to conduct the test. To determine the number of factors, the author used Screen Plot developed by Cattell R.B. in 1966, which provides a possibility to identify factors the eigenvalues of which in correlation matrix is larger than 1, thus grouping factors from strong correlation to weak correlation in dimension of certain correlations (Cattell, 1966). In the framework of the analysis the author used also Rotation Method – Varimax with Kaiser Normalization what shows the possibilities of variables inclusion in the obtained factors (Kaiser, 1958). Rotation converged in 5 iterations.

For a precise calculation of regression equation parameters, the author applied Multicollinearity Statistics Method available in MS Excel program, in the framework of which performed Multiple Linear Regression analysis (Kalnins, 2018). To make regression equation the Coefficient of Determination, Adjusted Coefficient of Determination were determined and several statistical tests were conducted: Student's t-distribution (Lafosse & Rodriguez, 2018), Fisher's exact test (Gunel & Ryan, 2017) and Durbin-Watson test (Bartels, 1992); as well as other indicators.

3. Results and discussion

The results of the Matrix of Pearson correlation coefficient (Fig 1) show multicollinearity of several variables.

Figure 1: Matrix of Pearson Correlation Coefficients

Indicators	FR_V																					
FR_V	1,000	FA_V																				
FA_V	-0,700	1,000	E_N																			
E_N	0,725	-0,659	1,000	AS																		
AS	-0,682	0,934	-0,842	1,000	NPA_E																	
NPA_E	-0,545	0,309	-0,108	0,239	1,000	FA_C																
FA_C	-0,667	0,828	-0,892	0,912	0,026	1,000	FA_D															
FA_D	0,175	-0,287	-0,100	-0,104	-0,168	-0,168	1,000	FA_T														
FA_T	0,761	-0,859	0,925	-0,960	-0,196	-0,958	0,131	1,000	FA_P													
FA_P	-0,454	0,221	-0,019	0,115	0,945	-0,051	-0,317	-0,082	1,000	PL												
PL	-0,662	0,918	-0,783	0,971	0,366	0,881	-0,228	-0,932	0,270	1,000	FC_P											
FC_P	-0,730	0,955	-0,598	0,830	0,240	0,777	-0,358	-0,774	0,198	0,789	1,000	P_A										
P_A	-0,726	0,972	-0,688	0,915	0,322	0,874	-0,417	-0,886	0,262	0,930	0,936	1,000	SR									
SR	0,035	-0,147	0,478	-0,317	0,548	-0,388	-0,043	0,392	0,560	-0,188	-0,173	-0,172	1,000	MA_E								
MA_E	-0,532	0,292	-0,044	0,170	0,972	0,005	-0,289	-0,137	0,979	0,310	0,274	0,327	0,580	1,000	TL							
TL	-0,261	0,440	0,126	0,255	0,605	0,017	-0,318	-0,068	0,582	0,311	0,436	0,361	0,492	0,628	1,000	DE						
DE	-0,284	0,559	-0,651	0,626	-0,466	0,697	0,213	-0,640	-0,514	0,484	0,562	0,510	-0,626	-0,480	-0,334	1,000	TAT					
TAT	0,683	-0,855	0,903	-0,961	-0,148	-0,973	0,180	0,984	-0,055	-0,946	-0,762	-0,888	0,382	-0,098	-0,117	-0,618	1,000	P_{ROS}				
P_{ROS}	-0,512	0,244	-0,013	0,123	0,970	-0,051	-0,292	-0,096	0,986	0,264	0,228	0,278	0,567	0,995	0,588	-0,505	-0,050	1,000	P_{ROA}			
P_{ROA}	-0,530	0,280	-0,065	0,168	0,966	0,000	-0,297	-0,139	0,993	0,309	0,263	0,317	0,547	0,993	0,590	-0,470	-0,099	0,996	1,000	P_{ROE}		
P_{ROE}	-0,541	0,282	-0,062	0,163	0,956	0,004	-0,342	-0,144	0,989	0,309	0,267	0,325	0,548	0,984	0,563	-0,470	-0,100	0,992	0,996	1,000	PO_N	
PO_N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$POC_{\%}$
$POC_{\%}$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	correlation coefficient at significance level a>0,05 (Two-Tailed Test).																					

Source: calculated and created by the author using Central Statistical Bureau, 2018; LFICIS, 2018

where $I^{nv}_{FR_V}$ - volume of fish resources;

$I^{nv}_{FA_V}$ - value of fixed assets per company;

$I^{nv}_{E_N}$ - number of employees;

I^{nv}_{AS} - average salary of employees;

$I^{nv}_{NVA_E}$ - net value added per employee;

$I^{nv}_{FA_C}$ - fixed assets capacity ratio;

$I^{nv}_{FA_D}$ - depreciation to fixed assets ratio;

$I^{nv}_{FA_T}$ - fixed assets turnover ratio;

$I^{nv}_{FA_P}$ - fixed assets profitability ratio;

I^{nv}_{PL} - productivity of labour;

$I^{nv}_{FC_P}$ - full cost pricing;

$I^{nv}_{P_A}$ - products average price;

I^{nv}_{SR} - sales resultivity ratios;

$I^{nv}_{MA_E}$ - efficiency of management abilities;

I^{nv}_{TL} - total liquidity ratio;

I^{nv}_{DE} - debt to equity ratio;

I^{nv}_{TAT} - total assets turnover;

$I^{nv}_{P_{ROS}}$ - return on sales;

$I^{nv}_{P_{ROA}}$ - return on assets;

$I^{nv}_{P_{ROE}}$ - return on equity;

$I^{nv}_{PO_N}$ - number of producers' organizations;

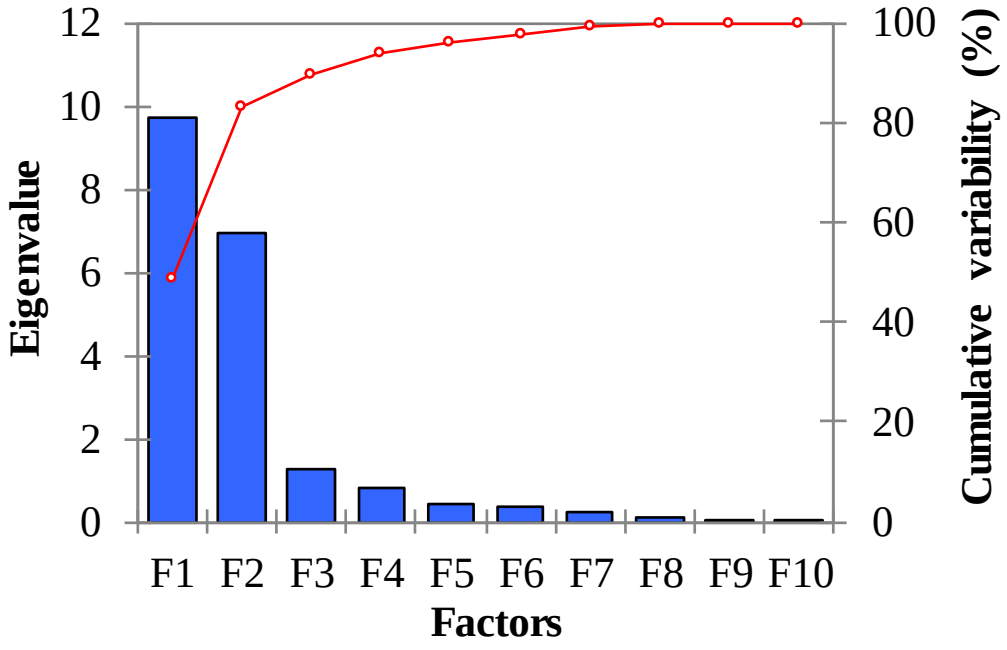
$I^{nv}_{POC_{\%}}$ - proportion of companies involved in producers' organizations from the total in the sector.

Internal consistency of the viewed variables is high (Cronbach's alpha coefficient's actual value 0,774 ≥ critical value 0,700) and the chosen data array – adequate (Kaiser-Meyer-Olkin

Test actual value 0,636 ≥ 0,600 critical value), what proves that the variables describing the factorial features are compatible.

In the Screen Plot diagram it is evident (Figure 2), that 3 variable eigenvalues are bigger than 1, what explains 89.82% of the total variability. The first factor $F1$ explains 48.71% of the total variability, the second factor $F2$ – 34.74%, and the third factor $F3$ – 6.38% of the total variability.

Figure 2: Screen Plot in Covariance Matrix



Source: calculated and created by the author using Central Statistical Bureau, 2018; LFICIS, 2018

The data of the performed calculations according to Rotation Method through Varimax with Kaiser Normalization show that the variables have different contributions into factor's loadings, and that they are to be combined in several factors.

In the framework of multiple linear regression analysis, the author elaborated regression equation (1).

$$I_{FP} = -3{,}9072 + 0{,}0203 \times FP_V - 13{,}7207 \times FA_D + 0{,}0243 \times SR + \\ + 1{,}7649 \times TL + 0{,}1443 \times DE \quad (1)$$

where I_{FP} Fish Processing Competitiveness Index;
FR_V volume of fish resources;
FA_D depreciation to fixed assets ratio;
SR sales resultivity ratios;
TL total liquidity ratio;
DE debt to equity ratio.

The results of multiple linear regression show (Table 2), that 59.42% ($R-squared = 0{,}594$) of the effective feature y variance can be explained through the linear influence of 5 factorial features, whereas the linear influence of other factorial features corresponds to the influence of the background.

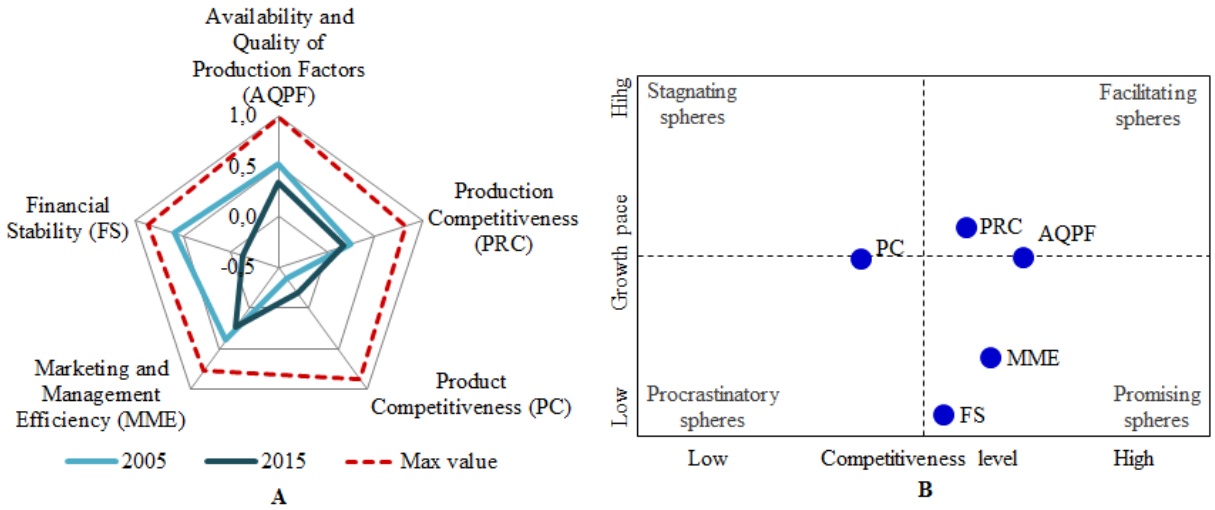
Table 2: Results of Multiple Linear Regression

Variable	Volume of fish resources	Depreciation to fixed assets	Sales resultivity ratios	Total liquidity ratio	Debt to equity ratio
Coefficient	0,020	-13,721	0,024	1,765	0,144
Std. Error	0,010	13,621	0,028	1,540	0,191
t-statistic	2,019	-1,007	0,867	1,146	0,756
R-squared	0,594				
Ad. R-squared	0,188				
F-statistic	1,464				
F-critical	0,343				
p-value	0,157				
Durbin-Watson stat.	3,196				
Lower 95%	-9,947				
Upper 95%	2,132				

Source: calculated and created by the author using Central Statistical Bureau, 2018; LFICIS, 2018

From the results of the conducted analysis of causal relationships it is evident that at the moment the influence of variables on the competitiveness can be evaluated as significant; however, it should be cautiously analysed, what is mostly determined by the comparatively small number of observations for a large number of independent variables. The obtained results of the analysis provide an opportunity to understand the factors influencing the competitiveness better and allow judging about the possibilities to facilitate competitiveness. Latvian fish processing sector competitiveness during the period from 2005 to 2015 is evaluated as medium-high, which in this period decreased by -68%: from 1.38 in 2005 to 0.44 in 2015 (Figure 3). In the sector the sphere of facilitating competitiveness is the production competitiveness, promising spheres – availability and quality of production factors, efficiency of marketing and management and stability of the finances, but the procrastinatory sphere - competitiveness of the product.

Figure 3: The changes of competitiveness (A) and the spheres influencing competitiveness (B) in 2005 and 2015 (sub-indexes value)

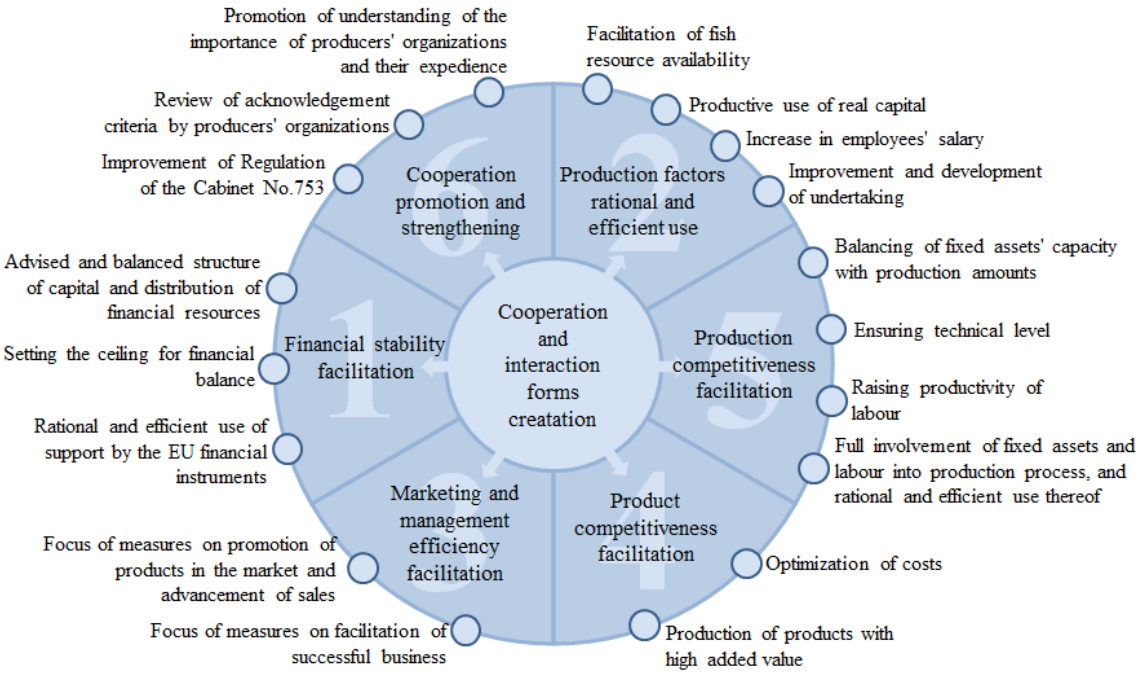


Source: calculated and created by the author using Central Statistical Bureau, 2018; LFICIS, 2018

Fish processing sector in Latvia has medium-high level of competitiveness, but with a tendency to deteriorate. For facilitating sector competitiveness would be advisable implement development strategy. In the framework of development strategy there are several interrelated

and subordinates measures to be taken (Figure 4). The priority measures are facilitation of financial stability, and only then – facilitation of availability and quality of production factors, efficiency of the marketing and management, product and production competitiveness. In addition, cooperation would be preferable to acquire new markets.

Figure 4: Measures for facilitation of competitiveness in the Framework of Priority Spheres



Source: created by the author

To facilitate competitiveness, it is advisable to create forms of tight cooperation and interaction with the institutions involved in establishment and implementation of fisheries policy, educational and scientific institutions and other type of institutions, especially in creation of new ideas and innovations.

4. Conclusion

The developed methodology allows assessing and analyzing the competitiveness of Latvian fish processing sector in time, identifying spheres (facilitating, promising, procrastinatory, stagnating) influencing competitiveness, and providing suggestions for further development of the sector. The methodology can be used for the assessment of the competitiveness of fisheries sectors not only in Latvia but also in other countries, thus providing the institutions involved in the fisheries' policy formation and implementation a possibility to develop, planning and improve the common policy in the field more successfully. The competitiveness of fish processing sector in Latvia from 2005 – 2015 may be evaluated as medium-high, what is facilitated by production competitiveness, availability and quality of production factors, efficiency of the marketing and management and stability of the finances. For facilitating sector competitiveness would be advisable implement development strategy, in the framework of which the priority measures to be taken are improvement of financial stability, and only then – strengthening of other fields. To facilitate the competitiveness, sector can used opportunities of support by the EU financial instruments as well as to participate in formation of common fisheries policy of the EU.

References

[1] Bartels, R. (1992). On the power function of the Durbin-Watson test. *Journal of Econometrics*, vol. 51, no. 1-2, pp. 101-112.

[2] Bartlett, M.S. (1950). Tests of significance in factor analysis. *British Journal of Psychology*, vol. 3, no. 2, pp. 77-85.

[3] Biuksane, I. (2016). Index of the Fisheries Sector Cluster Competitiveness: Internal factors, *Conference Proceedings of SGEM2016*, Book II, vol. 4, pp. 347-354.

[4] Biuksane, I. (2017). The results of the Interviews and the Questionnaire given by the representatives of the institutions involved in the Latvian fisheries sector policy-making and implementation and the fisheries sector companies' (restricted access data).

[5] Biuksane, I. and Judrupa, I. (2016). Evaluation of competitiveness of the fisheries sector cluster, *Proceedings of International Scientific Conference "Research for Rural Development 2016"*, vol. 2, pp. 238-245.

[6] Cattell, R.B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research*, vol. 1, no. 2, pp. 245-276.

[7] Central Statistical Bureau (April 2018). Database. [Online]. Available: http://data.csb.gov.lv/pxweb/en/?rxid=cdcb978c-22b0-416a-aacc-aa650d3e2ce0.

[8] Cronbach, L. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, vol. 16, no. 3, pp. 297-334.

[9] Finance Ministry (2003). *Single Programming Document for Latvia. Objective 1 Programme 2004 – 2006*, Riga, 328 p.

[10] Gunel, E. and Ryan, K.J. (2017). Fisher's exact test from a Bayes perspective. *Communications in Statistics-Simulation and Computation*, vol. 46, no. 9, pp. 7393-7404.

[11] Kaiser, H.F. (1958). The varimax criterion for analytic rotation in factor analysis. *Psychometrika*, vol. 23, no. 3, pp. 187-200.

[12] Kaiser, H.F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, vol. 20, no. 1, pp. 141-151.

[13] Kalnins, A. (2018). Multicollinearity: How common factors cause Type 1 errors in multivariate regression. *Strategic Management Journal*, vol. 39, no. 8, pp. 2362-2385.

[14] Lafosse, P. and Rodriguez, G. (2018). An empirical application of a stochastic volatility model with GH skew Student's t-distribution to the volatility of Latin-American stock returns. *Quarterly Review of Economics and Finance*, vol. 69, pp. 155-173,

[15] Latvian Fisheries integrated control and information system 'LFICIS' (April 2018). Database. [Online]. Available: https://lzikis.zm.gov.lv/Account/LogOn (restricted access data).

[16] Latvian State Institute of Agrarian Economics (2014). *Availability of production technologies for the development of the fisheries sector in Latvia*, Riga, 102 p.