



ECONOMICS AND MANAGEMENT OF ENTERPRISE

DOI: 10.15587/2312-8372.2017.113181

THE DEVELOPMENT OF THE METHOD OF RATINGS FORMATION OF SCIENTIFIC AND SCIENTIFIC-PEDAGOGICAL STAFF PUBLICATION ACTIVITY

page 4–9

Kuzmin Oleh, Doctor of Economic Sciences, Professor, Department of Management and International Business, Director of the Institute of Economics and Management, Lviv Polytechnic National University, Ukraine, e-mail: oleh.y.kuzmin@lpnu.ua, ORCID: <http://orcid.org/0000-0002-6014-6437>

Zhuk Liliya, PhD, Associate Professor, Head of the Department of Scientific Research, Lviv Polytechnic National University, Ukraine, e-mail: liliya.v.zhuk@lpnu.ua, ORCID: <http://orcid.org/0000-0001-7299-2705>

The analysis of the publication activity of domestic universities according to SciVerse Scopus scientometric database is conducted and its dependence on the effectiveness of the motivation systems in these universities is established. The necessity of rating the publication activity of scientific and scientific-pedagogical workers of higher educational institutions as effective ways of ensuring the competitiveness of universities, providing and improving the presence in international and domestic universities rankings is substantiated. The positive experience of managing the publication activity on the example of the Taras Shevchenko National University of Kyiv and the «Lviv Polytechnic» National University is shown. The methodology for the formation of the rating of the SSPS publication activity by the indicator is developed, which is calculated as the average number of scientific publications (monographs, articles, conference proceedings) for a certain period. It is shown that the indicators of publication activity and citation indexes are not the only and final criteria for assessing scientific results, but only an instrument for supporting decision-making by experts. Measures are developed to strengthen the publication activity.

Keywords: rating of publication activity, formation of ratings of scientific and scientific-pedagogical staff, motivation of scientific and scientific-pedagogical staff.

References

1. Pro naukovu i naukovo-tekhnicnu diialnist. *Law of Ukraine from November 26, 2015, No. 848-VIII*. Available at: <http://zakon3.rada.gov.ua/laws/show/848-19>
2. Akoev, M. A., Markusova, V. A., Moskaleva, O. V., Pislakov, V. V.; In: Akoev, M. A. (2014). *Rukovodstvo po naukometrii: indikatory razvitiia nauki i tehnologii*. Ekaterinburg: Ural State University, 250.
3. In: Rojo, J., Polt, W. (2003). *Handbook on the Evaluation of Research and Technology Policy: Concepts, Tools and Indicators*. N.Y. and Cheltenham: Edward Elgar, 208.
4. Kostenko, L., Zhabin, O., Kuznietsov, O., Kukharchuk, Ye., Symonenko, T. (2015). Naukometriia: metodolohiia ta instrumentarii. *Visnyk Knyzhkovoii palaty*, 9, 25–29.
5. Malyskyi, B. (2017). Problema obiektyvnoho otsiniuvannia yakosti roboty doslidnyka... *ZN.UA*. Available at: https://dt.ua/SCIENCE/boris-malickyi-problema-ob-yektivnogo-ocinyuvannya-yakosti-roboty-doslidnyka-vihodit-daleko-za-mezhi-sproshchenih-naukometriчних-indeksiv-256941_.html
6. Kyiak, B. R., Andrushchenko, V. B. (2015). Obruntuvannia kryteriiv otsiniuvannia fundamentalnykh naukovykh doslidzhen. *Nauka ta naukoznavstvo*, 4 (89), 67–72.
7. Orlova, A. I. (2013). Scientometrics and research management. *Upravlenie bol'shimi sistemami*, 44, 538–568.
8. Pro opublikuvannia rezultativ dysertatsii na zdobuttia naukovykh stupeniv doktora i kandydata nauk. *Order of the Ministry of Education and Science of Ukraine from October 17, 2012 No. 1112*. Available at: <http://zakon3.rada.gov.ua/laws/show/z1851-12>
9. Pro zatverdzhennia Poriadku prysvoiennia vchenykh zvan naukovym i naukovo-pedahohichnym pratsivnykam. *Order of the Ministry of Education and Science of Ukraine from January 14, 2016 No. 13*. Available at: <http://zakon2.rada.gov.ua/laws/show/z0183-16>

10. Reitynh universytetiv za pokaznykamy Scopus 2017 roku. (11.04.2017). *Osvita.ua*. Available at: <http://osvita.ua/vnz/rating/55425/>
11. Bibliometryka ukrainsoi nauky. Vyschi navchalni zaklady v naukometrychnii systemi Scopus. *Official website of the Center for Social Communication Studies of the National Library of Ukraine named after V. I. Vernadsky*. Available at: http://nbuviap.gov.ua/bpnu/pdf/scopus_uni_2016.pdf
12. Otsiniuvannia naukovoii roboty. *Official website of the Taras Shevchenko National University of Kyiv*. Available at: <http://science.univ.kiev.ua/research/analytics/>

DOI: 10.15587/2312-8372.2017.113175

FORMATION OF BLOCKS OF CATEGORIAL APPARATUS OF CONSTRUCTION INDUSTRY

page 9–13

Zalunina Olga, PhD, Associate Professor, Department of Management, Kremenchuk Mykhailo Ostrohradskyi National University, Ukraine, e-mail: olvalavina@gmail.com, ORCID: <http://orcid.org/0000-0002-7478-4528>

The object of research is the formation of blocks of the categorical apparatus of the construction industry to determine the strategic guidelines for development of construction. The need for criticality to the variable parameters of the construction complex requires the effectiveness obtained by mathematizing and modeling the formalized data.

In the course of the research, a comprehensive approach to the analysis of the conceptual apparatus is used, which determines the main directions for strategic development of construction in general. The need for an integrated approach is confirmed by the experience accumulated by science and practice.

The formed modular base of the indicative space of the conceptual-categorical apparatus of construction makes it possible to focus further research in direction of stable development.

Thanks to the formed blocks of the indicative space, the combined tools and tools for designing, developing and improving complex analysis in resource unity allow to evaluate the feasibility of construction activities, that is, they have the property of representability. The direction of actions through goals, functions, principles, i. e. the procedural component coordinates the sequence and interrelation of the construction stages.

Keywords: construction industry, construction complex, construction organizations, construction, blocks.

References

1. Kasykh, A. O. (2011). Teoretychni i metodychni osnovy analizu vnutrishnikh dzherel finansuvannia investytsiinoi diialnosti. *Aktualni problemy ekonomiky*, 3 (117), 243–250.
2. Wells, J. (1984). The construction industry in the context of development: A new perspective. *Habitat International*, 8 (3-4), 9–28. doi:10.1016/0197-3975(84)90040-7
3. Chan, A. P. C., Yung, E. H. K., Lam, P. T. I., Tam, C. M., Cheung, S. O. (2001). Application of Delphi method in selection of procurement systems for construction projects. *Construction Management and Economics*, 19 (7), 699–718. doi:10.1080/01446190110066128
4. Gort, M., Konakayama, A. (1982). A model of diffusion in the production of an innovation. *American Economic Review*, 72 (5), 1111–1120.
5. Chen, J. J. (1998). The characteristics and current status of China's construction industry. *Construction Management and Economics*, 16, 711–719. doi:10.1080/014461998372006
6. Fine, B. (2000). Critical survey. Endogenous growth theory: a critical assessment. *Cambridge Journal of Economics*, 24 (2), 245–265. doi:10.1093/cje/24.2.245
7. Johnston, R. E. (1966). Technical progress and innovation. *Oxford Economic Papers*, 18 (2), 158–176. doi:10.1093/oxfordjournals.oep.a041016

8. Hillerbrandt, P. (1985). *Analysis of the British Construction Industry*. London: Macmillan, 145.
9. Turin, D. (1969). *The construction industry: its economic significance and its role in development*. London: UNIDO, 213.
10. Moavenzadeh, F., Rossow, J. (1976). *Technology adaptation program. The construction industry, in developing countries*. Cambridge: Massachusetts Institute of Technology, 363.
11. Bon, R., Pietroforte, R. (1990). Historical comparison of construction sectors in the United States, Japan, Italy and Finland using input-output tables. *Construction Management and Economics*, 8 (3), 233–247. doi:10.1080/01446199000000021
12. Bon, R., Birgonul, T., Ozdogan, I. (1999). An input-output analysis of the Turkish construction sector, 1973–1990: a note. *Construction Management and Economics*, 17 (5), 543–551. doi:10.1080/014461999371169
13. Lean, C. S. (2001). Empirical tests to discern linkages between construction and other economic sectors in Singapore. *Construction Management and Economics*, 19 (4), 355–363. doi:10.1080/01446190010022686
14. Field, B., Ofori, G. (1988). Construction and Economic Development: A Case Study. *Third World Planning Review*, 10 (1), 41–50. doi:10.3828/twpr.10.1.63h4v2427v96132q
15. Bon, R. (1988). Direct and indirect resource utilisation by the construction sector. *Habitat International*, 12 (1), 49–74. doi:10.1016/0197-3975(88)90039-2
16. Papageorgiou, Y. Y., Smith, T. R. (1983). Agglomeration as Local Instability of Spatially Uniform Steady-States. *Econometrica*, 51 (4), 1109–1120. doi:10.2307/1912054
17. Papageorgiou, G. J. (1978). Spatial externalities I: theory. *Annals of the Association of American Geographers*, 68 (4), 465–476. doi:10.1111/j.1467-8306.1978.tb01210.x
18. Pheng, L. S. (1994). Balancing construction and marketing in world economic development: the four global scenarios. *Construction Management and Economics*, 12 (2), 171–182. doi:10.1080/01446199400000023
19. Barro, R. (1999). Notes on growth accounting. *Journal of Economic Growth*, 4 (2), 119–137. doi:10.1023/a:1009828704275
20. Feldman, M. P. (1999). The New Economics Of Innovation, Spillovers And Agglomeration: A Review Of Empirical Studies. *Economics of Innovation and New Technology*, 8 (1-2), 5–25. doi:10.1080/10438599900000002
21. Henderson, V. (2003). The urbanization process and economic growth: The so-what question. *Journal of Economic Growth*, 8 (1), 47–71. doi:10.1023/a:1022860800744
22. Nijkamp, P., Poot, J. (1998). Spatial perspectives on new theories of economic growth. *The Annals of Regional Science*, 32 (1), 7–37. doi:10.1007/s001680050061
23. Richardson, H. W. (1973). *Regional Growth Theory*. London: MacMillan, 215. doi:10.1007/978-1-349-01748-5
24. Gorelik, A. L. (1972). Ob odnom podkhode k vyboru prostranstva priznakov, ispol'zuemogo pri postroenii sistemy raspoznavaniya ob'ektov i yavleniy. *Kibernetika*, 4, 85.
25. Gorelik, A. L. (1973). Igrovoy podkhod k postroeniyu prostranstva priznakov sistemy raspoznavaniya ob'ektov i yavleniy. *Kibernetika*, 5, 76.
26. Kasych, A. O. (2013). Dosvid formuvannia natsionalnykh innovatsiynykh system v krainakh, sheho rozvyvaiutsia. *Aktualni problemy ekonomiky*, 5 (143), 46–49.
27. Kasych, A. O. (2016). Teoretychni aspekty vplyvu protsesiv detentralizatsii na ekonomichnyi rozvytok krainy. *Aktualni problemy ekonomiky*, 8, 16–21.
28. Zalunina, O. M. (2014). Construction of aggregates of features of the building complex of the territory for conceptual grouping scheme. *Eastern-European Journal of Enterprise Technologies*, 4 (3 (70)), 29–33. doi:10.15587/1729-4061.2014.26278
29. Zalunina, O. M. (2014). Postroenie kontseptual'noy skhemy grupirovki oblastey Ukrainy po makroekonomicheskim parametram v stroitel'nom sektore. *Problemy ekonomiki*, 4, 91–96.
30. Zalunina, O. M. (2015). Determine the relationship of industries related to regional development. *Technology Audit and Production Reserves*, 1 (7 (21)), 8–12. doi:10.15587/2312-8372.2015.38434
31. Zalunina, O. M. (2015). The economic dimension of management decisions in the building industry. *ScienceRise*, 9 (1 (14)), 42–46. doi:10.15587/2313-8416.2015.50512
32. Zalunina, O. M. (2016). Formation of optimal production scale of building materials. *Technology Audit and Production Reserves*, 1 (3 (27)), 45–49. doi:10.15587/2312-8372.2016.60447
33. Zalunina, O. M. (2016). Construction of complex index for evaluation of investment attractiveness of building projects. *ScienceRise*, 5 (1 (22)), 41–45. doi:10.15587/2313-8416.2016.69662
34. Zalunina, O. M. (2016). Formation of condition severity index of the industrial-building systems. *Technology Audit and Production Reserves*, 2 (5 (28)), 38–42. doi:10.15587/2312-8372.2016.65971
35. Zalunina, O. M., Druzhynina, V. V., Aleksieieva, N. F. (2017). Formuvannia bahatorivnevoi systemy pokaznykiv vymiru dobrobutu naseleennia. *Aktualni problemy ekonomiky*, 4 (190), 100–112.
36. Zalunina, O. M. (2016). Priorityty informatsionnogo polya, ispol'zue-mye v upravlenii predpriyatiem. *Naukoviy visnik Uzhgorod's'kogo natsional'nogo universitetu. Seriya «Mizhnarodni ekonomichni vidno-sini ta svitove gospodarstvo»*, 6, 132–135.

DOI: 10.15587/2312-8372.2017.113283

INVESTIGATION OF RELATIONSHIP MARKETING IN THE FRANCHISING ACTIVITY OF TRADE COMPANIES

page 13–19

Lisun Yanina, PhD, Associate Professor, Department of marketing and advertising, Kyiv National University of Trade and Economics, Ukraine, e-mail: yanaw@ukr.net, ORCID: <http://orcid.org/0000-0002-5250-2809>

The article reveals the essence and constituents of the concepts of «relationship», «interaction», «marketing relations», «marketing partnership», «partnership» of the trade business. The essence of the terms «distribution» and «franchising» is investigated and the place of franchising in the structure of organizational and legal forms of distribution systems is determined.

It analyses the activity of trading companies and the franchising market of Ukraine is conducted. The article analyses main strengths and weaknesses of franchising activity are summarized with the use of SWOT analysis, which makes it possible to clarify the nature of the partnership relations in the franchising business.

The article shows that relationship marketing is a mechanism for the development of business entities based on the integration of basic functions, partnerships and corporate interests. Franchising framework consists of various forms and principles of cooperation, ranging from the simplest, which consists in the distribution of franchisor goods using its brand and trade standards, to the most complex form of cooperation, which consists in proposing an entire franchise system.

It analyses the segmentation of franchises in the field of trade on the basis of such features as investments, the cost of a franchise, the payback period, the number of staff, technological requirements for doing business, which makes it possible to clarify the degree of manifestation (saturation) of the partnership.

Keywords: entrepreneurship, trade, distribution, partners, franchising, partnership marketing, coordination of interests, efficiency, sustainable development.

References

- Berry, L., Chostack, G., Upah, G. (1983). *Relationship marketing. Emerging Perspectives of Service Marketing*. American Marketing Association, 25–38.
- Kotler, P., Levy, S. J. (1999). Demarketing, Yes, Demarketing. *Brands, Consumers, Symbols, & Research Brands*. SAGE Publications, Inc., 75–83. doi:10.4135/9781452231372.n7
- Balabanys, A. V. (2012). Marketynh vzaemodii: Evoliutsiia kontseptsii i suchasni tendentsii. *Ekonomika i upravlenie*, 6, 8–13.
- Balabanova, L. V., Chernysheva, S. V. (2009). *Marketynh vidnosyn v systemi upravlinnia pidpriemstvom*. Donetsk: DonNUET, 280.
- Koval, T. A., Yakhkind, V. P. (2014). Doslidzhennia marketynhu partnerskykh vidnosyn yak instrumentu stratezhichnoho upravlinnia pidpriemstvom. *Biznes Inform*, 4, 441–448.
- Tankov, K. M. (2012). Marketynh vzaemovidnosyn v upravlinni lantsiuhamy postavok. *Biznes Inform*, 7, 180–183.
- Shtal, T. V., Dobrosiuk, Yu. B. (2012). Elementy mehanizma vzaemodeistviia sub'ektov v kanalah sbyta. *Biznes Inform*, 10, 17–22.
- Yakhkid, V. P. (2013). Marketynh partnerskykh vidnosyn yak instrument stratezhichnoho upravlinnia pidpriemstvom. *Ekonomika rozvytku*, 2 (66), 100–104.

9. Apopii, V. V., Babenko, S. H., Honcharuk, Ya. A. et al.; Apopii, V. V. (2008). *Komertsiiina diialnist. Ed. 2*. Kyiv: Znannia, 632.
10. Balabanova, L. V., Folomkina, I. S. (2009). *Upravlinnia realizatsiieiu stratehii pidpriemstva: marketynhovyi pidkhdid*. Donetsk: DonNUET, 402.
11. Verba, V. A., Hrebeshkova, O. M. (2007). Stratehichni partnerstva yak model rozvytku pidpriemstva. *Korporatsii ta intehrovani struktury: problemy nauky ta praktyky*. Kharkiv: VD «INZHEK», 244–267.
12. Lozynskiy, V. T., Mishchuk, I. P. (2010). Formuvannia suchasnykh system dystrybutsii tovariv: problemy teorii i praktyky. *Visnyk Natsionalnoho universytetu «Lvivska politekhnikha»*, 690, 95–103.
13. Mizuiuk, B. M., Ilchuk, O. O., Duda, S. T. (2011). *Ekonomichnyi potentsial torhovelnoho pidpriemstva: struktura, optymizatsiia, stratehichne upravlinnia*. Lviv: LKA, 260.
14. In: Illiashenko, S. M. (2010). *Marketynh. Menedzhment. Innovatsii*. Sumy: Drukarskyi dim «Papyrus», 621.
15. Myshchuk, I. P., Mitsenko, N. H., Lozynskiy, V. T., Khamula, O. O.; In: Myshchuk, I. P. (2015). *Mekhanizm aktyvizatsii prodazhu tovariv pidpriemstvamy torhioli*. Lviv: Ukrainian Academy of Printing, 516.
16. Romat, Ye. V. (2013). *Reklama: teoriia i praktika*. St. Petersburg: Piter, 512.
17. Frolova, L. V. (2005). *Mekhanizm lohystychnoho upravlinnia torhovelnykh pidpriemstvom*. Donetsk: DonDUET n. a. Tugan-Baranovsky, 322.
18. Heikkilä, J. (2002). From supply to demand chain management: efficiency and customer satisfaction. *Journal of Operations Management*, 20 (6), 747–767. doi:10.1016/s0272-6963(02)00038-4
19. Biekert, J. (1992). The data revolution. *Target Marketing*, 15 (1), 24–28.
20. Alderson, W. (1965). *Dynamic Marketing Behavior: A Functionalist Theory of Marketing*. Homewood: R. D. Irwin, 383.
21. Christopher, M. (2016). *Logistics and Supply Chain Management. Ed. 5*. FT Press, 328.
22. Hryhorenko, T. I. (2011). Klyasifikatsiia franchaizynhovyykh merezh. *Tovary i rynky*, 1, 36–43.
23. Dannikov, O. V. (2008). Problemy pobudovy ta funktsionuvannia franchaizynhovyykh system v Ukraini. *Marketynh v Ukraini*, 5 (51), 62–69.
24. Dmytryshyn, V. S. (2010). Dohovir komertsiiinoi kontsesii ta dohovir franchaizynhu. Spivvidnoshennia poniat ta pravova pryroda. *Chasopys Kyivskoho universytetu prava*, 3, 199–203.
25. Mazurenko, V. P. (2013). Rozvytok franchaizynhovyykh vidnosyn u mizhnarodnomu biznesi. *Naukovyi visnyk ChDIEU*, 3 (19), 78–84.
26. Makhnusha, S. M. (2010). Franchaizynhova forma vykorystannia brendu: pohliad z pozystsii marketynhu innovatsii. *Marketynh i menedzhment innovatsii*, 2, 26–33.
27. Semenenko, I. M. (2012). Vykorystannia franchaizynhu v diialnosti promyslovykh pidpriemstv. *Biznes Inform*, 7, 102–104.
28. Cherenkov, V. I. (2004). Evoliutsiia marketingovoi teorii i transformatsiia dominiruiushchei paradigmy marketinga. *Vestnik Sankt-Peterburgskogo universytetu*, 2 (16), 3–32.
29. Lisun, Y. V. (2014). Teoretyko-metodolohichni zasady formuvannia zbalansovanoho stratehichnoho potentsialu partnerskoi vzaiemodii pidpriemstv sfery posluh. *Naukovyi visnyk Khersonskoho derzhavnogo universytetu*, 6 (3), 12–15.
30. Lisun, Y. V. (2015). Teoretychni aspekty formuvannia vzaiemovidnosyn u kontseptsiiakh marketynhu. *Visnyk Odeskoho natsionalnoho universytetu im. I. I. Mechnykova*, 2/1 (20), 70–73.
31. Lisun, Y. V. (2015). Uzgodzhennia sotsialno-ekonomichnykh interesiv pidpriemstv na osnovi refleksyvnogo pidkhdodu. *Visnyk Khmelnytskoho natsionalnoho universytetu*, 4 (4), 27–32.
32. In: Zhuk, I. M. (2016). *Statystychnyi shchorichnykh Ukrainy za 2015 r.* State Statistics Service of Ukraine, 575.
33. *Franchise Group*. Available at: <http://franchisegroup.com.ua/>
34. Lisun, Y. V. (2015). Statystychnyi analiz franchaizynhu sfery hromadskoho kharchuvannia ta torhivli v Ukraini. *Ekonomichnyi analiz*, 20, 45–52.
35. Haivanovych, N. V. (2011). Merezhevi struktury malykh i serednykh pidpriemstv. *Visnyk Khmelnytskoho natsionalnoho universytetu. Ekonomichni nauky*, 6(4 (181)), 110–115.
36. Lisun, Y. V. (2016). Lohistychni systemy u zabezpechenni partnerskoi vzaiemodii pidpriemstv. *Actual problems of globalization*, 195–199.
37. Lisun, Y. V. (2015). Stages and technology in developing a strategic partnership. *Perspective economic and management issues*. Vienna: «East West» Association For Advanced Studies and Higher Education GmbH, 449–453.
38. Lisun, Y. V. (2015). Aktyvizatsiia partnerstva na osnovi klasterneho pidkhdodu yak mekhanizmu rehionalnoho rozvytku biznesu v Ukraini. *Spatial aspects of socio-economic systems development: the economy, education, and health care*. Opole: The Academy of Management and Administration in Opole, 76–82.
39. Lisun, Y. V. (2015). Management contractors interests based on network model of economic development. *Institutional framework for the functioning of the economy in the context of transformation*, 292–297.

DOI: 10.15587/2312-8372.2017.108794

MATERIAL FLOW MANAGEMENT OF INDUSTRIAL ENTERPRISE ON LEAN PRINCIPLES

page 19–23

Kolos Iryna, PhD, Associate Professor, Certified Accounting Practitioner, Department of Accounting And Auditing, National University of Food Technologies, Kyiv, Ukraine, e-mail: iryinakolos2016@gmail.com, ORCID: <http://orcid.org/0000-0001-7134-1441>

The material flow is characterized as a component of the value stream, where a material form of production stocks changes to a finished product, while creating value for the consumer.

The model of the material flow management of an industrial enterprise on the lean basis is proposed with the use of a process approach (on the basis of a set of agreed interrelated purchase/supply processes, production/processing, sales/consumption), a functional approach and a system approach (using specific lean methods within an individual management function) to ensure lean transformations in the material flow.

The relevance of the use of a combination of lean production methods in the implementation of individual management functions (analysis – VSM, 5W, planning and organization – 5S, VSM, SOP, JIT, accounting – VSM, SOP, JIT, Poka-Yoke, control – 5S, VSM, Visual Management, JIT, Jidoka, Andon, SOP, regulation and coordination – VSM, JIT, SOP, Kanban, Heijunka, Kaizen) with the material flow of an industrial enterprise with a focus on continuous improvement of value creation for the consumer.

The indicators of the effectiveness of material flow management are proposed, the key ones being: average days-in-inventory (days), level of reliability of suppliers (%), number of permanent suppliers (units), level of attracting new suppliers (%), level of vendor loyalty (%), age of accounts payable (days), average duration of the development of a new product (days), average duration of preparation for the launch of a new product in production (days), average duration of the technological process work hours (hours), average cost and unit cost of production (UAH), material consumption of products (UAH/UAH), material output (UAH/UAH), profit level per UAH of material costs (%), average duration of flow reconfiguration (hours), percentage of rejections for certain types of products (%), cost of rejection repairing (UAH), average duration of one order (hours), average days' sales uncollected (days), working capital DAYS (day).

In order to efficiently manage the material flow, the owners and top management of the manufacturing company need to revise the value stream daily, focusing on the future well-being of key players: suppliers and consumers, ensuring the adoption of joint lean management decisions in the «supplier-producer-consumer» chain.

Keywords: value stream, flow of material, material management, lean production, industrial production.

References

- Carreira, B. (2005). *Lean Manufacturing That Works: Powerful Tools for Dramatically Reducing Waste and Maximizing Profits*. AMACOM, American Management Association, 304.
- Martin, J. W. (2008). *Operational Excellence: Using Lean Six Sigma to Translate Customer Value through Global Supply Chains*. Boca Raton: Auerbach Publications, CRC Press, 662. doi:10.1201/9781420062519
- Womack, J. P. (2003). *Lean Thinking. Banish waste and create wealth in your corporation*. FREE PRESS A Division of Simon & Schuster, Inc., 402.
- Kolos, I. V. (2017). Naukovo-metodychni pidkhdody do tyopolohii metodiv oshchadlyvoho vyrobnytstva. *Naukovyi visnyk Mizhnarodnoho humanitarnoho universytetu. Seriya: «Ekonomika i menedzhment»*, 25 (1), 121–124.

5. Kolos, I. V. (2017). Integration on effective management of industrial enterprises on lean principles. *Technology Audit and Production Reserves*, 4 (4 (36)), 28–33. doi:10.15587/2312-8372.2017.108795
6. Ono, T. (2008). *Proizvodstvennaya sistema Toyoty. Ukhodya ot massovogo proizvodstva*. Moscow: Institut kompleksnykh strategicheskikh issledovaniy, 208.
7. Hobbs, D. P.; In: Sereda, D. V. (2007). *Vnedrenie berezhlivogo proizvodstva*. Minsk: Grevtsov Publisher, 352.
8. Omelianenko, T. V., Shcherbyna, O. V., Barabas, D. O., Vakulenko, A. V. (2009). *Oshchadlyoe vyrobnytstvo: kontseptsii, instrumenty, dosvid*. Kyiv: KNEU, 157.
9. Feld, W. M. (2001). *Lean manufacturing: Tools, Techniques, and How To Use Them*. CRC Press Series on Resource Management, 245. doi:10.1201/9781420025538
10. Dailey, K. W. (2003). *The Lean Manufacturing Pocket Handbook*. Summertown: Publishing Co., 42.
11. In: Marchwinski, C., Shook, J., Schroeder, A. (2008). *Lean Lexicon a graphical glossary for Lean Thinkers*. Cambridge: Lean Enterprise Institute, 136.
12. Veyder, M. (2011). *Instrumenty berezhlivogo proizvodstva: Minirukovodstvo po vnedreniyu metodik berezhlivogo proizvodstva*. Moscow: Al'pina Publisher, 125.
13. Hines, P., Found, P., Griffiths, G., Harrison, R. (2011). *Staying Lean: Thriving, Not Just Surviving*. CRC Press, 275. doi:10.1201/b10492
14. Womack, J. P., Jones, D.T. (2003). *Lean Thinking: Banish Waste and Create Wealth in Your Corporation, Revised and Updated. Ed. 2*. Productivity Press, 396.
15. Locher, D. A. (2008). *Value Stream Mapping for Lean development: A How-To Guide for Streamlining Time to Market*. CRC Press, 144.
16. Maskell, B. H., Baggaley, B., Grasso, L. (2013). *Practical Lean Accounting: A Proven System for Measuring and Managing the Lean Enterprise, Second Edition*. Productivity Press, 475.

ECONOMIC CYBERNETICS

DOI: 10.15587/2312-8372.2017.112514

DEVELOPMENT OF THE METHOD FOR FORMATION OF THE SYSTEMALLY BASED LEVEL OF RESOURCES OF LOGISTICS OPERATIONS

page 24–34

Lutsenko Igor, Doctor of Technical Sciences, Professor, Department of Information and Control Systems, Kremenchuk Mykhailo Ostrohradskiy National University, Ukraine, e-mail: delo-do@i.ua, ORCID: <http://orcid.org/0000-0002-1959-4684>

Fomovskaya Elena, PhD, Associate Professor, Head of the Department of Electronic Devices, Kremenchuk Mykhailo Ostrohradskiy National University, Ukraine, e-mail: 2fill.fo@gmail.com, ORCID: <http://orcid.org/0000-0002-8065-5079>

Despite its deep historical roots, at the present time there are no methods for solving logistics problems that allow to work out a unified approach to choosing the best option, relying on all relevant factors.

The method of choosing the optimal parameters of the logistics stock of a logistics operation is based on the possibility of estimating the efficiency of a global economic operation model with distributed parameters.

The method is based on the logistic operation model, which includes the possibility of variation by factors such as changes in the volume and price of purchases, changes in the delivery time, the possibility of accounting for changes in demand from the established mark-up and how to build the forecast.

Since the demand for commodity products in open systems is of a probabilistic nature, the method involves solving a logistics problem with three probable outcomes. These outcomes are expressed in the possibility of creating models of operations of three classes: surplus operations, coordinated and deficit operations.

On the basis of the proposed method, a software product is created that converts the initial data of the logistics task into a system of indicators on the basis of which it is possible to carry out an objective choice of the insurance stock size.

Based on such indicators as potential effect and resource intensity, the efficiency indicator of both a separate logistic operation and the efficiency of the logistics process can be determined. The best option is determined by the results of structural and parametric optimization.

Based on the results of optimization, the optimal parameters of operational forecasting are determined, the justified level of the insurance stock is selected.

Keywords: logistics operation, logistics operation model, insurance stock of logistics operation.

References

1. Lutsenko, I., Fomovskaya, E., Serdiuk, O. (2016). Development of executive system architecture of the converting class. *Eastern-European Journal of Enterprise Technologies*, 4(2 (82)), 50–58. doi:10.15587/1729-4061.2016.74873
2. Lutsenko, I., Fomovskaya, E. (2015). Synthesis of cybernetic structure of optimal spooler. *Metallurgical and Mining Industry*, 9, 297–301.
3. Kovrik, E. V. (2014). Logistics inventory management in conditions of systemic risk and financial constraints of the enterprise. *MIR (Modernization. Innovation. Research)*, 1, 97–99.
4. Dziuba, S. A. (2011). Izderzhki gibkogo proizvodstva i optimal'nyi razmer zakaza. *Ekonomicheskii analiz: teoriia i praktika*, 1 (218), 52–57.
5. Vasilieva, N. F. (2013). About the possibility of application of the formula for the optimal size of order to manage inventory in ferrous metallurgy. *Vestnik of Nosov Magnitogorsk State Technical University*, 3, 106–109.
6. Picavet, E. (2009). Opportunities and pitfalls for ethical analysis in operations research and the management sciences. *Omega*, 37 (6), 1121–1131. doi:10.1016/j.omega.2008.12.002
7. Merigo, J. M., Yang, J.-B. (2017). A bibliometric analysis of operations research and management science. *Omega*, 73, 37–48. doi:10.1016/j.omega.2016.12.004
8. Hassin, R., Sarid, A. (2017). Operations research applications of dichotomous search. *European Journal of Operational Research*. Available at: <http://www.sciencedirect.com/science/article/pii/S0377221717306586>. doi:10.1016/j.ejor.2017.07.031
9. Giannopoulos, G. A. (2017). Strategic management and promotion issues in international research cooperation. *Case Studies on Transport Policy*, 5 (2), 438–451. doi:10.1016/j.cstp.2016.08.001
10. Lutsenko, I., Fomovskaya, E., Oksanych, I., Koval, S., Serdiuk, O. (2017). Development of a verification method of estimated indicators for their use as an optimization criterion. *Eastern-European Journal of Enterprise Technologies*, 2(4 (86)), 17–23. doi:10.15587/1729-4061.2017.95914
11. Asllani, A., Culler, E., Etkin, L. (2014). A simulation-based apheresis platelet inventory management model. *Transfusion*, 54 (10pt2), 2730–2735. doi:10.1111/trf.12570
12. Lindstedt, M., Karvinen, R. (2016). Optimal control of pump rotational speed in filling and emptying a reservoir: minimum energy consumption with fixed time. *Energy Efficiency*, 9 (6), 1461–1474. doi:10.1007/s12053-016-9434-y
13. Pfau, T. (2016). Real-Time Implementation of High-Speed Digital Coherent Transceivers. *Enabling Technologies for High Spectral-Efficiency Coherent Optical Communication Networks*. John Wiley & Sons, Inc, 435–446. doi:10.1002/9781119078289.ch12
14. Berhanu, B. M., Blackhurst, M., Kiritsis, M. J., Jamarillo, P., Carlson, D. (2016). Feasibility of Water Efficiency and Reuse Technologies as Demand-Side Strategies for Urban Water Management. *Journal of Industrial Ecology*, 21 (2), 320–331. doi:10.1111/jiec.12430
15. Jia, H. W., Zheng, L. L. (2013). Irrigation Water Use Efficiency Based on the Deficit Irrigation Theories. *Advanced Materials Research*, 864–867, 2179–2184. doi:10.4028/www.scientific.net/amr.864-867.2179
16. Yakubovskaia, T. L., Alimova, V. V. (2011). Otsenka effektivnosti logisticheskikh protsessov predpriiatiia. *Materialy Mezhdunarodnoi nauchno-prakticheskoi konferentsii, posviashchennoi 60-letiiu avtotraktornogo fakul'teta «Logisticheskie otnosheniia v sfere transportnykh protsessov»*. Minsk: BSTU, 84–89.

17. Skochinskaia, V. A. (2007). Metody rascheta obiema strahovogo zapasa s uchetom znachimosti material'nyh resursov. *Vestnik BNTU*, 5, 52–57.
18. Yashin, A. A., Riashko, M. L. (2014). *Logistika. Osnovy planirovaniia i otsenki effektivnosti logisticheskikh sistem*. Ural, 52.
19. Bigel, D. (1973). *Upravlenie proizvodstvom*. Moscow: Mir, 303.
20. Lutsenko, I., Fomovskaya, E. (2015). Identification of target system operations. 4. The practice of determining the optimal control. *Eastem-European Journal of Enterprise Technologies*, 6(2 (78)), 30–36. doi:10.15587/1729-4061.2015.54432
21. Lutsenko, I., Vihrova, E., Fomovskaya, E., Serdiuk, O. (2016). Development of the method for testing of efficiency criterion of models of simple target operations. *Eastem-European Journal of Enterprise Technologies*, 2(4 (80)), 42–50. doi:10.15587/1729-4061.2016.66307
22. Lutsenko, I., Fomovskaya, E., Oksanych, I., Vihrova, E., Serdiuk, O. (2017). Formal signs determination of efficiency assessment indicators for the operation with the distributed parameters. *Eastem-European Journal of Enterprise Technologies*, 1(4 (85)), 24–30. doi:10.15587/1729-4061.2017.91025
23. *Logistic_operation_efficiency.xls*. Available at: https://www.dropbox.com/s/5b7xv4z2xcv4uta/Logistic_operation_efficiency.xls?dl=0

DOI: 10.15587/2312-8372.2017.113120

DEVELOPMENT OF MARKETING STRATEGIES IN SYSTEM-REFLEXIVE MARKETING

page 34–40

Dligach Andrii, Doctor of Economic Sciences, Associate Professor, Department of International Economics and Marketing, Taras Shevchenko National University of Kyiv, Ukraine, e-mail: ad@advanter.ua, ORCID: <http://orcid.org/0000-0001-6818-9290>

The author introduces the concept of system-reflexive strategic marketing management, represents a new paradigm of marketing and strategic management and generalizes the stages of their evolutionary development. System-reflexive approach in the formation of marketing strategies allows proactively manage the development of market interaction; determines the subjective position of the manager, which makes it possible to realize his interests by implementing an appropriate marketing strategy; increases business competitiveness and accelerates the diffusion of innovation.

The proposed integrated SRSMM system is based on a program management form in which interests, goals, strategies, and the strategic plan are not definite and static in the planning horizon, and the management activity itself presupposes constant clarification of interests, goals, strategies and plans.

In the course of the research it is revealed that for the introduction of the program form of system-reflexive strategic marketing management, a three-cycle management model is required as a set of methods, forms and tools for coordinating stakeholder interests at three levels: (1) objectifying the manager's interest in the management object, as well as actualizing interest in relation to other interests of the manager, the result is the prevailing view of the management object and the direction of its transformation (objectified interest), related for manager with the expected benefits from the transformation; (2) aligning the interests of internal stakeholders, including the reflexive marketing manager; (3) formation of a strategy in the process of coordinating the interests of external stakeholders, which, unlike existing approaches, allowed to reflect the subject approach in the formation of entrepreneurial strategies and to develop a mechanism for managing the alignment of stakeholder interests in the process of forming a marketing strategy.

The use of system-reflexive marketing in the activities of the enterprise makes it possible to constructively resolve internal and external conflicts, to form a strategic vision and corporate strategy, to help the subjects of management to determine the object of management and their own interests in relation to it; increases the efficiency of activities. In turn, this contributes to the development of entrepreneurship in Ukraine and to increase the competitiveness of domestic enterprises in a globalized market environment.

Keywords: strategic marketing, strategic management, system-reflexive strategic marketing management, system-reflexive marketing.

References

1. Aaker, D. A. (1995). *Strategic Market Management. Ed. 4*. New York: John Wiley & Sons Inc., 379.
2. Ansoff, H. I. (1984). *Implanting Strategic Management*. Englewood Cliffs, NJ: Prentice-Hall, 544.
3. David, F. R. (2011). *Strategic Management: Concepts and Cases. Ed. 13*. New Jersey: Prentice Hall, 694.
4. Drucker, P. F. (1985). *Innovation and entrepreneurship. Practice and principles*. New York: Harper and Row, 258.
5. Grunig, R., Kuhn, R. (2011). *Process-based Strategic Planning. Ed. 6*. Berlin, Heidelberg: Springer-Verlag, 358. doi:10.1007/978-3-642-16715-7
6. Hamel, G., Prahalad, C. K. (1994). *Competing for the future*. Boston: Harvard Business School Press, 358.
7. Mintzberg, H., Ahlstrand, B., Lampel, J. (1998). *Strategy Safari: The Complete Guide Through the Wilds of Strategic Management*. London: Pearson Education, 416.
8. Porter, M. E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Free Press, 557.
9. Achrol, R. S., Kotler, P. (2011). Frontiers of the marketing paradigm in the third millennium. *Journal of the Academy of Marketing Science*, 40 (1), 35–52. doi:10.1007/s11747-011-0255-4
10. Kotler, P., Calder, B. J., Malthouse, E. C., Korsten, P. J. (2012). The Gap between the Vision and Reality of Marketing. *MIT Sloan Management Review*, 54 (1), 12–14.
11. Lancaster, G., Massingham, L. (2010). *Essentials of Marketing Management*. Taylor & Francis, 552. doi:10.4324/9780203847206
12. Lambin, J.-J., Schuiling, I. (2012). *Market-Driven Management: Strategic and Operational Marketing*. Palgrave, 624.
13. Bagiev, G. L., Moiseeva, N. K., Cherenkov, V. I. (2009). *Mezhdunarodnyi marketing. Ed. 2*. St. Petersburg: Piter, 688.
14. Kudenko, N. V. (2002). *Marketynhovi stratehii firmy*. Kyiv: KNEU, 245.
15. Raiko, D. V. (2008). *Stratehichne upravlinnia rozvytkom marketynhovoii diialnosti: metodolohiia ta orhanizatsiia*. Kharkiv: VD «Inzhek», 632.
16. Lepa, R. N., Shkarlet, S. N. et al.; In: Lepa, R. N. (2011). *Refleksivnyie protsessy v ekonomike: kontseptsii, modeli, prikladnye aspekty*. Donetsk: Noulidzh, 408.
17. Lepa, R. N. (2012). *Modeli refleksivnogo upravleniia v ekonomike*. Donetsk: Institute of Industrial Economics, National Academy of Sciences of Ukraine, 380.
18. Dligach, A. A. (2014). *Sistemno-refleksivnyi marketing*. Kyiv: Aler-ta, 400.

DOI: 10.15587/2312-8372.2017.113273

DEVELOPMENT OF METHOD FOR OPTIMAL INVENTORY CONTROL UNDER CONTINUOUS SUPPLY OF PRODUCT AND RANDOM DEMAND

page 41–45

Postan Mykhaylo, Doctor of Economic Sciences, Professor, Head of the Department of Management and Marketing, Odessa National Maritime University, Ukraine, e-mail: postan@ukr.net, ORCID: <http://orcid.org/0000-0003-4891-3063>

The strategy of work of the supply firm under the conditions of a casual fluctuation of demand at a continuous replenishment of production stock in periods of availability of demand is studied. It assumes the use of adaptive management, which consists in the fact that during periods of lack of demand, replenishment of the stock level does not occur. For a formalized description of the firm's work, it is proposed to use the apparatus of semi-Markov processes with drift, in which the discrete component describes the state of the market environment, and the continuous component – the random fluctuations in the level of the stock in the warehouse. To find the limiting (for $t \rightarrow \infty$) probability distribution of states of a semi-Markov process with drift, a system of integral equations of convolution type on the half-axis is derived, the solution of which is found in closed form for the special case. With the help of the found solution, the problem of stochastic optimization is formulated to find the intensity of supply of homogeneous products to the warehouse of the supply firm in periods of availability of demand for it, which minimizes the average

total costs of the firm per unit time. The generalization of the stochastic optimization model to the case of several types of products is considered.

Keywords: supply company, product stock, continuous supply of products, semi-Markov process with drift, optimization of supply intensity.

References

1. Ryzhikov, Yu. I. (2001). *Theory of queue and inventory control*. Saint Petersburg: Piter, 384.
2. Simchi-Levi, E., Kaminsky, P. (2008). *Designing and managing the supply chain*. Columbus: McGraw-Hill International edition, 498.
3. Schreiblefder, J. (2006). *Achieving Effective Inventory Management*. Ed. 5. Effective Inventory Management, Inc., 316.
4. Gnedenko, B. V., Kovalenko, I. N. (2005). *Introduction to queueing theory*. Moscow: KomKniga, 400.
5. Postan, M. Ya. (2006). *Modeling complex systems with the help of semi-Markov drift processes. Identification and control problems*. Moscow: Institute of Problems Control named after V. A. Trapeznikov RAS, 604–617.
6. Mitra, D. (1988). Stochastic theory of a fluid model of producers and consumers coupled by a buffer. *Advances in Applied Probability*, 20 (3), 646–676. doi:10.1017/s000186780001819x
7. Prabhu, N. (1997). *Stochastic Storage Processes: Queues, Insurance Risk, and Dams*. New York-Heidelberg-Berlin: Springer Verlag, 206. doi:10.1007/978-1-4612-1742-8
8. Kaya, O., Kubali, D., Ormeci, L. (2013). Stochastic models for the coordinated production and shipment problem in a supply chain. *Computers & Industrial Engineering*, 64 (3), 838–849. doi:10.1016/j.cie.2012.12.012
9. Bertazzi, L., Bosco, A., Lagana, D. (2015). Managing stochastic demand in an Inventory Routing Problem with transportation procurement. *Omega*, 56, 112–121. doi:10.1016/j.omega.2014.09.010
10. Razmi, J., Moghadam, A. T., Jolai, F. (2015). An Evaluative Continuous Time Markov Chain Model for a Three Echelon Supply Chain with Stochastic Demand and Lead Time. *IFAC-PapersOnLine*, 48 (3), 248–253. doi:10.1016/j.ifacol.2015.06.089
11. Postan, M. Ya. (2006). *Economic-mathematical models of multimodal transport*. Odessa: Astroprint, 376.
12. Postan, M. Ya. (2007). Application of Markov Drift Processes to Logistical Systems Modeling. *Dynamics in Logistics. LDIC 2007*. Bremen: Springer-Verlag, 443–455. doi:10.1007/978-3-540-76862-3
13. Postan, M. Ya., Morozova, I. V., Shiryayeva, L. V. (2011). Optimization of Spare Parts Lot Size for Supply of Equipment's Park. *Dynamics in Logistics. LDIC 2009*. Berlin: Springer, 105–113. doi:10.1007/978-3-642-11996-5
14. Postan, M. Ya., Shiryayeva, L. V. (2007). Analysis of influence of production line reliability on its productivity. *Methods and tools of transportation systems development's control*, 12, 5–24.
15. Postan, M. Ya. (2016). Application of Semi-Markov Drift Processes to Logistic Systems Modeling and Optimization. *Dynamics in Logistics. LDIC 2014*. Berlin: Springer, 227–237. doi:10.1007/978-3-319-23512-7
16. Postan, M. Ya. (2014). Ob odnoi stokhasticheskoi modeli optimal'nogo upravleniya zapasami pry sluchaynom spros na produktsiyu. *Problemy ekonomichnoi kibernetiky*. Poltava, 103–104.
17. Postan, M. Ya. (2015). Model' optimal'nogo upravleniya mnogomenklaturnymi zapasami pri sluchaynom spros na produktsiyu. *Problems of decision making under uncertainties (PDMU-2015)*. Odessa, 124–126.
18. Avramchuk, E. F., Vavilov, A. A., Emelyanov, S. V. et al. (1988). *Technology of system modeling*. Moscow: Mashinostroeni; Berlin: Tehnik, 520.

DOI: 10.15587/2312-8372.2017.113280

DEVELOPMENT OF BINOMIAL PRICING MODEL OF SHARES AND BONDS FOR A LIFE INSURANCE COMPANY

page 45–51

Dyba Victoria, Postgraduate Student, Department of Mathematical Modeling of Economic Systems, National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute», Ukraine, e-mail: viktoriaad@gmail.com, ORCID: <http://orcid.org/0000-0003-4958-2219>

Kapustian Volodymir, Doctor of Physical and Mathematical Sciences, Professor, Head of the Department of Mathematical Modeling of Economic Systems, National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute», Ukraine, e-mail: kapustyanv@ukr.net, ORCID: <http://orcid.org/0000-0001-9823-3256>

The process of share price formation is studied in the article as well as a random process, and a model is developed that describes a random process that has characteristics close to the Brownian bridge, and realizes a multiplicative model of the bond price evolution with outpaced repayment time and normal value. The definition of a random process of forming a share price through a geometric Brownian bridge is also given.

Since the Ukrainian insurance market is at the initial stage of development, and the country's economy is unstable, insurance companies need practical and reliable tools for calculating and forecasting the expected return on investment activity. And especially urgent for this particular type of activity is the issue of breakeven investment, as insurance companies can't afford risky investment because of the specifics of their activities.

As a research result, the level of investing in a risk-free asset for an insurance company of a cumulative type is calculated.

Keywords: insurance market, life insurance, savings, Brownian bridge, random process, shares, bonds, binomial model.

References

1. Shiryaev, A. N. (1998). *Fundamentals of stochastic financial mathematics*. Moscow: Fazis, 512.
2. Boyko, A. O. (2010). Theoretical bases and practical experience of providing financial stability of the insurance company. *Economic sciences. Series Accounting and Finance*, 7 (4 (25)), 36–50.
3. Ivanyuk, V. A., Andropov, K. N., Egorova, N. E. (2016). Methods of Optimization of Investment Strategy. *Fundamental research*, 3 (1), 159–163.
4. Kao, C., Hwang, S.-N. (2008). Efficiency decomposition in two-stage data envelopment analysis: An application to non-life insurance companies in Taiwan. *European Journal of Operational Research*, 185 (1), 418–429. doi:10.1016/j.ejor.2006.11.041
5. Lu, W.-M., Wang, W.-K., Kweh, Q. L. (2014). Intellectual capital and performance in the Chinese life insurance industry. *Omega*, 42 (1), 65–74. doi:10.1016/j.omega.2013.03.002
6. Berry-Stolzle, T. R., Nini, G. P., Wende, S. (2014). External Financing in the Life Insurance Industry: Evidence From the Financial Crisis. *Journal of Risk and Insurance*, 81 (3), 529–562. doi:10.1111/jori.12042
7. Bawa, N., Dhanda, N. (2016, April–September). An analytical study on asset under management of life insurance companies in India. *Journal of Services Research*, 16.1, 61–80.
8. Eling, M., Schaper, P. (2017). Under pressure: how the business environment affects productivity and efficiency of European life insurance companies. *European Journal of Operational Research*, 258 (3), 1082–1094. doi:10.1016/j.ejor.2016.08.070
9. Kamat, M., Ramesh, B., Dhume, P. (2016). An application of Fixed-Effects Model (FEM) to evaluate financial performance of the Indian Life Insurance Industry. *SAARJ Journal on Banking & Insurance Research*, 5 (5), 14–31. doi:10.5958/2319-1422.2016.00006.0
10. Adelman, M., Arjona, L. F., Mayer, J., Schmedders, K. (2016). A Large-Scale Optimization Model for Replicating Portfolios in the Life Insurance Industry. *SSRN Electronic Journal*, 16–04, 1–44. doi:10.2139/ssrn.2727281

DOI: 10.15587/2312-8372.2017.113161

FINANCIAL EQUILIBRIUM AS BASIS FOR ENTERPRISE'S SUSTAINABLE DEVELOPMENT: ECONOMIC AND MATHEMATICAL FOUNDATION

page 51–56

Gudza Tetiana, PhD, Associate Professor, Department of Finance and Banking, Poltava University of Economics and Trade, Ukraine, e-mail: gtp9@ukr.net, ORCID: <http://orcid.org/0000-0002-2310-5425>

Using correlation-regression analysis the impact of financial equilibrium on the sustainable development of the enterprise is

investigated. The current insufficient level of methodology for assessing enterprise's sustainable development causes scientific search for its diagnosis's special tools. Relationship between enterprise's sustainable development and its financial situation is poorly researched. The economic-mathematical model of financial equilibrium's impact on enterprise's sustainable development is developed. It is described by influence of four factors on financial potential's internal growth ratio, which is an indicator of enterprise's sustainable development. Influencing factors are first and second indicators of financial equilibrium, financial leverages in assets and capital. The economic-mathematical model of the relationship between the coefficient of internal growth of the financial potential of the enterprise and the indicators of its financial equilibrium is developed. The obtained economic-mathematical model allows to predict the tendency of sustainable development depending on the actual establishment of enterprise's financial equilibrium as well as to model the probable changes in its financial status. Application of the economic-mathematical model is aimed at improving quality level of enterprise's financial management.

Keywords: financial equilibrium, sustainable development, financial potential, financial leverage, economic-mathematical model.

References

1. Belolipetskii, V. G. (2002). *Finansovoe ravnovesie v usloviiah rynochnoi transformatsii ekonomiki Rossii*. Moscow: Lomonosov Moscow State University, 563.
2. Dhaliwal, D. S., Li, O. Z., Xie, H. (2010). Institutional Investors, Financial Health, and Equity Valuation. *Asia-Pacific Journal of Accounting & Economics*, 17 (2), 151–173. doi:10.1080/16081625.2010.9720858
3. Liang, F. S., Pathak, S. (2016). Financial Health & Corporate Performance – a Comparison of Manufacturing Companies in China & India. *Journal of Asian Development*, 2 (1), 18–29. doi:10.5296/jad.v2i1.9414
4. Hur-Yagba, A. A., Okeji, I. F., Ayuba, B. (2015). Analyzing Financial Health of Manufacturing Companies in Nigeria Using Multiple Discriminate Analysis. *International Journal of Managerial Studies and Research*, 3 (7), 72–81.
5. Kocisova, K., Misankova, M. (2014). Discriminant Analysis as a Tool for Forecasting Company's Financial Health. *Procedia – Social and Behavioral Sciences*, 110, 1148–1157. doi:10.1016/j.sbspro.2013.12.961
6. Blank, I. A. (2004). *Finansovaia strategiiya predpriatiia*. Kyiv: Elga, Nika-Tsentr, 720.
7. Blank, I. A. (2002). *Upravlenie denezhnymi potokami*. Kyiv: Nika-Tsentr, Elga, 736.
8. Roome, N. J., Bergin, R. (2006). Sustainable development in an industrial enterprise: the case of Ontario Hydro. *Business Process Management Journal*, 12 (6), 696–721. doi:10.1108/14637150610710882
9. Vasiutkina, N. V. (2014). *Upravlinnia stalym rozvytkom pidpriemstv: teoretyko-metolohichnyi aspekt*. Kyiv: Lira-K, 334.
10. Dvorakova, L., Zborkova, J. (2014). Integration of Sustainable Development at Enterprise Level. *Procedia Engineering*, 69, 686–695. doi:10.1016/j.proeng.2014.03.043
11. Roomi, M. S., Ahmad, W., Ramzan, M., Zia-ur-Rehman, M. (2015). Bankruptcy Prediction for Non-Financial Firms of Pakistan. *International Journal of Accounting and Financial Reporting*, 5 (2), 26–37. doi:10.5296/ijaf.v5i2.7782
12. Uchenna, A. W., Okelue, U. D. (2012). Predicting Corporate Business Failure in the Nigerian Manufacturing Industry. *European Journal of Business and Management*, 4 (10), 86–94.
13. Richna finansova zvitnist mashynobudivnykh pidpriemstv Ukrainy stanom na 01 sichnia 2017 r. *Website of the Agency for the Development of the Ukrainian Stock Market Infrastructure*. Available at: <https://smida.gov.ua/db/emitent>

DOI: 10.15587/2312-8372.2017.113251

DEVELOPMENT OF THE TEMPORAL KNOWLEDGE REPRESENTATION MODEL FOR COMPUTER SUPPORT OF CONSUMER GOODD PRODUCTION PROCESSES AT MULTI-NOMENCLATURE MACHINE-BUILDING ENTERPRISE

page 57–63

Demyanenko Olena, PhD, Associate Professor, Department of Finance, Zhukovsky National Aerospace University «Kharkiv Aviation In-

stitute», Ukraine, e-mail: helenhsd@ukr.net, ORCID: <http://orcid.org/0000-0003-4839-8524>

Demyanenko Vladyslav, Senior Lecturer, Department of Software Engineering, Zhukovsky National Aerospace University «Kharkiv Aviation Institute», Ukraine, e-mail: dvavlad@ukr.net, ORCID: <http://orcid.org/0000-0002-1078-0114>

The object of research is the processes associated with the organization of the production of consumer goods (CG) at the multi-nomenclature machine-building enterprise (MME). These processes are considered in the aspect of automating the production of consumer goods by creating a special model of knowledge about the current state of production processes. One of the most problematic issues is the complex automation of combined processes for the production of basic products and CGs at MMEs. The solution of this question required the improvement of the formal apparatus for modeling time dependencies. In the course of the research, discrete mathematics methods, in particular set theory and mathematical logic, are used, as well as tools that are known in knowledge engineering, in particular production systems.

A temporal model of knowledge and technology is combined with the knowledge base of the decision support system. The peculiarity of this model is the possibility of adequate reflection of asynchrony and parallelism, which is inherent in the processes of CGs production at MMEs. The overall effect of the implementation of the developed model of knowledge will be achieved by reducing the incidence of disruptions in the production program, preserving the professional knowledge of experienced MME specialists in the production of consumer goods. In addition, the use of the temporal knowledge model as part of the intellectual core of the decision support system will ensure the reduction of the MME costs in the organization of production of consumer goods.

Keywords: machine building enterprise, consumer goods, decision support system, knowledge model, temporal logic.

References

1. Gavva, V. N. (2004). *Otsenka potentsiala predpriatiia i otrasli*. Kharkiv: NAU «KhAI», 287.
2. Matyushenko, I. Yu. (2015). Comprehensive modernization as a prerequisite economic recovery in Ukraine. *Processing of Conference «Institutional framework for the functioning of the economy in the context of transformation», Canada, Montreal, 25–31 May 2015*. Publishing house «BREEZE», 23–28.
3. *The OECD Innovation Strategy. Getting a Head Start on Tomorrow*. (2010). Paris: OECD, 226.
4. Winiewski, M. (1997). *Quantitative Methods for Decision Makers*. London: Pitman Publ., 576.
5. Allen, J. F., Ferguson, G. (1994). Actions and Events in Interval Temporal Logic. *Journal of Logic and Computation*, 4 (5), 531–579. doi:10.1093/logcom/4.5.531
6. Vila, L. (1994). A survey on temporal reasoning in artificial intelligence. *AI Communications*, 7 (1), 4–28.
7. Vila, L., Yoshino, H. (2005). *Time in Automated Legal Reasoning. Foundations of Artificial Intelligence*. Elsevier, 537–557. doi:10.1016/s1574-6526(05)80019-7
8. Jixin, M., Knight, B. (1994). A General Temporal Theory. *The Computer Journal*, 37 (2), 114–123. doi:10.1093/comjnl/37.2.114
9. Knight, B., Ma, J., Peng, T.; In: Adey, R., Rzevski, G., Teti, R. (1997). A discrete formalism for reasoning about action and change. *Applications of Artificial Intelligence in Engineering XII (AIENG97) «Computational Mechanics Publications»*, 31–35.
10. Demyanenko, V. A. (2013). Metod znanie-orientirovannoi podderzhki priniatiia reshenii pri tehnologicheskoi podgotovke proizvodstva tovarov narodnogo potrebleniia na mashinostroitel'nom predpriatii. *Aviatsionno-kosmicheskaiia tehnika i tehnologiiia*, 7 (104), 232–237.
11. Demyanenko, V. A. (2013). Informatsionnaia podderzhka proizvodstva tovarov narodnogo potrebleniia na mnogonomenklaturnom mashinostroitel'nom predpriatii. *Aviatsionno-kosmicheskaiia tehnika i tehnologiiia*, 8 (105), 287–292.