

method, the described method may also be useful. In accordance with the worked out e-foresight methodology, the performance of survey studies is expected through an original developed method which uses modern IT tools for obtaining the adopted aims: virtual organisation, internet platform and neuron networks. Attention must be paid also to an important practical feature of the proposed approach which enables the application of the worked out methodology with regard to each detailed technology of manufacturing a specific final product, as well as to different sizes of technology groups if their division is possible in terms of a clearly defined objectively verified criterion. As part of a broad scope of the currently realised individual studies, the working out of many groups of surfacing technologies was anticipated, using the mentioned newly-developed tools, which will certainly be the subject of further publications in which the methods described in this work will be applied.

## References

1. L.A. Dobrzański, A.D. Dobrzańska-Danikiewicz (eds.), Report from the realisation of 2nd task „Analysis of the existing situation in terms of the development of technologies and social-economic conditions” with regard to the FORSURF project entitled Foresight of surface properties formation leading technologies of engineering materials and biomaterials, International OCSCO World Press, Gliwice 2010 (in Polish).
2. L.A. Dobrzański, Shaping the structure and properties of engineering and biomedical material surfaces, International OCSCO World Press, Gliwice, 2009 (in Polish).
3. FORSURF, Headed by: L.A. Dobrzański, [www.forsurf.pl](http://www.forsurf.pl), project in realisation (in Polish).
4. A.D. Dobrzańska-Danikiewicz, The methodological fundaments of development state analysis of surface engineering technologies, *Journal of Achievements in Materials and Manufacturing Engineering* 40/2 (2010) 203-210.
5. A.D. Dobrzańska-Danikiewicz, Main assumption of the foresight of surface properties formation leading technologies of engineering materials and biomaterials, *Journal of Achievements in Materials and Manufacturing Engineering* 34/2 (2009) 165-171.
6. L. Georghiou, J.C. Harper, M. Keenan, I. Miles, R. Popper (eds.), *The Handbook of Technology Foresight. Concepts and Practice*, Edward Elgar Publishing Ltd., UK, 2008.
7. L.A. Costanzo, R.B. Mackay, *Handbook of Research on Strategy and Foresight*, Edward Elgar Publishing, 2009.
8. K. Borodako, *Foresight in strategic management*, Published by C.H. Beck, Warsaw, 2009 (in Polish).

9. M. Lindgren, H. Bandhold, Scenario Planning – Revised and Updated Edition: The Link Between Future and Strategy, Palgrave Macmillan, 2009.
10. M. Keenan, R. Popper, Comparing foresight „style” in six word regions, *Foresight* 10/6 (2008) 16-38.
11. R. Biloslavo, S. Dolinšek, Scenario planning for climate strategies development by integrating group Delphi, AHP and dynamic fuzzy cognitive maps, *Foresight* 12/2 (2010) 38-48.
12. J.E. Karlsen, E.F. Óverland, H. Karisen, Sociological contributions to futures’ theory building, *Technical Forecasting & Social Change* 12/3 (2010) 59-72.
13. Y-C. Shen, S-H. Chang, G.T.R. Lin, H-C. Yu, A hybrid selection model for emerging technology, *Technical Forecasting & Social Change* 77 (2010) 151-166.
14. The Future of Manufacturing in Europe 2015-2020; The Challenge for Sustainability; Materials; Final Report; Groupe CM International, 2003, [http://ec.europa.eu/research/industrial\\_technologies/pdf/pro-futman-doc3a.pdf](http://ec.europa.eu/research/industrial_technologies/pdf/pro-futman-doc3a.pdf).
15. C. Dreher, Manufacturing visions: A holistic view of the trends for European manufacturing, in: M. Montorio, M. Taisch, K.-D. Thoben (eds.), *Advanced Manufacturing. An ICT and Systems Perspective*, Taylor & Francis Group, London, 2007.
16. H. Dosch, M.H. Van de Voorde (eds.), *Gennesys. White Paper. A New European Partnership between Nanomaterials Science & Nanotechnology and Synchrotron Radiation and Neutron Facilities*, Max-Planck-Institut für Metalforschung, Stuttgart, 2009.
17. NANOMAT, Headed by: A.Szajdak, [www.nanomat.eitplus.pl](http://www.nanomat.eitplus.pl), project in realisation (in Polish).
18. K. Czaplicka-Kolarz (ed.), *Technology foresight of polymeric materials in Poland. Steady state analysis*, Totem Publisher, Poznan, 2008 (in Polish).
19. FORGOM, Headed by: K. Czaplicka-Kolarz, J. Bondaruk, [www.foresightgom.pl](http://www.foresightgom.pl), project in realisation (in Polish).
20. FOREMAT, *Technology Development Scenarios of Modern Metallic, Ceramic and Composites Materials. Reports of Project Co-Operators*, B. Gambin, W. Łojkowski, A. Świdarska-Środa (eds.), Unipress Publisher, Radom, 2010 (in Polish).
21. National Foresight Program. Poland 2020, Headed by: M. Kleiber, <http://foresight.polska2020.pl/cms/> (in Polish).
22. Priority technologies for sustainable development of Silesian Province, Headed by: A. Karbownik, <http://www.roz4.woiz.polsl.pl/foresight/> (in Polish).
23. T. Burakowski, T. Wierchoń, *Metal surface engineering*, WNT, Warsaw, 1995, (in Polish).
24. M. Blicharski, *Surface Engineering*, WNT, Warsaw, 2009, (in Polish).
25. L.A. Dobrzański, *Engineering materials and material designing. The basics of materials science and metal science*, WNT, Warsaw, 2006 (in Polish).
26. B. Major (ed.), *Designing and manufacturing functional gradient materials PBZ-KBN-100/T08/2003*, Polish Academy of Sciences, Institute of Metallurgy and Material Engineering, Cracow, 2007 (in Polish).

27. J. Kusiński, Lasers and their implementation in surface engineering, Akapit Publishing, Cracow, 2000 (in Polish).
28. A.J. Michalski, Physicochemical basis of layers physical vapor deposition, Warsaw University of Technology Publisher, Warsaw, 2000 (in Polish).
29. S. Mitura, Nanodiamonds, *Journal of Achievements Materials and Manufacturing Engineering* 24/1 (2007) 166-171.
30. J. Nowacki, Duplex steel and its weldness, WNT, Warsaw 2009 (in Polish).
31. G.A. López, P. Zięba, W. Gust, E.J. Mittemeijer, Analytical Electron Microscopy in a Discontinuous Precipitated Cu-In Alloy, *Microchimica Acta* 145 (2004) 101-105.
32. A. Klimpel, High-power diode lasers in welding, *Welding review* 71/8 (1999) 1-7 (in Polish).
33. L.A. Dobrzański, Designing and manufacturing functional tool gradient materials. The dependence of properties on technologies and thickness of surface layers with a gradient of a chemical or phase composition created on tools for various applications, in: *Designing and manufacturing functional gradient materials*, B. Major (ed.), PBZ-KBN-100/T08/2003, Polish Academy of Sciences, Institute of Metallurgy and Material Engineering, Cracow, 2007 (in Polish).
34. W. Kwaśny, A modification of the method for determination of surface fractal dimension and multifractal analysis, *Journal of Achievements in Materials and Manufacturing Engineering* 33/2 (2009) 115-125.
35. Z. Brytan, M. Bonek, L.A. Dobrzański, D. Ugues, M. Actis Grande, The Laser Surface Remelting of Austenitic Stainless Steel, *Materials Science Forum* 654-656 (2010) 2511-2514.
36. G. Matula, M. Bonek, L.A. Dobrzański: Comparison of Structure and Properties of Hard Coatings on Commercial Tool Materials Manufactured with the Pressureless Forming Method or Laser Treatment, *Materials Science Forum* 638-642 (2010) 1830-1835.
37. M. Adamiak, L.A. Dobrzański, Microstructure and selected properties of hot-work tool steel with PVD coatings after laser surface treatment, *Applied Surface Science* 254/15 (2008) 4552-4556.
38. K. Lukaszewicz, L.A. Dobrzański, Structure and mechanical properties of gradient coatings deposited by PVD technology onto the X40CrMoV5-1 steel substrate, *Journal of Materials Science* 43/10 (2008) 3400-3407.
39. A. Kloc, L.A. Dobrzański, G. Matula, J.M. Torralba, Effect of manufacturing methods on structure and properties of the gradient tool materials with the non-alloy steel matrix reinforced with the HS6-5-2 type high-speed steel, *Materials Science Forum*, 539-543 (2007) 2749-2754.
40. M. Soković, L.A. Dobrzański, J. Kopač, L. Kosec, Cutting Properties of PVD and CVD Coated Al<sub>2</sub>O<sub>3</sub> + TiC Tool Ceramic, *Materials Science Forum* 539-543 (2007) 1159-1164.
41. L.A. Dobrzański, M. Piec, Z. Trojanowa, J. Lełątko, A. Klimpel, Structure and Properties of Gradient Layers Using High Power Diode Laser, *Materials Science Forum* 530-531 (2006) 269-274.

42. M. Bonek, L.A. Dobrzański, E. Hajduczek, A. Klimpel, Structure and properties of laser alloyed surface layers on the hot-work tool steel, *Journal of Materials Processing Technology* 175/1-3 (2006) 45-54.
43. A.D. Dobrzańska-Danikiewicz, E-foresight of materials surface engineering, *Archives of Materials Science and Engineering* 44/1 (2010) 43-50.
44. A.D. Dobrzańska-Danikiewicz, Computer Integrated Development Prediction Methodology in Materials Surface Engineering, work in progress.
45. A.D. Dobrzańska-Danikiewicz, Development state analysis of surface engineering technologies, in: 3rd Workshop on foresight of surface properties formation leading technologies of engineering materials and biomaterials, L.A. Dobrzański, A.D. Dobrzańska-Danikiewicz (eds.), International OCSCO World Press, Gliwice, 2010 (in Polish).
46. A.D. Dobrzańska-Danikiewicz, Goals and methodology of the FORSURF project entitled Foresight of surface properties formation leading technologies of engineering materials and biomaterials, in: 2nd Workshop on foresight of surface properties formation leading technologies of engineering materials and biomaterials, L.A. Dobrzański (ed.), International OCSCO World Press, Gliwice, 2009 (in Polish).
47. L.A. Dobrzański, A.D. Dobrzańska-Danikiewicz, M. Kraszewska, A. Jagiełło, IT methods in goals and tasks of the FORSURF project entitled Foresight of surface properties formation leading technologies of engineering materials and biomaterials, in: 2nd Workshop on foresight of surface properties formation leading technologies of engineering materials and biomaterials, L.A. Dobrzański (ed.), International OCSCO World Press, Gliwice 2009, (in Polish).
48. A.D. Dobrzańska-Danikiewicz, Main assumptions of the foresight of surface engineering of engineering materials and biomaterials, in: 1st Workshop on foresight of surface properties formation leading technologies of engineering materials and biomaterials, L.A. Dobrzański (ed.), International OCSCO World Press, Gliwice, 2009.
49. J. Kisielnicki, MIS. Management Information Systems, Placet, Warsaw, 2008 (in Polish).
50. M. Hasan, E. Harris, Entrepreneurship and innovation in e-commerce, *Journal of Achievements in Materials and Manufacturing Engineering* 32/1 (2009) 92-97.
51. J. Papińska-Kacperk (ed.), Information society, PWN, Warsaw, 2008 (in Polish).
52. N. Gersdri, R.S. Vatananan, S. Dansamasatid, Dealing with the dynamics of technology roadmapping implementation: A case study, *Technical Forecasting & Social Change* 76 (2009) 50-60.
53. Y. Yasunaga, M. Watanabe, M. Korenaga, Application of technology roadmaps to governmental innovation Policy for promoting technology convergence, *Technical Forecasting & Social Change* 76 (2009) 61-79.
54. R. Phaal, G. Muller, An architectual framework for roadmapping: Towards visual strategy, *Technological Forecasting & Social Change* 76 (2009) 39-49.
55. Strategor, Stratégie, structure, décision, identité. Poitique générale d'enterprise, Interéditions, Paris 1991.

56. K. Lisiecka, Systems of Product Quality Management. Analysis and Assessment Methods, University of Economics Publishing, Katowice, 2009 (in Polish).
57. E. Skrzypek, M. Hofman, Processes Management in an Enterprise. Identification, Measurement, Improvement, Wolters Kluwer Publishing, Warsaw 2010 (in Polish).
58. A.A. Thompson, A.J. Strickland, Strategic Management. Concepts and Cases, R.D. Irwin (ed.), Homewood, Ill. Boston, 1987.
59. A.D. Little, Stratégie et technologie, Document ADL, Davos 1981.
60. C.W. Hofer, Conceptual Constructions for Formulating Corporate and Business Strategies, Inercollegiate Case Clearing House, Boston, 1977.
61. W.F. Glueck, Strategic Management and Business Policy, McGraw-Hill Book Co., New York 1980.
62. The Boston Consulting Group, The Product Portfolio, Perspectives 66 (1970).