(Extended Abstract)

Enhancement of SWOT Analysis in the Context of Technology Foresight

Joanicjusz Nazarko, Joanna Ejdys, Katarzyna Halicka, Andrzej Magruk, Łukasz Nazarko and Adam Skorek[1]

Purpose. The main purpose of the paper is to present the rationale, the methodological details and a practical example of the application of the enhanced SWOT analysis in the context of technological foresight.

Methodology. SWOT analysis is commonly used in foresight studies as an instrument of categorizing significant factors that determine the development of a particular phenomenon or an organization. In its classical form, SWOT analysis is based on the division of phenomena and states that influence the development of an organization into strengths and weaknesses located inside the organization as well as the opportunities and threats located outside the organization (Chermack and Kasshanna, 2007). As a result of such division, a four-field SWOT diagram is obtained. An extended SWOT analysis model that includes three criteria of factor division is proposed in the literature (Sztando, 2006). These criteria are: occurrence in time (existing or potential), source of origin (from inside of the system or from the environment), nature of influence (favourable or unfavourable). Such division leads to the creation of an eight-field SWOT diagram. In the opinion of the paper authors, such approach is still insufficient in the context of foresight studies. In foresight projects, SWOT analysis is defined as an analytical tool which should be used for categorizing significant factors that determine the development of a given organization of a territorial entity (Georghiou, 2009). When one adopts the foresight approach and aims at determining the long term visions of the future, the factors that may potentially occur in the future seem to be the most important to study, whereas the already existing factors should be a subject of planning and programming activities with fairly short time perspective. Authors propose that, for the purpose of foresight studies, the SWOT factors are evaluated with regards to their influence on the studied phenomenon (organization, territorial entity) in two time perspectives: the current and the future (Nazarko and Kędzior, 2010). Brainstorming was used in order to identify the SWOT factors. In the next stages of research the factors were critically analyzed and systematized. Similar factors were aggregated and new ones were generated.

Results. As a result of the proposed enhancement, each group of SWOT factors (strengths, stimuli, weaknesses, destimuli, internal opportunities, external opportunties, internal threats, external threats) was additionally split into four fields: factors that are insignificant today and insignificant in the future, factors that are significant today but insignificant in the future, factors that are insignificant today but significant in the future, factors that are significant today and significant in the future (Nazarko and Kędzior, 2010). The specificity of foresight research makes one pay special attention to the factors that are of low importance now but may be of high importance in the future.

[1] Faculty of Management, Bialystok University of Technology, 16-001 Kleosin, Tarasiuk 2 Street, Poland, Tel: +48-784680522, corresponding Author e-mail: j.ejdys@pb.edu.pl

Focusing on drivers which are currently insignificant and are not appreciated by others, but which may lead to a dynamic future growth, is one of the pillars of a good foresight-based strategy (Nazarko, 2011). Systematizing the drivers generated in the course of the SWOT analysis concerning the nanotechnology development in Podlaskie region allows to look into the future of the region with a broad perspective. It reveals the weaknesses of the region with regards to the possibilities of modern technologies development. At the same time, it points at key success factors. In result, the presented look at the diagnosed factors enables the determination of Podlaskie region's current strategic position with regards to nanotechnology development and the allows to chart the most important directions of future action (Nazarko, 2013).

The theoretical contribution. As a theoretical contribution to the field of technology management and engineering management, the authors recommend the enhancement of SWOT analysis taking into consideration the foresight context. By its nature, foresight deals with the – usually distant – future states of reality that cannot be determined by extrapolating past trends. The authors take it into account and propose an innovative extension of SWOT analysis by an additional dimension: the assessment of factor significance in two time perspectives: the current state and the foresight horizon. As a result, a thirty-two-field SWOT diagram is obtained. The proposed approach constitutes a significant enrichment of foresight methodology.

Practical implications (if applicable). The paper presents the practical implications of the proposed methodology by offering a case study of the application of the enhanced SWOT analysis in the project entitled "Technological Foresight «NT FOR Podlaskie 2020». Regional Strategy of Nanotechnology Development". SWOT study conducted in the project concerned the possibilities of nanotechnology development in Podlaskie region. The key SWOT factors identified by the experts have been situated in an original time-space framework providing significant strategic information on the conditions for the nanotechnology driven development of Podlaskie region.

Keywords: Extended SWOT Analysis, «NT FOR Podlaskie 2020», Technology Foresight, Technology Management

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