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IDENTIFICATION OF INERTIA AND ACTIVITY IN THE MARKET BEHAVIOUR OF ENTERPRISES

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The study investigates the market behaviour of Polish enterprises. It focuses on four different activities undertaken by them, including: implementation of development investments, increase in the employment level, introduction of new products and expansion into new markets. Those activities are considered to be the main differentiation criteria between enterprises' inert and congruent market behaviour.

The aim of the study was to recognize what combination of chosen criteria is the most accurate in identifying inert and congruent enterprise market behaviour. For this purpose, a research model was constructed and primary data collection on a sample of 1238 Polish enterprises was conducted. All data were analysed using *Statistica*. For model validation, a comparison of ROC curves was used. The obtained results show that the most accurate in recognizing inert and congruent enterprise market behaviour are three criteria: implementation of development investments, increase in the employment level and new market expansion. Such a combination of chosen criteria gives the highest specificity of the model. Furthermore, considering two out of the four analysed criteria, the most accurate in recognizing enterprises' inert and congruent market behaviour are aspects of increased employment level and new market expansion.

This research reveals findings and draws conclusions that help to better understand enterprises' market activities. The presented findings can lead to better knowledge about the behaviour of enterprises and their potential to contribute to economic development. As such, the study can be used in future economic projections.

Keywords: market behaviour, enterprises

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1. INTRODUCTION

Different scientific disciplines are focused on activities of enterprises. The processes and aims of acquiring this knowledge depend on and differ within each discipline. Generally, however, all disciplines develop models and establish facts that lead to a better understanding of the nature of the enterprise (Ho et al., 2006, p. 307). In the field of economics, for example, it is common to explore firms' behaviour on the market (i.e. enterprises' market behaviour). This behaviour is expressed by activities undertaken by firms to fulfil their aims; they can represent a firm's response to the behaviour of other market entities and/or can influence the activities of other entities (Kramer, 1999, p. 187).

Enterprises' market behaviour is investigated comprehensively (Fiala, 2014; Gorynia et al., 2005; Jędralska, 1992; Skowronek-Mielczarek, 2015) or separately (Nitu, Feder, 2012; Pickernell et al., 2016). In comprehensive research, a few of the chosen enterprises' behaviours are analysed. In the other case, only one selected factor of enterprise behaviour is explored, including aspects of, for example, investment, innovation or export (Fazzari et al., 1988; Milne, Robertson, 1998; Nitu, Feder, 2012; Pickernell et al., 2016). On the other hand, research investigating enterprises' market behaviour comprehensively tends to explore its determinants and concentrates on issues of globalization, internationalization, transformation as well as business resilience. This is because the enterprise is treated as an entity the behaviour of which is only partly independent of the market and partially under the influence of the market environment (Gorynia, 2009).

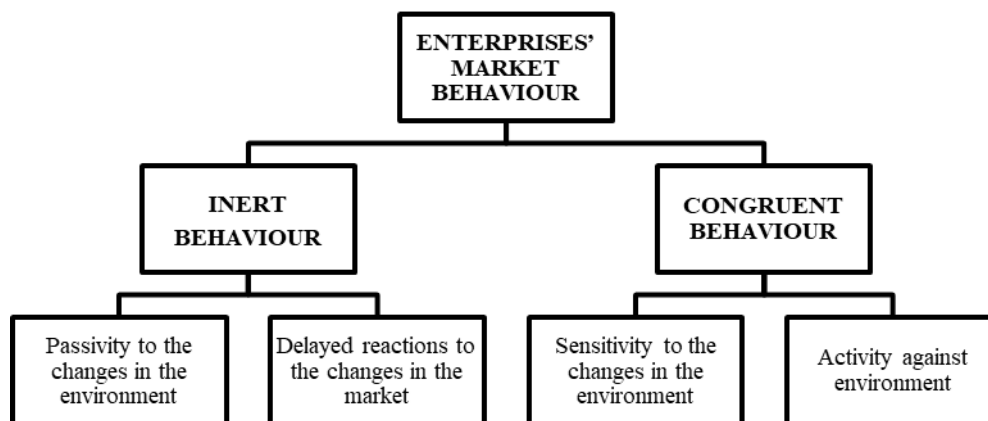


Fig. 1. Classification of enterprises' market behaviour based on the differences in the intensity of their interactions with the environment (Steinerowska-Streb, 2017)

Considering enterprises' market behaviour, and regardless of the external market environment, it can be observed that some enterprises do not attempt to forestall the activities of other entities. They only react to the activities of other market entities with which they have market linkages or to specific market circumstances. On the other side of the spectrum, the activities of other enterprises are undertaken also for preventing and overtaking the activities of the partners from their environment. Taking this into consideration, the market behaviour of enterprises can be divided into two groups (Figure 1).

The first one called inert market behaviour is characterized by the lack of a reaction to the changes which take place in the market environment. The second type of behaviour can be called congruent, because enterprises adjust their activities to the environment. The enterprises that represent inert market behaviour aim to keep their *status quo*. They do not want to enlarge or scale up and they adjust to the environment only when it is necessary. Usually they do not undertake development investments and they do not increase the employment level. Typically they also do not cooperate closely with other enterprises and do not expand into new markets.

On the other hand, congruent behaviour is associated with a higher degree of market integration. In comparison with inert behaviour, it is more focused on strengthening the enterprises' market position. Therefore, they often aim to forestall the activities of other entities rather than only responding to the occurring market changes. Enterprises that represent this type of behaviour undertake more development investments than inert behaviour enterprises. They also introduce more innovative solutions as well as make more changes in the level of firms' employment. Moreover, they closely cooperate with other enterprises and aspire to expand.

Inertia or congruence in enterprises' market behaviour can be then distinguished by the analysis of the firms' activity in areas such as implementation of development investments, increase in the employment level, introduction of innovations and expansion into new markets. Thus, the question that arises is: *Is it necessary to use all these variables to identify the type of market behaviour of the firm?* To answer this question, this research aimed to identify a combination of chosen criteria that best describes inert and congruent enterprise market behaviour. Taking into consideration that congruent behaviour focuses on enterprise development, this study analysed four variables associated with enterprise development. These were: implementation of development investments, increased employment, introduction of new products and expansion into new markets. It was assumed that the most accurate to identify inert and congruent enterprise market behaviour are aspects of increased employment level and implementation of development investments.

2. RESEARCH METHODOLOGY

In order to fulfil the research aim and to verify the hypothesis, primary data were collected. The study used a survey that was distributed in Poland on the sample of 1238 Polish enterprises (micro, small, medium and big). For the purpose of the study, a structured questionnaire was developed. It consisted of dichotomous and fixed-alternative questions helping to ensure the consistency and reliability of the study (Saunders et al., 2009). The questions explored aspects of firms' investments, firms' products, processes and organizational innovations, employment issues, cooperation with other enterprises, and new market expansion. The questions were based on previously developed and tested surveys conducted by the author (see Steinerowska-Streb, 2005). In order to further increase the validity of responses, a number of additional questions verifying the given answers were included (Bryman, Bell, 2007). The final version of the questionnaire was pretested in a pilot study. Prepared questionnaire was available online on a website, and access to it was granted only to firms invited to participate in the survey by e-mail. This method was selected for a number of reasons: (1) an online survey offered access to firms from all Polish regions, ensuring good geographical data coverage, and it enabled obtaining information from those who might not wish to be questioned face-to-face; (2) respondents (i.e., entrepreneurs) could complete the questionnaire at a convenient time, which was extremely useful considering the busy life and work commitments of the target group; (3) respondents could take as much time as they needed to fully understand and complete the survey, which promoted optimum quality of gathered data; (4) an e-mail survey often stimulates higher response levels than ordinary "snail mail" surveys; and, finally, (5) it is argued that participants of an online survey are willing to give more honest answers than to a person or on a paper questionnaire (Bryman, Bell, 2007; Saunders et al., 2009; Seale, 2004). The study sample consisted of enterprises included in a database of the Foreign Trade Promotion Group NETEXSTERLING, Edition 2010. This database consists of e-mail addresses of 290,000 Polish firms, and it is considered to provide a representative sample of Polish enterprises (i.e., according to research evidence, 96% of Polish enterprises that employ more than ten people have access to the Internet, and 65% of them have their own website [Eurostat, 2010]). Micro-enterprises' access to the Internet is also considered to be high and exceeds 90% (Juchniewicz, Grzybowska, 2010).

The questionnaire was e-mailed to the chief executive of all identified enterprises. In total, 1,238 questionnaires were correctly completed and analysed. A research sample was represented by 58.4 percent of microenterprises; 28.6 percent of small firms and 9 percent of medium enterprises. 24 percent of the research sample represented the trade sector, 21.4 percent – production, 38.1 percent – service (including construction companies), and the remaining 16.5 percent of enterprises – mixed activity.

The majority of surveyed firms were operating on the domestic market (48.19 percent). The dominant legal form among surveyed enterprises was a sole proprietorship (56.55 percent). 21.95 percent of responding firms were functioning as limited liability companies and joint stock companies. The remaining 21.95 percent of responding group represented other partnerships. All data were analysed using Statistica Software. A comparison of ROC curves was used for model validation.

3. FINDINGS

For the purpose of the study, different research models were constructed and investigated. The created models consisted of a combination of the chosen variables comprising: implementation of development investments, increase in the employment level, introduction of new products and expansion into new markets. Finally, for the investigation fourteen models were established. For each model the specificity and sensitivity were calculated (Table 1).

Table 1. Specificity and sensitivity of constructed models

	New products	Development investments	New markets	Increase in the employment level	Development investments – new markets	Development investments – Increase in the employment level	Development investments – New products	New markets – Increase in the employment level	New markets – New products	New products - Increase in the employment level	New products – Development investments – New markets	New products – Development investments – Increase in the employment level	Development investments – New markets – Increase in the employment level	New markets – Increase in the employment level – New products
Sensitivity [%]	100	100	100	97	97	97	100	97	100	97	100	97	97	97
Specificity [%]	52	74,1	76,50	86	92,6	94,4	83,8	96,5	82,7	92,3	94	97,4	99,5	97,9
AUC	0,76	0,87	0,88	0,91	0,95	0,96	0,92	0,97	0,91	0,95	0,97	0,97	0,98	0,97
standard error [10 ⁻²]	0,7	0,64	0,62	1,16	1	1	0,5	1	0,5	0,1	0,3	1	1	1
z statistic	35,79	57,89	61,74	35,66	40,15	41,53	77,72	43,24	74,92	39,97	135,66	43,96	45,84	44,4
P (area<0,05)	0,0001													
Youden's index J	0,52	0,741	0,765	0,83	0,89	0,91	0,84	0,94	0,83	0,89	0,94	0,94	0,97	0,95

The results show that any combination of three of the chosen criteria is adequate to distinguish between inert and congruent enterprise market behaviour. However, the highest specificity among these combinations gives the model including: implementation of development investments, increase in the employment level and, finally, expansion into new markets. In this case the specificity reaches almost 100% and in other remaining cases between 94% and 97%. The highest sensitivity gives the model including: implementation of development investments, expansion into new markets and introduction of new products. The sensitivity of this model is 100% and the sensitivity of the remaining models is 97% (Table 1).

To differentiate which of the two models – the model with the highest specificity or the model with the highest sensitivity – is the most accurate in identifying inert and congruent enterprise market behaviour, the area under the curve of those models was compared (Figure 2). This analysis led to the conclusion that in order to recognize inert and congruent enterprise market behaviour it is better to choose the model which includes: implementation of development investments, increase in the employment level and, finally, expansion into new markets.

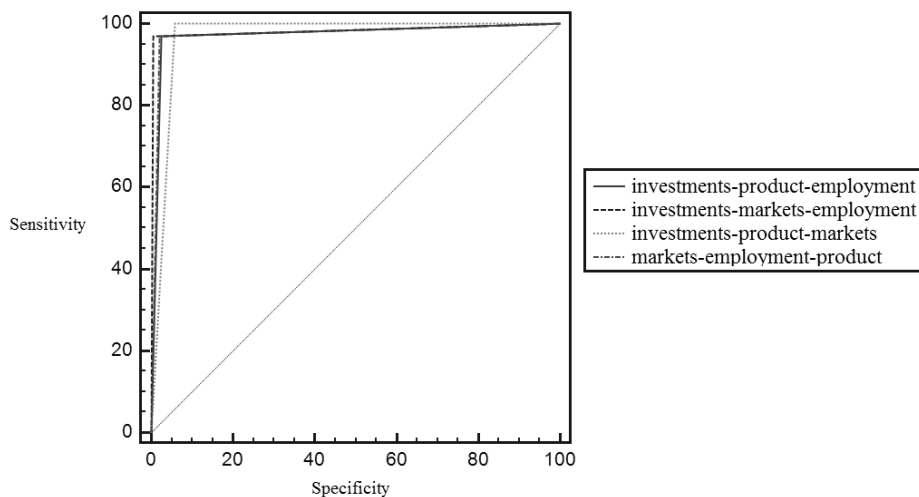


Fig. 2. ROC curves for all identified models containing three of the four analysed criteria

During the second stage of the performed investigation, six models with two out of four analysed criteria were compared. The specificity of these models showed to be between 82.7% and 94.4%. Their sensitivity was from 97% to 100%. A comparison of the received data indicated that the most accurate model that contains two variables recognizing inert and congruent enterprise market behaviour is the model consisting of new markets development and increase in the employment level. This model has the highest specificity and AUC (Figure 2, Table 1).

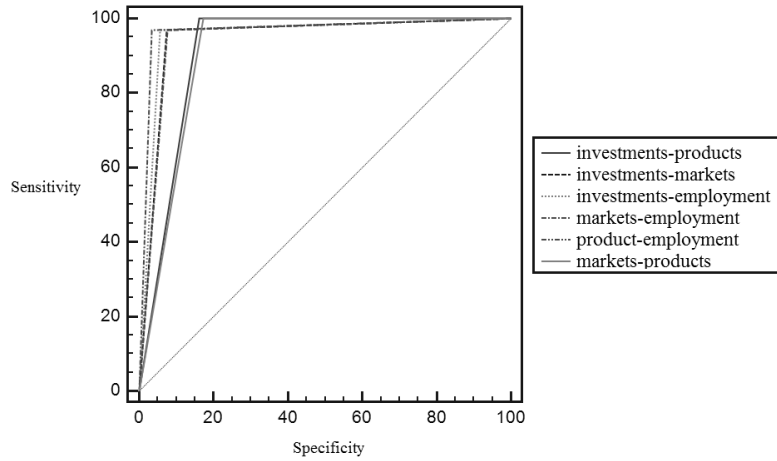


Fig. 3. ROC curves for all models containing two of the four analysed criteria

The next step of the undertaken investigation aimed to analyse models consisting of one of the four analysed criteria. Considering these models, the most accurate in recognizing enterprises' inert and congruent market behaviour was the model including the increase in the employment level. It had the highest specificity and the biggest AUC. Its specificity was 86%, while the specificities of the other models were: 52%, 74.1% and 76.5%. Moreover, the area under the curve of the mentioned model was 0.91, and for the remaining models: 0.76, 0.87 and 0.88 (Figure 4, Table 1).

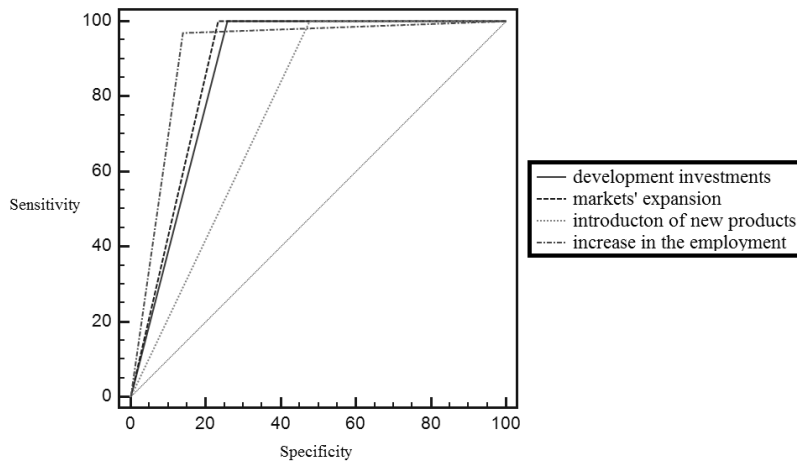


Fig. 4. ROC curves for all models containing one of the four analysed criteria

4. CONCLUSIONS

The comparison of all the created models shows that the most accurate for the recognition of inert and congruent enterprise market behaviour are three criteria: implementation of development investments, increase in the employment level and new market expansion. Such a combination of chosen criteria gives the highest specificity of the model. Following that, a model with slightly lower specificity includes only two criteria – the increase in the employment level and new market expansion. Moreover, in both of the models the area under the curve is also similar (Figure 5). This means that to recognize whether enterprises' market behaviour is inert or congruent it is not necessary to use the above mentioned model which contains three criteria because the model using two criteria: increased employment and new market expansion gives results that are sufficiently accurate.

Comparing the most accurate models that contain two and three variables with the most accurate model that consists of one variable, considerable differences can be observed. The model that is based only on the increase in the employment level variable has 10% lower specificity compared to a model including two variables of increase in the employment level and new market expansion. Its specificity is also 13% lower than a model that consists of implementation of development investments, increased employment and new market expansion (Table 1). Additionally, the area under the curve of the one variable model in both cases is substantially smaller. Therefore, it can be concluded that the model that includes only the increase in the employment level variable is not adequate in recognizing enterprises' inert and congruent market behaviour.

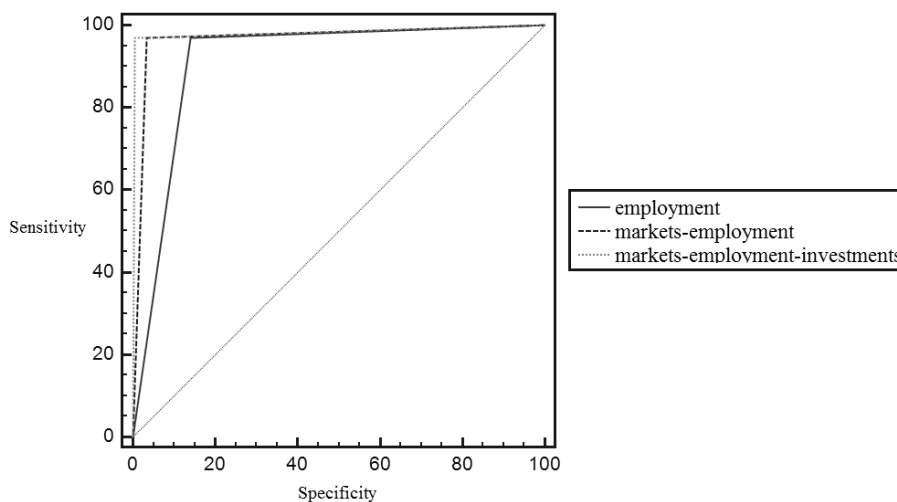


Fig. 5. ROC curves for the most accurate models containing a different amount of four analysed criteria

The results of the study led to the conclusion that the most accurate in recognizing enterprises' inert and congruent market behaviour are two variables: increase in the employment level and new market expansion. This finding leads to the negative verification of the assumed hypothesis, according to which the most accurate in identifying inert and congruent enterprise market behaviour are aspects of increased employment level and implementation of development investments.

Although the assumed hypothesis is not positively verified, the study identifies criteria which can be used in the differentiation of enterprises' market behaviour. Such findings facilitate the analysis of an enterprise's activity. Consequently, the results of this study lead to a better understanding and increased knowledge about enterprises' potential for the economy. Therefore, the research findings can be useful for future projections prepared for public bodies which aim to enhance economic development.

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IDENTYFIKACJA INERCJI I AKTYWNOŚCI W ZACHOWANIACH RYNKOWYCH PRZEDSIĘBIORSTW

Streszczenie

W pracy przeanalizowano zachowania rynkowe polskich przedsiębiorstw. Skoncentrowano się na czterech różnych działaniach, w tym: wdrażaniu inwestycji rozwojowych, zwiększaniu poziomu zatrudnienia, wprowadzaniu nowych produktów i ekspansji na nowe rynki. Działania te są uważane za główne kryteria rozróżnienia między inercją a zachowaniami rynkowymi stosownych przedsiębiorstw.

Celem badania było rozpoznanie, jaka kombinacja wybranych kryteriów jest najdokładniejsza w identyfikowaniu inercji i zachowań rynkowych stosownych przedsiębiorstw. W tym celu skonstruowano model badawczy i przeprowadzono zbiór danych pierwotnych na próbie 1238 polskich przedsiębiorstw. Wszystkie dane analizowano za pomocą Statistica. W walidacji modelu zastosowano porównanie krzywych ROC. Uzyskane wyniki wskazują, że najbardziej skrupulatne rozpoznawanie inercji i zachowań rynku stosownych przedsiębiorstw to trzy kryteria: realizacja inwestycji rozwojowych, wzrost poziomu zatrudnienia i ekspansja na nowe rynki. Taka kombinacja wybranych kryteriów daje najwyższą specyfikę modelu. Ponadto, biorąc pod uwagę dwa z czterech analizowanych kryteriów, najmniejszą podatnością na uznanie obojętnych i zgodnych zachowań rynkowych przedsiębiorstw są aspekty wzrostu poziomu zatrudnienia i nowej ekspansji rynkowej.

Na podstawie badań wyciągnięto wnioski, które pomagają lepiej zrozumieć działalność na rynku. Przedstawione wyniki mogą doprowadzić do lepszej wiedzy na temat zachowań przedsiębiorstw i ich potencjału do przyczyniania się do rozwoju gospodarczego. Badanie można także wykorzystać w przyszłych prognozach gospodarczych.

Słowa kluczowe: zachowania rynkowe, przedsiębiorstwa