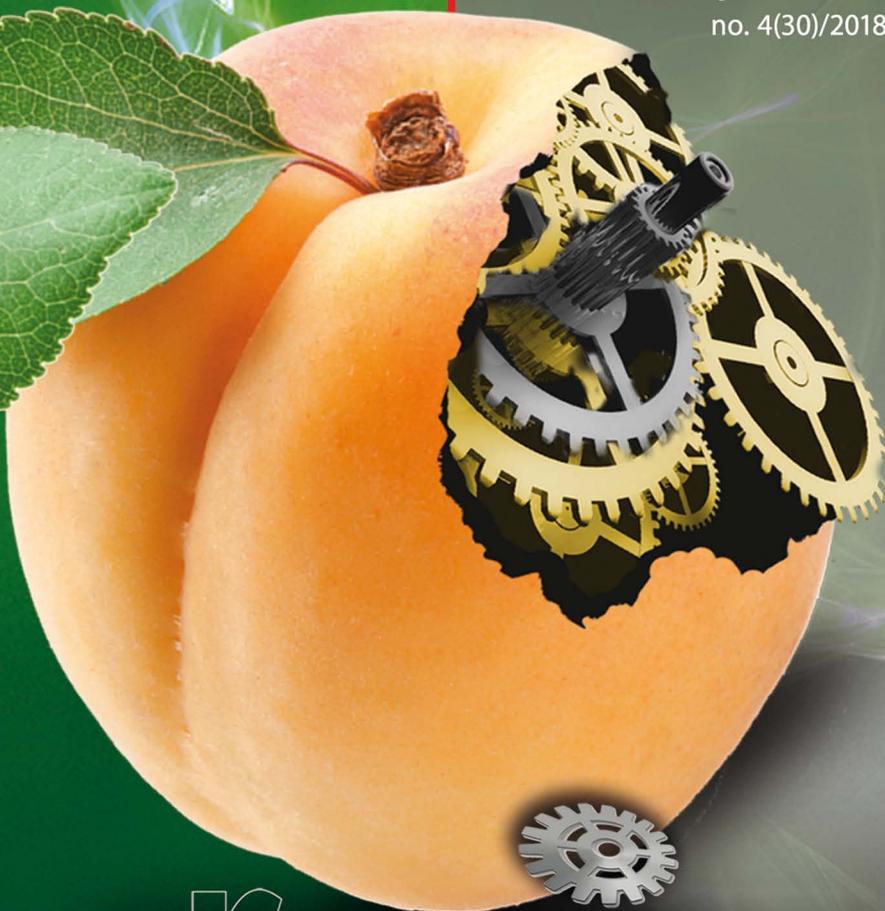


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**MARKETING ORIENTATION
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OF R&D RESULTS**



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MARKETING ORIENTATION OF SCIENTIFIC-RESEARCH UNITS AS SUPPORT FOR THE PROCESS OF COMMERCIALIZATION OF R&D RESULTS

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Summary

The market of R&D services formed as a result of social-economic transformation puts scientific-research units in the situation of companies from the service sector and consistently forces these entities to assume a marketing approach. New solutions and possibilities of using the achievements of marketing for the R&D sphere are sought after. One of such elements which have an impact on the growth of efficiency of the commercialization of the results of scientific-research works is the introduction of marketing orientation. The application of this orientation in scientific-research units contributes to building relations between science and business, leading to the transfer of knowledge to the economy. Appropriate implementation of marketing orientation for a scientific-research unit means on the one hand support for dissemination of information about its research-implementation and application works and on the other hand making potential entrepreneurs realize the profits they can get from the implementation of particular effects of R&D works.

The goal of the article was highlighting the methods of implementation of marketing orientation in a scientific-research unit thanks to the application of defined hybrid and dedicated models, depending on the model of the instrument set within the concept of marketing-mix 4P. Their application contributes to the growth of chances for successful commercialization of the results of R&D works.

Keywords: Marketing of scientific-research units, marketing orientation, rule of marketing mix 4P, commercialization of the results of scientific research, science-business

Introduction

Under conditions of accelerating processes of globalization and the accompanying technological progress, what plays a fundamental role are changes aimed at boosting the role of science and research in the development of business entities. More and more often entrepreneurs are interested in the implementation of R&D results, as they recognize not just the economic profit from participation in the transfer of technology, but also hope that cooperation with scientific and research institutions will contribute to their innovativeness (product-, process- and organization-related), growth of competitiveness and in the long-term perspective to the multiplication of company value. Building cooperation between science and business makes it necessary to apply new marketing tools securing the efficiency and quality of tasks carried out by R&D units operating in a changing market environment.

The article attempts to highlight the advantages of marketing orientation. The implementation of marketing orientation in the sector of specialized (professional) services, which includes the activity of the scientific sphere, supports the transfer of innovations to business practice.

Five hybrid models have been proposed: innovation model, niche model, subcontractor model, complex model and market model. The utilization of these models facilitates the implementation of marketing orientation in a R&D unit. Examples of utilization of the created hybrid models depending on three key attributes are presented. These three key attributes (input parameters) are: kind of results of R&D works (services, materials, systems, technologies, devices), the character of a solution (individual, short series, mass) and the mechanism of commercialization (sales, license, service spin-off). Later marketing tools within the concept of marketing 4P are chosen. These marketing tools dedicated to each model facilitate in the first place the process of dissemination and later market implementation of the results of scientific-research works.

The last part of the article presents good practices from the Institute for Sustainable Technologies — National Research Institute (ITE PIB) in Radom in the area of utilization of the developed hybrid models and the marketing-mix 4P instruments dedicated to them in the process of implementation of the results of R&D works in business practice.

Marketing orientation in light of literature

The pressure on transfer of the results of R&D works from the sector of science to economy makes it necessary to implement marketing-focused method of managing operations, also in scientific-research units, which treated as a special kind of company, offer on commercial terms the results of their scientific work. Their product portfolio contains innovative technological solutions, which not only are a carrier of innovation in the area of technique and technology, but additionally require the application of efficient and effective marketing orientation using modern sales techniques on precisely defined target markets.

In marketing orientation it is assumed that achieving the goals of an organization depends on defining the needs and desires of target markets and delivering the product expected by the buyers in a more efficient way than done by rivals (Kotler, 2002). In other words, marketing orientation is concentration on clients' needs, adapting the product to diversified preferences and wishes of buyers, as well as building new needs and markets (Altkorn, 1996). Within this orientation often the concept of marketing mix (product, price, distribution, promotion) is applied. It means creating a product satisfying the needs of buyers, at the right price, using distribution channels and forms of promotion (Wiśniewski, 1998). This makes it possible to formulate the thesis that if an R&D unit properly defines clients' needs before starting work on a new product and applies an appropriate marketing strategy, then it will achieve success in form of commercialization of the results of R&D works.

The outlined elements forming marketing orientation in a scientific-research unit reflect the dimensions of the marketing perspective as space for activities aimed at dissemination and later commercialization of the results of R&D works which also have an impact on the growth of recognizability of the brand of an R&D unit.

Hybrid models supporting market orientation in a scientific-research unit

On the basis of an analysis of marketing models by P. Kotler (Kotler, 2012), which are dedicated to commercial markets and models of commercialization in business by P. Kulawczuk (Kulawczuk, 2010), a set

of 5 hybrid models within a marketing-oriented scientific-research unit were defined. They are: innovation model, niche model, subcontractor model, complex model and market model. The interpretation of the created five hybrid models is as follows:

- M1 — Innovation model — it is based on the acquisition of a technological advantage and continuous effort to keep the advantage. For this purpose organizations regularly monitor their external environment, conduct intensive research and development works, focus on innovativeness, creation of innovative products which satisfy the needs of clients. Innovations should be transformed into particular usefulness for the recipients. The model can be applied when the general, scientific result is transformed into a particular product which generates revenues.
- M2 — Niche model — recommended, when the effects of conducted R&D works are new methods of implementation of processes, solving important social and environmental problems. It is often based on carrying out research for companies in form of outsourcing, which guarantees long-term cooperation. It is useful when niches grow and it is necessary to keep up with the growing demand.
- M3 — Subcontractor model — it is focused on adaptation of the offer to unique needs of the recipient, presenting to a particular client a product, or service prepared especially for the client. This is the recommended model in case of complex products, which require close cooperation with the buyers. The model assumes not just building close and lasting bilateral relations, but also cooperation with the recipient on the creation and implementation of the offer.
- M4 — Complex model — dedicated to complex products, processes, or technologies, to solutions consisting of many elements connected to each other, accompanied by various additional services offered not just at the moment of purchase, but also later during utilization. It promotes concentration on winning client's loyalty, high quality of service and individualization.
- M5 — Market model — applied when the effects of R&D works are aimed at solving social, civilizational and environmental problems. Organizations can achieve that by monitoring market trends which attract the attention of public opinion. In messages containing

information it is necessary to emphasize the way in which a given solution may contribute to solving the above-mentioned kinds of problems which are important at a particular moment for the society.

The application of these models enables/supports proper preparation and implementation of marketing orientation and has an impact on raising the likelihood of success of an implementation of the results of R&D works on the market.

Building a diagram of the relations of the results of R&D works in hybrid models

According to the purpose of creation of hybrid models, which is their practical utilization in the process of transfer of innovations to business practice, each of the five models has been verified in terms of the possibility of using it, according to three key attributes (input parameters) of the results of R&D works:

- a) Kind of solution (product) (Mazurkiewicz, Belina, Poteralska, Giesko, Karsznia, 2015):
 - service (e.g. IT services, surface engineering),
 - materials (e.g. chemical, textile, composite materials),
 - systems (e.g. software, computer systems),
 - technologies (e.g. chemical, mechatronic technologies),
 - devices (e.g. testing and research equipment).

- b) Character of solution (Walasik, 2014):
 - individual,
 - short series,
 - mass production.

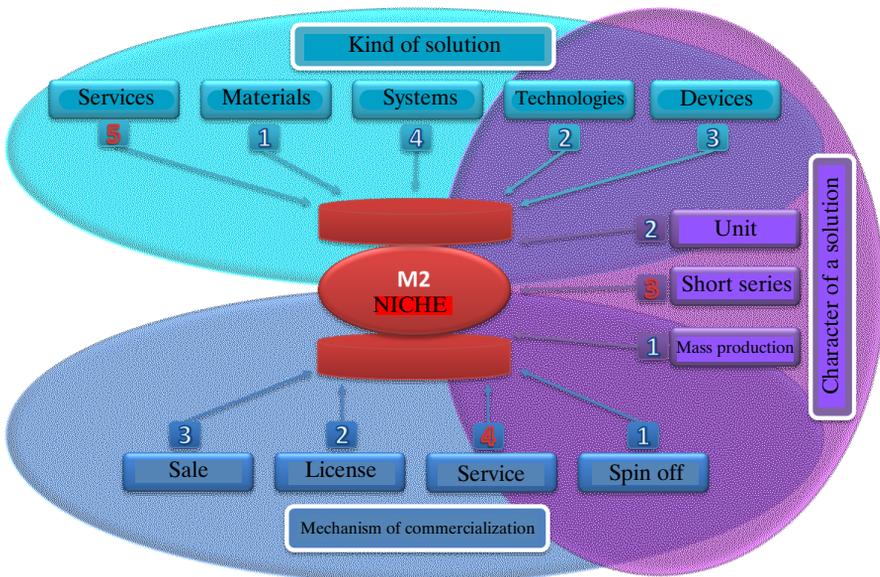
- c) Mechanism of commercialization (Walasik, 2014):
 - sale,
 - licence,
 - service,

- spin off.

The next step in the conducted works was identifying the strength of relations between the developed hybrid models and the input parameters. For every combination containing as follows: the kind of solution (5 options), character of a solution (3 options) and the mechanism of commercialization (4 options), relationship matrices were created. The analysis of these matrices determined the selection of appropriate hybrid models.

It was assumed that each of the created hybrid models is a conditional path of conduct for a particular combination of input parameters (categories of variables). An analysis was carried out and its results showed which model should be applied depending on the output parameters. The niche model (picture 1) is dedicated to the results of R&D works, which are services with the character of a solution — short series and to which a mechanism of commercialization — provision of services — is dedicated. Figures found next to input parameters show the strength of a relationship.

Picture 1. Diagram of relationships for the niche model



Source: Own materials.

An example of a result of R&D works verifying the assumptions of the niche model developed and implemented at the Institute of Sustainable Technology is a System for testing the efficiency of heat recuperation in recuperators applied in mechanic ventilation installations. It is the only solution in Poland enabling complex assessment of efficiency influencing the cost of energy consumed to secure heat comfort in buildings. The system was developed in response to the needs voiced by the producers of recuperators. The current stage of activities covers continuous cooperation in form of research services for many Polish producers and companies dealing with the sale of recuperators.

The developed hybrid models have been verified on the basis of a few dozen examples of commercialized results of R&D works and are applied with regard to the results of scientific research, development works, research-implementation projects etc. generated at the Institute.

The created models are general in character and at the same time they are flexible. They shouldn't be treated as rigid, unconditional guidelines resembling procedures, but as a proposal facilitating the introduction of marketing orientation in a R&D unit, which has an impact on taking up actions aimed at the commercialization of R&D works.

Set of marketing-mix tools dedicated to hybrid models

The process of implementation of marketing orientation in a R&D unit, adapted to the rules of competing on a particular market, can be supported by appropriately chosen marketing tools creating the possibility of more efficient implementation of the results of R&D works in the economy. A set of instruments from the area of 4P marketing has been adapted to the five defined hybrid models. Moreover, it has been determined which of these tools are dedicated to a given model, so that the conducted marketing policy brings an effect in form of commercialization of the results of R&D works.

On the basis of experiences (Lotko, Walasik, 2013) a set of tools within marketing-mix 4P (product, promotion, price, distribution) dedicated to a research-scientific unit has been created:

- for a product:
 1. treating the product as a core — the buyers choosing a product rely on a feature, or a few features forming the so-called product core, that is, the leading benefit (NP-1);
 2. treating a product as an extended product (real product + additional equipment raising benefits from the purchase, for example: extended guarantee period, additional services even during utilization) (NP-2);
- for promotion:
 1. fairs, exhibitions (NR-3).
 2. Internet website and other branch portals (NR-4).
 3. newsletter, e-mailing (NR-5).
 4. scientific conferences, branch seminars, scientific articles (NR-6).
 5. printed materials: brochures, catalogue cards, posters (NR-7).
- for distribution:
 1. direct distribution (ND-8).
 2. indirect distribution (ND-9).
- for price:
 1. competing with price (NC-10).

A set of marketing tools was matched with each of the five hybrid models. As a result a matrix of relationships between the marketing tools and models has been created. It is presented in table 1.

The justification for the tools shown in the table is as follows:

For M1 — innovation model — it is particularly recommended to present the benefits from the product core, to disseminate information about innovation through scientific publications and by means of Internet tools such as newsletter and e-mailing. These tools make it possible to strengthen the message conveyed to the environment and to build the desired image of an institution as a creator of innovativeness. In case of innovative products competing by means of price is not recommended. At the initial stage it is advisable to resort to direct distribution, later it is possible to use agents who have tested channels for the diffusion of innovations.

Table 1. Marketing tools and hybrid models

	M1 — innovation model	M2 — niche model	M3 — subcontractor model	M4 — complex model	M5 — market model
NP-1	++	++	+	+	++
NP-2	+	+	++	++	+
NR-3	+	+	++	++	++
NR-4	+	++	+	+	+
NR-5	++	+	+	+	++
NR-6	++	+	+	+	++
NR-7	+	+	++	+	++
ND-8	+	++	++	+	-
ND-9	+	-	-	+	++
NC-10	+	-	-	+	++

Markings: ++ recommended tool, + advisable tool, — inadvisable tool

Source: Own materials

For M2 — the niche model — applied often to the provision of services for external entities, the most useful marketing tool is promotion. Here the brand and image of the service provider, which are instruments for building the trust of clients, play a major role. It is suggested to present benefits from the core of the product. The form of direct sales is dominant and the scale of activity is limited. It is also the proactive approach of the personnel that plays a major role. It is characterized by careful implementation of top-quality service process carried out with care for satisfying the needs and satisfaction of the buyer. It is also recommended to run a regularly updated Internet website.

For M3 — the subcontractor model — it is recommended to clearly present the benefits of a product. It is necessary to not just highlight the core of the product (main advantage obtained by the client), but also the extended product covering the latest technical achievements, terms of deliveries and installations, preservation and maintenance, recommendations. As the product is not typical in character, as it is unique, it is important to maintain direct contacts with business partners. Business partners may be drawn to an offer, or obtained at specialist fairs. Taking into consideration the uniqueness of a product, a broad promotional message in the media is not needed. It seems that a

good tool for raising the awareness of subcontractor's existence and his offer among the potential recipients are printed materials. Similarly as in the niche model, distribution should be direct in character.

For M4 — the complex model — a particularly important marketing model is presenting an extended scope and package of benefits from the implementation of a product. It is easier to present complex products "live". That's why in this model the role of fairs and exhibitions is important. A significant promotion tool is putting information about a solution on branch portals. It is also important to identify the needs of business partners and the scale of demand. For solutions offered on a greater scale, it is worth conveying messages to the media (e.g. sponsored articles in specialist press), it is possible to take into consideration printed promotional materials and materials in electronic form posted on a website. Price is not the key competitive factor. Other factors such as functionality, technical support, image and experience of the supplier, users' opinions are decisive. For activity on a smaller scale direct distribution channels are recommended. In case of a bigger number of users it is worth considering cooperation with agents.

For M5 — market model — just as in other models (e.g. subcontractor model, or complex model) it is necessary to promote usefulness and benefits of a product with particular attention paid to its social, or environmental functions. It is advisable to promote the advantages of a product by participating in fairs, exhibitions. It is necessary to create an intensive message highlighting the role of the product for the society and economy. It seems that what may bring a good effect are publications concerning the results of research on a product and effects achieved thanks to the product with particular focus on positive social, or environmental impact. Traditional printed and electronic forms of promotion are recommended. Competitive price is one of the benefits which may definitely accelerate the diffusion of a new solution in the economy. The choice of the method of distribution depends on the scale of demand.

Verification of dedicated marketing-mix 4P tools is presented on the example of the niche model (table 2).

Table 2. Marketing tools dedicated to the niche model — example

	M2 — niche model	Applied marketing-mix 4P tools
NP-1	++	presenting the leading benefit — the core of a product
NP-2	+	highlighting the additional features of a solution
NR-3	+	presentation of a solution during fairs (national and international), submissions to contests for medals
NR-4	++	information about a solution on Internet websites
NR-5	+	information about a solution in an issue of the newsletter, in an article in a branch magazine
NR-6	+	participation in scientific conferences, seminars, scientific articles
NR-7	+	information materials, catalogue cards, posters, a video presenting the benefits of a solution
ND-8	++	direct distribution/proactive approach of the personnel
ND-9	—	indirect distribution
NC-10	—	monopolist on the market/ dictating prices

Source: Own materials.

We can conclude that for the results of R&D works fitting the niche model the following things play a fundamental role in the set of marketing-mix 4P instruments: within a product — functional features — uniqueness of the results of R&D works, within promotion — dissemination of information about a solution on Internet websites. Nevertheless, what plays an important role in this model (within distribution) is the personnel's approach engaged in looking for and maintaining relationships with the client.

For the purpose of facilitating the process of R&D commercialization a path of conduct has been developed. Its goal is supporting the activities leading to the transfer of the results of scientific-research works — making it possible to match a hybrid model (and further, marketing-mix tools determined by it within the concept of marketing-mix 4P) with a particular solution depending on three attributes (output parameters). An attributed set of marketing-mix elements dedicated to a given hybrid model is basic knowledge aimed at the improvement of quality of the results of R&D works offered by a scientific-research unit, the efficiency of information conveyed in the direction of a potential client, both about a product/service and the efficiency of the procedure of delivering the offer to the final recipient.

Conclusions

Scientific-research units, in order to build new streams of revenues fueling their statutory activity, are turning towards the economy. In order to be able to stand up to new challenges they take various active and diversified marketing actions using the available set of instruments which influence the formation of the market position of a scientific-research unit and its products and enabling efficient communication with business. Changes taking place in the economic environment should be reflected by marketing orientation of scientific-research units. The adoption and application of marketing orientation is an indispensable element of contemporary functioning in a R&D sphere focused on market implementations. The proposed hybrid models, which enable the preparation of a collection of market values which can be obtained by a potential client as a result of the implementation of R&D work results and marketing-mix 4P tools adapted to hybrid models, support the implementation of marketing orientation in a scientific-research entity, raising the chances for commercialization of the results of R&D works.

The implementation of marketing orientation in a R&D unit has the features of a long process taking into consideration many factors, both internal ones (depending on the kind of generated results of R&D works) and external ones (the dominant conditions on the market). Systemic conduct of activities focused on marketing, based on defined hybrid models and marketing-mix 4P instruments dedicated to them, may stimulate the development of relationships between the scientific-research unit and entrepreneurs interested in the utilization of innovations in business practice.

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