

Science Centres as The Drivers of Change on Social and Educational Arena

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ABSTRACT

Current situation at the educational market is extremely dynamic, what is reflected in the changes of the offer, its creation and perception by customers. Science centres influence society development in personal and general sense. Customers are a reflection of modern reality, being highly demanding and individual, pragmatic, oriented at speedy effects. The entities like science centres must rely on: multi-subjectivity, inclusion of the interest groups, multidisciplinary teams, creation and re-creation of the exhibition idea, design and content. Additionally, all the educational interactions and activities should be reflected in marketing actions, because then they can still be the leaders of change. The general aim of the article is to present science centres as the drivers of change in contemporary reality from the perspective of their role in modern society.

Keywords: science museum, science centres, contemporary education, children as customers

INTRODUCTION

Current situation at the educational market is extremely dynamic. It can be analyzed from a perspective of a changing environment, including new profiles of sellers and product competition, and the customers' requirements being influenced by technological, social and psychological circumstances. The general aim of the article is to present science centres as the drivers of change in contemporary reality. In the first part, the general features of contemporary customers shall be presented, starting with their attitude towards the sellers and the offer itself. In the forthcoming part, the offer shall be analyzed in terms of its creation and implementation. The third main part shall present marketing context of the actions, at the basis of the SAVE marketing mix model. All the analysis shall be concluded with presentation of main findings and proposed directions of research and actions.

Science centres have been created since XIX century, starting from United States and Western Europe. Those places are supposed to be organizations in which every visitor has a chance to experience science, learn in practice and develop previously absent motivation. Research conducted by H. Salmi (1993) shows that science centres influence positively the motivation of students, regardless of the motivation type, which might be one of sources of competitive advantage in the future, while compared to the other educational institutions. The role of the centres is evolving from the role of creators of additional and incidental educational situations, mainly with support of science centres' employees, to the model of an institution to host regular visits of students (but not only them) to inspire them for individual research, with support of teachers who use the educational scenery of science centre (Kamudu Applasawmy,

Naugah, Maulloo, 2017). Moreover, they start becoming the impulse for a broader change in society, driving innovation and popularizing science (Short, Weis 2013). Their growing importance from an individual and public perspective makes it a crucial area for research.

Concept of value creation (or co-creation) is strictly related to empowerment of customers and their major role in the life of the enterprises. One of the aims of co-creation is the humanization of a new product development, including customers as a crucial partners in the initial phase of the product life-cycle. The customers stopped being perceived as receivers and shoppers of the product or service, but became the active creators, involved in all the phases of its market existence (Roberts, Darler, 2017). Although, primarily, it has been implemented on the B2C market, its effectiveness made it interesting to be applied also in B2B, e.g. in pharmaceutical industry (Jose Luis, Soares, Rodriguez-Molina, Frias, 2018). The concept of consumer-centered approach, visible in science centres is one of the important contexts determining the functioning of those institutions.

Contemporary consumer of the educational offer

The modern reality, being placed in omnichannel reality, might be described with permanent social challenges and expectations, both in terms of customers relations and offerers, aimed at satisfying or even creating their needs (Gotwald-Feja 2016). Those processes of offer creation and implementation become crucial in terms of educational issues. It is caused by the engagement of diverse scope of customers at the same time (mainly parents and children). The specificity is determined by a few major factors, related to theoretical and pragmatic

issues in business and educational field.

Presentation of the mentioned issue requires building a relation with a few important components. They are related to adjustments of the offer to the needs of children, their personal and individual development, regarding the methods and techniques adequate to the mentioned context. The matter of multi-subjectivity seems to be determining the educational context of the offer. This is based on the assumption of parents, children and offerers' inclusion in the process of product creation, which is crucial in relation to holistic and personalistic perception of a child, often presented as the contrary to a stereotypical school reality.

The needs and aspirations of children were placed in the centre of educational work of pedagogues, educators and teachers, especially in post-modern reality. The concept was presented very often in scientific theories related to personalism, phenomenology, naturalism, humanistic pedagogy and psychology (Kowalczyk-Szymanska, 2001). It was supposed to be an answer to the crisis in needs and aspirations of children and youth. Many authors have conducted research and analysis in terms of supporting, stimulating and development of children's educational needs, not only in formal, but also in informal educational situations. As a consequence, specific methods in diagnosis and support of educational and development needs of children have been created (Więckowski, 1992; Kowalczyk, 2005).

Holistic perception of a child is strictly related to the personalism. A child is being perceived as a subject or partner of educational influence. It is also reflected in its positioning and perception as a subject-customer (Gotwald, 2008). For

that particular reason the offerers who aim their products at children should primarily diagnose the authentic needs of children, using qualitative research methods which may present the real, not declared needs of young customers. Not to mention the need to minimize the potential direct influence of a parent on the subjective choice of a child, which should be limited with reflective or projective techniques. After the detailed diagnosis, the strategy for supporting and stimulating child's development should be created and implemented.

Another important issue related to the educational offer is eliminated the adjustment of the product to the developmental abilities of children, with usage of the adequate organizational methods and techniques (Kowalczyk, 2004). That issue is complex and for that matter - challenging. The offerer needs to fulfil the stipulation of in-depth research and analysis the results on the regular basis to modify and diverse the product's specification. The individual traits of character and development line cannot be forgotten, especially while it is often marginalized in "mass" school reality (for lack of possibilities or other reasons). The stereotype of some development standards, which can be applied to all of the children is harmful for the individualisation of the educational process. It does also influence marginalization of individual personality traits. This bears the consequences related to the offer itself, but also - to the methods, forms and requirements toward the product, people and promotion (in terms of operational and marketing activity).

Multi-subjectivity is also a crucial issue in terms of educational offer and the engagement of all the subjects in educational process (offerers-parents-children). The issue was magnified in the concepts of pedagogy

pluralism and it evolved (Kowalczyk, 2008). Primarily, it was based on the concept of bi-polar partnership, including two basic entities in the education process, who were teachers on the one side and children on the other. In Poland in 1999 it started including parents as the active participants and creators of the process of education and upbringing. Nevertheless, it is also important to mention that the real engagement of the third mentioned party (who were parents) was barely noticeable. For years the situation has changed. For now, the trends related to the aware parenthood and the role of both parents in educational and individual development of a child is strengthened and legitimized. For that reason it is justified to say about multi-subjectivity in terms of interactions between educators, children and parents. Additionally, the trends of parents' engagement, growth of their education awareness and being authentic partner in the education process became more visible in educational praxis. This is extremely important in the reality of science centres aimed at children. In that particular case, the major role is being played, apart from multi-subjectivity and awareness in terms of the offer's influence on children, are financial issues. The mentioned matter stands in line with the concept of family engagement in the educational process which makes it not only more effective, but also creates a bond between parents and their children, who share similar experiences, linked to the science centre as a place (Ellenbogen, Luke, Dierking, 2007).

The opposite trend to the presented one are demanding parents, who are not only the advocates of a child (even unwanted), but also the sharp judges of the educational product, which in their opinions should be given with maximizing value and minimizing individual cost (especially the cost of

engagement in relation with other partners of the educational situation). For that particular reason the science centres who create their offer for children and youth may be required to analyze not only basic parameters of a child (as a client of the offer), but also communication schemes, needs and pedagogy culture of the parents. The last issue may be the most challenging in practice.

The last issue is related to a huge potential of science centres to become an interesting alternative to school reality or the other offerers of educational services. The crucial differences between science centres and other educational services are: the innovativeness of the product, high engagement and interest of educational process partners (children-parents-educators-offerers). Contemporary didactics and offerers race in ideas which may be the answer for those elements, focusing mainly on multimedia, audiovisuals and technical parameters (often easily accessed by children at home) (Gotwald, 2010).

The offer should be regarded in terms of the mentioned trends, mainly: conscious parenthood, multi-subjectivity, personalism and child-orientation. They determine the way all the products which are a part of the offer should be created and then - marketed. All the mentioned trends are visible in the reality of science centre, which evolve from educational institutions to the drivers of change.

The offer of a science centre - process of implementation

Designing and opening a new science centre requires many actions conducted simultaneously in synchronized way. Taking into account the exhibition preparation and development a unique team of competent

people responsible for many different strand of the whole process needs to be formed (Alt, Gosling, Miles, Miles, 1982). Every phase analysed below takes into consideration education aspects of the exhibits. Science centres have high aspiration on this field, which requires professional approach on every step, including classic education techniques and utilization of contemporary methods and science achievements.

General idea of the exhibition

Main thematic choice of the exhibit is usually determined at the very early stage of the planning process. It depends from many different factors, like target groups, the surrounding and available space, expected scale, funds available. Once these factors become precisely determined, the general character of the exhibit is much easier to be decided. Usually there is a need of dividing it into few coexisting parts complementing each other. Sometimes it has nothing to do with the context of the buildings and the place itself. But, if the exhibition is, for example, going to be located in an old power plant, like Science and Technology Centre EC1 in Lodz, Poland, it becomes natural that one of the most important parts of the design needs to be dedicated to the history of the place and the energy processing itself. If the exhibits surrounding the Planetarium is designed, it is almost obligatory to put it into the astronomical context. This way designers can make the best use out of the given heritage and create natural link between the history and the contemporary times, using modern technology to illustrate the past, or extend visitors experience. If this complies, then the effect can be much more impressive than when such a link is created only on the artificial elements. Educational content can become an interesting story to be told during the visit, the story that visitors want to find out themselves. They

want to run the power plant again, become the part of it, control the elements using interactive and cooperative games, fighting for the best possible efficiency. Not between each other – but coordinating their efforts, communicating and winning together (Perry, 2012). This way good design of the exhibits not only creates the interesting space of interaction, presenting the education content, but also make possible fostering superior aims of the education – the holistic, comprehensive person's development.

Exhibit designs

Every single exhibit design has to take into account several aspects, among others: the general objectives, education value and user experience – including the user's age, possible ways of interaction, general description, main elements, content etc. Often before the design itself, investor must describe these most crucial elements and put it into the tender documentation (in case of public companies). The description has to contain necessary information as a creative input for the designers. As one can imagine the description needs to be precise and quantitatively described, nevertheless, at the same time it should not be closed and finalised, giving the designers a chance to add their valuable input.

Still, even the initial description should contain the main objective of each exhibit. Usually one exhibit presents one phenomenon, illustrates one law of nature or science achievement. This way visitor can focus strictly on it, and not be distracted with other elements. In some cases however it is essential to show two or more elements simultaneously, as they coexists and depend on each other. It is possible to present Cartesian diver (classic experiment with floating element immersed in the fluid) as a simple column of water, covered with

the elastic membrane. When visitor puts pressure on it, diver deepens, due to the pressure rising in all volume of water. Simple experiment, obvious interaction, becomes a challenge if someone wants to manipulate and keep diver at a constant depth. If pressure gauges are added and located at various depths, not only Pascal law can be illustrated (visitors simultaneously observe the same increase on every gauge), but also hydrostatic pressure can be shown. One aim does not rule out the possibility to reach the other. And even if not everybody will be ready to observe both of them, some of them will.

Some of the exhibits not only show the phenomenon, but also give visitors the chance to conduct real experiments – including planning, preparation, measurement and critical analysis of gathered results. What is crucial in real science, and must not be forbidden for visitors (playing the role of real scientists), it is the consent for making the mistakes. We can learn from our mistakes and there is a great value in the moment, when analysing the experiment's results, visitors can correct themselves and conduct it again – this time correctly.

Very important aspect of the exhibit design is also the diversification of the visitors interaction. Different educational needs can be fulfilled by divers way of methods, people can make use of the different exhibits. Some of them are static, some can be dynamic, some can demand simple interaction (push button, turn crank) or more complex set of activities. Some of them should allow full body interaction. It all depends from the chosen objectives, target group, and have to match educational needs. When the form of design encourages people to use it, when it activates our natural curiosity then the exhibit can be acknowledged as the good one.

Content design

The importance of designing the good quality education materials describing the elements presented in the exhibition is commonly recognized. Long hours of the research, editorial work, graphic design and putting it into elegant form is not an easy task, requiring didactic specialists engaged full time. Most important elements has to be chosen and putted into unambiguous form. Often the educational content must be presented at least on two (or more) levels - basic and more advanced.

In terms of school groups (being common visitors and target group), preparation of the teachers' guiding materials is an inevitable part of the relation building process, because of the content, explaining the deeper sense of the exhibit. This can make the offer attractive for teachers and create a feeling of the «safe ground» if asked some details by students. Materials (online) should also present the ideas for the activities to be conducted after workshops in science centre, e.g. in a form of science projects. If teachers can find references to the school curriculum, it can be much easier to convince the school principal and pupil's parents to visit such a place.

Apart from the programme and didactic actions, scenography is extremely important too. It can bring only the aesthetic value, but sometimes it can become complementary element of educational adventure, putting exhibit in the real life context and make it readable for diverse spectrum of the visitors. Even from the distance, before they start the interaction. Presenting the Magnus effect exhibit with the rotating, falling cylinder can be described in multimedia content very well, showing the scientist, his history, discovery and its implementation on short animation or fragment of the video. But when the scenography shows a big football goal,

and several rotating balls hanging from the ceiling - representing ball's curved trajectory (when kicked with the certain rotation from behind "the wall" by consummate football player), almost everybody can realize when this phenomenon is being used in everyday life.

Educational interaction and activities

One of the greatest challenges in value delivery at the market of science centres is preparation of valuable and interdisciplinary offer, adjusted to the needs of diverse target groups. Apart from regular educational activities, being planned usually in a yearly cycle, there are chances for event creation. The second form is extremely important in terms of their potential. Single activities, devoted to specific actions, e.g. the Einstein Day or Young Scientists Night are those which can become a model for the other events. After definition of the target audience and the main targets, implementation of actions starts. The additional elements regarding cross-disciplinary application of marketing activities in terms of events was presented in the next part of the paper.

Marketing context of the science centre

Although the importance of science centres is certain, those entities still need marketing support, especially while their attitude towards customers is considered. For that reason science centres have a great potential for innovation also in the area of marketing activities. The SAVE framework of marketing mix (Ettenson, Conrado, Knowles 2013), proposed as an alternative form for 4Ps might be an interesting starting point for the analysis. For that reason the beginning shall be devoted to the SAVE framework's potential at science centres and then the other new marketing trends shall be discussed as those to be analyzed in the future.

In case of educational products the difference between a simple physical product delivered to a customer is highly visible. The science centres became a kind of solution for many problems that a society faces. Firstly, they might be perceived from the level of a community. The science centres play a significant role in science popularisation. The relationship that they build with teachers, local community and students makes their significance clear. They are the drivers of change through delivering a value to satisfy visitors. Real educational experience defined at many levels and stretching from teaching through researching to inspiring, they become far more than just an educational product. For that reason in terms of the "Solution", they deliver a chance to experience more, to understand more and to open up yourself for a totally new reality. The science centres from a perspective of SAVE model are a solution for a few general groups. Teachers who are questioning the interest of students may see the thrill with which they start to learn far from a school building. This changes not only students themselves, but also - the teachers who hope to see the same reaction during the schooling process. Additionally, parents who are often asked complex questions from their children and are reluctant to admit that they lack competences to answer, would find a support of the science centre, being a pure source for those questions. Thirdly, they deliver solutions at public policy level while it is agreed that innovative thinking and innovative approach, enhanced by science centres, can influence positively the economy. In that case, science centres' offer presents far more than just a physical product or a service.

As for the access, being contradictory to the "place" in 4P's model, the place of contact with a solution changes. For the solutions do

also evolve. Starting from physical presence of a product, impossible to be delivered virtually, the science centres have a huge potential to deliver value regardless of their location. Offline exhibitions and workshops are the first and basic form of the solution delivery. That type of delivery is well-known in services market, where even if the customer buys the tickets online, s/he must get it and consume it personally. The classical example is the offer of a hairdresser - s/he needs to be met to deliver you the service of cutting hair. Still, the development of distant learning creates possibilities of consumption online. The option is not only usage of pictures of the science centres' offer in a form of virtual product. The whole scope of virtual offer, in terms of courses and additional offer is easy to be sold and received by customers online. Even the forms of blended-access (mixed with online and offline), creates a potential for internationalisation and blurs the boundaries online and offline, creating new delivery models. The potential of access development is strictly related to customers' preferences and the product life-cycle.

The value of a product perceived by customers is another element of marketing mix model. The prices are not the only form of payment for science centres' offer. All the elements that might be perceived as cost-generating from a perspective of the customer should be regarded. In case of science centres working in a standard access model (offline forms) it is the cost of transportation paid to reach the centre, parking costs, time of reservation (also perceived as the one influencing total value for customer). The greater the costs are, the higher expectations toward a product. For that reason differentiation between the access forms, which reduces value, influences the whole model. In an equation in which the total cost should be lower than the received total value for

customer, science centres need to focus on the delivery of the highest quality possible, to meet general expectations. The entities operating on an analysed market are prone to improve the total value with product extensions. Additional workshops or animation programmes are supposed to enhance total customer experience, overwhelming the costs paid for the service. The problem may be related to business model creation, in which those mentioned additional forms are often perceived as a form of promotion, not a part of the extended product.

The last challenge to be presented in terms of marketing mix model is the customer education, which replaced promotion of the services. Such an attitude is not limited to the education of customers who are supposed to be prepared for new experiences. There are a few possible options which shall be presented in the next part of the paper. The first possibility with an outstanding potential is a broad range of outdoor activities. They are usually related to educational activities with promotion potential, conducted out of the organization itself. Those might be short workshops which suggest the prospects potential of the product itself. Apart from an obvious educational value related to the workshops, they can be perceived at least in two possible ways. They might be organized in two different ways. On the one side, they might be a presentation of the offer which prepares prospects to become the customers and perceive the whole product. On the other hand, they may enhance the desire for the product, extremely different than the need only. As for the needs, they are not always related to fast purchasing, on the contrary to the desire (e.g. in AIDA model). Similar attitude is related to indoor activities in educational field. Free-of-charge workshops and presentations, meetings and conferences

build an interest around the place and create an active participant of offer perception and creation. Co-creation which can be applied to those actions is the thing of the utmost importance. Due to the changes of customers' attitudes influencing the offer may be a strong point of difference. As far as educational activities are concerned, their marketing potential might be stretched and enhanced while they are used consciously. Only goal-oriented actions can become not only the educational service (which is a part of science centres scope of business activity), but also - promotion tool. The hardest element to differentiate both is the aim to be reached: selling more, being perceived different or simply - delivering the solution to the customer.

Surely, mass media (traditional and new ones) have the potential to educate customers. The reason might be their total reach. Nevertheless, the campaigns in traditional media (such as television, press or radio) are relatively expensive which makes it often hard for science centres to use the whole marketing potential of those channels. Internet seems to be a good option for lower costs and more active perception of communicates by receivers.

Due to the growing importance of online marketing it is also crucial for science centres to use it appropriately. We have focused on the ones that interrelate with the SAVE model. Education of customers, which has a potential to enhance sales might be related of course to online positioning, usage of website or newsletters, but the one with extreme importance is usage of social media, especially blogs. Content marketing, which uses blogging very intensively, is aimed at customer education and creation of the need to know more. That innate human openness for novelties, in terms of knowledge

and experience stimulates the needs which were blank or unconscious. The awareness of science centres' offer and their ability to solve a part of the human problems related to understanding gives a huge possibility for demand creation and stimulation. The ambassadors have similar impact in terms of the need stimulation. For that reason it becomes popular to use "experts" and/or "commoners" in marketing communication - the first ones to create an image of the expert institution, using its experts' voice, the second ones - to warm up the image and to convince prospects for their similarity to the ambassadors who are a part of the target group.

The omnichannel environment becomes extremely important due to its potential to integrate messages sent to customers with usage of a few. In case of science centres it is very hard to integrate messages for the actions that customers take up during their presence in the science centres, before and after the visit, and broad spectre of target groups, focusing on different aspects of the offer. Building the convincing messages which are aimed at different target groups is almost impossible, similarly, as managing the very different communication aimed at all of those groups. The diagnosis of the most common customer journeys might be a way to limit the scope of marketing communication channels and tools, to focus on the message to be delivered.

CONCLUSIONS

The science centres operate in a highly competitive environment. Their actions are related to offer creation and delivery, high above the business activities. The social role of them determines expected quality and openness for the society. The effort of science centres related to product creation and delivery, in terms of modern pedagogic,

social and economic trends, is highly demanding. The science centres - from the very beginning of education experience planning, through its development, implementation and management - are customer-oriented, because it has to be built in their mission and vision. Their role is crucial and it needs to be stretched from

educational services entities to important elements of local and regional landscape. Those entities must bear the responsibility for societal development and innovation. Among others, the last factor makes them an interesting research object, just as their actions become a vital research area. ◀

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