Designing online communication mix for machinery manufacturers

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Abstract: Recent global challenges and the development of digital technologies have caused companies to update their business models to incorporate the variety of existing online communication tools. This enables companies to design their communication with customers and other stakeholders in the most effective way based on the company's business goals. This study provides an approach for planning and assessing online communication mix for machinery manufacturers. The authors conducted a series of expert interviews and used the analytic hierarchy process as well as the method of parametric identification to determine the optimal set of elements for online communication in the market of machinery manufacturing. Based on the research findings, the authors developed and tested the model for planning online communication activities and assessing their effectiveness. The research results detect hidden relationships between the individual elements of online

communication activities and the impact of those elements on each other. This approach makes it possible to evaluate online communication in terms of achieving companies' business goals, rather than evaluating individual indicators of separate communication elements.

Keywords: machinery industry; online marketing; communication tools; promotion strategy; Ukrainian market; key performance indicators.

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1 Introduction

In the period of global challenges that many industries are facing nowadays, the internet is becoming more significant as a space for communication between the company, its customers, and other market participants. Companies rely on online communication significantly, and in order to effectively develop their marketing programs they need to

plan and design the usage of cyberspace in their activities (Karjaluoto et al., 2015). To plan properly a company's online marketing communication they should be able to track and evaluate its effectiveness.

There are several ways to evaluate the effectiveness of marketing communication and promotion. For example, the effectiveness of the website, one of the major communication tools companies use, may be evaluated by the positions of the site in search engines; by site attendance index; by quality indicators of traffic; by the number of targeted actions, conversions; by reducing the cost of attracting visitors to the site, by cost of conversions, etc. (Belch and Belch, 2004; Sampaio et al, 2011).

However, each of the above-listed approaches evaluates a separate promotion tool or channel, and does not allow to see and assess the situation as a whole. In addition to this, the machinery industry has its own peculiarities of communication mix. Therefore, there appears an issue of complex assessment and design of online communication mix in machinery industry.

2 Theoretical background

According to Habibi et al. (2015), about 71% of managers in industrial markets start their search from Google page; 89% of respondents use content marketing; 93% claim that e-mailing is the most commonly used communication and distribution channel and 100% of companies have their own web sites for marketing communication and promotion. Marketing communication is an integral part of company's business processes, which directly affects its relationships with customers and other company's stakeholders, and therefore contributes to performance (Peters and Fletcher, 2004; Akkaya and Tabak, 2017). Online communication of the company plays an increasing role in its overall communication with customers and other stakeholders (Karjaluoto et al., 2015).

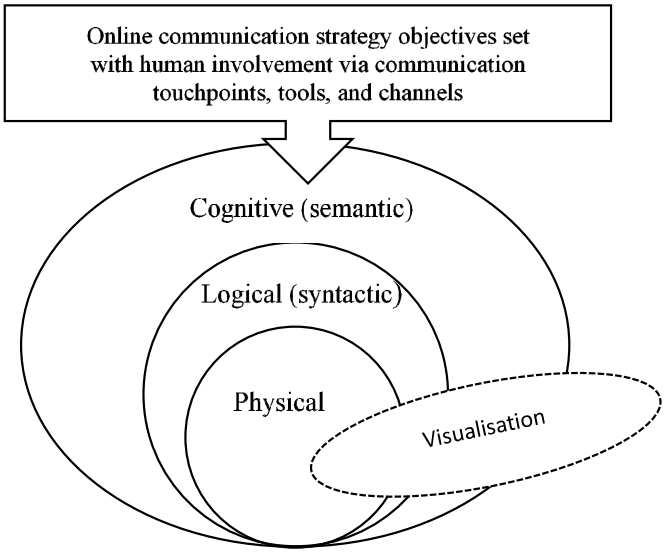
The main factors influencing the company's marketing communication are the level of informatisation, digitalisation, interactivity, and integration of various channels of communication (Andersen, 2001). Informatisation is a process of creating the optimal conditions for meeting the information needs of users through the use of appropriate technologies. Digitisation facilitates the transformation of information into a digital form. Thanks to the integration process, fragmented parts that have some similar features are united into one. In its turn, interactivity provides such system organisation that the goals are achieved by exchanging information (Ching and Ellis, 2004).

Market research data show that machinery industry characteristics determine the specificity of the company's communication system, which increases the role of integration, informatisation, digitalisation and interactivity (Muzylyov and Shramenko, 2020). This allows highlighting the influence of these factors on marketing communication programs and trends in their development (Jensen, 2006; Miller, 2012). To meet the information needs of the market, it is necessary to ensure usage of multiple information channels through a variety of tools. Digital tools have high effectiveness due to their advanced opportunities to plan, target, and track the results. Integration of communication channels and tools supposes not only their multiplicity, but also their combination to create a synergy effect. Interactivity provides the speed of obtaining necessary information, which determines consumer's attitude to the product and company (Kitchen and Burgmann, 2010; Paul et al., 2017). In this regard, Luxton et al. (2015)

consider integrated marketing communication to be a business capability that helps convert the company's resources into business results and outcomes.

For further analysis of cyberspace usage in marketing communication, it is necessary to investigate the concept of 'cyberspace'. Oxford dictionaries (Cyberspace, 2019b) define cyberspace as a notional environment for communication over computer networks. According to Webster's New World Hacker Dictionary (Cyberspace, 2019c), cyberspace is a conceptual electronic space, not limited by distance or other physical constraints. Technopedia (Cyberspace, 2019c) describes cyberspace as a virtual world and as a medium for facilitating online communication. Having analysed the above definitions and highlighting the key points, we can give our own interpretation of the concept of cyberspace as an infinite virtual space in the internet (a set of computer networks around the world) for storage and exchange of information, meeting and communicating with people.

Figure 1 Structure of cyberspace



To understand the nature of such interaction and its peculiarities, it is necessary to determine the structure of cyberspace and its connection with marketing communication strategy (Figure 1). Cyberspace is an artificial dimension created by humans, which consists of three layers: a physical layer, a logical (or syntactic) layer, and a cognitive (semantic) layer (Dodge and Kitchin, 2001; Heiets, 2015). The first physical layer consists of computers, cables, routers, mobile phone towers and satellites, computers, smartphones, and any devices that have built-in processors. The logical layer contains software, algorithms, protocols, operating systems, programs, and data stored in hard disks and in computer's memory (Gleason and Friedman, 2005; Williams, 2014). The third layer, which is an ultimate element of cyberspace, includes human or cognitive aspect. While other domains represent physical environment, the cyberspace as the only technogenic domain, is formed and used by humans. On a semantic layer the content, data, and information are used. This increases the value of cyberspace for its users. Cognitive individuals interact with the virtual environment and with each other. In

cyberspace a person may be reflexive, multiplicative, and even anonymous (Kline et al, 2003; Rosenbloom and Larsen, 2003).

From definition and structure of a cyberspace we can see that online communication is an integral part of cyberspace. Let's highlight the benefits of using communication tools in cyberspace (Table 1).

Table 1 Benefits of using communication tools in cyberspace

Benefit	*A brief explanation*
Targeting	High level of focusing on particular customers while communicating, the possibility to present the information to the target audience most effectively.
Tracking	Ability to analyse and measure effectiveness, to evaluate relevant indicators, do it immediately with the help of specialised programs and plug-ins.
Accessibility and flexibility	Accessibility of target groups (studies show that the internet audience is gradually phasing out other sources of information). Work in 24/7 mode.
Interactivity	Interaction via intermediaries, possibility of information exchange and sharing.
Volumes of information	Ability to transfer large volumes of information.
Speed	High speed of communication makes it possible to get responses to inquiries within minutes.
Low cost	While being offline the costs include rent, office labor, all kinds of stationery and other expenses. While in cyberspace the costs include mainly hosting, servers, and their administration.
Globalisation	Global opportunity to work without binding to a particular territory or local market.

Source: Clark (2010) and Lenders et al. (2015)

Machinery is one of the most important strategic industries in a business-to-business market. It is the industry, which reflects the level of scientific and technological progress of the country, as well as highly influences the development of other sectors of economy (Azevedo and Ribeiro, 2013). Modern machinery industry consists of a large number of sub-industries. It is one of the most complex and differentiated industries, which produces various machines, devices, and aggregates, mechanisms of industrial, domestic and military use, devices and equipment for scientific research (Qi-Mao, 2005; Mustafa and Shawwa, 2019).

The development of the machinery industry in a particular market goes through the five stages with the following characteristics (Lotti and Santarelli, 2004).

1 weak development of the industry: high dependence on imported equipment; minimum development of own production

2 industry growth: import of high-tech equipment; active transfer of imported technologies; start of producing own products

3 ensuring technological independence: getting own expertise; developing own technologies (mergers with world leaders / support of own R&D); export increase

4 export-oriented development: satisfaction of domestic needs (insignificant share of imports); the share of export in production exceeds 50%; advanced technological level; R&D support

5 growth decline: loss of technological advantage; productivity reduction; increase in share of imports.

Today, the world centre of machine-building moved from North America and Europe to Asia; and China became one of the leaders in this industry. In general, there are three macro-regions producing the highest share of machine building products: Asia – 58% of world production, Europe – 34%, and America (North and South) – 8% (Fuchs, 2018).

Key trends in the global machinery industry include consolidation and integration of companies (Cefis, 2010). In addition, the industry is moving toward unification of international standards of safety and quality. These trends are driving the importance of using cyberspace to develop strategies and models for promotion and communication between market participants.

3 Research design and methodology

The aim of this study is to evaluate the feasibility of applying a system approach for designing online communication mix for machinery manufacturers and complex assessment of relevant marketing communication programs.

To achieve the goal of the study, the following research tasks have been solved: analysis of the specifics of marketing communication mix in machinery industry, in particular, in a machinery market; analysis of the strategies for promoting products online, in particular, assessing the effectiveness of marketing communication activities and of the company's website, which is one of major communication touchpoints between the company, its customers and other stakeholders; and developing a model for complex assessment of various marketing tools and channels of communication. The hypothesis has been formulated that the analytic hierarchy process (AHP) may be applied to evaluate the effectiveness of online marketing communications.

In order to achieve the study's objectives, a number of general scientific and economic methods have been applied. To analyse and define theoretical positions regarding the specifics of marketing communications in machinery industry, to classify the basic concepts of the market under consideration, and to determine the trends of companies' online communication activities, the methods of theoretical generalisations and groupings were used, as well as the series of expert interviews were conducted. Expert interviews included industry experts responsible for marketing, communication, and public relations of the companies in respective industry. For the purposes of this research there were selected machine-building companies, in particular those that produce heavy, medium, and light machines, to give a better representation of the situation in the market (Zozulov and Poltorak, 2013). The interviews took place from January to September 2018.

While analysing the results of in-depth interviews for identifying the specifics and trends of marketing online communication mix, the method of triangulation was used. That provides reliable information, to solve the issue of 'experimental subjectivity', pertaining to qualitative research. The following types of triangulation were applied (Chong and Shafaghi, 2009): triangulation of data – for a joint comparative analysis of

information obtained both during in-depth interviews and through other research methods; research triangulation – by including several specialists in the process of analysis and preparation of reports and involving external experts to assess the adequacy and completeness of the information received and conclusions drawn from it (Flick, 2004). To analyse the quantitative information, descriptive statistics tools were applied. For processing data, Microsoft Office and SPSS software were used.

To determine the optimal set of elements for online marketing communication, the AHP and method of pairwise comparison by Tahiti Saaty, as well as the method of parametric identification were used (Saaty and Vargas, 2012). The AHP helps business makers who face complex issues, to define the solution that best suits their goals based on their understanding of the issue, rather than prescribing the only correct decision. It provides a comprehensive and rational framework for structuring the decision problem, representing and quantifying its elements, relating those elements to overall goals, and for evaluating alternative solutions (Onwuegbuzie et al., 2009).

Analytic hierarchy method was used for allocation of resources to design and plan company's marketing communication mix. It consisted of decomposing the online communication mix into a hierarchy of online tools and channels companies use, for each of them to be analysed independently. Some of them were measured by their performance indicators; others were estimated based on expert interviews.

After the hierarchy has been built, the evaluation of its individual components was done. For this purpose pairwise comparisons were performed, taking into account their influence on the higher level elements in the hierarchy. Applying AHP allows to use not only the measured performance, but also human judgments. So, while comparing the individual components of marketing communication mix, the measured elements' values as well as the relative judgments were used (Saaty, 2008).

With the help of AHP, those evaluations were converted into numerical values, to be used for further analysis. The numerical weights showed the priority of each component in the hierarchy of online tools and channels. That allowed comparing diverse values with one another in a rational and consistent way (Vaidya and Kumar, 2006; Thomas et al., 2017). The priorities received for each alternative such as communication tool and channel show the relative ability of the latter to achieve the goals set, and this provides with a clear consideration for decision makers on particular courses of action.

A system approach for developing company's online communication activities was used to form a model for comprehensive assessment of those activities at different stages of using the various marketing tools and channels of communication. The system model was tested in four stages, in each stage assigning different goals and measuring performance indicators. Powersim Studio software was used for model testing.

The system approach for designing and assessing the online communication mix is implemented by creating a model for predicting the effectiveness of implementing the marketing online communication programs by companies in machinery industry.

The research was performed in the market of Ukraine. Since in Ukraine the machine building is historically a well-developed sector of economy with numerous sub-sectors producing various types of machines, we develop a comprehensive approach for modeling the marketing online communication programs.

4 Data analysis

The analysis of machinery industry shows that introducing innovations in this industry is a long and low structured process due to the specifics of the industry. In particular, marketing communication of the company depends on implementing the innovations; and planning marketing communication programs becomes dependent on the organisation of business functions activities in the business model of the company (Freeman, 2013).

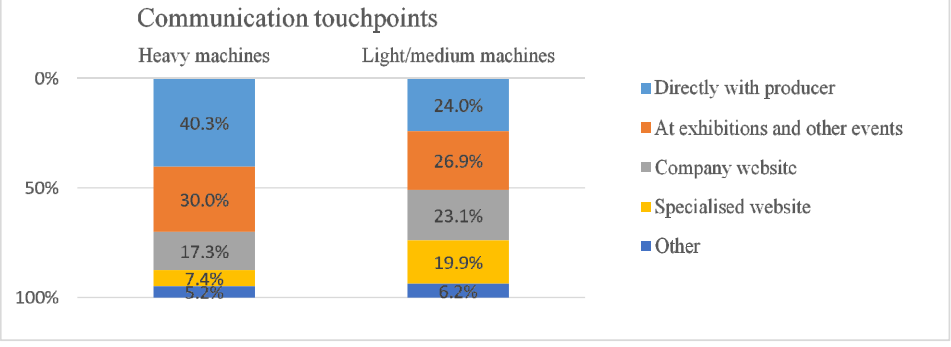
Based on experts' interviews analysis of marketing online communication by machine building companies, the following trends have been identified:

- Marketing of data is highly influenced by the regulations in the industry. Data analysis allows to identify the target audience as well as to adapt and optimise the promotion activities. In addition to that, the context helps to understand the motives and preconditions of the target audience actions.
- Quality of content depends on the level of industry participants informatisation, which creates extra value for marketing communication to a target group. Relevance takes into account the following three dimensions: the interest of the target audience (the value of the information), the corresponding emotional mood (emotional value), and usefulness for readers (value of the service).
- new formats of communication are limited with the level of digitalisation in the company environment and varies between the companies in the industry and between different departments within a company. The formats used include short videos, animations, podcasts, infographics, text, stories, communities, and blogs. New technological capabilities benefit from using virtual reality, augmented reality and chatbots. It is important to use and combine all possibilities and to prematurely plan a budget for their implementation.
- Omnichannels and consumer dialogue are used more actively in smaller-sized companies and in companies with higher number of clients compared to the companies, which depend on one or few customers. Since marketing communication is becoming more complex and includes higher and higher variety of formats, the multiplicity of digital touchpoints makes the customer journey more complex. The challenge often is to consistently install relevant content on different channels, so the content also needs to match the target audience to both analog and digital ones. It is necessary to combine a content strategy with communication and marketing channels.
- Customer care experience includes online and offline customers' contacts with brands. The quality of any experience can be described by usefulness, convenience, and desirability. Good customer experience helps make purchases or receive information from internet (usefulness), with ease (convenience), enjoying it (desirability).

According to experts survey, the following touchpoints were found to be the most effective in organising the communication with customers of the machinery industry (Figugre 2). From the diagram, we can see that the choice of communication touchpoints depends on the type of products sold. This is explained by the fact that before buying a complex machinery product, the consumer seeks to get the maximum information about

the product, to see it in action (often at exhibitions), and only then to buy it. Therefore, the internet resources and especially the website of the company are needed to fill in the information pool.

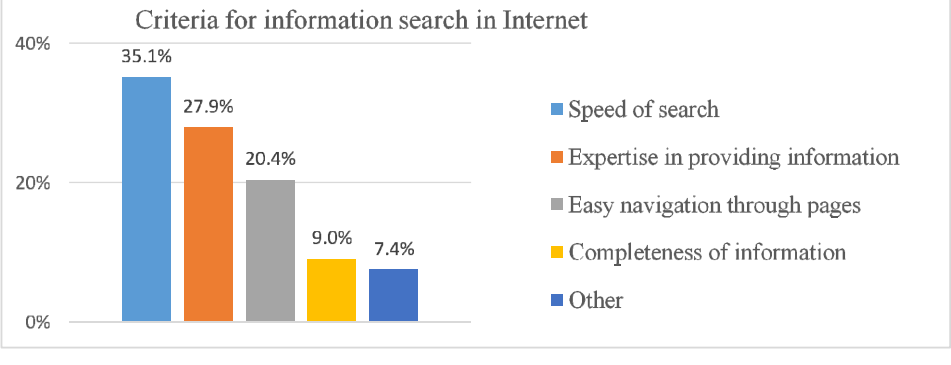
Figure 2 Communication touchpoints in machinery industry for different types of products (see online version for colours)



Marketing online communication is carried out through various digital communication channels and in particular via companies' websites. An evaluation of company's website, which is one of main touchpoints between a company and its customers, can demonstrate the effectiveness of marketing communication and to do a sales funnel analysis (Chaffey and Patron, 2012; Järvinen and Karjaluoto, 2015). It may be done by tracking the website traffic and its visitors' movements along the stages of sales funnel by visiting different pages of the website and performing certain activities (Lee and Kozar, 2006).

The results of the expert survey showed that nowadays in companies operating in the machinery market the process of managing a website is often spontaneous rather than strategically thought out and planned. And according to the machinery industry customers' opinions, the websites sometimes lack adequate representation of the company's product portfolio, as well as don't describe enough the service components of the whole company's offerings, i.e., payment options, after-sales maintenance, client managers support.

Figure 3 The importance of criteria for searching information in internet (see online version for colours)

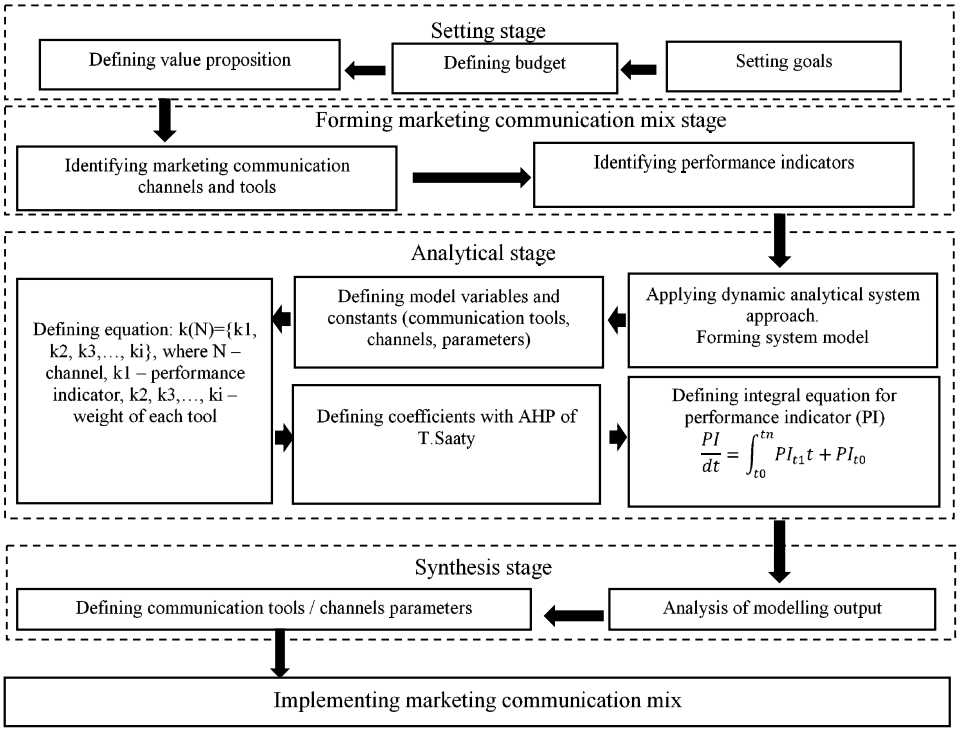


In the machinery market nowadays consumers prefer the speed of information search, and it is necessary to ensure its availability and visibility in the internet. The importance of different criteria for searching information in internet is shown in Figure 3. In particular, the survey results revealed high importance of expertise in presenting information and completeness of information, which is not typical for other consumer industries (Andersen, 2001).

The analysis of performance indicators of machine building companies allowed to identify the following gaps in communication through their websites: a gap between the growth of leads amounts and their quality; the difference between the amount of relevant marketing content and the actions needed to implement marketing plans affecting consumer awareness; websites do not meet the criteria of usability and userfriendliness, so consumers leave them too fast; as well as insufficient amount of interactive and visual content.

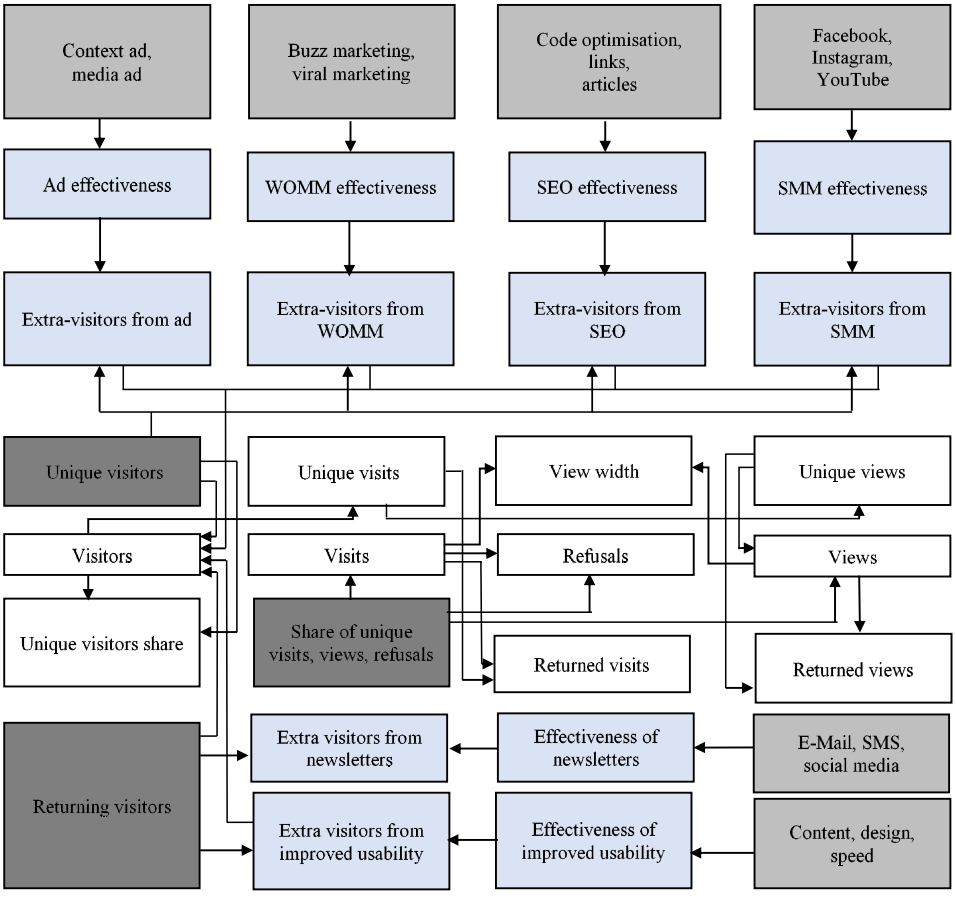
The effectiveness of using specific online marketing tools depends on a step-by-step development of marketing communication strategy (Figure 4).

Figure 4 Development of marketing communication strategy



Innovation technology impact on the companies' performance may be tracked by examining particular performance indicators. The performance of website, one of key digital touchpoints in a company's marketing communication programs, may be improved through using particular promotion tools and channels (Stone et al., 2007; Tarafdar and Zhang, 2008). The following scheme shows website performance and various promotion channels impact on it (Figure 5).

Figure 5 Website promotion tools impact on site's performance (see online version for colours)



All the indicators of the website promotion can be divided into several groups, which are shown in the scheme in different colors: in white are shown the standard performance indicators for assessing website effectiveness; dark gray – output data obtained by collecting statistical information and used to calculate the above mentioned indicators; blue – indicators for assessing various promotion channels effectiveness; light gray – indicators of various promotion tools usage, obtained by expert evaluation of the site and financial analysis of its activities (Tarafdar and Zhang, 2008). This scheme demonstrates graphically the nature of marketing communication tools, their performance indicators, and the degree of their impact on each other. An optimal way of assessing the effectiveness of website promotion is to use a system-dynamic approach that allows simulate site's performance before and after applying various promotion tools. Such an approach reveals hidden relationships between the individual elements of the site performance evaluation and their impact on each other, which allows evaluate communication in terms of its impact on the site as a whole, rather than on individual indicators of site's performance.

The system-dynamic approach is implemented by creating a model for designing the most effective marketing communication mix in terms of maximising the target indicators with the help of Powersim Studio software.

The model input data consist of constants and variables, which values are known and entered into the model before modelling. Other input parameters include those, which are configurable, – indicators of various promotion tools usage (blue in scheme) (Griffiths and Christensen, 2005). Since different parameters of site evaluation have different measurement units, a 4-point scale (from 0 to 3) for each parameter has been introduced to adequately measure their impact on site performance. The assessment is based on a financial analysis of site activities, expert evaluations of the site, and average indicators in the industry.

The model variables reflect the relationship between various parameters of site's activity, and the effectiveness of promotion tools. It is supposed that the effect of applying a particular promotion channel is reflected by channel effectiveness. The variable channel effectiveness can be shown as in the following equation (Saaty, 2008):

$$E(N) = \alpha_1 * k(N_1) + \cdots + \alpha_z * k(N_z),$$

where N – name of promotion channel; α_i – 4-point scale assessments of the effectiveness of a particular promotion tool; $k(N_i)$ – coefficient representing the weight of i tool of channel N in the efficiency of channel N.

Thus, the relationship of variables that reflects the efficiency of applying various site promotion channels, is characterised by coefficients that represent a vector in the following way:

$$k(N) = \{k_1; k_2; k_3; k_4\},$$

where N – name of promotion channel; k_1 is the coefficient, which shows the weight of channel N in the overall contribution to achieving the targeted performance indicators, such as number of additional visitors to the website from channel N or other; k_2; k_3; k_4 – coefficients representing the weight of each tool of channel N in the efficiency of channel N.

The values of k_1 coefficients were defined based on experts' opinions and industry average indicators using the parametric identification method through a series of experiments. The values of k_2; k_3; k_4 coefficients are obtained by applying Tahiti Saaty method of pairwise comparison (Saaty, 2008).

Its implementation is carried out by constructing the corresponding paired matrices, the columns and rows of which consist of the same sets of alternatives. The matrix cells have been filled in based on the information received from the experts, by comparing the corresponding elements of the row and column in the matrix, and the results are numerically evaluated on a special scale. This scale is used to determine the degree of advantage of a line item over the column item and express the numerical value of this advantage in the range from 1 to 9. When factor i compared to j is assigned one of the above values, then factor j is compared with i has the inverse value (1 / value). If a particular value is above the diagonal, then its inverse value will be under the diagonal.

From the group of matrices of pairwise comparisons, a set of priorities is formed. These priorities indicate the relative influence of the set of communication elements on a higher-level (group) communication element. The relative value and importance of each communication element is found through such matrices, each of them is inverse-

symmetric. To do this, we calculate the set of eigenvectors for each matrix, and then normalise the result to one, thus obtaining a vector of priorities.

Thus, all alternatives (site promotion tools) in groups (site promotion channels) are evaluated.

To create a holistic view of assessing the effectiveness of website promotion, we selected and grouped the following promotion tools and channels used by machinery companies: advertising, word of mouth marketing (WOMM), search engine optimisation (SEO), social media marketing (SMM), usability improving, and newsletters. Each of mentioned channels includes certain promotion tools.

The following output variables are chosen in the model as performance indicators: 'total visitors' (*TV*) and 'total returning views' (*TRV*). The *TV* indicator was chosen as an output one, since for the most of communication campaigns the primary goal is attracting as many visitors as possible (Rice and Atkin, 2009). The *TRV* indicator shows the level of interaction between visitors and the site: the more returns the more actions a visitor performs at a site. For a site that seeks maximum interactivity, returning view can be taken as a target indicator.

TV is a total number of site visitors over the modelling period, may be presented in the following form:

$$\frac{TV}{dt} = \int_{t_0}^{t_N} V dt + TV_{t_0}$$
$$TV(t+1) = TV(t) + V(t+1)$$

TRV is a total number of returned views per site over the modelling period:

$$\frac{TRV}{dt} = \int_{t_0}^{t_N} RV dt + TRV_{t_0}$$
$$TRV(t+1) = TRV(t) + RV(t+1)$$

In Table 2 are the calculations for the *TV* performance indicator for promotion channel *SEO*.

Table 2 Estimation of promotion tools in *SEO* channel by Tahini Saaty method of pairwise evaluation

SEO	*Code optimisation*	*Links*	*Articles*	*Vector component*		*Priorities vector*	
Code optimisation	1.00	0.25	0.17	0.47	0.08	0.26	0.08
Links	4.00	1.00	0.33	1.78	0.32	0.86	0.27
Articles	6.00	3.00	1.00	3.33	0.60	2.06	0.65
$\sum$				5.58	1.00	3.18	1.00

Based on the calculations, the following values for priorities vector in *SEO* channel are obtained:

$$k(SEO) = \{0.1; 0.08; 0.27; 0.65\}.$$

The obtained values show that the efficiency of *SEO* channel depends by 8% on the effectiveness of the code optimisation tool, by 27% – on link promotion tool, by 65% – on articles tool and the proportional ratio of channel efficiency for *SEO* is 1 to 10.

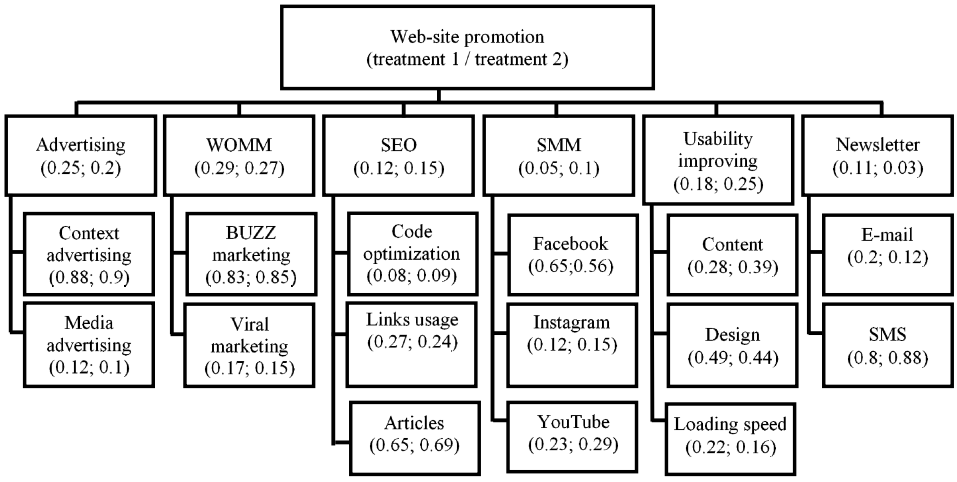
For other promotion channels, similar calculations have been carried out, which resulted in the following vector variables:

- advertising: $k(Ad) = \{0.3; 0.88; 0.13\}$
- word of mouth: $k(WOMM) = \{0.5; 0.83; 0.17\}$
- promotion in social networks: $k(SMM) = \{0.05; 0.65; 0.12; 0.23\}$
- improving usability: $k(Us) = \{0.3; 0.28; 0.49; 0.22\}$
- newsletters: $k(News) = \{0.1; 0.20; 0.8\}$.

The obtained set of coefficients provides for the model the quantitative indicators, which measure the efficiency of various channels and tools for website promotion, whereas in other approaches these indicators have only qualitative characteristics, or are not evaluated at all. This approach increases the objectivity, completeness, and universality of the model, making it a universal tool for supporting decision-making in developing the marketing communication strategy.

In a similar way the calculations for TRV performance indicator have been conducted, and the following results have been obtained (Figure 6).

Figure 6 Website promotion tools and channels contribution toward reaching performance indicators

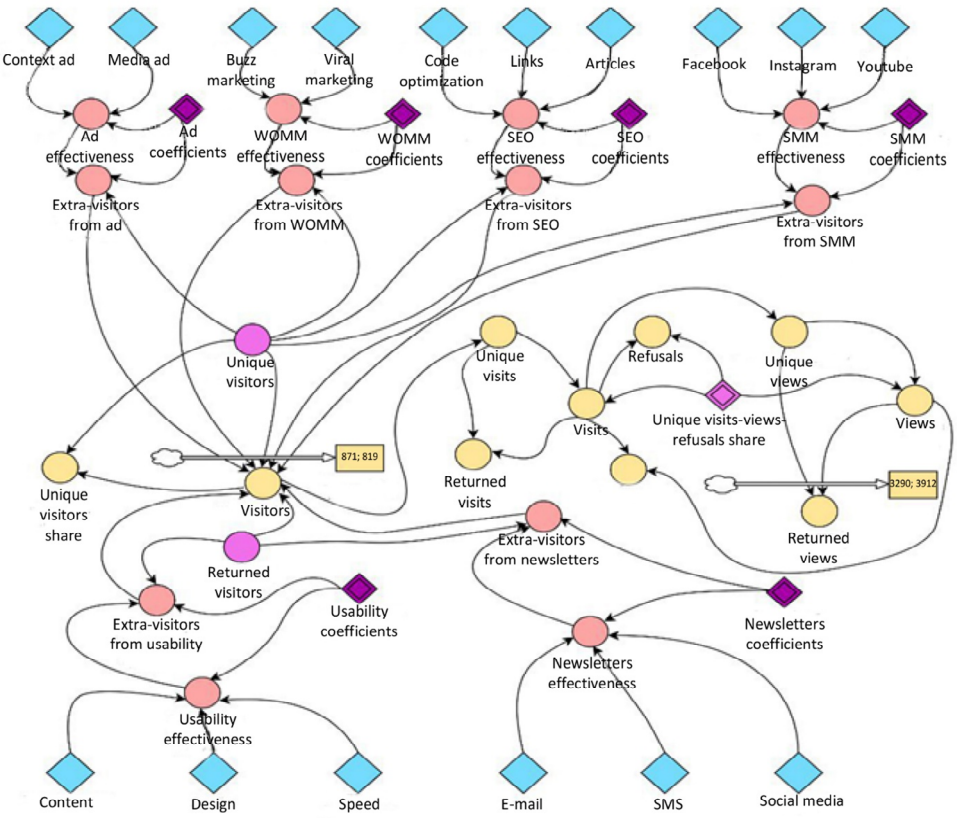


The developed model was tested on the example of 'Sphera-Techno', machine-building company website. The experiments were carried out to demonstrate the model work for forecasting the effectiveness of website promotion. The experiments consisted of four stages. At the 1st stage, the parameters values for communication mix were selected to reflect the real state of the system at that moment. The performance indicators were evaluated for the communication mix, which was chosen without applying the modelling results. During the 2nd stage, it was assumed to allocate the budget for website promotion according to the modeling output, which would be assumed to increase website traffic. At the 2nd stage the communication mix was designed according to the model output for the amount of visitors as a goal for maximisation. The budget amount for website promotion

was split among communication channels proportionally according to the model output; the channels, which received share below 0.1 were not included in the communication at all. The 3rd stage was supposed to be without treatment to negate the effects of the 2nd stage, and there was taken the same communication mix as applied at the 1st stage. At the 4th stage the communication mix was designed according to the model output received for the repeated views amount as a goal. Each of the four stages lasted for 30 days (one month), and simulation step was chosen one day, which are typical values for similar types of SEO analysis.

The application of the model for forecasting the effectiveness of site promotion activities in Powersim Studio is shown below (Figure 7).

Figure 7 Application of the model of efficiency forecast for site promotion activities (see online version for colours)



The results of modeling are shown in Table 3. The targeted performance indicator visitors amount (1st treatment) was increased 3.99 times, while 2nd monitored indicator, returned views, grew less – only 3.2 times. The targeted performance indicator returned views (2nd treatment) grew by 2.01 times while the other monitored indicator, visitors, increased only 1.59 times. Higher increase of the targeted performance indicator demonstrates effectiveness of the complex approach used. In addition to that, both growth coefficients (3.99 and 3.2), which show the effect of applying the modeling output

compared to not applying it, exceed the growth coefficients (1.59 and 2.01), which show application of the model outputs with different variables chosen as a goal.

Table 3 Performance indicators received in modelling experiments

	1st stage	*2nd stage*		*3rd stage*	*4th stage*	
Performance indicator	*Without treatment*	*Treatment 1 (goal: visitors)*	*Growth coefficient*	*Without treatment (break)*	*Treatment 2 (goal: returned views)*	*Growth coefficient*
PI-1 – visitors number	218	871	3.99	514	819	1.59
PI-2 – returned views number	1,027	3,290	3.20	1,943	3,912	2.01

With the help of system-dynamic approach, the mix of online and offline channels was determined for developing the relevant marketing communication strategy.

5 Findings

As we can see from testing the model, the system-dynamic approach for evaluating the elements of marketing communication mix for website promotion include offline channels such as advertising, PR, sales promotion, personal sales. Online channels include: website, SEO promotion, social media, instant messengers, online advertising (includes contextual advertising, social media ads and banners, banner ads, advertising on trading platforms), e-mail marketing, content marketing, referral-marketing.

This allowed developing the scheme for designing the online promotion strategy with a step-by-step algorithm of forming communication and marketing strategy. Such approach allows building a model for designing marketing communication mix by a company with the use of a comprehensive assessment of its target indicators before and after the application of various communication tools.

The model developed in this study can be used by companies while developing their marketing communication strategy. In particular, the proposed model allows determining the complex impact of different promotion channels and tools on the effectiveness of marketing communication programs, as well as to forecast and evaluate their effectiveness by selected indicators.

The model is tested on the example of the company from the machinery industry. At the same time, the application of the system-dynamic approach in constructing the model allows to carry out evaluations of target indicators of marketing communication tools for companies operating in other markets, where the integration of various tools of interaction with customers and other stakeholders of the company plays a significant role.

The developed model was tested on the example of Sphera-Techno company website, and may be applied by other companies using cyberspace as a marketing communication tool.

The proposed approach may be used for other sectors of economy in other markets based on the market specifics and the target performance indicators set by the companies. In continuation of this study, the further research of the correlation between the amount budgeted for certain promotion tools, channels and their efficiency may be conducted. It would allow incorporating this correlation into the model developed in current study.

6 Conclusions

This study is devoted to developing an approach for designing and assessing the marketing online communication programs and defining the optimal set of promotion tools and channels to reach the target performance indicators. Such an approach of using cyberspace in marketing communication programs may be incorporated by companies in their business models canvasses. For the purpose of this research the concept of cyberspace and its components has been defined. Marketing communication strategy have been found out to affect the quality of online communication, the components of which include hardware, software, and cognitive aspect. Within the cognitive aspect the promotion and communication tools interact with each other.

In the course of marketing research, the hypothesis concerning the possibility to evaluate the effectiveness of online marketing communications with the AHP was proved; the metrics have been identified, the system of key performance indicators has been summarised; and the model for developing marketing online communication programs has been proposed. The effectiveness of applying system approach to defining the complex of marketing communications has been shown.

The peculiarities and benefits of enhancing the use of online marketing communication in machinery industry were generalised. They include: the possibility of more precise targeting, tracking performance, accessibility and flexibility of the target audience, interactivity, managed volumes of information, efficiency of exchanges, and globalisation. The major communication touchpoints in the machinery industry were identified as internet, specialised websites, exhibitions, colleagues, and friends.

The model of evaluating the effectiveness of various elements of marketing communication mix for website promotion was offered. For integrative assessment of the effectiveness of website promotion, the system dynamic approach was applied, which allows simulating the website activity before and after applying various methods of promotion. A comparative analysis of the results showed the effectiveness of the methods used. This simulation identified hidden relationships between the individual elements of website's activity and their impact on each other, which enables the assessment of marketing communication in terms of its impact on the website as a whole, rather than on individual indicators of its activity.

The following gaps in marketing communication programs implemented by companies in cyberspace have been identified: a qualitative gap between the amount of leads and their quality; unreasonable difference between the amount of relevant marketing content and the amount needed to implement marketing programs and plans; lack of websites' usability for consumers using various devices and platforms; not clear understanding by consumers of business solutions companies offer, which often brings the price to become a major factor of choice; insufficient interactive content; insufficient visual content.

There are differences in choosing major communication channels for promoting large, medium, and small machinery products. For large equipment the main channel is direct sales, while for small and medium ones the specialised platforms are mostly used. This result reaffirms the importance of cyberspace as communication source.

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