



HOW TO MEASURE OMNICHANNEL? MARKETING INDICATOR-BASED APPROACH – THEORY FUNDAMENTALS

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ABSTRACT. Background: The ability to assess a situation is one of the key competences of companies operating on the market. One should know if one functions as well as their competitors, better or perhaps worse. In the case of the omnichannel concept, it is difficult to answer this question, since so far there has been no recognized standard for its evaluation. The aim of the article is to present the theory fundamentals of omnichannel measurement and evaluation in an indicator-based form.

Methods: The theoretical part features a systematic literature review based on the Scopus abstract and citation database. In the research part, an original indicator-based omnichannel measurement and evaluation theory was presented. The idea was based on the following ideas: marketing mix, benchmarking, OTIFEF, AHP.

Results: In the scientific literature, the dominant evaluation of omnichannel is based on financial measures, which, according to the author of this article, does not reflect the essence of the functioning of this concept. Therefore, the research part presents relational omnichannel indicators - individual (4) and aggregate (11) - based on non-financial measures.

Conclusions: There are currently no reference omnichannel evaluation instruments. The creation and functioning of such a standard would allow to form objective opinions. The standardization of the omnichannel measurement would enable to perform comparative analyses, the results of which could be used to further improve trade and distribution processes in companies using this sales strategy.

The research approach adopted in the article fits very well with the assumptions of the omnichannel concept. The proposed measurement and evaluation theory is simple and universal, and its application is not constrained by any limitations. It enables both individual and comparative evaluation.

Key words: omni-channel, marketing mix, benchmarking, omnichannel indicators, systematic literature review, expert research.

INTRODUCTION

Modern trade and distribution have recently been dominated by omnichannel. A great deal of talk and writing has been going on about one company being more omnichannel in its character than the other. Should or must omnichannel be considered only in relationships that exist between companies? Or is it possible to evaluate omnichannel within only one company, analyzing the conditions

offered by it in various sales (distribution) channels?

When evaluating a given business concept, a certain characteristic dichotomy can be noticed – an opinion is formed on the basis of financial and (or) non-financial measures. When analyzing this state of affairs in a more detailed way, one can discover the following regularity - in the vast majority of cases, evaluation based on financial measures is almost always present - an advanced, diverse set of measures / indicators can be observed.

Non-financial measures, which generally relate to operating activities, constitute a definite minority. They are used less frequently, usually as a complement to evaluation based on financial measures.

In the opinion held by the author of this article, only non-financial evaluation allows to capture the strict essence of omnichannel. It is true that the omnichannel effects are visible (bear influence) in financial evaluation, but it should be treated as an indirect (additional) opinion. It is the reliance on non-financial measures that touches the gist of omnichannel - it allows direct measurement and evaluation of the scale of this phenomenon.

The aim of this article is bring the attention of the academic community to an original scientific theory concerning an indicator-based evaluation of omnichannel that relies on non-financial measures. The undertaken topic is valid and important, as there have been no guidelines for omnichannel measurement so far. The development of a universal theory of evaluation, applicable in every trade and distribution line, will allow to evaluate this phenomenon both in the internal (individual) and external (collective) - comparative - aspects. The original concept presented in this article is a voice in the discussion regarding the approach to omnichannel measurement and evaluation.

THEORETICAL BACKGROUND

Assumptions of the literature analysis

A systematic literature review was carried out in October 2020 on the basis of the Scopus

abstract and citation database. This database is recommended by the Ministry of Science and Higher Education in Poland as the leading database of journals for scientists in the discipline of management and quality science, which is represented by the author of this article. The analysis of the literature consisted in searching for selected characteristic words and phrases in three places: title, abstract and keywords. The conducted literature review is both quantitative - the number of publications, and qualitative - the way of presenting the research topic.

The selection includes articles published since 2012. This is due to the fact that the term "omnichannel retailing" was formulated for the first time in December 2011 [Rigby, 2011] - since then it has been part of the industry terminology. Due to the fact that the spelling of the word omnichannel has a huge impact on the results of a literature review, the search was carried out in parallel in both notation systems: omni-channel and omnichannel.

Systematic review of publications

As part of the omnichannel-related topic, the following was selected in the Scopus database: a total of 370 articles with the "omni-channel" notation and 367 articles with the "omnichannel" notation, with only about 30 articles being common (repeated) for both notation systems. The relationships of omnichannel with the remaining thematic lines in this article are presented in Table 1.

Table 1. Popularity of the approach to the research topic according to the number of articles

thematic line	number of articles - potential	number of articles - substantive	list of articles - authors
omni-channel & measure	10	6	Acquila-Natale & Chaparro-Pelález, 2020; Klein et al., 2020; Patti et al., 2020; Cakir et al., 2019; Fuchs et al., 2017; Ma, 2017
omnichannel & measure	9	5	Chaparro-Pelález et al., 2020; Roy et al., 2020; Valentini et al., 2020; Buldeo Rai et al., 2019; Zhang et al., 2019
omni-channel & indicator	7	6	Pereira & Frazzon, 2020; Cakir et al., 2019; Liu et al., 2018; Martino et al., 2017; Beloborodova & Martynova, 2016; Cavender & Kincade, 2015
omnichannel & indicator	4	3	Chaparro-Pelález et al., 2020; Rivero Gutiérrez & Samino García, 2020; Martino et al., 2017
omni-channel & rate	11	5	Leung et al, 2020; MacCarthy et al., 2019; Jin et al., 2018; Tao et al., 2018; Bernon et al., 2016

thematic line	number of articles - potential	number of articles - substantive	list of articles - authors
omnichannel & rate	6	3	Liu & Xu, 2020; Fisher et al., 2019; Park & Kim, 2019
omni-channel & metric	5	4	Klein et al., 2020; Patti et al., 2020; Cakir et al., 2019; Ailawadi & Farris, 2017
omnichannel & metric	4	3	Roy et al., 2020; Adivar et al., 2019; Ailawadi & Farris, 2017
omni-channel & ratio	5	3	Hu & Xu, 2019; Ryu et al., 2019; Jin et al., 2018
omnichannel & ratio	1	1	Liu & Xu, 2020
omni-channel & index	3	2	Kim et al., 2018; Liu et al., 2018
omnichannel & index	0	0	
omni-channel & coefficient	2	2	Jiang et al., 2020; Yu et al., 2019
omnichannel & coefficient	0	0	
omni-channel & standard	8	1	Fuchs et al., 2017
omnichannel & standard	8	1	Radzevičė & Banytė, 2020
omni-channel & instrument	2	0	
omnichannel & instrument	3	0	
omni-channel & meter	0	0	
omnichannel & meter	1	0	
omni-channel & gauge	0	0	
omnichannel & gauge	0	0	
omni-channel & pointer	0	0	
omnichannel & pointer	0	0	

Source: own research

Table 2. Detailed literature review on omnichannel measurement and evaluation

author	area	method	task	result
Acquila-Natale & Chaparro-Peláez, 2020	distribution logistics	the tests of measurement instrument	level of channel integration	the systematic set of indicators in six different areas along the shopping process
Chaparro-Peláez et al., 2020	electricity markets	the mystery shopper technique	channel integration of electricity	the structured set of indicators
Jiang et al., 2020	pricing decisions	the retailer Stackelberg game	boost service value	the market scale expansion coefficient
Klein et al., 2020	digital media	the information and signaling theory	assessing cross-media exposure	the media entropy metric
Leung et al, 2020	order demand	the machine learning, time series data, neuro-fuzzy inference system	predictive forecasting	the hour-to-hour fast-changing arrival rates of e-commerce orders
Liu & Xu, 2020	online returns	the expected profit models	decision on pricing and ordering	the purchase ratio via an online channel
Patti et al., 2020	customer service	the review of literature, journey mapping	improving customer service delivery	the perception-based, operational and outcome-based metrics
Pereira & Frazzon, 2020	demand forecasting	the clustering, neural networks, simulation	synchronization of demand	the lead time, backorders and operational costs indicators
Radzevičė & Banytė, 2020	consumer behaviour	the Stimulus-Organism-Response model, behaviour literature	factors of irrational consumers behaviour identification	the standard of cognition of consumer behaviour
Rivero Gutiérrez & Samino García, 2020	distribution logistics	the Delphi method, statistical analysis with SPSS	distribution of health products	the set of indicators involve 19 different criteria grouped into 4 categories
Roy et al., 2020	customer's experience	the case study	emotional journey of consumers	the psychophysiological and self-reported measures
Valentini et al., 2020	customer channel preferences	the latent class cluster analysis	respond differently to promotions	the measure motivations, opportunities, abilities
Adivar et al., 2019	performance management	the statistical model	assessing the success of retailers	the comprehensive performance metrics – 4 competitive dimensions and 7 perspectives
Buldeo Rai et al., 2019	city logistics	the case-study research	parcel distribution	the improve distribution efficiency – parcel volume, stop density, delivery failure and urban regulation
Cakir et al., 2019	financial measures	the systematic literature review	development of financial and non-financial metrics	the customer experience and customer satisfaction measures

author	area	method	task	result
Fisher et al., 2019	sales	the quasi-experiment, difference-in-differences approach	faster delivery	the online store penetration rate
Hu & Xu, 2019	organic agricultural supply chain	the theory differential game, bi-level programming,	contracts of cooperation, decision modes	the online and offline marginal income ratio
MacCarthy et al., 2019	fulfil orders	the mathematical approach	picking operations	the picking rates
Park & Kim, 2019	consumer behavior	the survey study, partial least squares	consumers' personality trait	the adoption omnichannel service rate
Ryu et al., 2019	distribution channels	the stochastic frontier analysis	technical efficiencies of small-scale enterprises	the technology gap ratio
Yu et al., 2019	operating incomes	the symbiosis theory	establishing retail system	the symbiosis coefficient
Zhang et al., 2019	time management	the empirical method	fulfilment time	the key performance measure - fast fulfilment
Jin et al., 2018	services	the own theoretical model	mode of order fulfillment	the buy online and pick up in store customers' arrival ratio
Kim et al., 2018	shopping	the algorithm considering shopping route and stay time in a area	navigation of consumer	the consumer moving path similarity index
Liu et al., 2018	logistics services	the fuzzy analytic hierarchy process	evaluation of integration level	the logistics index system
Tao et al., 2018	strategy	the system dynamics, simulation	sensitivity analysis	the users' retention rate
Ailawadi & Farris, 2017	managing distribution	the literature review, case study	relationship between distribution and marketing objectives	the set of old and new distribution depth metrics
Fuchs et al., 2017	promotion	the interoperable couponing trial	cross-retailer coupon distribution and validation	the technical coupon standards
Ma, 2017	logistics service	the scenario-based role playing experiment	customer satisfaction and purchase intentions	the three variables - delivery time, shipping charges, purchase importance
Martino et al., 2017	decision support	the case study	correct time management in fashion sector	the set of key performance indicators
Beloborodova & Martynova, 2016	trade	the case study	analysis of Russian e-commerce market	the main indicators of e-commerce
Bernon et al., 2016	returns management	the mixed methods approach, convergent design	levels of consumer retail returns	the return rates
Cavender & Kincade, 2015	brand management	the case study, recontextualization techniques	develop a luxury brand management framework	the key dimensions of brand management operations

Source: own research

Table 2, based on Table 1, contains an original summary of the literature review in the field of omnichannel measurement and evaluation in the following section: area, method, task, result.

In the context of the review of the methodological approach used by other scientists, two columns seem to be the most interesting - method and result. The "method" column shows instrumental approaches to the topic of omnichannel measurement. The "result" column - the result of the research implementation - measures of omnichannel evaluation.

Summary of literature analysis

The question of omnichannel measurement and evaluation was noticed for the first time in 2015 (the oldest publication in Table 2). Looking at the number and age of publications, the measurement and evaluation of omnichannel is a highly topical issue that has recently been widely discussed in the scientific community - a large increase in the latest articles.

Individual scientists represent different research areas, dealing with various detailed research tasks within them. Some scientists focus more on marketing issues, some on

strictly logistic issues. The technical approach to the subject (method) is also very diverse - from standard literature analyses and case studies, to advanced interdisciplinary theories as well as optimization and simulation approaches. The results of the research are specific omnichannel measures - more often single than aggregate (conglomerates of measures / indicators), which take the form of standard (more often) than more exotic (less often) nomenclature.

RESEARCH FRAMEWORK

The concept presented in this article was inspired by the OTIFEF (on time, in full, error free) measure. It is a conglomerate of indicators related to the logistics area, assessing three aspects of operational activity - timeliness, completeness and error-free deliveries (non-financial measures). These indicators can be considered independently - separate calculation and analysis: OT (on time), IF (in full), EF (error free), and interdependently - in the form of tandems: OTIF (on time, in full), OTEF (on time, error free), IFEF (in full, error free), or the OTIFEF treble (on time, in full, error free). The result of a given indicator (whether individual or aggregate) is given in bare units or as a percentage. The obtained result can be interpreted individually (within the company) or comparatively (industry benchmarking). This approach enables a three-criteria evaluation of the functioning of the supply chain - both internal and external. Based on the opinions of logistics managers expressed in the Master of Business Administration (MBA) programmes, the author of this article has repeatedly heard that OTIFEF has been the most important key measure for assessing modern operational logistics of both a single company and a supply chain.

In the case of this article (omnichannel measurement and evaluation), its author decided to base the scientific approach on the marketing-mix concept. The marketing mix is defined as a conglomerate of four interdependent components - 4P: product, price, promotion, place. Each of these elements will constitute an omnichannel evaluation criterion. Then, under each criterion, it was

necessary to determine what would be the basis for measurement. In the case of product, it is their number. In the case of price, it is its level. In the case of promotion, it is the amount (level) of a discount. In the case of place, it is the number of channels. The author of this article decided to apply an indicator-based approach. It requires a juxtaposition of two values. The concept used by the author of this article adopts the omnichannel benchmarking approach, where the denominator is represented by the base (comparative) channel, and the numerator is represented by the alternative (compared) channel. Thus, the indicator is relational in nature, comparing the inter-channel conditions. In the author's opinion, this approach touches in a tangible way the essence of omnichannel - the possibility of direct evaluation of the offer in individual channels.

In accordance with omnichannel postulates, the consumer should not experience differences in the level of service between individual channels - in other words: the level of customer service in each channel should be the same.

RESEARCH RESULTS

Omnichannel indicators - individual approach

The general schematic of the omnichannel indicator is presented in Formula 1.

$$OC_{criterion} = \frac{a_{chII}}{a_{chI}} \quad (1)$$

where:

- OC (omnichannel) - omnichannel of a given criterion; the criteria are: product, price, promotion, place;
- a (attribute) - an attribute subject to measurement; the number of products within the product, the price level within the price, the amount of a discount within the promotion, the number of channels within the place;
- ch I (channel) - base, comparative channel (denominator);
- ch II (channel) - alternative, compared channel (numerator).

Bearing in mind the adopted four criteria, it is possible to determine four individual omnichannel indicators - Formulas 2 to 5.

$$OC_{\text{product}} = \frac{P_{\text{ch II}}}{P_{\text{ch I}}} \quad (2)$$

where:

- OC product - product omnichannel;
- p (product) - number of products;
- ch I (channel) - base, comparative channel (denominator);
- ch II (channel) - alternative, compared channel (numerator).

$$OC_{\text{price}} = \frac{P_{\text{ch II}}}{P_{\text{ch I}}} \quad (3)$$

where:

- OC price - price omnichannel;
- p (price) - price level;
- ch I (channel) - base, comparative channel (denominator);
- ch II (channel) - alternative, compared channel (numerator).

$$OC_{\text{promotion}} = \frac{d_{\text{ch II}}}{d_{\text{ch I}}} \quad (4)$$

where:

- OC promotion - promotional omnichannel;
- d (discount) - amount (level) of a discount;
- ch I (channel) - base, comparative channel (denominator);
- ch II (channel) - alternative, compared channel (numerator).

$$OC_{\text{place}} = \frac{c_{\text{ch II}}}{c_{\text{ch I}}} \quad (5)$$

where:

- OC place - distribution omnichannel;
- c (channel) - number of channels;
- ch I (channel) - base, comparative channel (denominator);
- ch II (channel) - alternative, compared channel (numerator).

Omnichannel measurement - evaluation systems

The indicator-based approach offers three possibilities for obtaining a result:

- numerator > denominator - the offer in the alternative channel is better than in the base channel – the result greater than 1: over omnichannel state;
- numerator = denominator - the offer in both channels is the same - the result is exactly 1: desired omnichannel state;
- numerator < denominator - the offer in the alternative channel is worse than in the base channel - the result is lower than 1: under omnichannel state.

The first evaluation proposal is based on relative assessments:

- 2 - awarded to the channel in which the offer is better than in the other channel (the other channel is evaluated at 1);
- 1 - awarded to both channels if the offers are comparable;
- 0.5 - awarded to the channel where the offer is worse than in the other channel (the other channel is evaluated at 1).

A problematic issue is the case of the denominator, which in the worse channel can never be zero. Hence, for worse evaluation, inspired by the Saaty scale in the AHP method, the author of this article decided to adopt evaluation which is opposite to the better one, i.e. ½ (0.5).

The following is an example that illustrates how omnichannel indicators are calculated. Table 3 contains data for calculations - characteristics of a business situation. Table 4 contains the results of partial evaluations and the relative individual omnichannel indicators calculated on their basis.

When interpreting the results (Tables 3 and 4), both products were also available in channel II, so it was given grade 1 (channel I remains with grade 1). In channel II, product prices are worse (higher), hence it was given grade 0.5 (channel I remains with grade 1). In channel II, product discounts are better (higher), so it was given grade 2 (channel I remains with grade 1). Both products were also

available for purchase in channel II in the form of two (same) delivery options, so it was given grade 1 (channel I remains graded at 1).

Table 3. Characteristics of a business situation - data for calculations

channel ID	number of products	level of the price	level of the discount	number of channels,
channel II	product 1 - yes product 2 - yes	product 1 price - 3 PLN product 2 price - 4 PLN	product 1 discount - 5% product 2 discount - 6%	product 1 - 2 product 2 - 2
channel I	product 1 - yes product 2 - yes	product 1 price - 2 PLN product 2 price - 3 PLN	product 1 discount - 3% product 2 discount - 4 %	product 1 - 2 product 2 - 2

Source: own research

Table 4. Results of partial evaluations and individual omnichannel indicators - relative approach

channel ID	product	price	promotion	place
channel II	1	0.5	2	1
channel I	1	1	1	1
OC	1	0.5	2	1

Source: own research

In summary, the desired state - omnichannel (result equal to 1) was achieved in terms of product availability and the option of its place (delivery). There are no differences in the offer in these elements. In the case of price and promotion, such differentiation already exists. Prices in the alternative channel (II) are too high (result below 1 - under omnichannel state). Discounts in the alternative channel (II) are too high (result greater than 1 - over omnichannel state). The question is whether discounts in the base channel (I) were well received. Does it not indicate the opposite, i.e. there is a need to increase discounts in the base channel (I)?

The other evaluation proposal is based on absolute assessments. In this case, it is based on the specific values of attributes present in individual criteria. However, there is a trap in

this metric system. In line with the trend, the higher the numerator is than the denominator, the better the situation in the alternative channel (II) is than in the base channel (I). This is true for product, promotion and place. In the case of price, a higher value of the numerator indicates worse terms of the offer, disrupting the overall logic of the trend of the results. Therefore, in the case of price, the inverse of the 3: 1 / OC price formula should be used in absolute terms. If this was not done, the omnichannel price indicator for product 1 would be 1.50, and for product 2 it would be 1.33. In the absolute metric system there will also be grades which are smaller, equal and larger than 1. In the case of smaller and larger grades, however, the entire spectrum of values will appear, while in the earlier relative metric system, these were only values of 2 or ½ (0.5).

Table 5. Results of partial evaluations and individual omnichannel indicators - absolute approach

channel ID	product	price	promotion	place
channel II product 1	1	3	5	1
channel I product 1	1	2	3	1
channel II product 2	1	4	6	1
channel I product 2	1	3	4	1
OC product 1	1.00	0.67*	1.67	1.00
OC product 2	1.00	0.75*	1.50	1.00
OC	1.00	0.71*	1.59	1.00

* the result is calculated as 1 / OC price (explanation earlier in the text)

Source: own research

Table 5 (based on the same data as before - Table 3) contains the results of partial evaluations and the absolute individual omnichannel indicators calculated on their basis. In the case of the OC indicator, the author of this article arbitrarily assumed that it is the average of the OC product 1 and OC product 2 indicators.

The interpretation of the results in Table 5 is the same as the interpretation of the results presented for the previous relative metric system (paragraphs under Table 4). The only difference is the other resulting numerical values of the indicators.

Omnichannel indicators - aggregate approach

So far, each of the 4 omnichannel indicators has been considered individually and independently. As in the case of the above-mentioned OTIFE indicator, the omnichannel evaluation can also be considered in a multi-criteria way, in the form of aggregate indicators. In this case, one can obtain 6 two-dimensional indicators, 4 three-dimensional indicators and 1 four-dimensional indicator. Individual indicators and their values (based on the OC results - the last row in Table 5) are presented by Formulas 6 to 16 (descriptions of formulas are unchanged - see *Omnichannel indicators - individual approach*).

$$OC_{\text{product-price}} = OC_{\text{product}} \bullet OC_{\text{price}} = 0,71(6)$$

$$OC_{\text{product-promotion}} = OC_{\text{product}} \bullet OC_{\text{promotion}} = 1,59(7)$$

$$OC_{\text{product-place}} = OC_{\text{product}} \bullet OC_{\text{place}} = 1,00(8)$$

$$OC_{\text{price-promotion}} = OC_{\text{price}} \bullet OC_{\text{promotion}} = 1,13(9)$$

$$OC_{\text{price-place}} = OC_{\text{price}} \bullet OC_{\text{place}} = 0,71(10)$$

$$OC_{\text{promotion-place}} = OC_{\text{promotion}} \bullet OC_{\text{place}} = 1,59(11)$$

$$OC_{\text{product-price-promotion}} = OC_{\text{product}} \bullet OC_{\text{price}} \bullet OC_{\text{promotion}} = 1,13(12)$$

$$OC_{\text{product-price-place}} = OC_{\text{product}} \bullet OC_{\text{price}} \bullet OC_{\text{place}} = 0,71(13)$$

$$OC_{\text{product-promotion-place}} = OC_{\text{product}} \bullet OC_{\text{promotion}} \bullet OC_{\text{place}} = 1,59(14)$$

$$OC_{\text{price-promotion-place}} = OC_{\text{price}} \bullet OC_{\text{promotion}} \bullet OC_{\text{place}} = 1,13(15)$$

$$OC_{\text{product-price-promotion-place}} = OC_{\text{product}} \bullet OC_{\text{price}} \bullet OC_{\text{promotion}} \bullet OC_{\text{place}} = 1,13(16)$$

Three- and four-element measures (Formulas 12 to 16) should be treated in more illustrative categories. A detailed search for the causes of the situation should take place primarily on the basis of a revision of the dual relationships of the individual components of the marketing mix components (Formulas 6 to 11).

Omnichannel criteria - hierarchy of importance

At the end, it was decided to conduct an expert study of the marketing mix criteria. The subjects of the study were Polish scientists publishing about omnichannel, whose articles were indexed in the Scopus database and/or Web of Science. Nine scientists - omnichannel experts from Poland - were selected, 7 of them agreed to take part in the study. They represent various universities: Wrocław University of Economics (3), Poznan School of Logistics (2), Poznan University of Technology (2). The aim of the expert study was to establish the importance of individual elements of the marketing mix in the light of the implementation of the omnichannel strategy from a scientific perspective - the perspective of a researcher, an expert in the subject. The respondents were asked to fill in 6 fields of the matrix presented as Table 6 (the order of experts is random). The matrix was to be read in the manner of row vs column. If a given marketing mix element (row) is more important than another marketing mix element (column), it was necessary to enter 2. If a given element of the marketing mix (row) is as important as another element of the marketing mix (column), it was necessary to enter 1. If a given element of the marketing mix (row) is less important than another element of the marketing mix (column), it was necessary to enter 0.5 (grade opposite to 2).

When analyzing the mode, Table 6 clearly shows: dominance of product over price, promotion over price, and equivalence of promotion and place. The product-promotion relationship can also be evaluated as neutral (even distribution of responses). Distribution,

both in terms of product and price, is treated rather in a secondary way (majority of grades 1 and 0.5).

The results obtained so far should be treated as a subject pilot study. Due to the small sample of experts, research should be extended

to include scientists from outside Poland. The results obtained in this way may constitute a basis for introducing weights for the criteria, which would increase the advancement level of the indicator's construction.

Table 6. The hierarchy of importance of the marketing mix elements in the opinion of scientists from Poland dealing with omnichannel

X	product	price	promotion	place
product	X	2*	1*	0.5*
		0.5**	0.5**	0.5**
		2	2	2
		2	1	1
		2	2	1
		1	0.5	0.5
		1	1	1
price		X	0.5*	0.5*
			0.5**	0.5**
			2	2
			0.5	1
			2	1
			0.5	0.5
promotion			X	0.5*
				1**
				1
				1
				0.5
place				1
				1
				X

* expert 1, ** expert 2, ...
Source: own research

CONCLUSION, LIMITATIONS AND FURTHER RESEARCH

After the emergence and crystallization of the omnichannel concept, it is natural to measure and evaluate this phenomenon. In addition to determining whether a given solution meets the assumptions of the omnichannel concept, another question arises: is this particular solution more or less omnichannel in relation to competing alternatives - other omnichannel solutions? Thus, who (the company) or what (aspect of its offer) is more / less omnichannel than others? Thus, the issue of developing and using a recognized standard for the measurement and evaluation of omnichannel is a key issue (holy

grail) for contemporary, modern commerce and distribution.

The original concept of omnichannel measurement and evaluation presented in the article was based on the logic of the marketing mix. The marketing approach, with its dominance of the consumer on the market, fits well with the omnichannel concept. In addition, the 4 elements of the marketing mix adopted as criteria cover a wide and diverse spectrum of trade and distribution. According to the basics of building a scientific theory, the presented original concept is simple and elegant, and can be used to explain various market scenarios.

While the research approach itself does not raise any doubts, the detailed solutions adopted

within its framework do - the author is critical of his concept and believes that the idea needs to be refined. The first issue concerns the number of attributes: is one attribute within a given criterion reliable, or would it be useful to have several - how many? Are the attributes proposed by the author correctly selected or should they be modified - partially or entirely? What evaluation system should be adopted - the scale and values of evaluations? Should a homogeneous or diverse system of attribute measures be used within the criteria - relative or absolute metric? It should be remembered that due to the relational character of the indicator, the test (benchmarking) makes sense for at least two channels. This state of affairs is most appropriate for the omnichannel concept (more than one channel) - the mechanics of calculating the indicator automatically include theoretical omnichannel assumptions.

Certain combinations of attributes, e.g. product or price, are more frequently checked by consumers than other combinations. The pilot research carried out by the author on the indicator-based evaluation of the stock and price omni-channel in Tesco and Carrefour retail chains was received in a positive way [Domański, Łabenda, 2020]. Perhaps one should also introduce weights for individual criteria (pilot expert study) - assigning significance and hierarchy to attributes. In this case, the solution would evolve towards a simple multi-criteria weighted evaluation system.

Despite numerous dilemmas to be resolved, the unquestionable advantage of the presented concept is its universality. It offers the possibility of comparing the omnichannel offer in various detail-related sections: single product, product group, distributor, trade line. The concept is therefore very broad and comprehensive - not susceptible to limitations related to the type of good, intermediary or selected industry.

The state of scientific knowledge on omnichannel measurement and evaluation was based on articles from the Scopus abstract and citation database. Scopus can be treated as a research limitation related the knowledge of the subject of this article. Perhaps in other sources (e.g. Web of Science, Google Scholar)

the state of knowledge is broader (more publications) and / or deeper (more detailed and precise information). It may be a form of breaking limitations, directions of future theoretical research.

The methodological approach adopted in the research part promotes the marketing approach to the topic. Perhaps, due to the origin of omnichannel as a concept on the border of marketing and logistics, one should look for a logistic approach to the subject. It is all the more interesting and innovative as it is only since 2017 that the Supply Chain Operations Reference (SCOR) Model (APICS, 2017), which is globally the most recognized model in the field of logistics, in its latest 12th edition for the first time takes into account omnichannel conditions. The pro-logistic approach to the subject can be treated as breaking (marketing) constraints, the direction of future practical research.

The ability to measure and evaluate the degree of omnichannel is very important, e.g. for Customer Relationship Management (CRM) systems. Monitoring consumer activity in relation to the level of the offer in individual channels is an important tool for distributors to construct a commercial strategy adequate to the market needs and expectations.

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REFERENCES

- Acquila-Natale E., Chaparro-Peláez J., 2020. The long road to omni-channel retailing: An assessment of channel integration levels across fashion and apparel retailers, *European Journal of International Management*, 14 (6), 1049-1069, <http://doi.org/10.1504/EJIM.2020.110562>
- Adivar B., Hüseyinoğlu I.Ö.Y., Christopher M., 2019. A quantitative performance management framework for assessing

- omnichannel retail supply chains, *Journal of Retailing and Consumer Services*, 48, 257-269, <http://doi.org/10.1016/j.jretconser.2019.02.024>
- Ailawadi K.L. Farris P.W., 2017. Managing Multi- and Omni-Channel Distribution: Metrics and Research Directions, *Journal of Retailing*, 93 (1), 120-135, <http://doi.org/10.1016/j.jretai.2016.12.003>
- APICS, 2017. Supply Chain Operations Reference Model SCOR, Version 12.0, APICS, Chicago USA, 1-1096.
- Beloborodova A.L. Martynova O.V., 2016. Trends of online trading development in Russia, *Journal of Economics and Economic Education Research*, 17 (Special Issue 1), 9-15.
- Bernon M., Cullen J., Gorst J., 2016. Online retail returns management: Integration within an omni-channel distribution context, *International Journal of Physical Distribution and Logistics Management*, 46 (6-7), 584-605, <http://doi.org/10.1108/IJPDLM-01-2015-0010>
- Buldeo Rai H., Verlinde S., Macharis C., 2019. City logistics in an omnichannel environment. The case of Brussels, *Case Studies on Transport Policy*, 7 (2), 310-317, <http://doi.org/10.1016/j.cstp.2019.02.002>
- Cakir G., Bezbradica M., Helfert M., 2019. The Shift from Financial to Non-financial Measures During Transition into Digital Retail – A Systematic Literature Review, *Lecture Notes in Business Information Processing*, 353, 189-200, http://doi.org/10.1007/978-3-030-20485-3_15
- Cavender R.C., Kincade D.H., 2015. A luxury brand management framework built from historical review and case study analysis, *International Journal of Retail and Distribution Management*, 43 (10-11), 1083-1100, <http://doi.org/10.1108/IJRDM-07-2014-0103>
- Chaparro-Peláez J., Acquila-Natale E., Hernández-García Á., Iglesias-Pradas S., 2020. The digital transformation of the retail electricity market in Spain, *Energies*, 13 (8), 2085, <http://doi.org/10.3390/en13082085>
- Domański R., Łabenda M., 2020. Omnichannel of private label grocery products in Tesco and Carrefour retail chains on the Polish market, *Ekonomski Vjesnik / Econviews – Review of Contemporary Business, Entrepreneurship and Economic Issues*, XXXIII, 1/2020, 191-202.
- Fisher M.L., Gallino S., Xu J.J., 2019. The Value of Rapid Delivery in Omnichannel Retailing, *Journal of Marketing Research*, 56 (5), 732-748, <http://doi.org/10.1177/0022243719849940>
- Fuchs K., Vuckovac D., Ilic A., 2017. Towards interoperability in mobile coupons: Enabling cross retailer coupon validation, *International Conference on Information and Communication Technology Convergence: ICT Convergence Technologies Leading the Fourth Industrial Revolution (ICTC 2017)*, 327-333, <http://doi.org/10.1109/ICTC.2017.8190997>
- Hu Q., Xu B., 2019. Differential game analysis of optimal strategies and cooperation in omni-channel organic agricultural supply chain, *Sustainability*, 11 (3), 848, <http://doi.org/10.3390/su11030848>
- Jiang Y., Liu L., Lim A., 2020. Optimal pricing decisions for an omni-channel supply chain with retail service, *International Transactions in Operational Research*, 27 (6), 2927-2948, <http://doi.org/10.1111/itor.12784>
- Jin M., Li G., Cheng T.C.E., 2018. Buy online and pick up in-store: Design of the service area, *European Journal of Operational Research*, 268 (2), 613-623, <http://doi.org/10.1016/j.ejor.2018.02.002>
- Kim M.B., Jung S.W., Chi Y.D., Gim G.Y., 2018. A study on improvement of algorithm for measuring similarity of consumer movement paths in shopping mall, *International Journal of Advanced Science and Technology*, 116, 49-58, <http://doi.org/10.14257/ijast.2018.116.05>
- Klein J.F., Zhang Y., Falk T., Aspara J., Luo X., 2020. Customer journey analyses in digital media: exploring the impact of

- cross-media exposure on customers' purchase decisions, *Journal of Service Management*, 31 (3), 489-508, <http://doi.org/10.1108/JOSM-11-2018-0360>
- Leung K.H., Mo D.Y., Ho G.T.S., Wu C.H., Huang G.Q., 2020. Modelling near-real-time order arrival demand in e-commerce context: a machine learning predictive methodology, *Industrial Management and Data Systems*, 120 (6), 1149-1174, <http://doi.org/10.1108/IMDS-12-2019-0646>
- Liu J., Xu Q., 2020. Joint decision on pricing and ordering for omnichannel BOPS retailers: Considering online returns, *Sustainability*, 12 (4), 1539, <http://doi.org/10.3390/su12041539>
- Liu X., Lan H., Song G., 2018. An evaluation model of omni-channel retail logistics service integration level, *ACM International Conference Proceeding Series*, 80-85, <http://doi.org/10.1145/3288155.3288187>
- Ma S., 2017. Fast or free shipping options in online & Omni-channel retail? The mediating role of uncertainty on satisfaction & purchase intentions, *International Journal of Logistics Management*, 28 (4), 1099-1122, <http://doi.org/10.1108/IJLM-05-2016-0130>
- MacCarthy B.L., Zhang L., Muyldermans L., 2019. Best Performance Frontiers for Buy-Online-Pickup-in-Store order fulfillment, *International Journal of Production Economics*, 211, 251-264, <http://doi.org/10.1016/j.ijpe.2019.01.037>
- Martino G., Fera M., Iannone R., Miranda S., 2017. Proposal of a multi-method decision support system for the fashion retail industry, *Lecture Notes in Electrical Engineering*, 413, 187-199, http://doi.org/10.1007/978-3-319-48511-9_16
- Nguyen N.M.H., Borusiak B., 2021. Using UTAUT2 model to examine the determinants of omnichannel technology acceptance by consumers. *LogForum*, 2, 5, <http://doi.org/10.17270/J.LOG.2021.580>
- Park J., Kim R.B., 2019. The effects of integrated information & service, institutional mechanism and need for cognition (NFC) on consumer omnichannel adoption behavior, *Asia Pacific Journal of Marketing and Logistics*, 1-29, <http://doi.org/10.1108/APJML-06-2018-0209>
- Patti C.H., van Dessel M.M., Hartley S.W., 2020. Reimagining customer service through journey mapping and measurement, *European Journal of Marketing*, 54 (10), 2387-2417, <http://doi.org/10.1108/EJM-07-2019-0556>
- Pereira M.M., Frazzon E.M., 2020. A data-driven approach to adaptive synchronization of demand and supply in omnichannel retail supply chains, *International Journal of Information Management*, 102165, <http://doi.org/10.1016/j.ijinfomgt.2020.102165>
- Radzevičė J., Banytė J., 2020. Driving Factors of Consumer Irrationality in Omnichannel Consumer Behaviour, *Smart Innovation, Systems and Technologies*, 167, 146-155, http://doi.org/10.1007/978-981-15-1564-4_15
- Rigby D.K., 2011. The Future of Shopping, *Harvard Business Review*, 89, 65-76.
- Rivero Gutiérrez L., Samino García R., 2020. Omnichannel Strategy and Consumer Behavior in Distribution Channels: Trends in the Ophthalmology Sector, *Frontiers in Psychology*, 11, 1142, <http://doi.org/10.3389/fpsyg.2020.01142>
- Roy A., Sénécal S., Léger P.-M., Demolin B., Bigras É., Gagne J., 2020. Measuring Users' Psychophysiological Experience in Non-linear Omnichannel Environment, *Lecture Notes in Computer Science including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics (LNCS)*, 762-779, http://doi.org/10.1007/978-3-030-60114-0_50
- Ryu M.H., Cho Y., Lee D., 2019. Should small-scale online retailers diversify distribution channels into offline channels? Focused on the clothing and fashion industry, *Journal of Retailing and Consumer Services*, 47, 74-77, <http://doi.org/10.1016/j.jretconser.2018.09.014>

- Tao Z., Zhang Z., Wang X., Shi Y., 2018. Simulation Analysis of Omni-channel Strategy Based on System Dynamics: A Case Study of Company X, *IOP Conference Series: Materials Science and Engineering*, 439 (3), 032039, <http://doi.org/10.1088/1757-899X/439/3/032039>
- Wojciechowski H., Łukasz Hadaś Ł., 2020. Ranking of opportunities for implementing the omnichannel concept, *LogForum*, 2,4, <http://doi.org/10.17270/J.LOG.2020.381>
- Valentini S., Neslin S.A., Montaguti E., 2020. Identifying omnichannel deal prone segments, their antecedents, and their consequences, *Journal of Retailing*, 96 (3), 310-327, <http://doi.org/10.1016/j.jretai.2020.01.003>
- Yu B., Chen X., Cao M., 2019. Omni-channel Retail Symbiosis Model and Its Empirical Analysis, 5th International Conference on Systems and Informatics (ICSAI), 8599338, <http://doi.org/10.1109/ICSAI.2018.8599338>
- Zhang J., Onal S., Das R., Helminsky A., Das S., 2019. Fulfilment time performance of online retailers – an empirical analysis, *International Journal of Retail and Distribution Management*, 47 (5), pp. 493-510, <http://doi.org/10.1108/IJRDM-10-2017-0237>

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