WHY CAN METRICS OF MULTICHANNEL CONSUMER BEHAVIOUR BE USEFUL?

Radosław MĄCIK
Faculty of Economics, Maria Curie-Skłodowska University in Lublin, Poland;
radoslaw.macik@poczta.umcs.lublin.pl

Abstract: Multi-channel consumer behaviour has become an everyday reality. Increasing numbers of purchasing processes are carried out using more than one channel. However, there are no commonly used measures of multichannel consumer behaviour intensity. The article attempts to fill this gap – it proposes two primary indices for the intensity of multi-channel behaviours: in a specific purchasing process (MCA_IPI – in two variants) and for many purchasing processes (MCA_MPI). The last measure looks particularly promising as being a normalised to the 0-1 range index, and independent of the number of analysed channels as well as the separate stages of the purchasing process. Proposed measures have practical applications – they allow to segment the buyers regarding the intensity of multi-channel behaviours and to observe changes in the structure of channel use by buyers over the time.

Keywords: multichannel consumer behaviour, multi-channelling measurement, proposed multichannel behaviour measures, calculation formulae, simulation of values of proposed indices

1. Introduction

The virtualisation of the economy changed substantially the way consumers communicate with brands and make purchases (Mącik, 2016). The traditional purchase opportunities in physical retail formats (classic stores and non-web retail outlets) are complemented by online sales (also in various business models, including those based on mobile devices), as well as the telephone services (mainly in the form of push contacts initiated by the seller or info lines), thus using more than one channel in decision-making process is not only possible, but somewhat typical. Individual mentioned channels can fulfil consumer goals regarding sales and information in varying degrees. For example, the product manufacturer's website may indicate product characteristics and provide information where the product can be purchased (online and offline). Also, physical stores can report the online availability of the product, not allowing to make the transaction online (e.g. IKEA in most locations). So different channels are often

perceived as complementary rather than substitutional from consumer's point of view (Mącik, 2015).

Integration of standalone sales channels, e.g. through a physical store network, phone sales, internet sales, aims to follow customer expectations, but primarily leads to utilise the marketing resources better. The advantage of having a well-known brand, when the buyer can contact with trough more than one channel (even in 2-3 channels at a time), should lead to maximising the conversion of a customer's contact with a business into actual transactions. While determining the level of multichannel behaviour of a consumer from a multichannel vendor's point of view is not formally more difficult with the use of internal data, capturing contact sequences across channels with different brands and sellers is still virtually unrealistic even with the usage of Big Data.

The goal of this paper is to discuss two propositions of multichannel consumer behaviour intensity metrics on particular consumer level: one considering different channel usage within particular shopping process, and the second one – across many shopping processes. There is not a goal in this case to analyse the level of multichannel activity from the seller side, nor the level of channel integration. Paper is the conceptual type, and illustrative examples are further provided to illustrate proposed metrics.

2. Channel definition and examples

Channel in a broader sense is defined as customer contact point or a medium through which the business and the customer interact (Neslin et al., 2006). The emphasis on the term "interact" reflects the exclusion of one-way communications, such as television advertising, and inclusion all contact points allowing for two-way communication (even asynchronous, like e-mail). Nota bene, such defined channels and one-way media taken together are called consumer touchpoints. This concept is less relevant from the paper goals point of view, as counting all touchpoints in consumer decision-making process.

The meaning of channel in a narrow sense includes contact points making possible to make sales, but not necessarily focusing on transactions only. Let's call them further "sales channels". Such approach allows to differentiate between following channels (at least):

- offline channel (physical retail in different formats),
- traditional direct marketing channel (including personal sales, mail order or phone order),
- online channel (online sales, mainly via online stores or marketplace platforms),
- mobile channel (accessible via smartphones or tablets and mobile apps).

Optionally vending machines selling goods can be counted as another sales channel considered offline, but not involving human interactions during the sales process. So this is possible to analyse typically three to five sales channels.

After characterising channel concept, there is a need to define what consumer decision-making processes are multichannel ones. As a multichannel decision-making process, it can be considered such process where at least at one stage consumer uses more than one channel (at the same time or sequentially). Real life example of such process is searching the Internet or using the mobile app during a visit to a physical store when consumer goal is to gather relevant information about products compared before purchase. A number of stages in decision-making process considered is not particularly relevant in that case, but it is worth to note that purchase (transaction) is possible in one channel only for the individual decision-making process. Before the introduction of proposed metrics the desirable properties.

3. Desirable properties of the metric

Taking into account theoretical and practical considerations about desirable properties of metric the following requirements can be postulated. The excellent metric should be:

- Simple in calculation – based on easy computations and accessible data.
- Intuitive in interpretation – number and sign of calculated value should be easy to interpret, notably: the higher metric value, the better evaluation; and when negative numbers are admissible, the positive assessment should be for positive values, and negative assessment should come from low or negative metric value.
- Normed (within a specified range) – eg. $\langle 0; 1\rangle\langle -1; 1\rangle\langle 0; 100\rangle$ for easy comparisons.
- Unequivocal (leaving no doubt) – having established reference values (even empirically assessed for industry or context).
- Not sensitive for cultural differences/social norms/answering habits – mainly when data come from questionnaire responses.

Last two properties are harder to fulfil, and even established indicators like for instance the Net Promoter Score metric, are not easily comparable across cultures (Seth et al., 2016). Taking into account mentioned properties of the metrics, two propositions are made in the next part of the paper, including considerations about data sources used for calculations.

4. Data sources used to assess multichannel consumer behaviour

In particular decision-making process common data sources for calculation of proposed later metrics are: self-descriptions of decision-making processes (in retrospection, more or less free responses about buying particular things, requiring coding of the text), and adequately modified purchase diaries (when consumer notes the number and time of the contacts with analysed channels on the specified decision-making processes).

When we want to assess multichannel activities across different decision-making processes most useful are mentioned modified purchase diaries, surveys and (partly) transactional data. It is worth to note that only in case of some services (mostly bought on a subscription basis) internal records of for instance contacts with a service provider are complete. Otherwise, for most purchases not done on a routine basis, even merged behavioural data from many Big data sources may be still inaccurate.

5. Multichannel behaviour metric in particular decision-making process

The most straightforward way to assess the level of multichannel behaviour at the individual level of the particular decision-making process is to count a number of used channels, as the sum of distinct channels used by consumer across considered stages of consumer decision-making process, and express it as the percentage of channels available in the particular situation. This allows to overcome the significant disadvantage of using metric not scaled as a percentage: using the sum of channels used makes comparisons meaningful only for the same number of analysed channels. Expressing the metric as a percentage of the number of used channels to the numbers of channels available to the consumer makes the metric not sensitive to a different number of channels in the analysis, and comparable. Unfortunately there exist still another disadvantage of such measure: it does not allow to point which stages of the process are in reality performed in a multichannel way. To overcome this disadvantage, separate metrics for each considered stage should be used.

Considering advantages and disadvantages of mentioned simple measures, and to avoid too small "resolution" of the measurement – when it is possible to obtain very often result on the level 100% for the whole decision-making process, following proposal (let's call it later the Proposal 1) is made. The metric for multichannel activity of the particular decision-making process: metric should be calculated as simple average of the number of channels used on each stage of assessed decision-making process, expressed in percentages, where 100% is the maximum possible number of channels to use (that means the product of number of channels in analysis and number of stages distinguished in decision-making process). This leads to two

formulas for calculate metric under Proposal 1 (let's call this metric the Multi-Channel Activity in Individual Process Index – MCA_IPI): direct one – as single measure for the whole decision-making process (1), and indirect – as average of partial metrics for particular decision-making process stages considered (2):

$$MCA\_IPI = \frac{\sum_{i=1}^{n} c_i}{n \cdot c} \cdot 100\% \quad (1)$$

$$MCA\_IPI = \frac{\sum_{i=1}^{n} \left(\frac{c_i}{c} \cdot 100\% \right)}{n} \quad (2)$$

where:
k – number of considered stages in decision-making process,
c_i – number of channels used at particular stage of decision-making process,
c – number of channels available to the consumer.

Numerically the results are identical, the latter approach making possible the assessment of the multichannel activity of separate stages in the process. Example of calculation and assessment under Proposal 1 is provided in Table 1.

Table 1.
Example of calculations for MCA_IPI metric under Proposal 1

Stage of decision-making process	Channel usage:				Calculations:		
	offline	phone	online	mobile	c_i	c	$\frac{c_i}{c} \cdot 100\%$
Problem recognition	YES				1	4	25%
Information search	YES		YES	YES	3	4	75%
Alternative evaluation	YES		YES		2	4	50%
Purchase			YES		1	4	25%
Payment			YES		1	4	25%
Delivery status check		YES		YES	2	4	50%
Post-purchase behaviour				YES	1	4	25%
				Σ	11	28	N/A
				Average	1,57	N/A	39,29%
				MCA_IPI value	(11/28)·100% = 39,29%		

Note: Own calculation on the base of exemplary data.

In working example presented in Table 1, the average number of channels used across decision-making process is 1,57 (where the possible minimum is one – for the process in single channel only, and maximum – four – for highest multichannel activity involving the use of all channels in all stages of consumer decision-making process. This leads to MCA_IPI metric value on the level of about 40% – somewhat low. Simple counting the number of the distinct channels used in relation to available gives a result equal 100%, as each channel has been used at least once in the described decision-making process. Comparing values makes visible the advantage of the proposed metric over the simple approach, as not all possibilities to use considered channels were utilised, as simple measure suggests. Although, single channel

processes will get the MCA_IPI metric on the level of (1/n)·100%, for instance, 25% for four channels available and 33% for three channels. Getting different results in mentioned cases is a disadvantage of the proposed metric, but this reflects the proportion of channel used to available and is computationally correct.

6. Multichannel behaviour metric in particular decision-making process

As for different product categories and situations, the actual multichannel activity level may vary, the metric that resembles variability in channel usage by the particular consumer for given period should be useful to assess the average level of multichannel activity and changes of the measure over the time. To construct metric, several approaches can be used, from straightforward averaging metrics computed for individual decision-making processes, through some formulas that include the coefficient of variation of a number of contacts in channels under consideration over selected period. Using average is simple, but in many cases not practical, mainly when we want to compare situations with a varying number of analysed channels. Also, direct usage of the coefficient of variation (V) calculated from numbers of contacts in each channel over particular time is far from ideal because it gives reversed values of metric – higher values are obtained for low multi-channel activity. Obtained values are also not comparable to a different number of channels (e.g. the same number obtained for three channels has a different meaning than for four channels), so there is a need to find a proper scaling factor. One of the possibilities is to use the metric normed to the range of $\langle 0; 1 \rangle$ with scaling factor as a square root of a number of channels available to the consumer (Proposal 2 – formula (3), called Multi-Channel Activity in Many Processes Index (*MCA_MPI*):

$$MCA\_MPI = \frac{\sqrt{k}-V}{\sqrt{k}} = \frac{\sqrt{k}-\frac{SD}{|M|}}{\sqrt{k}} \tag{3}$$

where:

k – number of channels available to the consumer (typically 3-5),

V – coefficient of variation of contacts/transactions in analysed channels,

M – mean of contacts/transactions in analysed channels,

SD – standard deviation of contacts/transactions in analysed channels.

Exemplary calculations of MCA_MPI metric are shown in Table 2 for several cases.

Table 2.
Example of calculations for MCA_MPI metric under Proposal 2

a) For four channels

Case id	Number of contacts in channel				Measures			MCA_MPI value
	offline	phone	online	mobile	M	SD	V	
1	5	3	10	1	4,75	3,86	0,81	0,59
2	5	5	5	5	5,00	0,00	0,00	1,00
3	3	3	3	3	3,00	0,00	0,00	1,00
4	0	0	5	2	1,75	2,36	1,35	0,32
5	0	0	10	4	3,50	4,73	1,35	0,32
6	5	0	5	0	2,50	2,89	1,15	0,42
7	10	0	10	0	5,00	5,77	1,15	0,42
8	20	2	5	0	6,75	9,07	1,34	0,33
9	20	5	20	10	13,75	7,50	0,55	0,73
10	5	0	25	15	11,25	11,09	0,99	0,51
11	0	0	15	0	3,75	7,50	2,00	0,00
12	0	0	30	0	7,50	15,00	2,00	0,00
13	0	0	1	0	0,25	0,50	2,00	0,00
14	5	5	4	5	4,75	0,50	0,11	0,95

Note: Own calculation on the base of exemplary data.

b) For three channels

Case id	Number of contacts in channel			Measures			MCA_MPI value
	offline	phone	online	M	SD	V	
1	5	3	10	6,00	3,61	0,60	0,65
2	5	5	5	5,00	0,00	0,00	1,00
3	3	3	3	3,00	0,00	0,00	1,00
4	5	0	0	1,67	2,89	1,73	0,00
5	10	0	0	3,33	5,77	1,73	0,00
6	5	0	5	3,33	2,89	0,87	0,50
7	10	0	10	6,67	5,77	0,87	0,50
8	20	2	5	9,00	9,64	1,07	0,38
9	20	5	20	15,00	8,66	0,58	0,67
10	5	0	25	10,00	13,23	1,32	0,24
11	0	0	15	5,00	8,66	1,73	0,00
12	0	0	30	10,00	17,32	1,73	0,00
13	0	0	1	0,33	0,58	1,73	0,00
14	5	5	4	4,67	0,58	0,12	0,93

Note: Own calculation on the base of exemplary data. M – arithmetic mean from the row, SD – standard deviation, V – coefficient of variation.

Main Advantage of this proposal is being computationally simple, having an intuitive interpretation, normed and also not sensitive per se for cultural differences.

MCA_MPI metric is normed to be within 0 and 1. Value 0 means that the consumer uses only one channel from those available for him/her. Similarly, value 1 means that all channels are used with the same intensity. The same value of MCA_MPI can be obtained from different number of contacts – see cases number 4-5 and 6-7 from Table 2 part a), and 6-7 from Table 2 part b), so proposed measure is not related to general intensity of contacts made, but reflects the relations between number of channels used and differences between intensity of usage within the set of used channels. This is desired property of proposed measure (MCA_MPI).

Although some potential problems with this metric arise, including the possibility of misinterpretation of obtained value with the proportion of channels used to channels available (both indices look similar), and also the number of channels being non-linear scaling factor for proposed metric.

7. Multichannel behaviour metric in particular decision-making process

Although data used to calculate both proposed metrics are not always readily available, both proposals of consumer multichannel activity assessment have clear managerial implications. As being simple measures, proposed metrics can be included within managerial dashboards (Kumar et al., 2013; in this case averaged MCA_MPI calculated on the base of internal data seems to be useful).

Easy segmentation of the consumer is also another available option, regarding their pattern of multichannel behaviour used to help to manage particular channels. Changes over the time to indicate channel usage changes can be observed on general, segment and individual level – in last case the metrics can be included in customer relationships management rules as the events requiring individualised contacts and offers to stimulate channel migration and retention.

8. Conclusion and further research

Two metrics have been proposed in the text to assess the level of multi-channel purchasing behaviour of consumers in two different situations (single decision-making process and many processes over a specified period). The choice of the appropriate mathematical formulas for the metric that synthesises the multi-channel nature of many consumer decision-making processes in a particular period remains still open. The proposed formula for calculating the potentially desirable metric (MCA_MPI), normed within range of 0 to 1, where the value obtained is independent of the number of channels in the analysis and number of contacts or transactions in the analysed period seems to be promising. The next stage of research is to go from methodological considerations to the practical applications of the proposed solutions based on the data of the author's research and obtained secondary information, including observation of changes of MCA_MPI metric value over the time for the same consumer.

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