Online retailers’ management system of marketing commodity policy

Abstract. Introduction. In the conditions of continuous change and bifurcations of the marketing environment, the system of management of marketing commodity policy (SMMCP) of online retailers is impacted by a set of immanent components, the inclusion of which makes it possible to multiply the efficiency of their functioning in the cyber space and timely adjust the plan to implement marketing activities. In this regard, the urgency in substantiating, systematising the immanent components (quantitative measurement) and developing practical principals relevant to the assessment of the impact of such components on the SMMCP of online retailers based on the use of a multidimensional simulation method is becoming more relevant. The purpose of this article is to develop canonical models for assessing the impact of partial immanent components (quantitative measurement) on the SMMCP of online retailers, taking into account the corresponding latent root causes. In order to automate calculations and construct canonical models, the authors of the article use the demo version of the «STATISTICA» software package. Results. The author of the article has substantiated and systematised the immanent components and their impact on the SMMCP of online retailers (quantitative measurement), as well as the root causes of the formation of the SMMCP of online retailers that determine the partial immanent components of impact, and explained the correlation between the corresponding attributes, giving their meaning in interpretation. Consequently, canonical models for assessing of partial immanent components of impact on the SMMCP of online retailers, the implementation of which is the basis for making effective marketing decisions and achievement of corresponding goals by applying managerial impact locally. Conclusion. The approbation of the developed canonical models has allowed the author to single out three groups of online retailers and formulate practical recommendations with regard to further implementation of marketing activities.

Keywords: online retailers; management system of marketing commodity policy (MSMCP); immanent components of influence; latent root causes; canonical models.

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1. Introduction

In the conditions of continuous change and bifurcations of the marketing environment, the system of management of marketing commodity policy (SMMC) of online retailers is impacted by a set of immanent components, the inclusion of which makes it possible to multiply the efficiency of their functioning in the cyber space and timely adjust the plan to implement marketing activities. In this regard, the urgency in substantiating, systematising the immanent components (quantitative measurement) and developing practical principals relevant to the assessment of the impact of such components on the SMMCP of online retailers based on the use of a multidimensional simulation method is becoming more relevant.

2. Brief Literature Review

Various aspects of the development of online business in the context of constant change in the environment, as well as...
the peculiarities of the development of digital business models that make it possible to adapt to such change, have been investigated by G. Remane, A. Harue, R. Nickerson, L. Kolbe, F. Svahn, L. Mathiassen, R. Lindgren and G. Kane (2017). It is important to note that D. Paulus-Rohmer, H. Schattan and T. Bauernhansel (2016), as well as N. Foss and T. Saebi, dedicate their scientific work to the study of the role of innovation in the development of business models that improve management efficiency by changing the environment. Leading economists representing well-known companies in the world market and academicians, such as M. Rachinger, R. Rauter, C. Müller, W. Vorraber and E. Schirgi (2018); H. Gimpel and M. Röglinger (2015), study various problems of online business in the conditions of digitalisation, finding it necessary to take into account the impact of marketing environment factors. Not downplaying the importance of scientific achievements in this area, it should be noted that the assessment of the impact of immanent components on the SMMCP of online retailers remains insufficiently studied, therefore relevant.

3. Therefore, the purpose of the article is to develop canonical models for the impact of partial immanent components (quantitative measurement) on the SMMCP of online retailers, taking into account the relevant latent root causes.

4. Results

According to the results of the studies of the specifics of online retailers’ functioning at both the national and international levels, the author proposes to consider traffic statistics and the size of the product portfolio to be partial immanent components of the impact (quantitative measurement) on the SMMCP of online retailers.

Traffic statistics (TS) of online retailers, which is the first partial immanent component of the impact (quantitative measurement) on the SMMCP of online retailers, is determined by five latent root causes identified basing on data from the information company «Alexa», which is the world leader in the Web analytics industry.

1. Ranking of the website in Ukraine (TS1)

This is a latent root cause that shows how popular one retailer’s website is if compared to others. It is worth pointing out that, when ranking websites, it is important to consider visitors who possess the built-in «Alexa Toolbar» browser which transmits data to the general service. When ranking websites, it is common to take into account the quality of their traffic and the level of their popularity. Therefore, the more potential buyers visit the online retailer’s website and leave their comments, the higher the website ranks, holding the first or close position in the ranking. The foregoing indicates that TS1 is a dominating factor, if compared with TS2, since an increase in TS1 negatively affects TS2.

2. Refusal rate (TS2)

This is a latent root cause that reflects the percentage of visitors (potential online buyers) that left the website from the sign-in page or viewed no more than one page on the website. In general terms, a refusal is a visit during which the user views only one webpage without proceeding to another webpage before the end of online session. It should be noted that there is no generally accepted standard that considers either minimum or maximum amount of time that the user must spend online before closing the webpage and leaving the website. The duration of one online session is determined by the length of time it takes to view the first and the last page on the webpage. According to R. Nichols (2018), the main reasons for refusals are linking to another website, closing the window or tab of the web browser, entering a new URL, returning to search (clicking the «Back» button on the web browser), the session timeout.

3. Visitor browsing the web on a daily basis (TS3)

This is a latent root cause which shows the ratio between the number of visitors (potential online buyers) to the website and the total number of views, and reflects the maximum number of revisits to the website, including the frequency of visits by those who previously visited the website. The online retailer’s commercial portfolio created in accordance with the preferences of online buyers and taking into account their various queries increases the number of revisits to the website.

4. Time spent by the visitor on the website daily (TS4)

This is a latent root cause that shows a daily page views per visitor in seconds. The long-term presence of online buyers on the online retailer’s website can be interpreted as tracking the emergence of new products, which determines the maximum satisfaction of online buyer’s needs and preferences.

5. Location of website visitors by country (TS5)

This latent root cause makes it possible to see from what countries website visitors come from and determine in which of the countries the website is popular. Data are updated on a monthly basis.

The three latent root causes that determine the size of the commercial portfolio (CP) of the online retailer are the second partial immanent components of impact (quantitative measurement) on the SMMCP of online retailers are given below.

1. Width of stock keeping units (CP1)

This is the optimal number of product line items on the online retailer’s website, which is also a factor determining the attractiveness of the website with regard to its visitors and strengthening the online retailer’s market position, if compared to their competitors.

2. Product depth (CP2)

The online retailer’s product depth is reflected in the structure of the online directory and its nesting depth. A well-designed directory structure of a website, which is usually designed in a hierarchical manner, is required to maintain convenient and efficient work of online retailers. In the process of the directory structure development, online retailers define the required nesting depth.

3. Number of product items (CP3)

This is a latent root cause which reflects the number of products offered by an online retailer.

According to the research conducted by Prom.ua (2017), an item with a generalised name is ignored by users in 70% of cases, and goods without description and photographs are not noticed by 80% of users. Therefore, it is appropriate for online retailers to pay close attention to the description and characteristics of product items that are observed on websites.

In order to construct models for assessing the impact of partial immanent components (quantitative measurement) on the SMMCP of online retailers, we have identified the values of the latent root causes (Table 1). When studying the latent root cause TS3 (Location of website visitors by country), the maximum number of countries relevant to online retailers was determined to be 5. Also, we can determine three intervals to evaluate CP3 (Number of product items): if the number of product items (x) is greater than or equals 350 (x ≥ 350), then CP3 = 1; if 350 < x ≤ 700, then CP3 = 2; if x > 700, then CP3 = 3.

At this stage of studying the relationships between the latent root causes which determine the traffic statistics (TS) and the size of the commercial portfolio (CP) in the demo version of the «STATISTICA» software package (2018), the value is provided for each of the 21 online retailers under study, including their canonical analysis.

The overall results of the canonical analysis are reflected in Table 2. The canonical correlation R is 0.739. The obtained value indicates the presence of a strong relationship between the groups of variables. The value of $\chi^2$ is 20.618 at a significance level of less than 0.005, which proves the significance of the canonical correlation.

As can be seen from Table 2, the left set consists of 5 variables, while the right set comprises 3 variables. The variance of the left set is 81.035%, while the variance of the right set is 100%. 18.979% of the left set of variables is explained by the right set of variables, and 43.121% of the right set of variables is explained by the left set of variables. Below each of the sets in Table 2, there are relevant variables that form them. The percentage of the variance of the proportion of each of the variances (its variability), which is explained by each set of variables. The overall redundancy of the sets of variables is a value that shows to what extent the real variability of one of the set of variables is explained by the other set of variables.

It should be noted that the number of canonical roots is equal to the number of variables in a smaller set. Consequently, the total number of roots is 3. To check the significance of the canonical roots, we determined the $\chi^2$ statistics.
The results of the test indicate only two canonical roots should be considered statistically significant and be used for further interpretation. The load of canonical factors can also be interpreted as in the case of the factor analysis. They represent a correlation between the sets of variables and corresponding canonical variables. Taking into account that our research touches upon two canonical roots, the first canonical root is determined by the variable \( TS_4 \) (time spent by the visitor on the website daily). The first root for the right set is determined by the variable \( CP_1 \) (width of stock keeping units), and the second root is determined by the variable \( CP_3 \) (number of product items). In the left set, the second root accounts for 24.8% of the variance, while the first root accounts for only 14.1%. In the right set, the second root accounts for 48.5% of the variance, while the first root accounts for 43.2%.

Also, according to the results of the canonical analysis, we determined canonical scales for each set of variables. The scales meet the standardised variables. They can be used to interpret canonical roots. Therefore, it can be argued that the first canonical root has \( CP_1 \) (width of stock keeping units) at the negative pole, while \( TS_4 \) (time spent by the visitor on the website daily) is observed at the positive pole. The second canonical root has \( CP_3 \) (number of product items) at the positive pole and \( TS_5 \) (location of website visitors by country).

To construct the mathematical expression of canonical models for assessing the impact of partial immanent components (quantitative measurement) on the SMMCP of online retailers, we used the canonical scales for the left and the right sets of variables. The obtained canonical models for estimating traffic statistics \( Z_{TS} \) (1) and the size of the commercial portfolio \( Z_{CP} \) (2) are given below:

\[
Z_{TS} = 0.24TS_1 + 0.408TS_2 - 0.696TS_3 + 1.548TS_4 + 0.940TS_5 \tag{1}
\]

\[
Z_{CP} = -0.976CP_1 + 0.251CP_2 + 0.888CP_3 . \tag{2}
\]

In order to assess the impact of partial immanent components (quantitative measurement) on the SMMC of the online retailers under research, we used the standardised values of the corresponding root causes as the variables \( TS_1 - TS_5 \) and \( CP_1 - CP_3 \). The results are given in Table 3.

We identified three groups of online retailers with regard to the assessment of the impact of partial immanent components. To do this we determined three equal intervals taking into account the minimum and the maximum values (Table 4).

The overall results of the distribution of the online retailers in three groups depending on the assessment of the impact of partial immanent components (quantitative measurement) on the SMMC of the online retailers are given in Table 5.

5. Conclusions
The results of the calculations show that the online retailers, which represent Group 1 and have the impact of partial immanent components on the SMMC assessed as low, do not fully take into account the effect of the latent root causes. This necessitates the development and implementation of a series of

| No. | Online retailer | Code designation | Traffic statistics (TS) | Size of the commercial portfolio (CP) |
|-----|-----------------|-----------------|-------------------------|---------------------------------------|
| 1   | Auchan Ukraine LLC | FR1             | 674 | 55 | 4   | 181 | 4 | 23 | 206 | 3 |
| 2   | Metro Cash and Carry Ukraine LLC | FR2 | 1,208 | 53.8 | 2.75 | 213 | 5 | 20 | 175 | 3 |
| 3   | NOVUS Ukraine LLC | FR4             | 1,196 | 53.8 | 2.75 | 213 | 5 | 14 | 127 | 3 |
| 4   | DC Ukraine LLC | DR1             | 1,001 | 37.6 | 4.46 | 336 | 5 | 9 | 89 | 2 |
| 5   | RUSH LLC | DR2             | 1,731 | 33.6 | 4.20 | 297 | 5 | 10 | 53 | 1 |
| 6   | ALLO LLC | HA1             | 83 | 60.9 | 2.94 | 243 | 5 | 10 | 178 | 3 |
| 7   | Group of companies Foxtrot LLC | HA2 | 129 | 42.0 | 3.83 | 326 | 5 | 12 | 57 | 3 |
| 8   | DIESA LLC | HA3             | 349 | 70.7 | 1.79 | 196 | 5 | 8 | 66 | 3 |
| 9   | Comfy Trade LLC | HA4 | 103 | 47.0 | 3.25 | 297 | 5 | 8 | 54 | 3 |
| 10  | NRP LLC | HA5             | 280 | 64.5 | 1.90 | 166 | 5 | 17 | 192 | 2 |
| 11  | Economists Discount LLC | HA6 | 295 | 70.5 | 2.02 | 184 | 5 | 21 | 137 | 3 |
| 12  | Leroy Merlin Ukraine LLC | DIV5 | 3727 | 30.2 | 5.40 | 347 | 5 | 18 | 143 | 3 |
| 13  | NASH KRAI-LC LLC | FR3 | 16,364 | 68.3 | 3.00 | 154 | 5 | 19 | 178 | 1 |
| 14  | Tavista B LLC | FR5 | 4,712 | 31.6 | 12.00 | 346 | 5 | 17 | 114 | 2 |
| 15  | Pozzy Food LLC | FR6 | 3,407 | 52.3 | 4.00 | 240 | 5 | 23 | 125 | 3 |
| 16  | Budmax LLC | DIV3 | 32,145 | 48.8 | 2.70 | 205 | 5 | 6 | 36 | 1 |
| 17  | BRV Kyiv Private JSC | DIV1 | 19,728 | 37.5 | 7.30 | 339 | 5 | 5 | 32 | 2 |
| 18  | Nova Lineas private JSC | DIV2 | 838 | 42.4 | 3.65 | 296 | 5 | 13 | 102 | 2 |
| 19  | Epicentre K LLC | DIV4 | 146 | 41.2 | 5.16 | 387 | 5 | 9 | 107 | 3 |
| 20  | Furniture Company of Ukraine LLC | DIV6 | 6,335 | 43.0 | 4.80 | 303 | 3 | 10 | 77 | 2 |
| 21  | JYSK UKRAINE LLC | DIV7 | 1,669 | 28.3 | 7.00 | 385 | 5 | 9 | 99 | 2 |

Source: Compiled by the author

The results of the \( \chi^2 \) test indicate only two canonical roots should be considered statistically significant and be used for further interpretation.

Tab. 1: Latent root causes of partial immanent components (quantitative measurement) on the SMMCP of online retailers (as of 01 November 2018)

Tab. 2: Results of the canonical analysis

| No. | Number of variables | Left set of variables | Right set of variables |
|-----|---------------------|-----------------------|-----------------------|
| 1   | 5                   | 5                     | 100.00%               |
| 2   | 3                   | 3                     | 43.12%                |
| 3   | Overall redundancy  | 18.97%                | 43.12%                |
| 4   | Variables           | TS1                   | CP1                   |
| 5   | TS2                 | CP2                   |
| 6   | TS3                 | CP3                   |
| 7   | TS4                 |                        |
| 8   | TS5                 |                        |

Source: Compiled by the author

Tab. 3: Results of the canonical analysis

Tab. 4: Results of the canonical analysis

Tab. 5: Results of the canonical analysis

The canonical scales can be interpreted as load factors. Therefore, it can be argued that the first canonical root has \( CP_1 \) (width of stock keeping units) at the negative pole, while \( TS_4 \) (time spent by the visitor on the website daily) is observed at the positive pole. The second canonical root has \( CP_3 \) (number of product items) at the positive pole and \( TS_5 \) (location of website visitors by country).

The overall results of the distribution of the online retailers in three groups depending on the assessment of the impact of partial immanent components (quantitative measurement) on the SMMC of the online retailers are given in Table 5.

5. Conclusions
The results of the calculations show that the online retailers, which represent Group 1 and have the impact of partial immanent components on the SMMC assessed as low, do not fully take into account the effect of the latent root causes. This necessitates the development and implementation of a series of

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activities aimed at increasing the online retailers’ Internet activity and ensuring timely updating of the commercial portfolio according to variation requests and preferences of online buyers, which, in the long run, will indicate a high or medium level of impact of the partial immanent components of quantitative measurement on the SMMC of the online retailers.

The online retailers forming Group 2 and Group 3 have a medium level and a high level of the impact of partial immanent components on the SMMC, respectively. This means that Group 2 online retailers should focus on changing or expanding the online marketing tools that they traditionally use to most fully consider the latent root causes, in particular the size of their commercial portfolio. Meanwhile, Group 3 online retailers should continue to implement marketing activities that provide the necessary positive impact of partial immanent components on the SMMC.

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