Metaverse's Virtual Reality and its impact on the buying behavior – an Empirical Study

Valerie Busse [1], Christine Strauss [2]

[1] *Munich University of Applied Science, Department of international Management, Am Stadtpark 20, Munich, Germany*
[2] *University of Vienna, Department of Marketing and International Business, Oskar Morgenstern Platz 1, 1090 Vienna, Austria*

Abstract

Metaverse represents a novel iteration of the future internet which currently features various technologies. This makes the scope of applications extremely broad. An important B2C application refers to online shopping. A survey is conducted to analyze the possible influence of the attitude-behavior relationship of buyer behavior. Based on the classic behavioral perspective model of purchase and consumption (BPM model) eight hypotheses have been developed. The survey *(i)* investigates to what extent a selected part of the Metaverse, namely virtual reality (VR), affects the buyer behavior based on the BPM according to Foxall, and *(ii)* provide insights into the changed buyer behavior of digital natives aged between 20 and 25 years.

Keywords

Metaverse, Online Buyer Behavior, BPM Model, Virtual Reality

1. Introduction

Metaverse is a three-dimensional virtual world inhabited by avatars of real people based on Neal Stephenson's novel published in 1992 "Snow Cash" [1]. It is known as a virtual world where one can dive in via virtual reality (VR) glasses and create her or his own personal dream environment. The term "Meta" got viral as Facebook's CEO Mark Zuckerberg announced that his company will now be called as "Meta" or **"**Meta Platforms" [2].

The new platform combines technologies and apps under one new umbrella brand. Metaverse seems to merge the entire technological advances of Web 1.0, the internet, and Web 2.0, smart phones, social media, and virtual/augmented/mixed reality, into a new area of Web 3.0. For this reason, Metaverse most likely affects a wide range of online activities. As online shopping has gained tremendous relevance worldwide, the study at hand aims to analyze if and how Metaverse has an impact on the purchasing behavior of digital natives, which refer to people aged between 20 and 25 years. The hypotheses, which form the basis of the survey, were formulated using the classic behavioral perspective model of purchase and consumption according to Foxall [20,21].

The remainder of the paper is structured as follows: Fist of all, the customer behavior in Metaverse will be clarified including changes in current customer demands, the different application areas of Metaverse and potential risks. Secondly, the theoretical background will be explained. Then, the behavioral perspective model of purchase and consumption will be applied and hypothesis formulated. Followed by the design and results of the empirical study. Finally, a conclusion will be derived based on the results.

COLINS-2023: 7th International Conference on Computational Linguistics and Intelligent Systems, April 20–21, 2023, Kharkiv, Ukraine
EMAIL: valerie.busse@hm.edu (V. Busse); christine.strauss@univie.ac.at (C. Strauss)
ORCID: 0009-0009-3117-9326 (V. Busse); 0000-0003-0276-3610 (C. Strauss)

2. Metaverse and Customer Behavior

The corona pandemic has forced companies to digitalize their processes rapidly. It has also forced a rethinking of the importance of customer care. Suddenly, the study of customer journeys and satisfaction metrics to shed light on what customers want, has given way to an acute urgency to meet customers' needs and preferences.

2.1. Changes in current Customer demands

Current changes of customer needs can be observed in terms of behavior, expectations and requests and can be summarized as follows:

Increased online purchasing behavior: Customers are becoming more convenient, and therefore online shopping and home delivery will increase. The pandemic has shown that the concept is being embraced and is making life easier. As a result, it is crucial for any business to effectively implement online sales and marketing strategies to keep up with the competition [2,3].

Increased customer need for social experiences: Beyond the usual purchases, customers want to have an experience and connect with others as the demand for interaction with others has peaked due to pandemic isolation. This presents a major opportunity for companies to rethink their shopping experiences for customers [4].

Higher demand for transparency: Customers today are demanding a higher level of transparency. As many companies in various industries have betrayed customer trust through scandals, customers today demand a clear picture of the supply chain, processes and ingredients [5].

Increased focus on sustainability: Clean energy has been a trend before, but this year it will grow exponentially as we clearly recognize the damage we have done to our planet. As consumers demand more environmentally friendly products, suppliers will produce more, further driving demand. Demand for electric vehicles, solar panels and vegan meat will be higher than ever before, and more and more companies will adapt to this trend [6,7]

Omnichannel communication: customers expect a coherent brand experience and 24/7 customer service across all channels whenever it is convenient. AI and bots in the form of customer service will lead to all channels being controlled [8].

Stronger human element in customer interactions: customers expect a greater "human" element in their interactions. Virtual meetings and the absence of gatherings make people eager for meaningful conversations in real time [9].

2.2. Application of Metaverse

Metaverse can be applied in a wide range of possible applications and sectors:

Work, Collaborate: The Metaverse could facilitate the transition to hybrid forms of work by providing people with virtual work environments that enhance interaction. Imagine virtual meetings where participants show up with their avatars and have conversations that are more lifelike than current video conferencing capabilities allow [10, 11].

Manufacturing, logistics: Companies can use digital twins to emulate manufacturing and logistics processes in the metaverse, which can enable more cost-effective predictive planning and maintenance. Industrial engineers can test product designs in a mixed reality launch pad, for example [10].

Education, training: Online experiences combined with avatars could expand opportunities for learning and collaboration. A single avatar could move fluidly between different spaces, from the lecture hall to the science lab to the operating room. Medical students could practice on a single avatar before applying their skills to real patients [11].

Consumer: Businesses and consumers could operate in a space where people live, work and shop in a virtual world, which could expand the potential scope of interactions and transactions [10].

Government, public sector: The Metaverse provides a platform for civic engagement and for government officials to be more accessible to their constituents. Town meetings and public events can be held virtually. Even city halls and embassies can be virtualized. This could lead to far-reaching

questions about how organizations can deliver services cost-effectively and where physical structures are even necessary [12].

Adventures, Experiences: Metaverse offers a huge range of virtual theaters and concerts around the globe [10].

Well-being, health, sports: the current focus on telehealth may evolve into virtual care to replicate the in-person experience. The metaverse could spawn innovations in healthcare, from mental health and pain management to surgery, fitness and physical therapy [10].

2.3. Potential Drawbacks in Metaverse

In addition to the advantages of Metaverse, different risk categories can be identified. These relate not only to the technical data of the platform, such as energy waste and data garbage, but also to the issue of users. The following example is intended to show a risk. For example, in the health care sector, barriers and misunderstandings can arise between providers and users. For instance, risks for incorrect medication and diagnosis can potentially lead to significant health damage [13, 22, 23].

Another risk category is psychological risks. Here, racist, sexual harassment, mobbing, criminality and irrationality can lead to depression in real life for users of the Metaverse. The generation Z is particularly at risk here, as they have never experienced a reality without digitization and therefore place greater trust in platforms and providers. The Metaverse cannot replace human communication and haptic experiences [14, 15].

Entry barriers can be considered a further risk category: These result from the fact that access to the metaverse is only available to privileged groups of the population. This means that regions with inadequate Internet coverage in particular cannot be reached by the metaverse, creating imbalances between current and potential users [14, 15].

In addition, there are the barriers to entry due to the user costs that arise from the virtual reality usage conditions such as the virtual reality glasses and the virtual reality glove [13, 14].

3. Theoretical and Conceptual Background

The Metaverse currently features various technologies such as virtual reality mixed reality, extended reality, whatever reality, avatars digital twins, fast network, blockchain and smarts contracts (non-fungible token, NFT) [10]. In the following analysis, based on the Behavioral Perspective Model of Purchase and Consumption according to Foxall (BPM Model), it will be investigated to what extent a selected part of the Metaverse, namely in this case virtual reality, affects the buyer behavior. The analysis is to gain insights through a survey of digital natives. With a market volume of approx. 800 billion USD expected for the year 2024, the analysis is highly relevant [16].

In order to place the empirical study on a profound scientific theoretical basis, the theory of buyer behavior, the behavioral perspective model of purchase and consumption according to Foxall (BPM Model), is taken as a basis [17].

Scientific research has developed a number of theories to determine consumer decisions. The BPM model of Foxall as well as the well-established tricomponent model of Rosenberg and Hovlands and Fishbein-Aizen's theory of reasoned actions are still the most common used theories of behavior orientated decision making processes [18, 19].

The focus of the BPM Model lies in an analytical approach to explore the possibilities of buyer behavior explicitly focusing on the perspectives: Feeling, behavior and their influences.

"A comprehensive account will eventually incorporate both cognitive and behavioral source of explanation but, as a prelude to such synthesis; the BPM explores the implication of radial environmental perspective on choice" (Foxall 1992, 189) [20].

The BPM Model is based on two fundamental theses:

1. The expression of current customer behavior is a function of customer behavior in the past
2. Determinants of customer behavior must therefore be identified more in the customer's environment than in the customer's personality itself

Customer behavior itself is differentiated in the BPM model into role behavior (rule-governed behavior) and random behavior (contingency-based behavior) [21].

The current characteristics of the theories of buyer behavior developed in the past are fundamentally changed by the Metaverse. This will be illustrated by the following example:

If the buyer behavior is divided into a presale and an after sale, it is already recognizable, due to the extreme growth of online trade, that almost 60% of the entire purchase process lies in the pre-sale activities. The information search and product and detail research, as well as the product recommendations of other customers that are publicly accessible are simplified and detailed by the Metaverse. This raises the question of analyzing buyer behavior and the buying process under the influence of Metaverse, especially for companies. The analysis of the behavior of ideal customers under the influence of the Metaverse goes so far that salespeople have to penetrate the brain of ideal customers in order to anticipate their behavior. The Metaverse offers excellent possibilities for this, especially through avatars.

Due to the broad application of the Metaverse from medical technology to hybrid work models educational training to gastronomic application, the analysis will be limited in the following to the purchase of durable consumer goods. This will also be the main focus of the survey. The survey is conducted exclusively among digital natives between the ages of 20 and 25. The educational background of all respondents is a bachelor's degree in business administration and international management.

4. Application of the Behavior Perspective Model

In the following section the hypothesis are presented followed by the description of the categories of buyer behavior.

4.1. Formulating the Hypotheses

First consequences and questions from the scientific-theoretical anchoring of the BPM model for buyer behavior for durable consumer good under the influence of the Metaverse. Based on the theory theses the following hypotheses can be derived in table 1:

Table 1
Derived Hypotheses based on theory of BPM

Hypothesis	
Hypothesis 1:	Customers buy durable consumer goods in the Metaverse because they have already bought in the past in this medium (see thesis 1 BPM model)
Hypothesis 2:	Customers buy durable consumer goods in the Metaverse because they encounter their experiences of other customers
Hypothesis 3:	Customers buy durable consumer goods in the Metaverse according to the pure random principle (contingency based behavior)
Hypothesis 4:	Customers buy durable consumer goods in the Metaverse because they are close to the role behavior of other personalities in their environment (ruled-governed behavior)
Hypothesis 5:	Customers buy durable consumer goods in the Metaverse because they like the sales setting
Hypothesis 6:	Customers buy durable consumer good in the Metaverse because they like the sales setting and because they can transfer the product setting into their own environment through virtual reality (see theses 2 BPM model)
Hypothesis 7:	Customers buy durable consumer good in the Metaverse because it exerts a reinforcing advertising influence on buyer behavior directly next to the products (see these 2 BPM model). Examples are celebrity endorsement and influencer marketing.

Hypothesis 8:	Hedonic reinforcers affect buyer behavior in the Metaverse as important influencing factors in the future

In the BPM Model, the situation analysis shows that the customers behavior is determined by five factors (i.e., current behavior setting, consumer's learning, hedonic reinforcement, aversive stimuli and informational reinforcement) as depicted in figure 1.

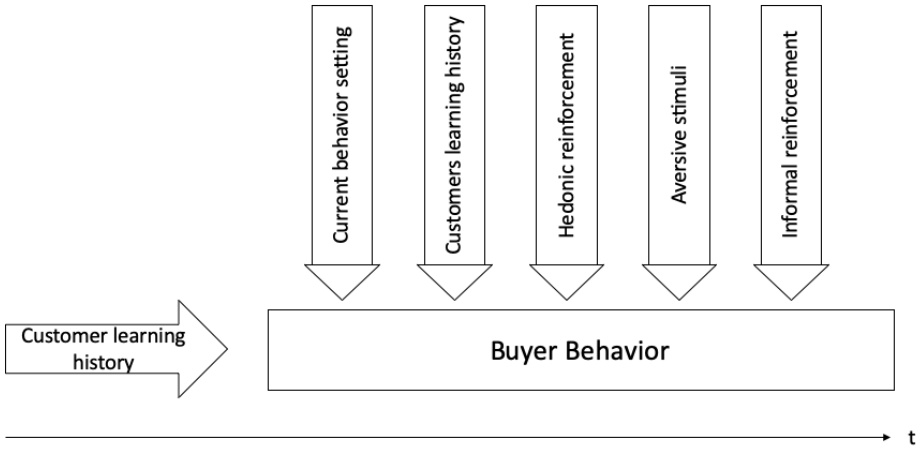

Figure 1: Situation Analysis (based on [21]).

Already in advance it is clear that the Metaverse influences current behavior setting and customer learning history sustainably and significantly. Foxall sees further influencing factors on buyer behavior in the form of hedonistic amplifiers. These are for example fantasy feeling fun amusement arousal sensory stimulation and enjoyment (Foxall 1992, 191) [20].

Such hedonistic amplifiers are offered in particular by the Metaverse, for example VR. Furthermore, Foxall distinguishes four categories of buyer behavior accomplishment pleasure accumulation and maintenance (see figure 2).

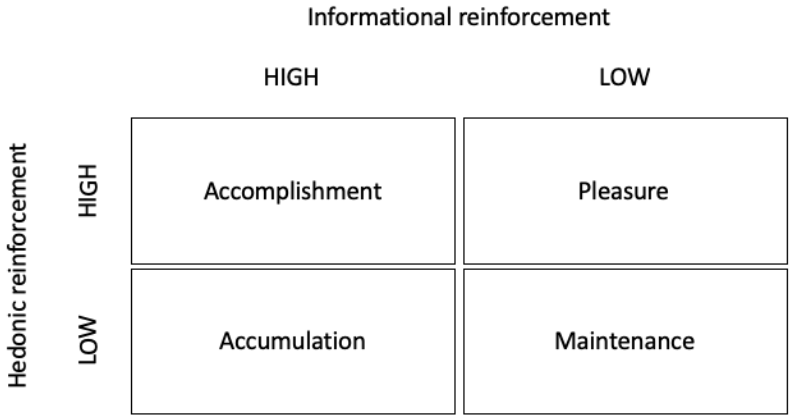

Figure 2: Categories of buyer behavior (based on [21]).

From these theoretical principles, the following four questions can be addressed by focusing on the changed buyer behavior of Metaverse.

1. Customers buy consumer goods in Metaverse because their behavior conveys status symbol character (accomplishment)
2. Customers buy consumer goods in the Metaverse because they feel great pleasure, high hedonic (for example via VR)
3. Customers buy consumer goods in the Metaverse because they are bargain hunters (accumulation high influence of prices at purchase)
4. Customers buy consumer goods in the Metaverse because they do it routinely and regularly every week

5. Empirical Study: Design and Results

The following survey was acquired with 53 students (digital natives) from Munich University of Applied Science faculty of business administration Bachelor 4th semester. The results are as followed:

Table 2
Survey Questions & Results

Questions	Positive	Negative	Indifferent	Median
1.Do you know Metaverse?	49	3	x	
2.How do I estimate the customer behaviour change as a result of the Metaverse?	22	11	19	
3.To which extent will customer behaviour change as a result of Metaverse (1=not at all, 10=immensive)	x	x	x	6.06
4.Have you ever looked at products using virtual reality VR?	33	19	x	
5.Did you ever buy products using virtual reality VR?	9	43	x	
6.Do you buy customer goods randomly (contingency based behaviour)	15	21	16	
7.If you should analyse your purchasing behaviour, what percentage of your purchase are made in advance (1=none, 10=a lot)	x	x	x	6.04
8.Are you scared of the development of Metaverse? (1=not at all, 10=completely)	x	x	x	4.58
9.Will Metaverse influence you buying behaviour if I can transfer products into my own personal environment (e.g. clothes, glasses, accessories, furnitures) (1=weak, 10=high)	x	x	x	5.40
10.Do celebrity endorsement and Influencers presented in the Metaverse influence my buying behaviour? (1=not at all, 10= completely)	x	x	x	4.12
11.Do you buy used goods because you imitate personalities in the Metaverse?	6	37	9	
12.Can the Metaverse display good (virtual reality) so that they appear in the perfect environment (light, colours,product setting)	35	17	x	
13.Can you imagine avatars creating status symbols (clothes, accessories, glasses etc)	35	17	x	

14.Can you imagine that Metaverse is able to create desire for products (piece of furniture at the beach under palm trees)	35	8	9	
15.Can you imagine that the Metaverse promotes bargain hunters?	24	11	17	
16.Rate 7 Factors of influencing customer behavior with scores and their influence by the Metaverse: (Intensity of Influence by the Metaverse in points) (1=weak, 5=high)	x	x	x	x

The main results of the survey show that 94 % of the participants know the types and appearances of Metaverse *(Question 1)*. On the subject of influencing the Metaverse on buyer behavior the participants answered as followed: 22% positive, 11% negative and 19% indifferent *(Question 2)*. To the question To which extent will customer behaviour change as a result of Metaverse(1 = not at all, 10 = immensive) the mean value is 6.06 (Question 3). Pre-sale activity percentage of entity purchase process is up to 60,4% *(Question 7)*. 45,8 % of the participants are scared of the development of Metaverse *(Question 8)*. 67 % of the participants can imagine that avatars create status symbols that which can influence the buying behavior *(Question 13)*. 79 % of the participants are convinced or can imagine that buying durable consumer goods in the Metaverse can promote bargain hunters *(Question 15)*.
In the following the results are presented for each single hypothesis:

Hypothesis 1: *Customers buy durable consumer goods in the Metaverse because they have already bought in the past in this medium (see thesis 1 BPM model).*
Hypothesis 1 cannot be confirmed, as only 17% of the participants have purchased in the Metaverse. However 63% of the participants inform about durable consumer good via. VR in the Metaverse (Question 4 and Question 5).

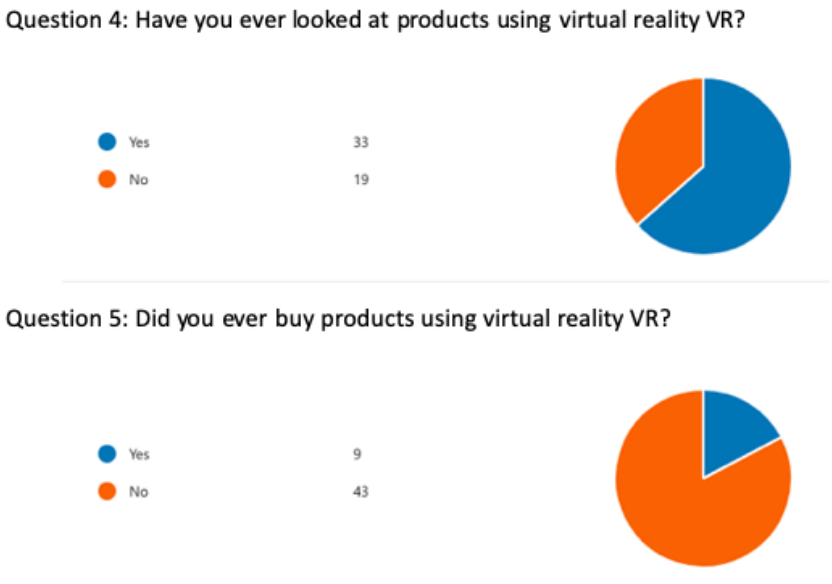

Figure 3: Survey answers question 4 and 5 (Hypothesis 1)

Hypothesis 2: *Customers buy durable consumer goods in the Metaverse because they encounter their experiences of other customers*

Only 29 % are buying durable consumer goods by imitating personalities in the Metaverse. Therefore this hypothesis cannot be confirmed (Question 11).

Hypothesis 3: *Customers buy durable consumer goods in the Metaverse according to the pure random principle (contingency based behavior)*

The results show that 60% buy actually or potentially according to the pure random principle. The hypothesis is therefore confirmed (Question 6).

Hypothesis 4: *Customers buy durable consumer goods in the Metaverse because they are close to the role behavior of other personalities in their environment (ruled-governed behavior)*

The results are as followed: 71% do not buy used goods because the imitate personalities in Metaverse. Therefore the hypothesis 4 cannot be confirmed (Question 11).

Hypothesis 5: *Customers buy durable consumer goods in the Metaverse because they like the sales setting*

The results are as followed: 67% confirm the hypothesis. Therefore the hypothesis is confirmed (Question 12).

Hypothesis 6: *Customers buy durable consumer good in the Metaverse because they like the sales setting and because they can transfer the product setting into their own environment through virtual reality (see theses 2 BPM model)*

The results show that 67% of participants are buying or expected to buy durable consumer good in the Metaverse because they like the sales settings specially via VR. Subsequently, the hypothesis is confirmed (Question 14).

Hypothesis 7: *Customers buy durable consumer good in the Metaverse because it exerts a reinforcing advertising influence on buyer behavior directly next to the products (see these 2 BPM model). Examples are celebrity endorsement and influencer marketing*

The results are as followed: Only 41,2% support the hypothesis. Therefore, it cannot be confirmed (Question 10).

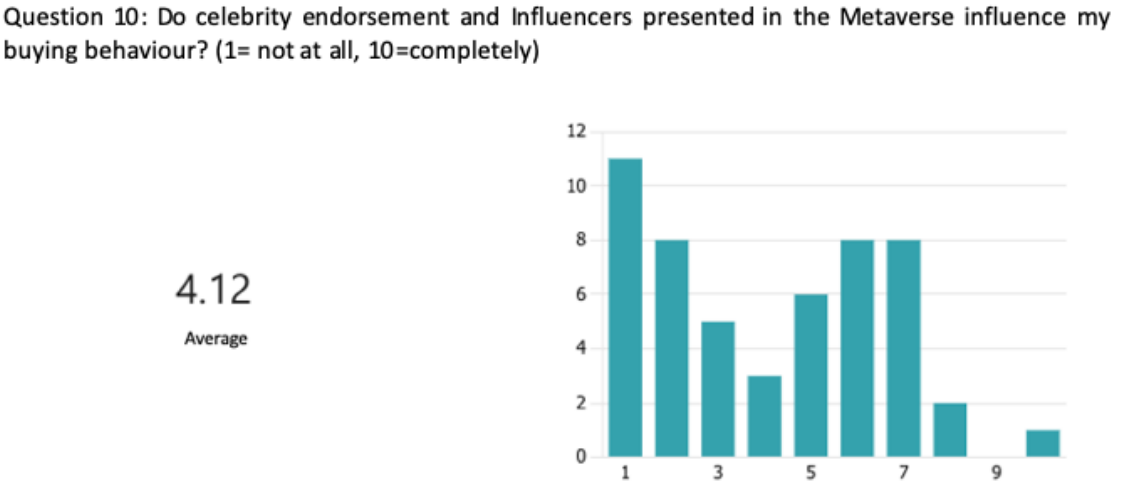

Figure 4: Survey answers question 10 (Hypothesis 7)

Hypothesis 8: *Hedonic reinforcers affect buyer behavior in the Metaverse as important influencing factors in the future*

The bar chart in figure 3 of responses shows predominantly a strong influence of hedonistic determinants on buyer behavior by the Metaverse. Subsequently, the hypothesis is confirmed *(Question 16)*

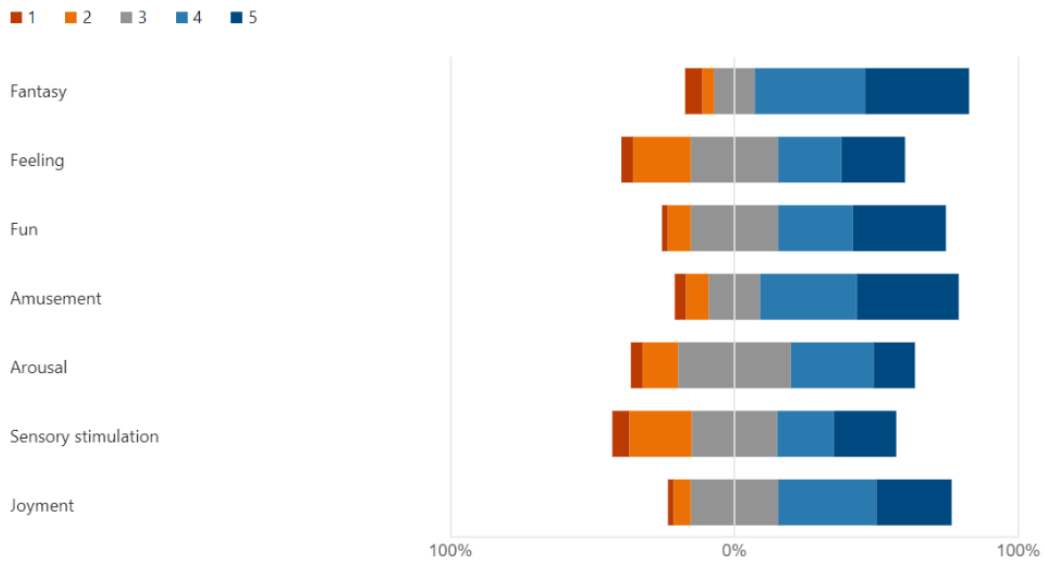

Figure 5: Rating of influences on customer behavior (Hypothesis 8)

6. Conclusion

A survey was conducted to analyze possible influence of the attitude-behavior relationship of buyer behavior. Based on the behavioral perspective model of purchase and consumption (BPM model) eight hypotheses have been developed. Within the survey digital natives were asked to what extent their buyer behavior is influenced by the Metaverse. A priori, it could be assumed that this target group in particular has a strong influence on purchasing decisions in the Metaverse.

A posteriori, it can be determined that influences on buyer behavior will increase. For instance, it is noticeable that only 22 % of the participants of the survey have made purchases in the Metaverse already and with the help of VR. It is also noticeable that 45,8 % of the survey participants showed skepticism on the future development of the Metaverse. Out of eight hypotheses based on Foxall's BPM model, four were confirmed and four hypothesis had to be rejected.

Further research could be done in using a higher spread target group in terms of demographic factors as this research only focuses on german survey participants. Other limitations are that only young people were asked while older ones might have a different point of view on the development of Metaverse.

References

[1] Stephenson, N., Snow crash (Bantam Spectra trade paperback reissue). Random House, New York, NY, 2003.

[2] Flint,D., Woodruff, R., Gardial, S., “Customer value change in industrial marketing relationships: A call for new strategies and research“ Industrial Marketing Management, Volume 26, Issue 2, 1997,163-175, doi.org/10.1016/S0019-8501(96)00112-5.

[3] Gu, S.; Ślusarczyk, B.; Hajizada, S.; Kovalyova, I.; Sakhbieva, A. Impact of the COVID-19 Pandemic on Online Consumer Purchasing Behavior. *J. Theor. Appl. Electron. Commer. Res.* 2021,16, 2263-2281, doi.org/10.3390/jtaer16060125.

[4] Handarkho, Y. D., Impact of social experience on customer purchase decision in the social commerce context. *Journal of Systems and Information Technology*, Vol.22 No.1, 2020, 47-71, doi.org/10.1108/JSIT-05-2019-0088.

[5] Li, T., Tong, S., Zhang, H.: Transparency of Information Acquisition in a Supply Chain. Manufacturing & Service Operations Management 16(3), 2014, 412-424, doi.org/10.1287/msom.2014.0478.
[6] Robertson, M., Sustainability Principles and Practice. 2nd ed.,, New York, NY, 2017
[7] Tuker, D., Altuntas, C., Sustainable supply chain management in the fast fashion industry: An analysis of corporate reports, European Management Journal, Volume 32, Issue 5,2014, 837-849, doi.org/10.1016/j.emj.2014.02.001.
[8] Payne, M., Peltier, J.W. and Barger, V.A. "Omni-channel marketing, integrated marketing communications and consumer engagement: A research agenda", Journal of Research in Interactive Marketing, Vol. 11 No. 2, pp. 185-197, 2017, doi.org/10.1108/JRIM-08-2016-0091.
[9] Nath, P., Goyal, K., Prasad, J., Kullar, B., Chat Bot – An Edge of Customer Insights, International Journal of Research and Scientific Innovation, Volume 5, Issue 5, 2018, 29-32.
[10] Kye, B., Han, N., Kim, E., Park,Y., Jo, S., Educational applications of metaverse: possibilities and limitations, Journal of educational evaluation for health professionals, 2021, doi.org/10.3352/jeehp.2021.18.32.
[11] Hwang, G., Chien, S., Definition, roles, and potential research issues of the Metaverse in education: An artificial intelligence perspective, Computers and Education: Artificial Intelligence, Volume 3, 2022, 1-5, doi.org/10.1016/j.caeai.2022.100082.
[12] Yfantis, V., Ntalianis, K., Exploring the Potential Adoption of Metaverse in Government. In: Jacob, I.J., Kolandapalayam Shanmugam, S., Izonin, I. (eds) Data Intelligence and Cognitive Informatics. Algorithms for Intelligent Systems. Springer, Singapore, 2023, 815–824, doi.org/10.1007/978-981-19-6004-8_61.
[13] Rosenberg, L., Regulation of Metaverse: A Roadmap: The risks and regulatory solutions for largescale consumer platforms, Proceedings of the 6th International Conference on Virtual and Augmented Reality Simulations, 2022, 21-26, doi.org/10.1145/3546607.3546611.
[14] Ortiz, L. Risks of the Metaverse: A VRChat Study Case. The Journal of Intelligence, Conflict, and Warfare, 5(2), 2022, 53–128, doi.org/10.21810/jicw.v5i2.5041.
[15] Paquin V, Ferrari M, Sekhon H, Rej S,(2023), Time to Think "Meta": A Critical Viewpoint on the Risks and Benefits of Virtual Worlds for Mental Health, JMIR Serious Games, 2023, doi.org/10.2196/43388.
[16] Bloomberg Intelligence December 01, 2021: URL:https://www.bloomberg.com/professional/blog/metaverse-may-be-800-billion-market-next-tech-platform/
[17] Foxall, G., Interpreting Consumer Choice: The Behavioral Perspective Model, 1st ed., Routledge, London, 2009.
[18] Rosenberg, M.J. and Hovland, C.I. Cognitive, Affective and Behavioral Components of Attitudes. In: Rosenberg, M.J. and Hovland, C.I. Eds., Attitude Organizational and Change: An Analysis of Consistency among Attitude Components New Haven, 1960.
[19] Fishbein, Martin and Ajzen, Icek. Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research, Reading, MA: Addison-Wesley, 1975.
[20] Foxall, G.R. The behavioral perspective model of purchase and consumption: From consumer theory to marketing practice. JAMS 20, 189–198, 1992, doi.org/10.1007/BF02723458
[21] Foxall, G.R.,A Behaviorist Perspective on Purchase and Consumption, European Journal of Marketing, Volume 27, 1993, p. 10.
[22] Becker, A., Mladenow, A., Kryvinska, N., Strauss, C., Aggregated survey of sustainable business models for agile mobile service delivery platforms, Journal of Service Science Research 4,2012, 97-121, doi.org/10.1007/s12927-012-0004-3.
[23] Kryvinska, N, Van Than, D., Strauss, C., (2010) Integrated management platform for seamless services provisioning in converged network, International Journal of Information Technology, Communications and Convergence, 2010 Vol.1 No.1,2010, 77-91, doi.org/10.1504/IJITCC.2010.035228.