SCIENTIFIC ADVISOR'S REFERENCE

Program:	**Master in Business Analytics and Big Data**
Student:	**VLASOVA Natalya Sergeevna**
Title of thesis:	**ADVANCED ANALYTICS FOR PREDICTION OF CUSTOMERS' PREFERENCES: L'ORÉAL CASE**

Justification of the topic choice. Accuracy in defining the aim and objectives of the thesis. Justification of the topic choice; accuracy in defining the aim and tasks of the thesis; originality of the topic and the extent to which it was covered; alignment of the thesis' topic, aim and objectives.
Advance Analytics and Machine Learning are the prominent areas of research in knowledge discovery and in identification of hidden patterns from the datasets. Machine Learning focuses on the training of intelligent models so that the prediction can be accurate and fast. Machine Learning learns from the data and then gets trained for prediction. The goal of the master thesis is to analyze consumer behavior to personalize the customer experience of using recommendation behavior models, an algorithm for predicting the order in the future. Considering all above, the master thesis of Natalya Vlasova seems to be surely topical. The title, research problem and research questions are clearly specified. The goal is real, accurately expressed and the tasks are defined in a good form.
Structure and logic of the text flow. Logic of research; full scope of the thesis; alignment of thesis' structural parts, i.e. theoretical and empirical parts.
The thesis is organized in a logical way. The structure of the research is divided into two main parts. In the first chapter Natalya Vlasova discussed the basics of consumer behavior analysis, built on the analysis of the literature and business cases. Natalya described four main areas of consumer behavior analysis implementation: dynamic pricing, consumer clustering, purchase prediction, and the creation of recommendation systems. After that, she described the basics of using machine learning to analyze consumer behavior and considered the typical problems and challenges that arise both in the analysis in general and in the creation of recommender systems, which are the central part of this work. Finally, the author carried out and justified the choice of methods that were used in the next chapter to carry out the practical part of the study and described in more details the procedure for applying each method and the necessary tools that will be used further. In the second chapter the author developed the analysis of the L'Oreal company Kiehl's brand's consumers in terms of opportunities of advanced customization techniques. Firstly, the several clusters of customers were identified based on their peculiarities. It technically required investigation of categorical data provided on the clients and application of several different tools and approaches, including Hierarchical clustering (agglomerative) with SciPy and Partitional clustering (K-means) with Scikit-learn. As a result, the allocation of the customers by the clusters was comprehended through the main division factors (age, income level, ordering time, variability of product formats and purposes, and others). Understanding of these factors gives the brand of Kiehl's a hand in establishing new campaigns and understanding of their target audience and their specifics which must be a powerful knowledge for future development. In conclusion Natalya summarizes the paper's results. Both theoretical and empirical part of the thesis are consequently aligned in terms of their structure.
Quality of analytical approach and quality of offered solution to the research objectives. Adequacy of objectives coverage; ability to formulate and convey the research problem; ability to offer options for its solution; application of the latest trends in relevant research are for the set objectives.
Author demonstrates ability to formulate and convey the research problem and to offer options for its solution applying the latest trends in relevant research.
Quality of data gathering and description. Quality of selecting research tools and methods; data validity adequacy; adequacy of used data for chosen research tools and methods; completeness and relevance of the list of references.
The dataset used in this thesis was provided by L'Oreal company and does not infringe or breach any confidentiality. Quality of selecting research tools and methods is good. Author demonstrates adequacy of used data for chosen research tools and methods. The data samples are described and analysed. The list of reference is complete and relevant.
Scientific aspect of the thesis. Independent scientific thinking in solving the set problem/objectives; the extent to which the student contributed to selecting and justifying the research model (conceptual and/or quantitative), developing methodology/approach to set objectives.
The theoretical contribution of the thesis is the development of customized ML-based solution for the Kiehl's recommender system. Thus, the thesis is designed to be the first related analysis created especially for the Kiehl's brand of the L'Orèal company, where the former has never applied anything like this. It

creates the link between existing theoretical concepts and in-depth analysis of the Kiehl's brand in Russia, thus making the specific market of related Russian companies covered by researcher.
Practical/applied nature of research. Extent to which the theoretical background is related to the international or Russian managerial practice; development of applied recommendations; justification and interpretation of the empirical/applied results.
The practical contribution of the thesis is that it creates the variety of different approaches to clustering, building the recommender and predicting orders, which gives to the business a chance to choose the best suitable option for their tasks and specifics of the information they work with. Therefore, it provides a chance to apply the above-mentioned models for the L'Orèal's case with the highest possible level of adjustments and tuning. The result of the study provides guidance for industry practitioners.
Quality of thesis layout. Layout fulfils the requirements of the Regulations for master thesis preparation and defence, correct layout of tables, figures, references.
Layout fulfils the requirements of the Regulations for master thesis preparation and defence. All the tables and figures are properly edited and represented. Unfortunately, there are some misspellings, typos and formatting issues in the text.
Originality of the text. All sources of match identified by the Safe Assign system follow the allowed cases, the paper does not contain any elements of plagiarism.
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The Master thesis of **Natalya Vlasova** meets the requirements for master thesis of MiBA program thus the author of the thesis can be awarded the required degree.

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Scientific Advisor:

Assoc. Professor Sergey Yablonsky