

REVIEW

by **Prof. Simeon Denev Zhelev, DSc.**, University of National and World Economy,
Department of Marketing and Strategic Planning, professional field 3.8 "Economics",
scientific specialty "Marketing" 05.02.26

Author of the dissertation: DIMITAR GEORGIEV TRICHKOV, PhD student at the
Department of Marketing, SA D. Tsenov, Svishtov

Dissertation name: PRODUCT DIVERSIFICATION USING BIG DATA
ANALYTICS

I. OVERVIEW OF THE DISERTATION

The dissertation in terms of volume, structure, terminology and stylistics fits into the requirements of the Law on the Development of the Academic Staff of the Republic of Bulgaria. There is a correspondence between the title of the work and its content. The dissertation consists of an introduction, three chapters and a conclusion with a total volume of 218 pages.

The object of the present study are the alternative activities, not related to the main subject, of the telecommunication companies.

The subject of the study is the possibility for market growth and related additional financial inflows generated as a result of offering its own digital financial services by the telecommunications company in partnership with a financial institution.

The research thesis of the dissertation is that telecommunications companies have a huge potential for diversification of their services, based on the big data generated by and in connection with the activity of their customers.

The aim of the paper is to analyse the possibility of increasing the revenues of the telecommunications company through diversification, in the form of offering its own financial services outside the usual telecommunications activities based on the available technological, information and physical infrastructure of the enterprise.

To achieve these goals, the author sets himself the following tasks:

- To show the possibility of telecommunication companies to add value by providing services from the financial sector.
- Justify the benefits of cross-sectoral use of big data and sharing of analytical results with different areas of application.

- To develop forecasting models for the analysing the behavioural telecom data and the possibility of their use in an unrelated economic field.
- Apply customer segmentation based on behavioural data and test the hypothesis of its adequacy in the absence of other information.
- To propose a business model for the active participation of a telecommunications company in the financial services market.

All the above target elements of the work are well outlined in its introduction.

The first chapter "Prospects and challenges in the telecommunications and financial spheres" reviews the state of the telecom and banking industries and the challenges associated with the digitalization of the economy. Market threats are considered, incl. those from alternative suppliers. The statement is raised about the need to expand the telecom's services beyond the provision of connectivity and communications and to focus on complex proposals that support the digitalization of business in general. Product diversification is justified as an opportunity for growth of client capital.

The second chapter, "The offering of financial services and credit risk", addresses the issue of credit risk assessment. An overview of the basic data and indicators that are in use in different methods for credit assessment, their advantages and disadvantages. In my opinion, the section related to the possibilities that open up with the research and evaluation of alternative data is particularly important.

The third chapter "The role of big data analysis in diversification as a strategy for the growth of telecommunications companies" presents the results of the analysis of behavioural telecom data and testing of machine self-learning models to predict individual income. The benefits of applying these models in practice are presented, as well as the market potential for the development of mobile financial services. An overview of possible strategies for telecom and banking convergence in the field of financial services has been reviewed and a proposal for a specific business model has been demonstrated.

II. FORM AND CONTENT OF THE DISSERTATION

1. The dissertation is dedicated to an extremely important from a practical point of view research problem. The object, the subject, the defended thesis, the goals and tasks, as well as the limitations are correctly, precisely and clearly formulated. It is obvious that the author knows about what he writes about, and does not write while studying, about what he writes about.
2. Extensive and in-depth practical awareness of the researched issues (useful practices, empirical research, statistical data) is shown, as well as awareness of the literature on this issue.

3. I find the volume of work, as well as the abstract, a little bloated. They could be tightened without losing content and meaning.
4. The illustrative material such as tables, graphs, figures is accurate, clear and appropriate.
5. There is much to be desired in terms of scientific, linguistic and stylistic editing, but I will say more about this in the critical notes.
6. I find that it is correct to use analytical software for processing quantitative information and interpretation of the results of computational work.
7. The candidate kept the rules of scientific ethics in use and citation of literary sources. I find no reason to suspect plagiarism.
8. The abstract accurately and completely (in some places too fully!) Reflects the content of the work. The attached publications are on the topic of the dissertation.

III. SCIENTIFIC AND SCIENTIFIC-APPLIED CONTRIBUTIONS

The author pretends for three contributions:

1. A new concept for cross-sectoral business models, implemented on the basis of alternative use of big data, is proposed.
2. An empirical relationship has been established between the consumption of mobile telecommunications services and the declared income of individual customers by demographic.
3. An author's model for the process of work and distribution of responsibilities in a platform for financial services, based on the combined information resources of telecommunication and banking institutions, is proposed.

I find these contributions actually achieved. With less modesty, at least as many could be found.

IV. CRITICAL NOTES, QUESTIONS AND RECOMMENDATIONS

I will divide my critical remarks into two groups: editorial and essential.

To the editorial ones I refer:

- Lack of unification in use of terminology for example, loans or credits?! If you say "neck" once in fiction, then you have to say "neck" to the same thing - because you've been taught since first grade that you shouldn't "repeat" - then in science

fiction, if you say "neck" once, and then "neck", readers will expect to understand the difference between the two. Or maybe the author finds a conceptual, not just a linguistic difference?!

- In many places in the text there are incomplete or overcomplete sentences (the same expression twice). There are also linguistic errors - spelling and style.
- There are terminological errors:
 - "The skills for analysis and processing of big data are known by the term Data Mining." (p. 27 of the abstract). People have or do not have skills, software has functions, procedures, etc.
 - I cannot agree with the translation of Data Mining as "extraction of knowledge from data". Information is extracted from the data, and knowledge can be extracted (and often not extracted) from the information.
 - "Effectiveness of the result" (p. 27 of the abstract) - this is a tautology, because efficiency is the ratio of resource to result or goal to result. The result cannot be effective or not, but good or bad, high or low, appropriate or inappropriate, achieved or unachieved, etc.
- Excessive use of abbreviations, and "to top it all off" - in Bulgarian and English. It is good, however, that those in Chinese have not entered, if there are any, of course.

To the essential critical remarks, I will mention:

- It seems to consider the validity of the hypothesis that people with low incomes (below the minimum wage) are classified as "unreliable" payers of loans, and those with higher incomes (above the minimum wage) as "reliable". Couldn't it be the other way around: those with low incomes (minimum wage is not a good anchor!), because they have low incomes and are more financially disciplined and therefore, may better to service their loans ?!
- The classification task of dividing customers binominal into "reliable" or "unreliable" is oversimplified. Reliability is a continuum: very reliable, reliable, unreliable very unreliable or whatever you choose there. During World War II, the Germans and Russians reported differently on tank losses - Russians - shot down (destroyed) or whole (healthy); the Germans - slightly damaged, moderately damaged, severely damaged but repairable and completely damaged, not repairable. Guess who reported more losses?!
- Different mathematical procedures (statistical and non-statistical) with different software products are used to analyse the same data. Sometimes this leads to a premonition that it is done to show technical skills. I hope not. But how to explain the compatibility of two statements: "... the algorithms applied by Orange give significantly better results than other models (p. 35 of the abstract) with" Predicting a continuous digital value, such as declared income, based on telecom

data consumption is a task whose accuracy is relative, and measurement and forecasting can largely be defined as subjective.” (p. 36) One wonders in which objective criterion Orange is better against?!

- I do not know if I am right, but I would consider whether in the proposed table of roles participants in the business model, in the column of banks not to put a role in credit and risk assessment. This is also a question for the author.

V. SUMMARY CONCLUSION AND OPINION

I find that the proposed dissertation is a personal and conscientious work of the author. He has all the features of a dissertation according to scientific traditions and regulatory requirements in the country. I will confidently vote "FOR" with the award of the educational and scientific degree "Doctor" to the doctoral student Dimitar Georgiev Trichkov.

January 6, 2022, Sofia

Prof. Simeon Denev Zhelev, DSc