

REVIEW

by Prof. Dr. Victor Ivanov Yotzov
Department of Finance and Accounting, Sofia University "St. Kliment Ohridski"
of a doctoral dissertation for the award of the educational and scientific degree "Doctor"
in Higher Education Area 3: Social, Economic, and Legal Sciences;
Professional Field 3.8: Economics.
Doctoral Program: *Finance, Insurance, and Social Security*

Author: KIRIL GEORGIEV ANACHKOV

Topic: THE IMPACT OF FINANCIAL TECHNOLOGIES ON THE MANAGEMENT OF CREDIT RISK IN BANKS

Supervisor: PROF. DR. DANIELA BOBEVA

1 General Description of the Procedure and Submitted Materials

By Order No. 135 dated April 15, 2025, issued by the Rector of the Higher School of Insurance and Finance (VUZF), Prof. Dr. Jur. Sci. Boris Velchev, I have been appointed as a member of the academic committee for conducting the procedure for the defense of a doctoral dissertation entitled "The Impact of Financial Technologies on the Management of Credit Risk in Banks". The dissertation is submitted for the acquisition of the educational and scientific degree "Doctor" in Higher Education Area 3: Social, Economic, and Legal Sciences, Professional Field 3.8: Economics, Doctoral Program: Finance, Insurance and Social Security.

The author of the dissertation is Kiril Georgiev Anachkov, a doctoral student in the independent form of study in the Department of Finance and Insurance, supervised by Prof. Dr. Daniela Bobeva.

The materials submitted by Kiril Georgiev Anachkov related to the defense procedure include the following documents:

1. Application for admission to public defense
2. Curriculum Vitae (CV)
3. Doctoral dissertation
4. Dissertation abstract
5. Declaration of originality and authenticity
6. Statement of fulfillment of the minimum national requirements for obtaining the doctoral degree
7. List of all publications
8. List of publications related to the topic of the dissertation
9. Copies of the publications related to the topic of the dissertation
10. Summaries of the publications related to the topic of the dissertation

The doctoral candidate has submitted a total of four (4) publications, including two articles in academic journals and two conference papers.

2 Brief Biographical Information about the Doctoral Candidate

Kiril Anachkov holds a bachelor's degree in finance, obtained from the University of National and World Economy (UNWE) in 2020. One year later, he earned a master's degree in international financial Markets from the same university. Since 2022, he has been a doctoral student at the Higher School of Insurance and Finance (VUZF), enrolled in the doctoral program “*Finance, Insurance, and Social Security*”.

Kiril Anachkov's professional experience is relatively limited and is primarily associated with Maxima Bulgaria Ltd., where he has held various positions, including managerial roles. He has acquired some experience in the financial sector, specifically in banking and insurance.

3 Relevance of the Topic, Subject and Object of the Study, Appropriateness of the Objectives and Tasks, Limitations

The topic of the dissertation is both relevant and significant. Financial technologies (fintech) have the potential to revolutionize the management of credit risk in banks, which operate in an increasingly complex and dynamic environment influenced by globalization, evolving regulations, and growing competition from fintech companies and non-bank financial institutions. Particularly valuable is the dissertation's focus on the Bulgarian banking sector — an area where in-depth empirical research is still lacking. The author successfully positions the study within both global and local trends, which adds further relevance to the work. The research aims to address this academic gap and contribute to existing international literature.

The *object* of the study is commercial banks in Bulgaria, and the *subject* is credit risk management and the opportunities that modern financial technologies offer for its improvement. The research also addresses the challenges and risks associated with the use of these technologies and how they may be mitigated.

The objectives set by the author are:

- To define the nature of financial technologies and their application in the context of credit risk management.
- To systematize the stages of credit risk management and analyze the potential for their improvement through integration with modern financial technologies.
- To examine the opportunities and risks associated with the application of modern financial technologies in credit risk management.
- To study and identify the factors influencing the share of non-performing loans in leading commercial banks in Bulgaria.
- To explore the relationship between the application of financial technologies and the fulfillment of ESG (Environmental, Social, and Governance) standards.
- To formulate recommendations regarding the application of financial technologies in the management of credit risk in banks.

There are no explicitly stated limitations to the study, apart from the noted lack of in-depth research on the topic in Bulgaria and, more broadly, internationally.

4 Familiarity with the Problem

The doctoral candidate demonstrates good awareness of the existing literature in the field of credit risk management and financial technologies. Fundamental sources such as Greuning & Bratanovic (2020) and the Basel Committee on Banking Supervision (2000) are cited, along with contemporary empirical studies on the impact of artificial intelligence (AI), blockchain technologies, big data, and cloud computing on banking processes. The dissertation examines both theoretical and historical aspects of credit risk and banking regulation. It traces the evolution of credit risk management and regulation from the early stages of banking, through the introduction of quantitative models and credit scoring in the 20th century, to the effects of financial crises (notably the 2008 crisis) and the subsequent regulatory changes (e.g., Basel III).

It is noted that the topic of the influence of fintech on credit risk management is relatively new and that global research—particularly in the context of Bulgaria—is still limited. The dissertation builds upon an analysis of existing academic literature, studies from leading credit institutions, regulatory frameworks, and information from international bodies such as the ECB and the World Bank.

The study strikes a balance between theoretical analysis and empirical data from real-world practice, with a clear systematization of previous scholarly contributions. However, the reviewer considers that the critical discussion of inconsistencies in literature, especially regarding the risks of improper application of fintech solutions, could have been expanded.

5 Research Methodology

The methodology employed in the dissertation is based on conventional academic research tools, including *Theoretical analysis*, used to examine the essence of credit risk management, banking regulation, and financial technologies and their interconnections; *Historical-logical approach*, applied to outline the characteristics, differences, and new trends in the management and regulation of credit risk across different historical periods; *Comparative analysis*, used to highlight similarities and differences between traditional models and fintech-based models; *Hypothetical-deductive method*, applied in the formulation of research hypotheses subject to confirmation or rejection; *Descriptive analysis*, used to identify the stages of credit risk management in Bulgarian commercial banks.

The dissertation makes extensive use of *statistical tools* in analyzing key performance indicators of the banking sector, particularly to assess the benefits of implementing financial technologies. It is also worth noting the use of econometric modeling techniques to empirically identify and evaluate the impact of various factors on the share of non-performing loans. The econometric models were tested for autocorrelation, homoskedasticity, and normal distribution of residuals using Gretl software.

In summary, the methodology adopted by the doctoral candidate is adequate for the research objectives. It effectively combines theoretical analysis, historical and comparative approaches, empirical data from financial statements and interviews, as well as modern data collection and analysis techniques (such as web scraping and econometric modeling).

6 Characteristics and Evaluation of the Dissertation

The dissertation is structured into an introduction, three chapters, a conclusion, a list of references, and appendices. The introduction defines the relevance and significance of the topic, identifies the object and subject of the research, outlines the objectives and tasks, formulates the thesis and hypotheses, and describes the methodology and structure of the dissertation.

Chapter I: Conceptual Framework of Credit Risk Management and Financial Technologies

This chapter analyzes the theoretical and historical aspects of credit risk and banking regulation. It defines the essence of financial technologies and categorizes their main types (AI, blockchain, cloud computing, big data). It presents the concept of credit risk management and the opportunities for integrating financial technologies. The main conclusion of this chapter is that credit risk is the most significant risk faced by banks, and its poor management is a common cause of banking failures. Banking regulation is crucial for systemic stability. Financial technologies can transform the financial industry and streamline processes. Relying solely on traditional methods for managing credit risk may lead to inefficient credit policies due to limitations such as subjectivity, limited scope, inability to capture emerging risks, data quality issues, and lack of timeliness. Achieving optimal outcomes requires combining traditional practices with modern financial technologies.

Chapter II: Application of Financial Technologies in Credit Risk Management in Banks

This chapter explores the opportunities and challenges banks face when applying specific financial technologies (AI, blockchain, cloud computing, big data) in credit risk management. It analyzes similarities and differences between modern financial technologies and traditional statistical methods. Recommendations for successful fintech integration are formulated. The key conclusions highlight that financial technologies can improve credit risk management by reducing fraud, automating processes for increased efficiency, and enhancing credit scoring models. Further benefits include improved decision-making, personalized products and services, cost optimization, competitive advantage, and regulatory compliance. The author also discusses the main challenges in implementing AI, such as the lack of qualified personnel, costs, data quality and availability, lack of trust, and regulatory uncertainty.

Chapter III: Assessment of the Effect of Financial Technologies on Credit Risk Management in Banks in Bulgaria

This chapter presents the applied methodology for constructing econometric models to evaluate the impact of various micro- and macroeconomic factors on non-performing loans. It presents the results of the econometric models and their interpretation. The relationship between the application of financial technologies and the fulfillment of ESG criteria is also examined. The main findings from the analysis of publicly available data and conducted interviews show that during the studied period (2015–2022), banks made significant technological investments, coinciding with a consistent decline in the share and volume of non-performing loans, despite increased credit activity. The interviews reinforce the conclusion that financial technologies play a key role in credit risk management, leading to more accurate assessments, automation, and improved efficiency. Fintech investment is cost-effective. The econometric model for macroeconomic factors shows statistically significant effects of the unemployment rate and the dynamics of average wages on the share of non-performing loans. Rising unemployment leads to an increase in non-performing loans, while higher average

wages contribute to their reduction. Moreover, financial technologies can contribute to ESG compliance by improving the monitoring and analysis of ESG factors and supporting sustainable banking practices.

The conclusion provides a summary of the key findings from the chapters and synthesizes the results of hypothesis testing. The contributions of the dissertation are also outlined.

7 Contributions and Significance of the Dissertation for Science and Practice

The dissertation contains contributions both in theoretical and practical terms. The main contributions can be summarized as follows:

1. Definition of the terms "bank fintech" and "external fintech", along with a classification of four main groups of financial technologies.
2. Systematization of the stages of credit risk management, identification of weaknesses, and suggestions for their improvement.
3. Development of a comprehensive methodology and models for assessing the effect of financial technologies on credit risk management, tested with empirical material (statistical data and original research), proving that the use of financial technologies enhances credit risk management.
4. Enrichment of research practice through the development of an innovative method for automated data collection (web scraping) on the application of financial technologies in the examined banks.
5. Quantitative and qualitative evaluation of the relationship between financial technologies and ESG, as well as an assessment of fintech applications in fulfilling ESG requirements and sustainable development goals.
6. Systematization of successful examples from leading global banks regarding the use of modern financial technologies in credit risk management, serving as a guideline for other institutions.
7. Formulation of recommendations for credit institutions on how to apply modern financial technologies in managing credit risk.

The *theoretical significance* lies in addressing an academic gap and supplementing the existing body of literature. The *practical relevance* of the work is expressed through concrete findings, methodologies, and recommendations that can assist banks in improving credit risk management through fintech integration.

8 Evaluation of the Publications Related to the Dissertation

The doctoral candidate has submitted a total of four publications – two journal articles and two conference papers. It should be noted that while the conference papers are directly related to the topic of the dissertation, the articles are only indirectly related to the issues examined in the dissertation. All publications are single-authored and in Bulgarian, with only one published in a reputable academic journal.

9 Assessment of Compliance with Minimum National Requirements

The doctoral candidate has submitted documentation confirming compliance with the minimum national requirements for obtaining the educational and scientific degree "Doctor" in the professional field 3.8 Economics. The materials provided demonstrate that the candidate meets these requirements.

10 Personal Contribution of the Doctoral Candidate

There is no evidence of unauthorized use of third-party work. The dissertation has been checked using the specialized plagiarism detection software *StrikePlagiarism*, which did not indicate any instances of plagiarism across the examined indicators (SC1: 6.43%; SC2: 2.70%).

11 Dissertation Abstract

The dissertation abstract has been prepared in accordance with the relevant requirements and standards. It provides an accurate representation of the structure, content, and findings of the dissertation.

12 Critical Remarks and Recommendations

Critical Remarks:

- Although the dissertation successfully demonstrates the positive influence of fintech on credit risk management, a quantitative assessment of the specific contribution of individual fintech technologies (AI, blockchain, etc.) to the reduction of non-performing loans remains a challenge, partly due to the lack of publicly available data on banks' IT expenditures. The econometric model in Chapter III focuses primarily on macroeconomic factors, while the connection to fintech is supported more by qualitative analysis and the temporal correlation between investments and the decline in non-performing loans. It would have been helpful to attempt a more direct quantitative assessment of fintech's impact (even via proxy variables, in the absence of direct data).
- The discussion of the challenges associated with fintech implementation is thorough, but could benefit from additional detail through concrete examples or case studies from Bulgarian banking practice—if such information is available or could be further investigated (while observing confidentiality requirements).
- Although the methodology includes interviews, the number of interviews conducted and the representativeness of the sample (beyond the fact that they are drawn from the eight largest banks) are not clearly specified, which hinders the evaluation of the qualitative analysis's scope.
- The contribution related to ESG is important and timely; however, the dissertation focuses more on the opportunities fintech provides for ESG integration than on an empirical assessment of ESG factors' influence on credit risk in the Bulgarian context, or how fintech specifically aids banks in conducting this evaluation.
- In the econometric section, it would be useful to apply additional techniques to address potential endogeneity.

- A separate paragraph addressing the limitations of the study is missing. Including such a section would improve the transparency and academic rigor of the research.
- The critical review of the literature could be enriched with more discussion on contradictory findings in the field of fintech and risk.

Recommendations to the Doctoral Candidate:

- Based on the developed methodology and the collected data, the doctoral candidate could continue to enhance the econometric models by exploring opportunities to include more direct or proxy data on fintech investments at the bank level, should such data become available.
- The results of the empirical research (interviews) represent a valuable qualitative contribution. These results could be presented in greater detail, for example, through summary tables or graphics, and where possible, compared with international studies, if such studies provide publicly available data on similar topics.
- The topic of fintech and ESG is of growing importance. In future research, the candidate could focus more specifically on developing a methodology or framework for the empirical assessment of ESG risk in the credit portfolios of Bulgarian banks and the role of fintech in this process.

13 Personal Impressions

I have no personal impressions of the doctoral candidate.

14 Recommendations for Future Use of the Dissertation's Contributions and Results

- Conduct a more in-depth quantitative study on the direct impact of specific fintech solutions (e.g., AI-based scoring algorithms, monitoring platforms, etc.) on key credit risk indicators (PD – Probability of Default, LGD – Loss Given Default, EAD – Exposure at Default) within the Bulgarian or regional context, if data is available.
- Study the changes in processes and organizational structures of banks in Bulgaria as a result of fintech implementation in credit risk management.
- Analyze regulatory challenges and the need to adapt the regulatory framework in Bulgaria and the EU in light of the rapid development of fintech and its application in bank risk management.
- Investigate the impact of Big Data and alternative data sources on credit scoring and risk assessment in Bulgaria, including ethical and regulatory aspects.
- Perform a comparative analysis of fintech implementation strategies in credit risk management between Bulgarian banks and banks from other EU or regional countries.

CONCLUSION

The dissertation of Kiril Anachkov constitutes a comprehensive and in-depth study. The work demonstrates the author's solid academic preparation and analytical capabilities. Despite the noted weaknesses, the contributions of the research represent an important step toward expanding knowledge in the field of credit risk management within the banking system.

The requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and its Implementing Regulations have been met. The submitted materials and dissertation results comply with the specific requirements of the Regulations for Admission and Training of Doctoral Students at the Higher School of Insurance and Finance.

The dissertation shows that the doctoral candidate, Kiril Anachkov, possesses the necessary theoretical knowledge and professional skills in Professional Field 3.8. Economics, demonstrating qualities and capabilities for conducting independent scientific research.

In light of the above, I confidently give a positive assessment of the results of the research, the accompanying abstract, and the achieved outcomes and contributions, and I recommend to the esteemed academic committee that the educational and scientific degree “Doctor” be awarded to Kiril Georgiev Anachkov in the Field of Higher Education 3: Social, Economic, and Legal Sciences; Professional Field 3.8: Economics.

19.05.2025

Reviewer:

(Prof. Dr. Victor Yotzov)