New Digital Life for Fourteenth Century South Slavonic Scriptoria

Marco Scarpa[1][0000-0002-9320-5990], Constanta Burlacu[2],
Desislava Paneva-Marinova[3][0000-0001-5998-687X]

[1] Cyrillo-Methodian Research Center at the Bulgarian Academy of Sciences,
13, Moskovska Str., Sofia, 1000, Bulgaria
[2] University of Oxford, Merton College, Merton Str., OX1 4JD, Oxford, UK
[3] Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences,
8, G. Bonchev, Str., Sofia, 1113, Bulgaria
marco.kmnc@gmail.com, constanta.burlacu@merton.ox.ac.uk,
dessi@cc.bas.bg

Abstract. Written testimonies about the activity of South Slavic scribes and their monastic scriptoria in the 14th century are an essential resource of information, part of the world's cultural and historical heritage which is at risk. Their tracking as well as the systematization and digitalization, will show how the information derived from medieval manuscripts is a source for the history of the Bulgarian state, but also for understanding the state policy in the fields of science and culture, and for constructing and managing new knowledge in today's modern society. In this article we present the objectives of the *Fourteenth Century South Slavonic Scribes and Scriptoria* project. After giving a brief introduction to the cultural context of South Slavic lands in the 14th century, we proceed with describing how we intend to bring digital palaeography to the field of Slavonic Studies.

Keywords: Fourteenth Century, Digital Palaeography, Script Analysis, Scribes, Scriptoria.

1 Introduction

During the 14th century the entire area of the Balkan Peninsula experienced an incredible period of cultural flourishing (Scarpa, Blanchet, & Batalova, 2021). This led to the creation of a significant amount of new literary material, part of which is currently stored in manuscript repositories of libraries located in Bulgaria, Serbia, Croatia, Montenegro, Northern Macedonia, Bosnia and Herzegovina, Russia, Ukraine, Romania and on Mt Athos, as well as in the monastery of Sinai and in different libraries in Western Europe. Significantly, the cultural and historical process of one century influenced the development of the art of writing of the following centuries, as it is witnessed by various manuscripts (Musakova, 2015). Undoubtedly, such a large-scale literary production required the involvement of many scribes and scriptoria, the identity of which is little

known. In the South Slavic area, and in Bulgaria in particular, the development of calligraphy was greatly influenced by Greek minuscule throughout the 14th century, which happened in light of intensive contacts between the two literary and linguistic communities (see the monastic activity on Mt Athos, for example). As a consequence, writing with Cyrillic letters acquired some flexibility and variability, leaving room for expression of copyist's personal qualities and for the development of different writing styles in the main book production centres, as described by Kotseva (Kotseva, 1985).

Some names of copyists from the 14th century are known to the scientific community, and there are attempts to identify groups of relevant types of writing based on specific handwriting features (Musakova, 2015) (Turilov, 2005). However, a global study (synchronization) of the literary activity of these scribes or scriptoria is yet to be made in the field of Slavonic Studies. First of all, so far, no scientific method has been developed for identifying and classifying the vast variety of handwritten letters witnessed in the 14th century in particular, as well as throughout the entirety of the Middle Ages (Tsypkin, 2015). Second, little is known about the activity of individual copyists, and the information available is not easily accessible. Both of these issues have been so far faced by specialists only, who, based on their experience and intuition, advance palaeography studies and hypotheses about the production of one manuscript or another. The aim of the *Fourteenth Century South Slavonic Scribes and Scriptoria* project is to direct our attention upon the identity of single copyists and their place of work, and, based on the material they produced, trace back their activity through a certain period of time.

A comparison with the achievements within the field of Greek and Latin palaeography is useful, for it has a much longer history of research, and the contribution of new technologies (digital palaeography) is extremely important (Maniaci, et al., 2011). Digital technologies are applied mainly to Latin scripts and partly to Greek ones, but they have yet to be used methodically for Slavonic manuscripts. The introduction of such technologies would require a specific adaptation to the characteristics of Slavic scripts compared to the Latin and the Greek ones.

Additionally, the project aims at looking into the field of Digital Humanities and bridge this to that of Slavonic Studies, at least on the front of palaeography. In recent years there has been an increase in interest in innovation in areas and sub-areas serving data processing - access, management, protection, semantics - on behalf of Bulgarian ICT specialists and researchers. There is an urgent need to timely solve important problems of manipulating the growing volumes of data, which directly affect the economy (such as the creative and recreational industry), the public sector (cultural institutions such as museums, libraries, galleries, *etc.*), education and social processes (Strategy for Research Development in the Republic of Bulgaria 2017-2030, Innovation Strategy for Smart Specialization, Horizon 2020, Citizens' Europe Programme, *etc.*).

2 Project Objectives and Hypotheses

The purpose of the project is to extract data from primary medieval written sources, which will then be processed according to specific palaeographic indicators, and consequently to identify the South Slavic scribes from the 14th century. The analysed, systematised, and catalogued data will be released online and available to the international scientific community, following the latest digital technologies. To accomplish this goal, the project envisages, through the new achievements of information technology, the construction of ag scientific methodological approach for defining a similar type of data, which currently does not exist in the field of Medieval Slavonic Studies.

This will include handwriting analysis, the identification of different types of Cyrillic writing systems and the formalisation of data: font size, letter inclination, letter ductus, presence or absence of ligatures, merged writing, elements of semi-constitutional script, etc. based on manuscripts of known provenance (date and place). These formalised criteria will be systematised and analysed in view of building reliable tools for defining a manuscript palaeographically. Aspects such as change in Cyrillic handwriting styles in the 14th century (conservative or innovative), the influence of Greek scripts upon the Cyrillic ones will also be taken into account. All these observations will then be used to develop an objective, formal and working model for the identification of copyists, to be applied upon examples of dubious or unknown origin and/or authorship.

The fundamental area of research in this project focuses on: managing, processing, analysing, drawing inferences and visualizing data (Data Management, Data Processing, Data Analysis, Data Mining, Data Visualization). The project's aim is to retrieve information, to promote and to find new knowledge, to create a new analysis method, new tools, and to improve the usage and the interaction between digital written cultural and historical objects.

The main hypothesis is that by using a new ICT platform for gathering, investigating, analysing and delivering new knowledge, some problems related to providing access and manipulating large volumes of cultural data will be solved. In particular, the project will address problems such as: lack of unified criteria for describing manuscripts, lack of uniformity in data interpretation, lack of a user-friendly n website, lack of uniformity in accessing the web pages related to single objects, poor adaptability and personalisation in presenting the objects in question, to mention some. Additionally, a significant investment will go towards technological advancement in the humanities and social sciences.

The idea of identifying and determining the activity of a specific scribe and to create a digital repertoire of South Slavonic copyists in the 14th century is a new method in the field of Slavonic Studies, which is currently being defined by our international team and which will be verified upon the material gathered for the online database.

The amount of material purposed for scientific processing will be accurately identified by a preliminary list of all 14th century South Slavonic manuscripts, established either on information derived from published catalogues or directly from libraries preserving the primary sources. A key feature of the gathered bibliographical data is its focus on the identity of individual scribes or information of specific hands.

The second step in the project will be the establishment of significant palaeographical features upon which to base the scientific method of recognition of scribes and scriptoria. These will be related to the available tools for digital palaeography and will be adjusted to the needs of Slavonic Palaeography. All material which serves as examples of handwritings will be obtained from the library collections where the manuscripts are currently located, following the already established technical and methodological criteria, the same to be used in presenting the material on the website. The postulated scientific method will be applied gradually, primarily when comparing different folia written by one and the same scribe. The new technology will be tested on currently unidentified material, comparing it with different types of already identified handwritings. As far as possible and as a preliminary measure, technological procedures for comparison between individual hands may also be used, although they will not yet be aimed at identifying the copyist.

3   The Project's Team

The collaboration between PhD students, young scientists, and experienced researchers in our project's team (twelve in total) is a fundamental prerequisite for a sustainable development of research in accordance with the fast changing dynamics of the international scientific community.

Since the study of the Cyrillic alphabet is at the heart of Cyril and Methodius Cultural and Historical Heritage, the Cyrillo-Methodian Research Center (CMRC www.kmnc.bg) at the Bulgarian Academy of Science offers the ideal community of scholars for conducting this type of interdisciplinary research project. CMRC is a small but well-functioning and productive institution, with a remarkable position nationally and internationally. Thanks to its staff capacity, scholarly output quality and international activities, the institution is a world centre in its field. Additionally, its multifunctionality and interdisciplinarity allow it to work as a proven and reliable partner of other Bulgarian and foreign universities and institutes, especially as a consulting and teaching resource. The associates of CMRC are established specialists with interdisciplinary skills in the field of Medieval Studies.

The cooperation of CMRC with the Institute of Mathematics and Informatics (IMI) of the Bulgarian Academy of Science is of utmost importance in view of the technical aspects necessary for the success of the project. IMI's staff have experience in digital presentation and preservation of cultural and scientific heritage, which will undoubtedly prove beneficial during the various development phases of the project. Additionally, the cooperation between these two centres of research will bring together specialists from different research fields and will increase the scientific and technical potential of the research team.

4   Expected Results

Reaching the end of the *Fourteenth Century Scribes and Scriptoria* project we hope to accomplish the following:

- Collect on one platform samples of Slavonic manuscripts from the 14th century, which will enhance our understanding of the literary activity in the Balkans during the Middle Ages;
- Make the collected data accessible open source to the international scientific community and to a wider public interested in the material;
- Identify and attribute the authors (scribes, writers, copyists, calligraphers) of medieval texts based on the information retrieved from primary sources;
- Create an online catalogue with an open database of copyists active in the Balkans during the 14th century.
- By reliably establishing the identity of single calligraphers, cast further light upon the structure and activity of the scriptoria in which they were educated and worked;
- Introduce a new methodological approach to Slavonic Palaeography, which integrates the new opportunities offered by the Digital Humanities and uses written sources as material evidence for the understanding of intellectual history in the Balkans.

5   First Steps and Results

Currently, the vast majority of our energies are focused on compiling a list of all 14th century Slavonic manuscripts surviving across Western and Eastern Europe. Besides inserting bibliographical data about individual manuscripts, the spotlight of our database is taken by any information concerning specific copyists, calligraphers, handwritings, scriptoria and other testimony related to the art of writing. This activity is paralleled by that of establishing detailed indications about the calligraphic elements to be taken into account while analysing the primary material. The aim is to be able to describe and therefore search every handwriting according to these elements. This process is leading us towards questions regarding the quality of the photographic material to be gathered, the development of a suitable software for the analysis of the latter, the implementation of AI to our project, data storage and data access by users other the project's scientific team. In this respect, we aim at building a fruitful dialogue with experts in the fields of Latin, Greek and Digital Palaeography.

During the first phase of our project (the first six months) we have been working towards the creation of a new website (https://kopisti14.kmnc.bg/en) dedicated to *Fourteenth Century South Slavonic Scribes and Scriptoria*, which serves as a communication space between the project's team and the scientific community. On the website it is possible to read more about the objectives of the project, its activities and events, and eventually it will be possible to access the data gathered within the framework of the project.

Alongside the creation of the website, we have invested time in building a cataloguing database with the aim of collecting as much bibliographical information as possible about all the Slavonic manuscripts surviving from the 14th century (1,500 to 2,000 manuscripts). A complete overview of the material to be used for the project will give us

more precise indications about the steps to take next – collection of digitised material to use as samples for our palaeographic investigation.

During these first few months our project team has also been engaged in scientific discussions about the past, present, and future of Slavonic Palaeography with international specialists in the field. All seminars have been held online, which gave us the chance to invite colleagues from different countries and share our experience with a wider audience (all lectures can be accessed here: https://kopisti14.kmnc.bg/en/events).

6   Conclusions

From a present point of view, the relevance of the topic is defined by an increasing use of digitalized material in everyday life as well as scientifically in the Humanities, while palaeography remains a greatly under-researched and old-fashioned branch of science within Medieval Studies. In this respect, the project aims at drawing the attention of those scholars who study history of handwriting, copying, writing, and so advance a comprehensive approach which brings further knowledge in the field and shows the benefit of using modern technologies applied to palaeography.

The interest shown by the scientific community over the past months and its receptiveness encourages us to continue our work. So far, we have realised that the issues raised during the seminars about the necessity of a method to establish the identity of copyists confirms the need for such a project as *Fourteenth Century South Slavonic Scribes and Scriptoria*. We have also come to realise that there are many difficulties involved in carrying out such projects, especially at this point of our technological developments in the field of Digital Humanities. Nonetheless, this is also an indication of the fact that the project is addressing some of the most topical questions related to palaeography in general, and to Slavonic palaeography in particular – the use of computer technologies in the area of palaeographic analysis. Needless to say that the cooperation between CMRC and IMI this year has been fruitful in this respect, and is an important element for the further development of the project.

Acknowledgements

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