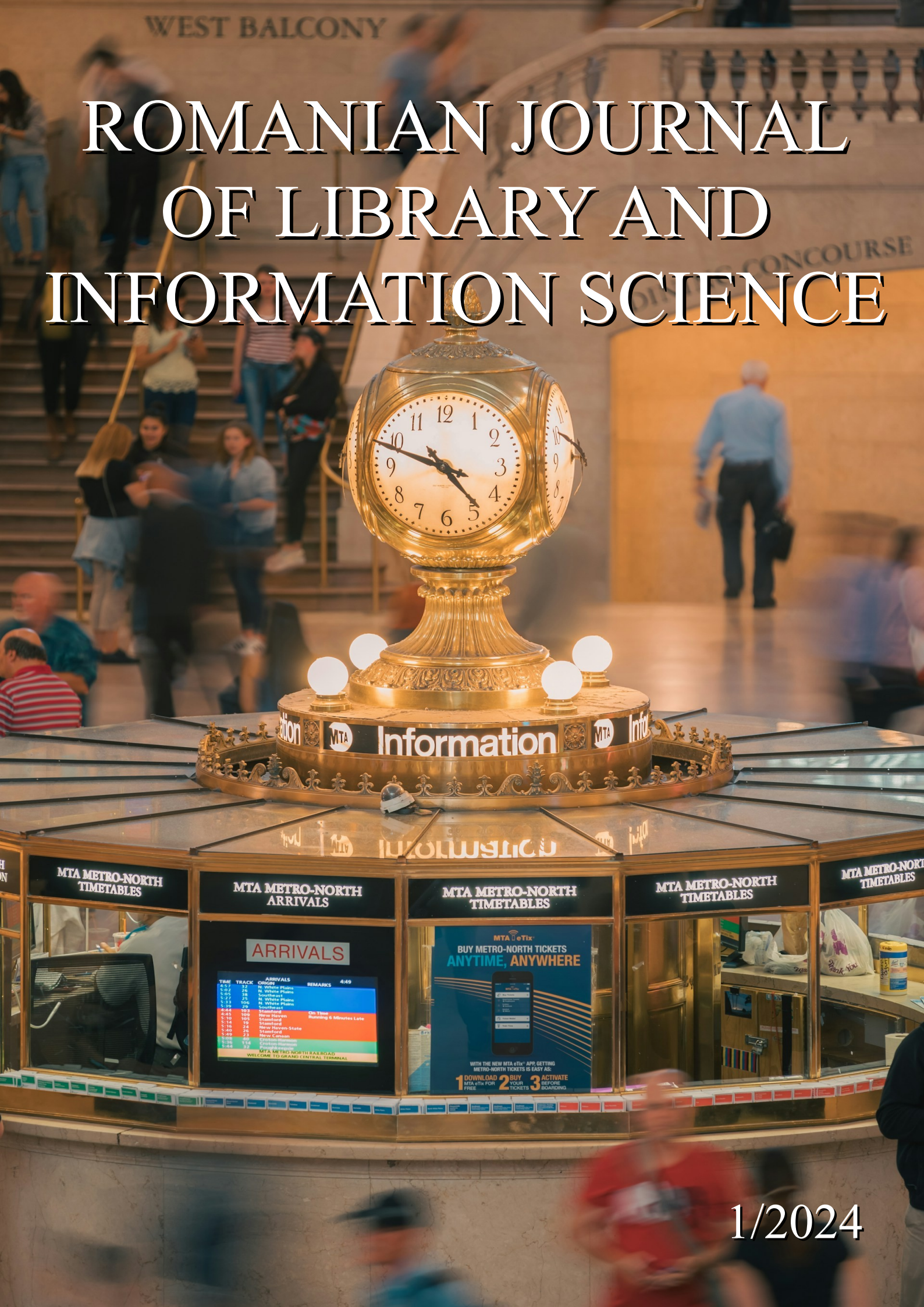

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Peculiarities and trends in doctoral research in the Republic of Moldova in the light of the bibliographical references of theses

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Abstract:
This study investigates the trends and peculiarities of doctoral research in the Republic of Moldova through an analysis of bibliographical references in doctoral theses from 2005 and 2023. Aiming to understand the features and evolution of citation practices, the study examines 375 theses available in national databases. The research addresses the quantity, nature, and language of citations, revealing significant findings. It shows an increase in the average number of references per thesis over time, indicating heightened scientific rigour and comprehensive literature integration. Differences across scientific fields are noted, with history and political science theses having the most references and computer science and physical-mathematical sciences the fewest. The analysis finds that scientific publications dominate the references, though other sources are important in some socio-humanities fields. Language trends indicate a shift from Russian to English references, reflecting increased global integration. The study also highlights the correlation between the thesis language and the predominant language of references used. These insights can be useful for policymakers, researchers, and academic institutions in understanding and improving the quality and impact of doctoral research in Moldova.

Keywords*: bibliographical reference, doctoral thesis, bibliometric analysis, Republic of Moldova*

1. Introduction

The analysis of bibliographic references from the end of a scientific paper, i.e., citations, represents a relevant bibliometric study for understanding and evaluating the impact and relevance of scientific research. It is useful for understanding the characteristics and trends of scientific publication, relationships between research topics, the most important journals and conferences on a

specific subject, differences between scientific fields, and other aspects of the scientific process. Such a bibliometric study is based on the principle that the effective use of bibliographic sources in a scientific paper, including a doctoral thesis, is an indication of their relevance to the respective research, and therefore their analysis can produce useful and relevant empirical data.

The study of sources used in a paper helps us establish its scientific rigour, the quality of the literature used, the author's original contribution, and adherence to scientific ethics, as it indicates the sources on which the work is based (high-quality sources can indicate high-quality research) and we can see how the declared scientific novelty fits into the specialized literature.

The data obtained from the analysis of references help to establish scientific networks between researchers and scientific specialities, monitor research trends including the evolution and emergence of new directions, evaluate the impact of research, etc. Based on this information, evidence-based science policies can be developed, including resource allocation and the prioritization of scientific specialities/fields.

The study of bibliographic references is particularly important in the field of librarianship, as it helps to analyse resources to determine the actual use of documents, providing libraries and information system developers with ideas for acquiring important documents and planning products and services, and is also useful in identifying materials that are related to a particular topic that are worth reading (Roy et al. 2021).

In this context, the analysis of citations in doctoral theses is important because these are complex, fundamental scientific works that present in detail all elements of scientific research, including an in-depth analysis of the scientific literature on the researched subject, written for the purpose of recognizing individuals as qualified researchers, and for advancing scientific knowledge.

2. Literature review

Studies on bibliographical references (citations) of doctoral theses are quite common in the literature. They vary in terms of the number, field, and period of thesis defence but especially in the way citations are analysed. Most studies focus on the analysis of the types of cited publications and the number of their authors.

In a study of 61 doctoral theses in library and information science, Buttlar (1999) highlighted a strong preference for journal articles over books and other types of publications. Approximately 80% of citations were to single authors, with a notable gender disparity in favour of male authors (61%). This study also highlighted the interdisciplinary nature of library and information science, significantly influenced (according to citations) by education, computer science, medicine, psychology, communication, and business. In the chemistry, Gooden (2001) analysed Ohio State University doctoral dissertations from 1996-2000. He determined that only 12 journals are needed to cover 50% of the bibliographic references and that the majority of citations are articles published in scientific journals. The same situation, with journal articles predominating among references, was found in botany - 74.8% citations (Banateppanvar et al. 2013) and overall in biological sciences (Walcott 1994).

Focusing on citation policy, Afful and Janks (2013) analysed doctoral theses in various fields and found that books are preferred in social sciences and humanities, while journal articles are preferred in other sciences. Overall, books were most cited (34%), followed by journal articles (24%) and book chapters (12%). Single authors predominate in social sciences and humanities, while multiple authors are more frequent in the other fields. In total, 67% of cited sources have multiple authors. This study also noted the predominance of recent papers in citations across all

science fields (except the humanities, where old material is widely used), but also the low citation of other doctoral theses.

A research analysing citation evolution in doctoral theses was conducted by Knapp (2013). He compared 20 doctoral theses in political science defended at Penn State University between 1953-1968 and 2005-2010, finding an increase in the proportion of journal article citations over time, consistent use of books, and a decline in the use of government documents, newspapers, and archival materials. These changes reflected a shift from humanities to a more social sciences-based approach.

Singh, Bebi, and Garg (2014) analysed social science doctoral dissertations from the University of Delhi for the period 1995-2008. Their study found that books were the most cited sources (55.5%) except in economics where journal articles were more prevalent. Single-authored papers dominated the citations (86%) and the most cited period was between 1991 and 2000. The predominance of books as the main source for doctoral theses in sociology was previously established by Zafrunnisha (2012), after analysing 9162 citations from 77 doctoral theses. Other fields of science for which books have been shown to predominate as a main source for doctoral theses include philosophy (Herubel 1991), musicology (Kuyper-Rushing 1999), political science, and psychology (Kushkowski et al. 2003).

An analysis published in the same year (2014) showed that books were still highly cited in doctoral dissertations in the Spanish and Portuguese Department at Rutgers University in New Jersey in both the humanities and social sciences. Another important finding was that doctoral students in these fields tended to favour open access journals, which might indicate that they did not know how to navigate the library's paid resources (Gasparotto 2014).

Schadl and Todeschini (2015) examined the languages and citation formats of doctoral theses on Latin American studies at the University of New Mexico. They found that the 179 theses contain 26,483 citations, of which 16,981 (64%) refer to books and/or book chapters and 9,532 (36%) to journal articles; English-language materials predominate, with 22,511 citations (85%), followed by Spanish (14%) and Portuguese (1%).

In a study devoted to citations in 53 economics PhD theses, Mondal and Roy (2018) find several features concerning this field of science, previously highlighted for this domain in general studies on social sciences. Thus, the analysis revealed that journals were the most cited documents (50.1%), followed by books (26.6%), and single-authored articles were cited more than multi-authored articles.

Citation patterns in social sciences and humanities doctoral theses at a STEM university were analysed by Burrows et al. (2019) based on work defended at Purdue University. The study found that, while journal collections met the needs of the social sciences, the humanities, which are more reliant on books, were less well supplied with the needed information from these collections. Overall, Purdue libraries hold 76% of bibliographic sources used in the humanities and 84% in the social sciences.

In a more recent study, Roy, Biswas, and Modak (2021) examined doctoral theses from ICFAI University of Dehradun, focusing on 8979 citations from 23 theses submitted between 2012 and 2020. The study found a clear preference for journals and books as sources of information, with a significant predominance of foreign authors (59.65%) over Indian authors (40.35%). The majority of the cited publications were from the U.S. and U.K. The study also found problems with the writing of bibliographical references (non-compliance with citation standards, omission of metadata, etc).

In the same year, a group of authors published a study of 172 PhD theses in design from Portugal defended between 2005 and 2019, to see the impact of previous doctoral studies. The

results reveal few connections between doctoral studies and little overlap between them, thus indicating low continuity and reproducibility of national doctoral work and a low tradition of citing doctoral theses (Costa et al. 2021).

The analysis of journal use as sources in sociology was conducted by Woods (2024) based on 104 sociology theses from Pennsylvania State University defended in 2010-2021. The analysis of 10,395 journal citations identified the core journals used by doctoral students, with significant variation in journal use across different sociology programs.

Our study aims to extend the knowledge in the field of bibliometric analysis of bibliographical references in doctoral theses in the following ways: a first analysis for the Republic of Moldova and this part of Europe, focusing on the language structure of references and on the comparing sources used over a period of nearly two decades.

3. Literature review

For the study, doctoral theses defended and confirmed by the authorized authority in the field in two years far apart (about two decades) were selected to be able to compare differences and see the evolution of bibliographic source usage in doctoral theses from the Republic of Moldova. The consulted theses were those posted on the websites of the National Council for Accreditation and Attestation (CNAA) - http://www.cnaa.md/theses/ and the National Agency for Quality Assurance in Education and Research (ANACEC) - https://anacec.md/ro/technical-staff/evaluations. In the Republic of Moldova, doctoral dissertations have been posted online, for access by all those interested, since 2004. The choice of specific years for analysis was determined by the following factors:

- 2005 – the first year all theses were posted in electronic format on the CNAA website;
- 2023 – the latest available year when all theses were posted in electronic format on the CNAA and ANACEC websites.

In total, 375 doctoral theses with full text and bibliography at the end of the thesis were identified and found, including 186 theses for which the CNAA approved scientific titles in 2005 (the number of scientific titles in that year was higher, but some habilitated doctoral titles were awarded for synthesis works and not theses, and for some approved doctoral titles, only the abstracts were found, not the full text of the theses) and 189 theses for which the ANACEC approved scientific titles in 2023.

The data extraction from the electronic version of the doctoral theses was done manually, as the national authority's websites for confirming scientific titles do not list bibliographic references separately. According to the Guide for Writing the Doctor / Doctor Habilitated Thesis, "the bibliography will list all sources of information used in writing the thesis". Therefore, since the bibliography must include only cited sources, we will consider the bibliography list at the end as the citation list, and the terms references, sources, and citations will be used interchangeably.

The 375 doctoral dissertations under analysis were divided by several characteristics:

- Type of work: doctoral (341 theses) and habilitation (35);
- Author's gender: women (209) and men (166);
- Author's country: 10 countries, mostly from the Republic of Moldova (288) and Romania (72);
- Language of the thesis: Romanian (334), Russian (32), English (9);

- Scientific field: 22 fields, mostly in educational sciences (71), medical sciences (65), law (51), and economic sciences (42);
- Institution where the defence took place: 32 institutions, mostly at the Moldova State University of Moldova (105), State University of Medicine and Pharmacy "Nicolae Testemițanu" (56), State Pedagogical University "Ion Creangă" in Chișinău (36), and the State University of Physical Education and Sport (32).

All these served as criteria for analysing bibliographic references. It should be noted that in 2005 and 2023, there were different nomenclatures for scientific fields/specialities. In our study, we used the 2005 nomenclature, with some field names adjusted to the 2023 nomenclature, using an abbreviated name in figures (e.g., instead of engineering sciences – engineering).

In the analyses conducted, we focused on the following three aspects of bibliographic references:

1. Their number;
2. Their nature – all sources used in theses were divided into three groups: scientific publications, normative acts (we separated this type considering that many theses in social sciences often use normative acts as sources), and other sources (literary works, folklore texts, observation data, dictionaries, archival data, patents, web pages, survey data, standards, statistical collections, etc.);
3. The language in which the reference was published – they were divided into four groups: Romanian, Russian, English, and other languages (French, German, Italian, etc.).

Additionally, an original aspect of the study was the comparative analysis of references in theses from 2005 and 2023, in order to try to observe the evolution over time of the above characteristics.

4. Results and discussion

4.1. Number of references

A total of 86,028 bibliographic references were identified, with an average of 229 per doctoral thesis. However, there are significant differences between theses. For instance, there are 8 theses with fewer than 100 bibliographic references and 10 theses with more than 500 bibliographic references. The theses with the fewest references are: "Developing Knowledge Competencies at the First Grade Pupils through Integration of Curriculum Content" (41 references), "Mathematical Models and Program Products in District Management" (46), and "Study of Electronic and Irradiation Processes in Gold-Doped Zinc Selenide Monocrystals" (58). In contrast, the theses with the most references are: "The Russian Federation in the Context of Contemporary International Political Processes" (820), "The Habitat of Late Bronze Age Communities in the Carpatho-Niprean Space (Noua-Sabatinovka-Coslogeni Cultural Complex)" (729), and "Criminological Victimology: Theoretical, Methodological, and Applied Issues" (695). Comparing the two years, the average number of bibliographic references used in a doctoral thesis increased from 220 (2005) to 239 (2023).

As expected, a habilitated doctoral thesis includes more citations (387) than in a PhD thesis (214), because the former is considered a product of more advanced scientific research, which "contains fundamentally new results for science and practice, which determine the solution of a complex scientific problem of major importance" (Methodology for Granting and Confirming Scientific Titles – Government Decision 497/2019). However, the difference between the number of references used in the two types of theses decreased from 200 (in 2005) to 145 (in 2023). It would

be interesting to analyse, in this context, whether other aspects (amount of data used, depth of analysis, methodology used, etc.) also show a convergence between these types of theses. We can assume that this development is also related to the fact that the procedure for defending of doctor habilitated theses was greatly simplified in 2018 by the Regulation on the Organization and Conduct of Postdoctoral Programs (Government Decision 499/2018), allowing any higher education and research institution to organize postdoctoral programs without criteria or mechanisms for accrediting institutions for organizing these programs in specific scientific fields/specialities. It is no coincidence that the academic community perceives a decline in the quality of habilitation theses.

The highest number of bibliographical references are recorded in history and political science, while the lowest in computer science and physical-mathematical sciences (Fig. 1). Overall, there are 10 scientific fields (out of the 22 fields in which titles have been confirmed) where theses have, on average, less than 200 references.

There are significant differences in some scientific domains in the average number of bibliographic references in theses from 2005 and 2023. Thus, the number of bibliographical references decreased in chemistry theses by 288 and in agricultural sciences - by 113. However, in both cases, the number of theses was too small to draw definitive conclusions, primarily because in 2005 there were doctor habilitated theses in the 2 fields (one out of 3 in agricultural sciences and the only thesis in chemistry). However, we note that the average number of bibliographic references to doctoral theses in chemistry in 2023 is only 127. Nevertheless, it is noteworthy that the average number of bibliographic references in doctoral theses in chemistry in 2023 is only 127.

By institution, the highest number of references is found in theses defended at the Institute of Philosophy, Sociology, and Law and the Institute of Cultural Heritage, while the lowest is at the Institute of Applied Physics and the Academy of Music, Theatre, and Fine Arts (Fig. 2).

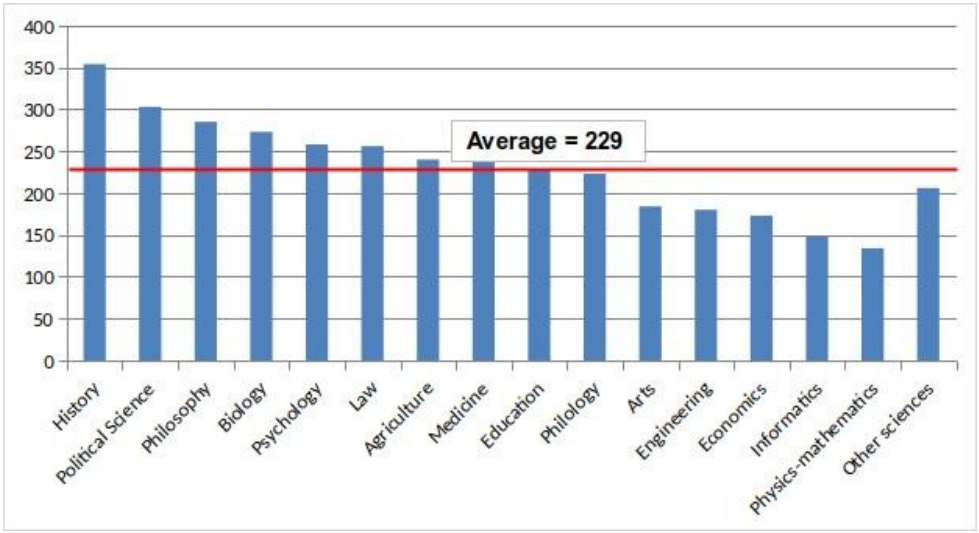

Figure 1. Average number of bibliographical references in doctoral theses from 2005 and 2023 according to scientific fields

Note: other science includes fields of science in which less than 5 theses have been defended

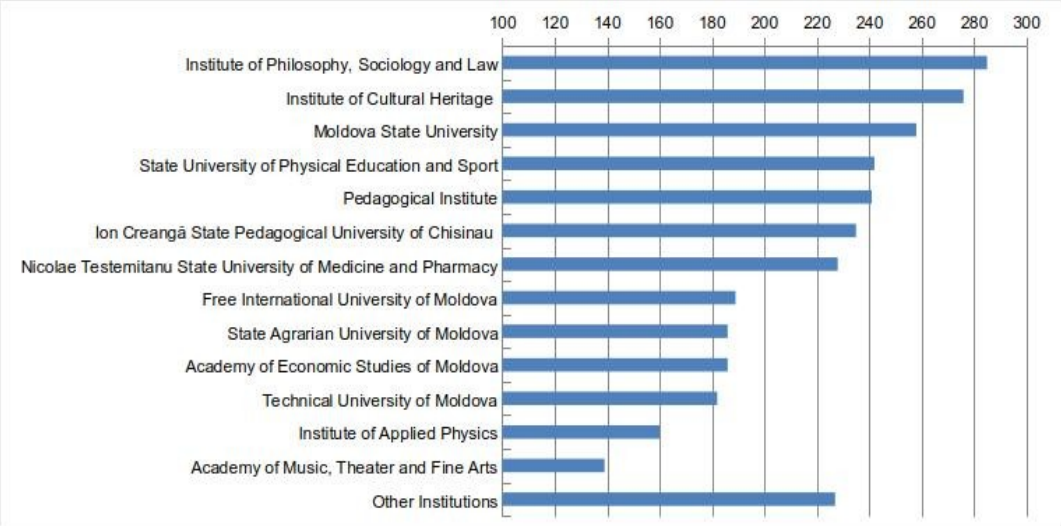

Figure 2. The average number of bibliographical references to doctoral theses from 2005 and 2023 according to the institutions where they were written

Note: other institutions includes institutions in which less than 5 theses have been defended

Generally, there is a good correlation between the average number of references at an institution and the scientific fields in which theses are defended at that institution. For example, at the Moldova State University, where theses are defended almost in all fields of sciences (105 theses in the analysed period), with the predominance of some social sciences (law - 30 theses, political sciences - 11, education sciences - 9) and humanities (philology - 13 theses, history - 8, philosophy - 7), the average number of references is higher than the average by almost 30. In contrast, at the

Technical University of Moldova, where theses are predominantly defended in engineering sciences, physical-mathematical sciences, economics and informatics (11 out of 18 theses in the analysed period), the average number of references is lower than the average by almost 50. An exception to this rule is the Institute of Cultural Heritage and the Academy of Music, Theatre and

Fine Arts (AMTAP), which have a similar profile of theses defended, however, the average number of references per thesis is higher in the former institution than in the latter. One explanation is that at AMTAP, following the modification of the regulatory framework in 2014, professional doctoral theses began to be defended (six in 2023), which have fewer bibliographical references. Based on this case, we might also assume that that in theses defended in research institutes, the number of references is higher than in those defended in higher education institutions. However, in other cases, this assumption does not hold. Thus, the average number of citations in theses defended at the State University of Medicine and Pharmacy “Nicolae Testemitanu” (228 citations per thesis) is close to that in theses defended at medical research institutes (232 citations per thesis).

Women use fewer bibliographical references than men - 223 compared to 238. This happens despite the fact that women have defended more doctor habilitated theses (60%), which cite more sources, or that men predominate in some scientific fields with fewer citations, e.g. informatics (80% men). However, the difference is not so significant enough to speak of a rule, especially since in the theses from 2023 this difference was reduced to just seven references.

The most bibliographical references are used by citizens of Belarus, explained by the fact that one of the two defended theses is a habilitation thesis in political sciences (a field with a high number of references), followed by those from the Republic of Moldova, who do not exceed the average by much. The fewest bibliographical references (under 175) are found in theses produced

by citizens of Jordan, Syria and Turkey (in the latter two countries, however, there is only one thesis each).

According to the language in which the theses are written, there are no significant differences regarding the average number of bibliographic references per thesis. We note, however, that while the number of references per thesis has increased over time in theses written in Romanian (324 theses) and English (9), the number of references in theses written in Russian has decreased from 243 in 2005 (average references from 14 theses) to 220 in 2023 (average references from 18 theses). The case of theses in Russian can be explained by the scientific field (e.g., in 2005 there were 4 theses in political sciences, and in 2023 – none) and the type of thesis (in 2005 there were 2 doctor habilitated theses, and in 2023 – none).

4.2. Nature of references

Out of the total references in doctoral theses from 2005 and 2023, scientific publications constitute 89%, normative acts – 5%, and other sources – 6%. The high proportion of normative acts is explained by the large number of theses defended in law in the Republic of Moldova.
These figures do not differ significantly between doctoral and habilitation theses. However, there are significant differences between fields, with the proportion of scientific publications exceeding 90% of total sources in 12 fields and being below 80% in 10 fields. Fields with the highest proportions of scientific publications out of total sources used are chemical sciences, biological sciences, physical-mathematical sciences, engineering, agricultural, and medical sciences.

Normative acts are most frequently used in law doctoral theses (20% of total references), followed by administrative sciences (17%), sociology and political sciences (both 10%), pharmacy (9%), and economic sciences (7%). Fields with high proportions of other sources besides scientific and normative ones include military sciences and geography (over 17% of total), which include cartographic sources, observation data, dictionaries, etc.; philology (15%) with many citations of literary works; pharmacy (13%) due to a thesis on drug authorization citing guidelines, instructions, and the like; economic sciences and administrative sciences (both also 13%); history (9%) with many citations of archival sources; art studies (7%) with citations of art works.

Comparing the nature of references by institution shows that only in 3 of them does the percentage of citing scientific publications in doctoral theses fall below 80%. The proportion of normative acts is high especially in theses from institutions where many law theses are defended – "Ştefan cel Mare" Academy of the Ministry of Internal Affairs (26%), Institute of Philosophy, Sociology and Law (17%), Free International University of Moldova (16%), European University of Political and Economic Studies "Constantin Stere" (9%).

There are no significant differences in the proportion of scientific publications among references in theses written by men and women, but certain differences are observed in the use of the other 2 groups of sources. Thus, men more frequently use normative acts (8% of total sources compared to 3% for women), which is explained by the predominance of men in fields where normative acts are more frequently cited (e.g., law), while women more frequently use other sources (7% of total compared to 5% for men), likely due to the predominance of women in philology, art studies, and other fields with wide use of tertiary sources.

No relevant differences can be observed in the proportion of source groups used by the citizenship of individuals who wrote theses or the language in which the thesis is written. The observed differences show the same correlation previously observed between scientific fields and types of sources used.

4.3. Language of References

Most references in doctoral theses from the Republic of Moldova in 2005 and 2023 are in Romanian (about 40% of total), followed by English (30%), Russian (25%), and others (5%). Among other languages, French references are most frequent. Comparing the figures for the two years included in our study, we observe a decline in references in Russian – from 35% (2005) to 17% (2023) and an increase in references in English – from 20% (2005) to 39% (2023).

In doctor habilitated theses, Russian references predominate (32% of all sources), while in doctor theses, Romanian references predominate (41%). This difference is somewhat surprising and difficult to explain, given that the proportion of theses written in Russian is higher for doctoral candidates (17%) than for habilitation candidates (9%), but also the field structure of doctor habilitated theses (medical sciences – 44%, educational sciences – 12%, law – 9%, etc.). The proportion of English sources is closer for both types of theses (30% for doctor and 29% for doctor habilitated theses), even though doctor habilitated theses are considered more advanced research and should be more integrated into the international science circuit, consequently having a higher proportion of citations of English sources, the "lingua franca" of science.

However, we note spectacular changes in the structure by language of references in doctor habilitated theses in recent decades: compared to the 18 doctor habilitated theses from 2005, the 16 habilitation theses from 2023 cited 27% more sources in English, 18% more sources in Romanian, and 36% fewer sources in Russian (as a proportion of total sources).

Romanian is the main language of bibliographic references in doctoral theses in over half of the scientific fields in which titles of doctor and habilitated doctor have been approved, with military sciences, philosophy, and educational sciences having over 60% references in theses in this language (Figure 3). On the other hand, there are 4 fields in which Romanian bibliographic references in theses constitute less than 10%.

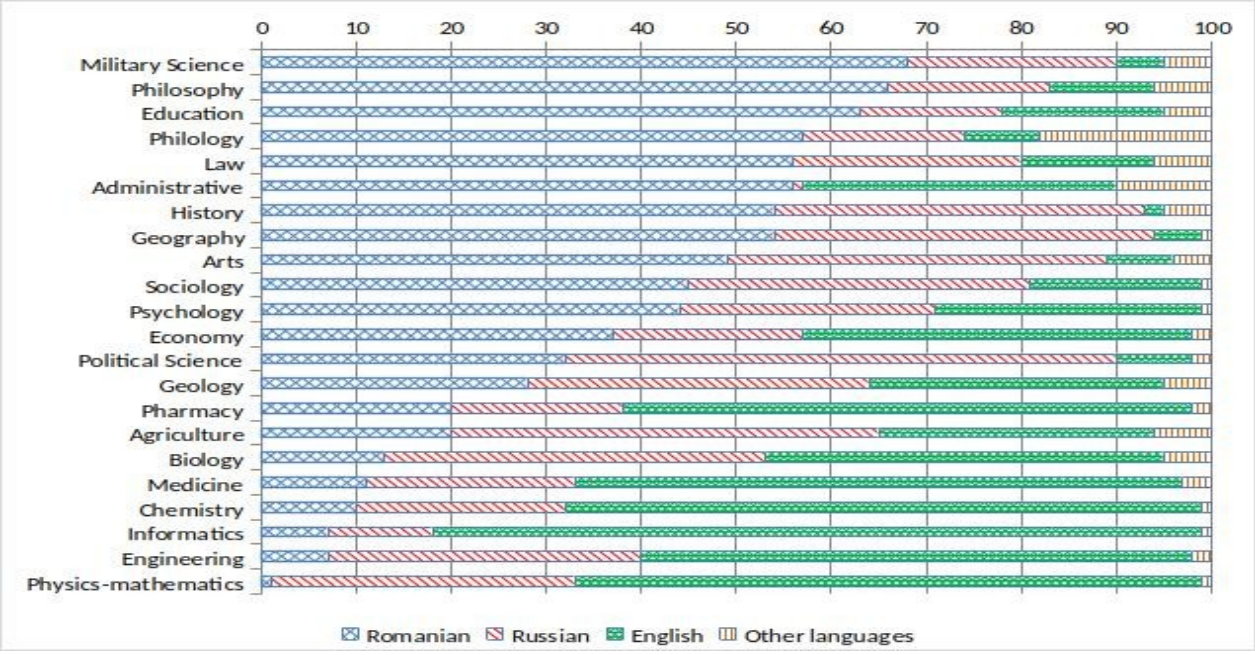

Figure 3. Language of bibliographic references in doctoral theses from 2005 and 2023 according to scientific fields

In two fields, the majority of sources used in theses are in Russian – political sciences (58% of total) and geology (36%). In the latter case, this is explained by the fact that many studies on the geology of the Republic of Moldova are in Russian, and the only thesis defended in the field refers to the northern part of the Prut-Dniester interfluve. In the case of political sciences, which is the only field with over 50% sources used in Russian, the situation is more debatable. The fact that many sources are from Russia, where there is no freedom of creation, especially in socio-human sciences, and they are more or less connected to the official propaganda of a non-democratic regime, could suggest that some researchers in the field from the Republic of Moldova accept the views promoted in that state, which are in contradiction with scientific approaches and the national interests of the Republic of Moldova. Another 5 scientific fields are strongly "Russified" in the sense that the proportion of bibliographic references in this language is very high, constituting 40-45%. This proportion is explained by traditional connections to post-Soviet space research (agricultural and biological sciences, art studies) and the existence of significant sources regarding the territory of the Republic of Moldova in Russian (history, geography).

English references predominate in theses from 8 fields, with over 50% in 6 of them, including the field with the second highest number of theses defended – medicine. The highest proportion is in computer science, explainable by the development of this field, followed by sciences that publish extensively in journals included in Web of Science and Scopus – chemistry, physical-mathematical sciences, and engineering sciences. There are also 2 fields where the predominance is relative – biological sciences and economic sciences.

References in other languages are more frequent in philology, the only field where their proportion exceeds 15%, explainable by the existence of studies on French literature, followed by 7 other fields with proportions of these sources between 5-10%.

Analysing the references in theses separately by year, we find that in 2023, Romanian predominates in 8 fields (including 2 with over 50% references), English – in 8 fields (including 2 with over 90% and 5 with over 50%), and Russian – in 5 fields (including 2 with over 50%).

Institutions with the most references in Romanian in doctoral theses are the Institute of Literature and Folklore, the Institute of Linguistics, and the Institute of Pedagogy, with over ¾ of total references, followed by 5 other institutions where the proportion of these references exceeds 50%. The most "Russified" institutions are "Alecu Russo" State University of Bălți, Botanical Garden, "Chiril Draganiuc" Institute of Phthisiopneumology, Scientific-Practical Institute of Biotechnologies in Zootechnics and Veterinary Medicine, Institute of Geography, and Institute of Physiology and Sanocreatology, all with a proportion of Russian sources in doctoral theses over 60%, with 2 other institutions having the same proportion exceeding 50%. The most "Anglicized" institutions are the Institute of Cardiology (over 90% of bibliographic references in English) and the

Institute of Mathematics and Informatics (over 80%), followed by the "Nicolae Testemițanu" State University of Medicine and Pharmacy, Institute of Plant Physiology, Institute of Oncology, Institute of Applied Physics, Mother and Child Institute, and Technical University of Moldova (with proportions in the 60-68% range).

Regarding gender, there are no major differences in the language of bibliographic references used, but as a matter of curiosity, women use Romanian sources more frequently than men, while men use Russian and English sources more frequently.

Romanian predominates in the bibliographic references of doctoral theses written by Romanian (69%) and Moldovan (34%) citizens, Russian – by citizens of Ukraine and Belarus (over 80% in both cases), Turkey and Jordan (about 48% in both cases), while English – by citizens of Israel and Palestine (over 80% in both cases), Syria and Russia (about 65% in both cases).

However, it should be noted that for the last 3 countries mentioned, only one thesis was defended during the analysed period.

There seems to be a strong correlation between the language in which the thesis is written and the predominant language of bibliographic references. Thus, in theses written in English, bibliographic references in the same language predominate (80% of references used), in theses written in Russian – references in that language (68%), and in theses written in Romanian – references in Romanian (44%). Interestingly, in theses written in English, the proportion of references in Russian is the lowest (0.3%), while the proportion in other languages is the highest (13%), suggesting that the authors of these theses have used a wider variety of sources from different languages.

5. Conclusions

The analysis of citations in doctoral theses is considered a very useful bibliometric method for obtaining data on trends in scientific publishing, relationships between research subjects, and the quality and rigour of scientific works.

This study included the analysis of 375 doctoral theses from the Republic of Moldova, focusing on the number, nature, and language of bibliographic references. The results provide a detailed and relevant picture of the characteristics and trends in doctoral scientific research in the Republic of Moldova, with the main findings being as follows:

- An increase in the average number of bibliographic references per doctoral thesis, suggesting an increase in scientific rigour and broader integration of specialized literature into theses;
- Significant differences in the characteristics of references between fields, with the most references recorded in theses from history and political sciences, and the fewest in computer science and physical-mathematical sciences. This likely reflects the complexity and interdisciplinary nature of certain fields compared to others;
- Predominance of scientific publications among bibliographic references, with a significant proportion of other sources in some socio-human fields;
- Predominant use of references in Romanian, alongside the observed trend over time of a decrease in references in Russian and an increase in those in English, indicating a shift towards international literature and greater integration into the global scientific circuit;
- A large proportion of English sources in the fields and institutions well integrated into the scientific circuit, publishing in journals from the most important international databases;
- Significant influence of the language in which the thesis is written on the language of bibliographic references used.

These findings help us better understand the trends and citation practices in doctoral theses and, in this sense, can be useful to those involved in doctoral research, including doctoral supervisors and authorities responsible for developing scientific and educational policies in the Republic of Moldova.

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Digital Skills

A Necessity in the New Informational and Communication Context

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Abstract:
The complexity of the digital environment, as an information and communication environment, determines changes in the information and communication behaviour of users, in the context of the social, cultural, educational, economic activities carried out, leading to new paradigms in the field of information, documentation and research and essentially changing contemporary society in all its components.
Digital skills are essential in contemporary society, substantially influencing the educational process. It is crucial that individuals, educational institutions and organizations work together to develop these skills, thus ensuring a society better prepared for the challenges of the future. Investigating the university environment in Romania, respectively the opinions of undergraduate and master's students, we note that they prefer to use electronic resources for study and equally strongly feel (78,4%) the need to train to use digital tools and resources.

Keywords*: digital education, digital competences, information literacy*

1. Introduction

The digital environment, seen as a new informational and communication context, modifies traditional social, cultural, and psychological models. To notice that, especially after the pandemic experience, it has become more concrete, offering mobility, and significantly detaching the dependence of communication activities on physical space(Sala 2023 p. 24).

In an increasingly digitized world, digital skills have become essential for an effective adaptation in contemporary society, along with those related to multilingualism, citizenship, entrepreneurship, literacy in new fields, etc.(Directorate-General for Education 2019) Digital skills

are not only limited to the use of technology: they also include specific communication, critical thinking, and collaboration skills. Rejection of the digital environment or the refusal to use databases or digital applications is not justified unless it is caused by insufficient understanding and recognition of the trends of contemporary society therefore, education on the use of information and communication technologies becomes a mandatory part of contemporary educational strategies.

The evolution of society from information society to digital society determined a new relationship of each person with information and technology. Digital society does not mean only information and technology, but an integrative approach of the two components in digital constructions that reproduce and transpose the socio-economic and cultural environment in which people live. Therefore, integration into the digital society is a complex approach that requires the acquisition of appropriate digital skills, along with a psycho-cognitive, social, and cultural approach that helps assimilate these new models of social representation. Equally, looking in perspective, all other knowledge necessary for life in society must be transmitted, at the same time, from sciences to arts, ethics, and ecology. Jaques Attali appreciates that "even if infinite databases will make memory seem useless, even if it will practically no longer be necessary to acquire knowledge, because everything will be available in virtual libraries, practising memory will remain a primordial activity for people to know where to look for this data and how to associate it. A society based only on the contents of its libraries would be dead without knowing it (Attali 2024 p. 316)."

2. Definition of Digital Skills

This theoretical article aims to explore the area of digital skills – definition, importance, and the ways in which they can be developed.

Digital competences refer to the set of knowledge, skills, and attitudes required to use digital technology effectively and responsibly. According to the European Digital Competence Framework(Joint Research Centre (European Commission) *et al.* 2022), digital skills include:

- Information and data: the ability to search, evaluate and manage information.
- Communication: the ability to interact and collaborate with others through digital technologies.
- Content creation: the ability to develop and edit digital content.
- Safety: understanding online safety and data protection issues.
- Problem Solving: the ability to use technology to solve problems and make informed decisions.

Acquiring digital skills has become a necessity for everybody, a mandatory condition to be present in the digital space and to use the digital products and services made available in this new environment of communication and interaction. Digital skills are considered the "new normal," characterized by the widespread use of digital technologies that enable people of all ages, social classes, and educational levels to use the skills acquired through digital literacy to learn, work, inform, and stay connected with family, friends, and other members of the community, no matter the geographical area or locality they are located in (Buchholz *et al.* 2020).

Digital literacy or digital culture takes various forms of varying complexity, depending on the needs of the applicants and on the objectives set as level and content of acquiring theoretical knowledge and practical skills regarding the digital environment and everything it means in terms

of existing technologies and applications, digital content, and the forms and levels of interaction that people can achieve (Bejan 2022 pp. 105-115).

Thus, three levels/groups of components of digital culture or digital literacy can be distinguished (Yashalova *et al.* 2019):

4. Digital culture for digital consumption (which presupposes theoretical knowledge and digital skills necessary for the online use of information, educational, professional, administrative, cultural, banking, online shopping, social networks, and other digital applications that allow everybody to interact and communicate in the digital space staying only at the user level).
5. Digital culture for digital content creation (which presupposes theoretical knowledge and digital skills necessary for the online use of digital applications and technologies for the creation of digital content in the most diverse formats and for its publication or integration in global networks the evaluation of existing digital content and its use in new contexts of information and communication the interaction on digital content platforms or applications or the use of any computer application that involves the creation, evaluation, processing, or communication of digital content according to the user's decision).
6. Digital culture for digital security (which presupposes theoretical knowledge and digital skills necessary for the online use of applications and technologies that ensure security on the Internet at the network level and at the level of all applications, products and services offered through the protection of personal data by respecting the intellectual property laws and other legal norms by ensuring free or controlled access to data by other forms and ways of ensuring digital security the technologies involve, the digital content, and the presence of the human factor in the digital environment.

2.1. Importance of Digital Skills

1. Integration into the labour market. Digital skills are increasingly sought after by employers. Many jobs require advanced digital skills, and their lack can limit individuals' career opportunities. In addition, developing digital skills can help increase productivity and efficiency at work.
2. Civic and social participation. In a democratic society, digital skills are essential for active participation in the community life. Citizens who master these skills can access relevant information, participate in debates, and contribute to the decision-making process.
3. Education and lifelong learning. Digital skills are fundamental to education, both in formal and informal settings. They facilitate access to educational resources, promoting lifelong learning. Digital skills are also essential for students who need to use technology for research, collaboration, and presentation (Tîrziman 2023 pp. 160-161).

3. Ways to Develop Digital Skills

In the European Commission's report European Framework for the Digital Competence of Educators: DigCompEdu (Redecker 2017), a common European framework is formulated to define the skills needed by citizens and which should be a concern for institutions and individuals involved in educational activities. This Framework Programme for Educators builds on the concerns of European structures to ensure digital skills for all its citizens (Digital Skills Framework Programme DigComp)(Joint Research Centre (European Commission) *et al.* 2022). It is considered that, due to

the omnipresence of digital technologies in all areas of social life, it is necessary for pupils and students to be helped to acquire the necessary digital skills and, to do so, it is first necessary for trainers, educators, and teachers to acquire these digital skills. At the international and national level, several theoretical frameworks, self-assessment tools, and training programs have been developed to describe the digital competences needed by trainers and educators so that adequate training is ensured. The European DigCompEdu framework resulted from the analysis and interpretation of these existing national and international tools and programs. The DigCompEdu framework is aimed at educators at all levels of education, from primary to higher education, including general and vocational education, lifelong education, special needs education, and non-formal learning contexts. The DigCompEdu framework starts from the premises that people live in an increasingly complex and highly dynamic digital world in which the environment people live and work in no longer resembles the world of previous generations. People's relationship and communication, banking, commercial, professional, cultural, administrative, and social activities are carried out through specialized applications and platforms and, therefore, diverse digital skills are required. DigCompEdu was developed after an intensive two-year research and consultation process involving over 120 experts and a variety of stakeholders from EU Member States. This European DigCompEdu framework is a scientific attempt to define a common set of skills that people need to thrive in all areas of their lives in a digital context.

Lack of digital skills can have a profound effect on people's overall life chances and employability. The DigComp framework has been supplemented with DigComp at Work, a document that considers digital skills in specific professional activities (Kluzer *et al.* 2020). A study carried out at European level(Directorate-General for Employment, Social Affairs and Inclusion (European Commission) 2016) reveals that around 40% of the EU population has insufficient levels of digital skills and 22% have no digital skills at all (they are often older citizens, less educated young people, lower-income families, or migrants). It is estimated that 32% of the EU workforce has insufficient digital skills and 13% of the registered workforce at European level has no digital skills at all. It is also mentioned that 42% of EU citizens who do not have computer skills are inactive on the labour market in fact, they have minimal chances of professional insertion. For this reason, the European Commission considers it important and supports the development of digital skills for all its citizens.

The European Digital Competence Framework DigComp identifies 21 competences in five key areas, which describe what it means to be digitally experienced. People need to have skills in each of these key areas to achieve the goals related to carrying out professional, administrative, learning, entertainment, and leisure activities, and engaging in social activities in the digital space. Being digitally competent means being able to use diverse digital technologies (including smartphones) in a critical, collaborative, and creative way (Directorate-General for Employment, Social Affairs and Inclusion (European Commission), 2016). The five key areas and related digital skills are presented in the Table 1 below(Directorate-General for Employment, Social Affairs and Inclusion (European Commission) 2016).

Table. 1. Five key areas of DigComp and related digital skills

Training in the use of data and information	Browsing, searching, and filtering data, information, and digital content
	Evaluation of data, information, and digital content
	Management of data, information, and digital content
Communication	Interaction through digital technologies

	Sharing digital resources and content through digital technologies
	Involving citizens in social, democratic activities through digital technologies
	Collaboration through digital technologies
	Netlabel
	Digital identity management
Digital Content Creation	Digital content development
	Integration and re-elaboration, re-use of digital content
	Copyright and licenses
	Programming
Security and protection	Protective devices and technologies
	Protection of personal data and privacy
	Protecting health and well-being
	Protecting the environment
Trouble shooting	Solving technical problems
	Identifying technological needs and responses
	Creative use of digital technologies
	Identifying digital skills gaps

Source: The European Digital Competence Framework for Citizens(Directorate-General for Employment, Social Affairs and Inclusion (European Commission) 2016).

DigComp is a theoretical framework that can be used as a common reference tool for all EU countries to ensure digital skills for all European citizens through basic education and lifelong training. DigComp can also be used for self-assessment as it allows people to measure their digital skills and identify gaps in their knowledge, skills, and abilities in the five key areas. The official document(Directorate-General for Employment, Social Affairs and Inclusion (European Commission) 2016) states that DigComp can be used free of charge by public and private sector organizations, i.e., by any institutional structure interested in contributing to the development or improvement of people's digital skills.

DigComp at Work focuses on the ICT profession in the workplace. In addition, the framework supports broader key EU policy objectives, including efforts to boost jobs, growth, and investment creation of a digital single market, and the creation of new jobs. DigComp is also part of the wider EU skills initiative and must be seen as part of European concerns to ensure the right and necessary skills and qualifications for its citizens ('Skills and qualifications - Employment, Social Affairs & Inclusion - European Commission' 2024). The Digital Competence Framework for Citizens was developed by the EU Joint Research Centre on behalf of the Directorate-General for Employment, Social Affairs, and Inclusion.

EU citizens who have digital skills assessed as low can use Dig Comp to identify the knowledge they need to become more active in society. Employers looking for staff can use DigComp to accurately define the skills and qualifications needed to draw up a job description or the requirements for filling a vacancy. DigComp is a guide to learning requirements, which means that it is also a valuable resource for the education and training sector [1].

1. 1. Formal education. Educational institutions play a crucial role in developing digital skills. The educational curriculum should integrate digital skills into all subjects, not just technology courses. Teacher training is also essential to ensure a conducive learning environment.
2. 2. Vocational training programs. Companies and organizations can offer lifelong training programs for their employees focused on developing digital skills, including online courses, workshops, and training sessions tailored to the specific needs of employees.
3. 3. Online resources and learning communities. The Internet offers a wealth of learning resources such as online courses, video tutorials, and discussion fora. Participating in online learning communities can foster the development of digital skills and provide support and feedback from other users.
4. 4. Practice and experience. Developing digital skills takes practice. Frequent use of digital technologies in everyday life, whether it is social media, productivity apps, or collaboration tools, can help strengthen these skills.

3.1. Challenges in the Development of Digital Skills

Although the importance of digital skills is recognized, there are also challenges in developing them. Some of these include:

- **Access to technology**: all individuals have not access to digital devices or the Internet, which can create disparities in the development of digital skills it is found that there are growing differences between communities according to their level of technology and use of the Internet. The most disadvantaged are offline communities which are excluded from a range of social activities the phenomena of social exclusion with all its forms of manifestation are accentuated – pauperization, isolation, diminishing access to information, education and culture, access to social and health services, etc. Many offline communities suffer from the partial migration of human activities – shopping, commerce, socializing, leisure activities, professional interactions – to the Internet. Another disadvantage is the different level of literacy or training of citizens in the use of digital technologies. Their inability or limited ability to use the computer or even the phone for specific applications represents a limit or even a serious barrier in an adequate quality of life today.
- **Security and privacy**: The increased use of digital technology comes with security and privacy risks, which can discourage users from fully engaging. Technology-based services are prone to technical and security issues ranging from hardware failures, vulnerability to cyber-attacks, power outages, slow or non-existent connectivity, etc. Websites of public institutions are prone to malicious attacks from hackers and malware. Such cyber-attacks endanger citizens' personal data, as well as the confidential information of institutions and, therefore, it becomes vital for any kind of public institution or government agency to protect its systems from complex cyber threats.
- **Speed of technological change**: technology evolves rapidly and digital skills must be constantly updated to remain relevant.

4. Digital Competences in the University Environment: A Local Didactic Perspective

As an applied part to complement the approach of valorising the theories and practices of digital culture, below are some of the results of a study carried out by the authors on students' opinions on how to use digital documentary resources. The respondents come from the West University of Timişoara, the University of Bucharest, the "Transilvania" University of Braşov, and other universities, to a lesser extent. The quantitative research method, the opinion survey by questionnaire (applied online) was used. The data presented are part of an ongoing research project on undergraduate and master's students' views of the bibliographic sources they use, and of their competencies and skills in using bibliographic databases. Data collection was carried out through the Google Forms platform, between November 2023 and February 2024, by completing the questionnaire in online format. There were 916 responses.

The results of our opinion survey, regarding the use of digital documentary resources by undergraduate/master students, are presented below.

Distribution of respondents by levels and years of education:

Undergraduate, Master, 1st year, 2nd year, 3rd year, 4th year

The respondents belong to all study years, from undergraduate and master levels, with a significant participation of 41.8% of 2nd-year undergraduate students, followed by 1st-year undergraduate (18.1%), 3rd-year undergraduate (15.2%), and 1st year master (11%) students.

Frequency of appeal to bibliographic resources in electronic format:

Daily, weekly, monthly, once in 2-3 months, during exam sessions, very rarely, not at all, every 2 days.

Students turn to sources of information in electronic format mainly daily: 70% of respondents or weekly: 19.2%, indicating that the preference for these resources is supported by university education.

Favourite locations to access the Internet:

At home, at the faculty, at the library, in public areas, everywhere.

Any location is suitable for accessing the Internet.

Extent to which students know about the existence of bibliographic databases and self-assess their skills in using them:

To a very large extent largely to a medium extent, to a small extent, to a very small extent, not at all.

Current generations of students are familiar with the use of bibliographic databases in the following proportions:

- 38.3%, to a medium extent
- 28.6% to a large extent
- 15.3% to a very large extent

or, at the opposite pole:

• 12.8%, to a small extent
• 5.0%, not at all.

Self-assessment of the need for training / improving one's information culture and the use of bibliographic databases:
YES, NO, I have already taken such a course

The students' need for training and improvement in the use of databases (78.4%) manifests itself to a degree almost like that of the daily use of electronic information resources (71%) as a result, the training offer in this sense should be in concordance.

5. Conclusions

The complexity of the digital environment, as an information and communication one, determines changes in the procedures and methods of creating, processing, and using documentary and informational resources changes in the informational behaviour of users, changes in social, cultural, educational, and economic activities lead to new paradigms in the field of information, documentation, and research, and fundamentally change contemporary society in all its components.

Digital skills are essential in contemporary society, influencing not only professional careers, but also civic participation and the educational process. It is crucial that individuals, educational institutions, and organizations work together to develop these skills, thus ensuring a society better prepared for the challenges of the future. In a digitized world, digital skills are not just an advantage: they are a fundamental necessity.

Notes

[1] Employers' organisations, trade unions, employment services, education and training providers, and European sectoral skills councils are among those already contributing to the development of the framework. Their continued and active involvement will ensure that DigComp remains a practical, flexible, and relevant tool – one that can be used by a wide range of individuals and organisations. More about DigComp can be found by accessing the full document: DigComp 2.2, The Digital Competence framework for citizens: with new examples of knowledge, skills and attitudes, Publications Office of the European Union, 2022. Available at: https://data.europa.eu/doi/10.2760/115376 [accessed 08.10.2024].

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Digital University Collections and the Open Access System

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Abstract:
In the contemporary era, the university libraries are forced to adapt to new technologies and digital requirements, becoming the main information resources for educational and research activities. The concept of Information Society is defined by the exchange of information, and technology is the basis of this society. Romanian university libraries must adapt to these challenges by digitizing their collections, creating digital archives that provide quick and diversified access to the necessary information.
Within the Romanian university libraries, it is necessary to digitize the collections in order to meet the online users' needs, and their development strategies must be correlated with the available funding. The digitization process must take into account the type of document and the required resources, such as metadata and access to information. The cooperation with other libraries and institutions is essential in order to avoid the repeated digitization of the same documents.
Currently the Romanian university libraries face challenges regarding access to digitized documents and the development of users' digital services. The cooperation with other institutions, such as the National Digital Library, is crucial for preserving the cultural heritage and for diversifying the access to information. The digitization process requires planning, financial resources and IT specialists in order to ensure its success.
In conclusion the university libraries adaptation to new technologies is crucial for ensuring fast and efficient access to the information needed for research and education activities. The cooperation with other institutions and the implementation of digitalization strategies will ensure that libraries remain the main sources of information in the digital era.

Keywords*: digital university collections, open access system; university libraries, information society*

1. Introduction

In current times, with the new technological developments, the behaviour of the user has changed, and the university library has the task, due to the nature of the activity performed, to do everything possible so that the user deems it the main information resource for the optimal performance of the teaching or research activity.

In his paper, *Theories of the Information Society* Frank Webster lists five categories of definitions of the information society: "technological, economic, occupational, spatial, cultural. The

basis of the future global information society is represented by recent information and communication technologies" (‘Theories of the Information Society’ 2024 p. 139).

Also, in his work *Noi studii de bilioteconomie* (New Librarianship Studies), Professor Mircea Regneală stated the fact that "the role of libraries today is not limited to keeping books and documents; the library also contributes intensively to the dissemination of the information contained in the publications. For this, it is required to take the initiative to create and multiply the channels along which the information can pass easily from the library to the reader". To this end, at the level of universities, departments have been established to train professionals in the field of information and documentation, who acquire skills in working with information based on clear methodologies.

That is why it is imperative for the university libraries in general and for the Romanian central university libraries, in particular, to adapt to the new challenges generated by the information society, to set at as their objective the steps related to the identification of the financial resources necessary for scientific documentation and, at the same time, to reject the status of simple extensions of the universities, meeting the informational needs of the readers by organizational strategies applied to the new realities faced by the academic environment.

To that effect, it is absolutely necessary for the electronic services of traditional and newly created university libraries to be equivalent, in terms of organization, to the traditional services of classic university libraries. Digitizing funds that were traditionally set up as university collections and making them available to users through scientific databases is one of the most important tasks for university libraries.

Without modern info-documentary structures capable of satisfying the quality parameters required by the EU, reducing the gap between Romanian libraries and those in developed countries will remain a simple illusion. In order for Romanian research results to be known and disseminated internationally, it is necessary for Romania to develop a coherent digitization strategy at the level of higher education institutions, under the coordination of a consortium of Romanian university libraries, and this, firstly, for a faster access to different funding sources. Moreover, the cooperation between a university and its library should be translated into an agreement whereby all rights and obligations are regulated. More precisely, any university or university library should establish a digital institutional repository, through which to ensure the access of the entire scientific community to the various intellectual products: doctoral theses, various works and important publications of the university, etc. This objective requires the structuring of some conditions, both legal and organizational, to ensure access to materials in electronic format, especially since most of the university libraries participating in the creation of digital archives are implement publishing contracts, as well as standard record control numbers, such as ISBN. A such, there is a qualitative leap, because an enormous amount of works containing valuable information, stored in libraries, but with a restricted degree of access, is entered in well-organized databases, which contain the full text of the document and the metadata describing it, along with the protocols that facilitate interoperability with other systems and services (services providers).

Consequently, the objective of setting-up a digital university archive, i.e. creating the possibility for researchers and students to access digitized scientific documents quickly and from various locations, must represent a priority task of all university libraries and, more than that, the need for members of university communities to master the methods of using these new technologies it is all the more pressing.

In his work *Science of communication*, writer J.J. Cuilenburg shows that "the methods and extent with which information is produced, collected, processed, preserved, have evolved together with the development of human society. To all this is added the marriage between the computer and telecommunications, decisive for the amplification of communication. The two technologies

(computer technology and communication technology), taken together, are called information technology" (van Cuilenburg *et al.* 1998 p. 59).

Therefore, in the future, Romanian university libraries must be able to respond to user requests in the most documented way possible, in order to identify and operationalize information, and it is necessary, at the same time, to actively participate in research and knowledge development processes, in order to substantiate research bases and ensuring the efficient transfer of information.

2. The impact of digital information technology on collections in Romanian university libraries under open-access system

In the contemporary age, the university library faces important transformations, due to the rapid development of information and communication technology. Alongside the traditional libraries, together with the advent of digital technology, the foundations of a new info-documentary structure model were laid: the digital library. In this new context, university libraries are under strong pressure to align themselves with the information society's objectives, whose defining goal is the permanent access via the most efficient search engines to national and international digitized informational collections.

Hence, in the process of adapting the university environment to the directives of this new way of managing and organizing information, the educational system has a key role in initiating any project to update the university structures, especially communication systems, which are under a true exponential development.

Also, it is mandatory to create a planning of the services that "will be the core of the entire managerial activity, because it is involved in all segments of this development process. Planning is an analytical process that involves assessing the future, establishing a mission, determining certain objectives in the context of that future, imagining the paths of action to achieve these objectives, all included in an appropriate action program", as specified by Professor Ionel Enache, in his book *Planning and organizing library services (Ionel 2004 p. 52)*.

In order for these radical, completely new changes to be made, first it is imperative to find the financing methods, without which narrowing the gap between Romanian libraries and those in developed countries will remain a simple illusion because, in the information society, the library permanently redefines its objectives and resources to constantly ensure the exchange of information on traditional or digital media and the continuous access to national and international information resources, through the most efficient search engines. All the more as university libraries and university centers, which are integrated into the education and research system, deal with both the processing and the management of information dissemination, support the development of the scientific community by popularizing electronic resources organized by profile or by rendering individual services on demand, acting as mediators between library resources and users, trying to establish the necessary balance between collections and their circulation.

In essence, it can be stated that the information society is the society that is based on the Internet. At the same time, globalization is also a consequence, mainly of the exponential evolution of the Internet. So, "it can be said about globalization that it is one of the phenomena specific to the information society. Given the link between the informational society and globalization, the statement that globalization is a consequence of the informational society is justified, because the informational society is an irreversible process".) , says researcher Mihai Draganescu in the book

titled *Globalizarea și Societatea Informațională (Globalization and the Informational Society)* (Drăgănescu 2001 p. 3).

Therefore, any info-documentary structure must identify methods for: selecting, digitizing and storing cultural resources corresponding to written heritage, movable cultural heritage, immovable cultural heritage, audiovisual heritage, archival heritage and, in particular, to ensure quick access to stored information and at the same time, the regulation of the legal framework and the identification of financial resources.

The main reason for the digitization of traditional documents worldwide and then nationally was the preservation of heritage and rare documents. Digital scanning of rare documents is universally recognized as preventive preservation. For this type of documents, digitization is the only successful solution in the fight with time and space.

The selection of documents for the digitization process is much more laborious than the selection for the purchase or licensing of documents published directly in digital format, as it involves the expenditure of resources for titles that may already exist in the library collection. Thus, in order to avoid repeated digitization of a title, it is necessary to identify the digitization projects that have taken place or are taking place at the level of university libraries or other educational institutions throughout the country.

At the same time, it should be mentioned that in the process of cataloging digital documents, the lack of drafting the descriptors (they can be quickly and radically converted into metadata) is a decisive factor in excluding a collection from digitization. Creating metadata is more expensive than scanning, but the accuracy of the description provided and the user's quick access to information must be taken into account.

Usually, the access to digitized documents is achieved depending on the type of document, even via the Internet. From this perspective, it is necessary to put into practice a new system that allows the electronic management of access control, but also of the frequency of use of the managed digitized documents. It is very useful that all digitization efforts are supported by effective search engines, especially since access is desired not only from the library, but from any location.

Also, the retroactive conversion of the documents already existing in the library funds is increasing the level of access to the collections, but it is much more important that the titles newly entered into the collections are also in digital format, in order to increase accessibility.

But, among all the conditional elements, the financial aspect can be appreciated as decisive. This aspect will be in close interdependency with the digitization solution chosen, which is determined by the type of document. Worldwide, digitization projects attract more and more researchers, engineers, specialists in computers or in the science of information and communication. The high interest in this direction is explained by the substantial funds that have begun to be invested in this type of cutting-edge research. In Romania, the financial resources available to the libraries only allow the development of specific, small-scale initiatives. In order to carry out a digitization project at the national level, it is necessary to ensure direct financing or support through projects dedicated to the achievement of this objective.

Until now, few Romanian university libraries have significantly digitized book collections, courses and periodicals found in the bibliographic lists of the faculties, the vast majority of them have digitized special collections. Sanda Bercovici believes that "The profile of the university, the number of faculties, the spatial organization determine, in most cases, the structure of the library. University libraries are more efficient and more cost-effective than specialized ones, especially in the era of the informational explosion" (Bercovici 2007 p. 10).

Conclusions

In the digital age, users of university libraries can influence selection decisions directly through purchase recommendations, but, especially, indirectly through the librarian's knowledge of the educational programs and research interests of the relevant institution. The greatest responsibility rests with the library and teaching staff. Lack of collaboration seems to be, in most Romanian university libraries, a critical issue, difficult to solve in a short period of time. It would be ideal for all university libraries, central facilities and branches, to receive a copy of each bibliography recommended for each subject of study, for each individual academic year, with specifications regarding the number of students enrolled in each course at the relevant universities. When these data involve changes, it is natural that they should be brought to the attention of the library staff. However, this does not always happen, having adverse consequences on the structure and characteristics of library collections.

The reference fund also requires special attention in the context of the collection development process, as it is positioned on the border between the two essential directions of the development process: universality or specialization. University libraries tend to keep reference documents of a general nature at the central facilities, those of a specific nature falling under the responsibility of the branches. Angela Marcu in the work titled *Noi tendințe în serviciile de referințe din biblioteci* (*New trends in library reference services)* states that: "The librarian-user relationship goes beyond rigid formalism, conventional communication, a feedback, without which a real and fruitful communication relationship cannot be established, between the partners who relate, regardless of the context and purpose, establishing, therefore, between the holder of information and the beneficiary, a very special connection, a mutual support" (Marcu 2006).

Also, the extremely contradictory trends manifested in the current librarianship activities carried out, especially in the Romanian university libraries, have imposed the need to adopt appropriate managerial practices for each individual structure, starting from general aspects, but insisting more on their specificity. The idea circulated by specialists in the field is that, currently, the main contradiction in the development of contemporary library collections is related to the ratio between the investment of resources in own collections and the investment for the expansion and improvement of interconnections, of various types of informational relations. The determinations are imposed by general goals and objectives, but also by the specific conditions of the environment, the particularities of users, the size of resources, the quality of technologies, traditions, etc. The option is not easy, it is not obvious, it is not without risks.

Specialist Peter Brophy points out that "the classic library model, based only on collection development, is no longer up-to-date. The model of systems that thought of the library according to purchase, classification or loan operations retains its value as an organizational and administrative tool, but it can no longer define the mission of libraries in the new age of information technology" (Brophy 2004).

The process of supplementing the collections has been and will be constantly given special attention because the contemporary library cannot successfully fulfill its mission of being both a manager and a generator of information, without developing viable strategies to be permanently integrated in the fast pace of the development of society on a global scale.

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