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FINANCIAL VULNERABILITY AND ENVIRONMENTAL IMPACT: HOW HOUSEHOLD DEBT AFFECTS SUSTAINABLE CONSUMPTION

Abstract

This article examines the relationship between household debt burden and sustainable consumption, with an emphasis on the environmental consequences of debt-driven consumer behavior. As household debt levels increase worldwide, consumers often prioritize cost over sustainability, leading to choices that may run counter to Sustainable Development Goal (SDG) 12, which focuses on responsible consumption and production. Using bibliometric analysis, this study maps the academic landscape focused on household debt and sustainable consumption, identifying research trends and existing gaps in the literature. The purpose of the study is to identify and scientifically substantiate the relationship between household debt burden and sustainable consumption, as well as to assess the impact of financial debt on environmentally oriented consumer behavior based on a bibliometric analysis of scientific literature in order to identify key trends, research gaps and develop recommendations for policy formation that ensures a balance between household financial stability and the achievement of goals. sustainable development. The results of the study show that the debt burden of the household sector largely causes unstable consumer behavior due to financial pressures that limit consumers' ability and ability to make environmentally conscious choices. At the same time, this list can be expanded with such characteristics as culture and education. The analysis highlights the growing body of research on the impact of debt on consumption. Nevertheless, the study examining the intersection of the debt burden of the household sector and sustainable consumption by this sector is insufficiently covered in the scientific community in Central Asia and in the research environment of Kazakhstan. The results of the study highlight the need for policies that balance financial stability and environmental objectives.

Keywords: household debt burden, sustainable development goals, responsible production, bibliometric approach, household consumption

Introduction.

The growing burden of household debt has become a major concern for governments around the world and has attracted considerable scientific attention due to its profound economic, social, and environmental impacts. This scientific interest is primarily driven by the multidimensional characteristics of household debt, which include its determinants in an era of rapid technological progress, the impact on sustained economic growth, the effects on consumer behavior, and related environmental impacts. These interrelated factors create crucial public policy challenges related to achieving the Sustainable Development Goals (SDGs) set by the United Nations, in particular Goal 12 — Responsible consumption and production.

Empirical evidence strongly suggests that household debt has various temporary effects on economic growth. In the short term, an increase in household debt can stimulate economic activity through immediate consumption; however, in the medium term, this positive effect is eroding, leading to a slowdown in economic growth [1]. Such dual impacts require careful consideration by policy makers, especially regarding sustainable economic and environmental strategies. Tunc and Kilink confirm this assumption once again, showing that rising debt significantly limits household consumption, especially when the debt service to income ratio reaches critical levels such as approximately 30% [2 - 3].

The relationship between household debt and consumption remains the subject of ongoing scientific debate, reflecting opposing views. Du Caju et al. emphasizes the predominantly negative impact of household debt on consumption [3]. Conversely, other researchers, including Chucherd and Khan et al., identify scenarios in which increased debt can stimulate certain categories of consumption, such as transportation, communications, and education [4 - 5]. However, Chucherd recommends caution regarding the long-term sustainability of these positive impacts, recognizing the

potential negative effects over a long period of time [4]. Similarly, Khan et al. emphasizes the causal relationship between debt and consumption, noting that increased consumption often drives households further into debt, thereby creating a "debt trap" that exacerbates financial vulnerability during economic downturns [5]. Consequently, reasonable government regulation of household debt levels and responsible lending practices are becoming necessary to maintain economic stability.

In response to these economic dynamics, policy initiatives in various countries are increasingly focusing on rational household consumption with an emphasis on resource and energy efficiency. Cohen advocates the integration of social and financial education into government programs to empower households to manage debt and discourage excessive borrowing, thereby promoting sustainable consumer behavior [6].

The environmental impacts of household consumption highlight the critical importance of sustainable practices. According to Ivanova et al. [7], household consumption accounts for more than 60% of global greenhouse gas emissions and has a significant impact on the planet's land, water and material resources. The main consumption categories that have been identified as particularly significant include food, housing, and mobility, with food consumption itself having a significant impact on land and water use. These conclusions are confirmed by Kerkhof et al., which demonstrates a direct correlation between rising household spending and environmental degradation, including increased acidification and smog formation [8].

Balancing economic and environmental goals remains the most important policy objective. Although short-term environmental measures can temporarily reduce pollution levels, Boli et al. warn against accumulating potential long-term environmental debt [9]. Lombardi et al. also illustrated the parallels between environmental debt and household debt, emphasizing that increased household debt initially stimulates short-term consumption and economic growth, but eventually leads to long-term economic decline once critical debt thresholds are overcome [10]. They note a marked decrease in consumption growth when the household debt-to-GDP ratio exceeds 60%, which underscores the need to ensure a balance between economic growth and environmental sustainability.

Consequently, this study aims to address existing knowledge gaps by systematically examining how financial vulnerability due to rising household debt affects sustainable consumer behavior and its environmental impacts. With a particular focus on Central Asia, and particularly Kazakhstan, a region underrepresented in existing research, this document provides valuable insights into targeted policy interventions and makes significant contributions to both academic discourse and practical policy development strategies.

Materials and methods of research

This study uses descriptive bibliometric analysis to systematically examine the complex relationships between household debt, consumer behavior, and environmental impacts, especially in the context of sustainable consumption. Bibliometric analysis is a quantitative approach to identifying and studying trends, influential works, and structural relationships in existing scientific literature [9-12]. This methodological framework allows for a comprehensive and structured assessment of modern scientific discourse, identifying important research clusters and thematic relationships related to household debt and related environmental impacts.

The bibliometric data used for this study was taken from the SCOPUS database, known for its wide coverage and extensive collection of peer-reviewed scientific literature. To maintain methodological accuracy and increase the relevance of the dataset, an initial keyword search was conducted using the term "sustainable consumption". The search was limited to scientific publications released between 2000 and 2024, resulting in an initial dataset of 59,218 documents. Subsequent refinement was carried out using specific inclusion criteria: relevant thematic areas, publication types (articles and reviews), predefined keywords and language filters (English and Russian). These steps were taken to ensure the thematic consistency of the dataset and the comprehensive presentation of relevant studies.

Descriptive analysis served as the main analytical method for processing and interpreting the collected bibliometric data. This analytical method included quantifying publication trends, identifying influential authors, recognizing well-known journals, and examining the geographical distribution of research efforts. The descriptive analysis provided a fundamental insight into the

breadth, scale, and thematic diversity of the existing literature on household debt and sustainable consumption, bringing clarity to existing scientific discussions and research gaps.

Even though the bibliometric method provides significant advantages in analyzing scientific trends and thematic relationships, this study examines several methodological limitations:

- Excluding publications in languages other than English and Russian could potentially lead to important materials available in other language contexts being ignored.
- The exclusive use of the SCOPUS database may lead to the exclusion of relevant research published in other significant academic databases, such as Web of Science or PubMed.
- The temporary limitation of the period from 2000 to 2024 may lead to the fact that important works published before this period may be skipped, potentially affecting the comprehensive historical continuity of the analysis.

Despite these limitations, the bibliometric approach adopted in this study provides a reliable systematic framework for a thorough examination of key literature related to household debt and sustainable consumption.

Results and their discussion

An initial search for publications from 2000 to 2024 yielded 59,218 documents. Subsequent refinement by subject areas, in particular economics and social sciences, reduced this number to 41,700 documents. A further sample devoted exclusively to articles and reviews narrowed the list to 20,173 relevant scientific publications. The inclusion of additional criteria by keywords — "environmental impact assessment", "consumer behavior" and "consumer behavior" — and the restriction of the use of languages only to English and Russian resulted in a final dataset of 1,966 articles and reviews.

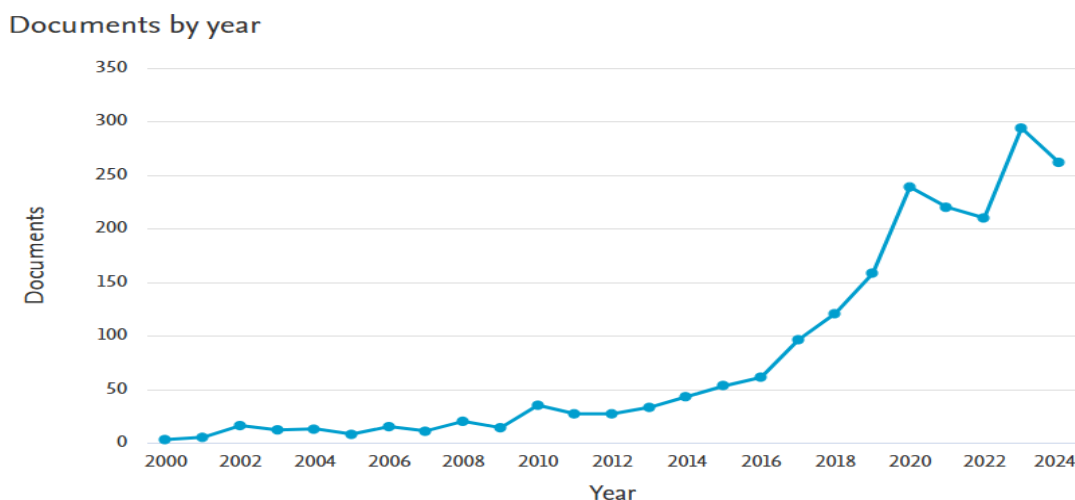


Figure 1 – Quantitative assessment of publications for the period from 2000 to 2024

Note: Constructed by the author using Biblioshiny (Bibliometrix R-package interface) based on SCOPUS database data, 2000–2024

Figure 1 shows trends in publications on sustainable consumption from 2000 to 2024, indicating a steady increase in scientific interest since 2010, reaching its peak around 2020. The marked decline between 2020 and 2022 correlates with the immediate post-pandemic period, which will be followed by a surge in scientific attention starting in 2022. This trend is confirmed by the data presented in table 1.

Table 1 – Annual quantitative assessment of publications (2000-2024)

Year	Documents	Year	Documents
2000	3	2013	33
2001	5	2014	43
2002	16	2015	53
2003	12	2016	61
2004	13	2017	96

2005	8	2018	121
2006	15	2019	158
2007	11	2020	239
2008	20	2021	220
2009	14	2022	210
2010	35	2023	294
2011	27	2024	262
2012	27		

Note: Constructed by the author using Biblioshiny (Bibliometrix R-package interface) based on SCOPUS database data, 2000–2024

An analysis by country shows that the largest number of publications were published in China (358), the USA (262), Great Britain (234), Italy (136) and Germany (127), reflecting significant interest in this topic worldwide.

Information on the sources is shown in Figure 2.

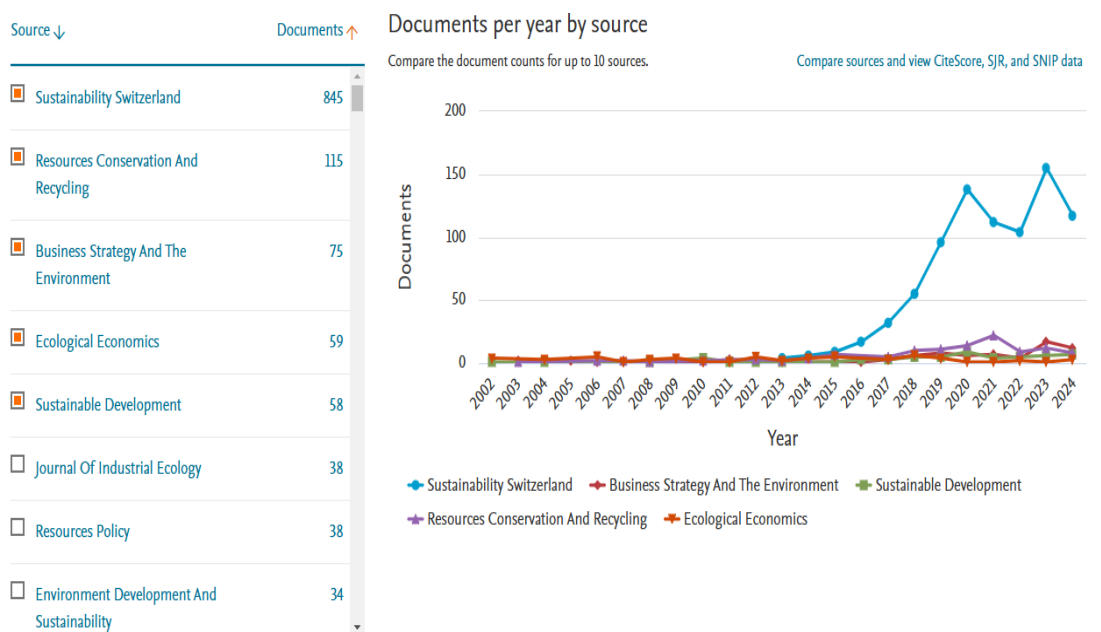


Figure 2 – According to sources for the period from 2000 to 2024

Note: Constructed by the author using Biblioshiny (Bibliometrix R-package interface) based on SCOPUS database data, 2000–2024

Figure 2 shows the distribution of publications in various scientific journals for the period from 2000 to 2024. The most popular magazine dedicated to sustainable consumption is Sustainability (Switzerland), which published 845 articles during the specified period. In second place is "Resource conservation and waste recycling" (115 publications), followed by "Business Strategy" and "Environment" (75 publications). The predominance of publications on social sciences (28.8%) corresponds in essence to the socio-scientific nature of sustainable consumption, which examines human behavior patterns, decision-making theories, and socio-economic interactions. Environmental sciences (25.8%) and energy (16.6%) occupy the second and third places, respectively, demonstrating a clear interdisciplinary interest.

Figure 3 shows a more detailed breakdown of publications by subject area for the period under review (2000-2024), highlighting the predominance and relevance of sociological approaches in interpreting models of sustainable consumption and their effects on the environment.

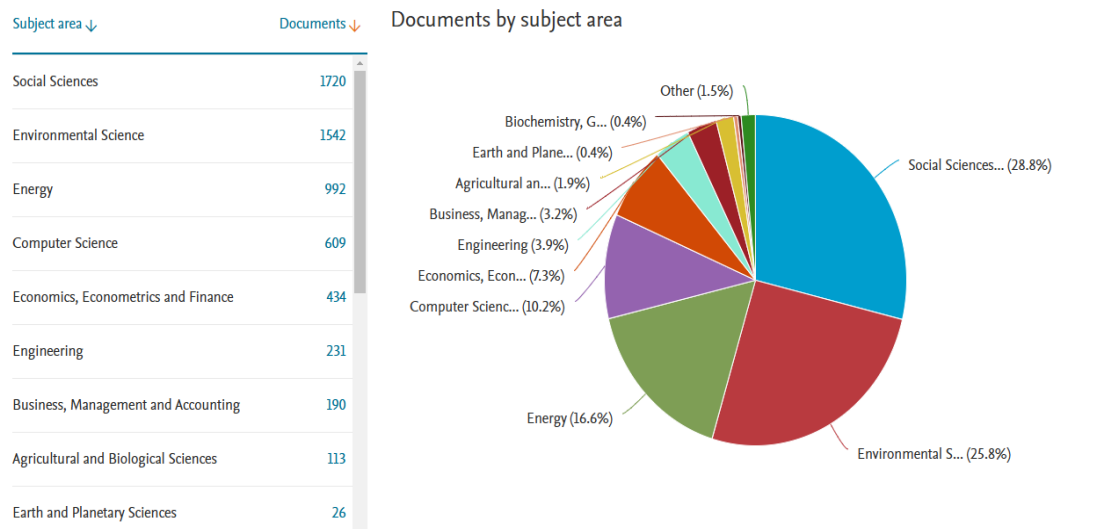


Figure 3 – Research of scientific papers in the context of the subject area

Note: Constructed by the author using Biblioshiny (Bibliometrix R-package interface) based on SCOPUS database data, 2000–2024

Further bibliometric analysis allows us to identify key authors who have made significant contributions to this field of research. Figure 4 shows the top ten authors who publish most frequently in the field of sustainable consumption, which provides insight into influential researchers and their academic backgrounds.

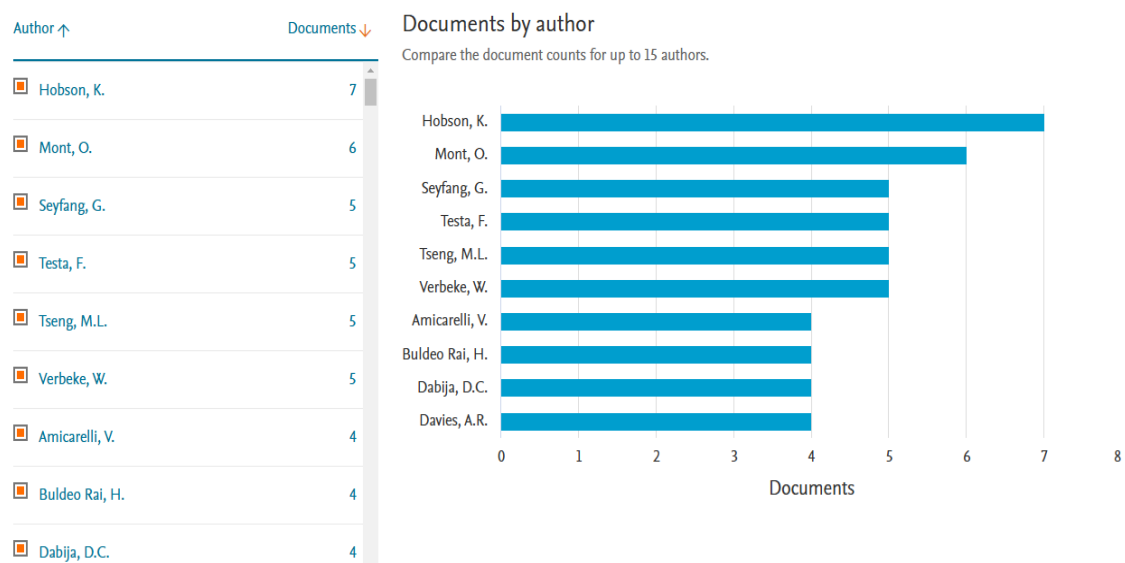


Figure 4 – Information on the authors of scientific results for the period from 2000 to 2024

Note: Constructed by the author using Biblioshiny (Bibliometrix R-package interface) based on SCOPUS database data, 2000–2024

China's leading position in terms of the number of scientific organizations underlines its important role in promoting international scientific discourse and joint research efforts in the field of sustainable consumption.

The bibliometric data highlights the ongoing and growing research interest in sustainable consumption, especially in exploring the complex interrelationships between household debt and consumption patterns in the face of rapid technological progress. The observed trends and identified research clusters suggest that growing financial vulnerability due to household debt significantly affects consumer behavior, reducing the likelihood of making environmentally responsible decisions.

International cooperation is an additional advantage of the author's analysis, as shown in Figure- 5.

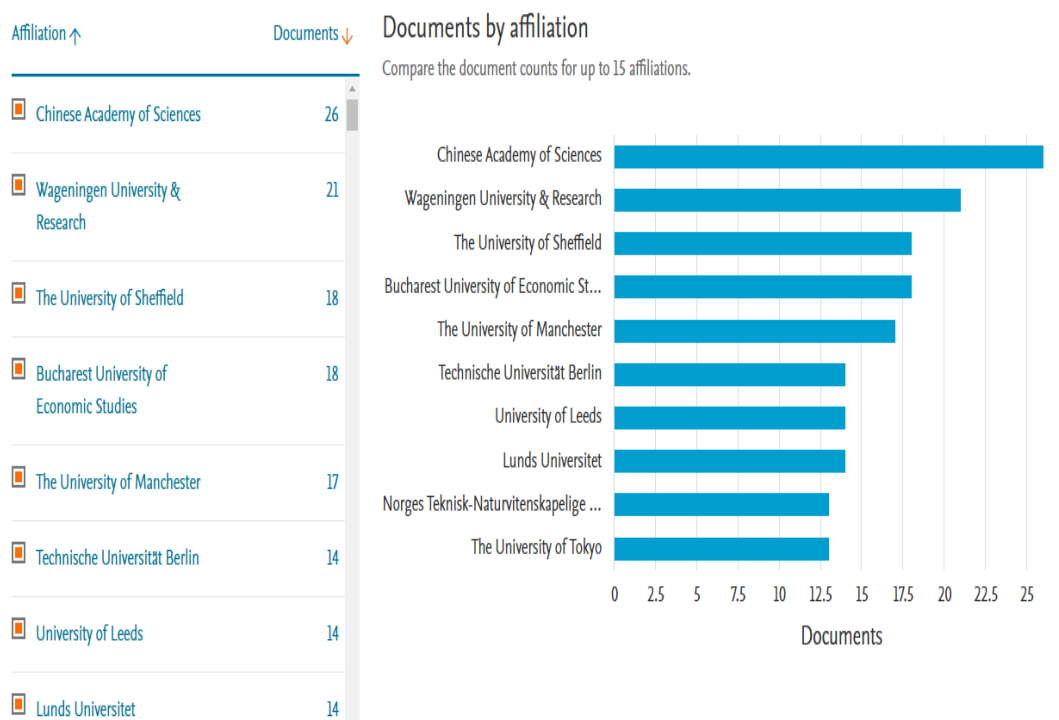


Figure 5 – Affiliation for the period from 2000 to 2024

Note: Constructed by the author using Biblioshiny (Bibliometrix R-package interface) based on SCOPUS database data, 2000–2024

This analysis also reveals existing knowledge gaps, in particular, insufficient study of how household debt interacts with sustainable consumption practices. Such gaps open opportunities for future research to explore targeted financial interventions aimed at mitigating the negative impact of household debt on sustainable consumption.

Overall, the presented bibliometric analysis highlights the urgent need for interdisciplinary research linking financial behavior to environmental sustainability goals, thereby contributing to the development of more holistic and integrated approaches to sustainable development.

Conclusion

This study explored the complex and multifaceted relationship between household debt and sustainable consumption, highlighting the negative effects of increasing financial vulnerability on environmentally responsible consumer behavior. The results confirm that, although household debt can stimulate economic growth in the short term, it contributes to a noticeable decline in economic performance in the medium term. At the same time, the growing debt burden limits the ability of households to adhere to rational purchasing behavior, which is a significant obstacle to achieving Sustainable Development Goal 12 — responsible consumption and production.

Using bibliometric analysis, the study identified key scientific trends and thematic blocks that highlight the growing interest of scientists in the relationship between debt dynamics and environmental sustainability. The results indicate an emerging consensus on the importance of integrating financial and environmental objectives into a single policy.

In the light of these findings, the authors argue that solving the problem of household debt should be considered as an essential component of sustainable development strategies. The ongoing impact of financial stress on consumer behavior requires the development of holistic, interdisciplinary policies that simultaneously promote economic sustainability and environmental responsibility.

To this end, the authors of the study advocate the development of targeted financial education programs aimed at increasing household debt literacy, along with a regulatory framework that prevents unsustainable borrowing practices. Policy makers should also consider introducing debt

monitoring tools and early warning systems to prevent households from falling into unsustainable debt cycles, especially among socially and economically vulnerable groups.

Future research should focus on assessing the effectiveness of these measures in various economic contexts, with a particular focus on emerging market economies such as Kazakhstan, where debt-driven consumption intersects with unique institutional and social dynamics. A deeper understanding of regional differences and behavioral factors will make a significant contribution to the development of more adaptive and inclusive sustainable consumption policies.

To summarize, this study highlights the urgent need to integrate household debt management into national sustainable development programs, strengthening the role of interdisciplinary research in shaping forward-looking development policies focused on equality.

Funding Information

This research is funded by the Science Committee of [Ministry of Science and Higher Education of the Republic of Kazakhstan](#) (Grant No. AP327.26.767).

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ҚАРЖЫЛЫҚ ОСАЛДЫҚ ЖӘНЕ ҚОРШАҒАН ОРТАҒА ӘСЕРІ: ҮЙ ШАРУАШЫЛЫҒЫНЫҢ ҚАРЫЗЫ ТҰРАҚТЫ ТҰТЫНУҒА ҚАЛАЙ ӘСЕР ЕТЕДІ

Аңдатпа

Мақалада тұтынушылардың қарызға негізделген мінез-құлқының экологиялық салдарына баса назар аударып, үй шаруашылығының қарыз ауыртпалығы мен тұрақты тұтыну арасындағы байланыс қарастырылады. Дүние жүзінде үй шаруашылықтарының қарыз деңгейі өскен сайын, тұтынушылар көбінесе тұрақты дамуға емес, шығындарға басымдық береді, бұл жауапты тұтыну мен өндіріске бағытталған Тұрақты Даму Мақсатына (ТДМ) 12 қайшы келуі мүмкін таңдау жасауға әкеледі. Библиометриялық талдауды пайдалана отырып, бұл зерттеу әдебиеттердегі зерттеу тенденциялары мен бар олқылықтарды анықтай отырып, үй шаруашылығының қарызы мен тұрақты тұтынуға бағытталған академиялық ландшафтты картаға түсіреді. Зерттеудің мақсаты-негізгі тенденцияларды, зерттеулердегі олқылықтарды анықтау және үй шаруашылықтарының қаржылық тұрақтылығы мен мақсаттарға жету арасындағы тепе-теңдікті қамтамасыз ететін саясатты қалыптастыру бойынша ұсыныстар әзірлеу мақсатында ғылыми әдебиеттерді библиометриялық талдау негізінде үй шаруашылықтарының қарыз ауыртпалығы мен тұрақты тұтыну арасындағы байланысты анықтау және ғылыми негіздеу және қаржылық қарыздың экологиялық бағдарланған тұтынушылық мінез-

құлыққа әсерін бағалау. Зерттеу нәтижелері көрсеткендей, үй шаруашылығы секторының қарыздық ауыртпалығы тұтынушылардың тұрақсыз мінез-құлқын тудырады, бұл қаржылық қысымға байланысты тұтынушылардың экологиялық саналы таңдау жасау қабілеті мен қабілетін шектейді. Сонымен қатар, бұл тізімді мәдениет, білім сияқты сипаттамалармен кеңейтуге болады. Талдау қарыздың тұтынуға әсері туралы зерттеулердің өсіп келе жатқан көлемін көрсетеді. Осыған қарамастан, үй шаруашылығы секторының қарыздық ауыртпалығы мен осы сектордың тұрақты тұтынуының қиылысын зерттейтін зерттеу Орталық Азиядағы ғылыми қоғамдастықта және Қазақстанның ғылыми-зерттеу ортасында жеткіліксіз қамтылған. Зерттеу нәтижелері қаржылық тұрақтылық пен экологиялық мақсаттарды теңестіретін саясаттың қажеттілігін көрсетеді.

Негізгі сөздер: үй шаруашылығының қарыз ауыртпалығы, тұрақты даму мақсаттары, жауапты өндіріс, библиометриялық тәсіл, үй шаруашылығын тұтыну.

ФИНАНСОВАЯ УЯЗВИМОСТЬ И ВОЗДЕЙСТВИЕ НА ОКРУЖАЮЩУЮ СРЕДУ: КАК ЗАДОЛЖЕННОСТЬ ДОМОХОЗЯЙСТВ ВЛИЯЕТ НА УСТОЙЧИВОЕ ПОТРЕБЛЕНИЕ

Аннотация

В этой статье рассматривается взаимосвязь между долговым бременем домохозяйств и устойчивым потреблением с акцентом на экологические последствия потребительского поведения, обусловленного долгами. По мере роста уровня задолженности домашних хозяйств во всем мире потребители часто отдают предпочтение затратам, а не устойчивости, что приводит к выбору, который может противоречить Цели устойчивого развития (ЦУР) 12, в которой основное внимание уделяется ответственному потреблению и производству. Используя библиометрический анализ, это исследование отображает академический ландшафт, сосредоточенный на задолженности домашних хозяйств и устойчивом потреблении, выявляя тенденции исследований и существующие пробелы в литературе. Цель исследования заключается в выявлении и научном обосновании взаимосвязи между долговым бременем домохозяйств и устойчивым потреблением, а также в оценке влияния финансовой задолженности на экологически ориентированное потребительское поведение на основе библиометрического анализа научной литературы с целью определения ключевых тенденций, пробелов в исследованиях и разработки рекомендаций по формированию политики, обеспечивающей баланс между финансовой устойчивостью домохозяйств и достижением целей устойчивого развития. Результаты исследования показывают, что долговое бремя сектора домашних хозяйств в значительной степени вызывает нестабильное потребительское поведение из-за финансового давления, которое ограничивает возможности потребителей делать экологически сознательный выбор. В то же время этот список можно расширить за счет таких характеристик, как культура и образование. Анализ показывает растущий объем исследований, посвященных влиянию задолженности на потребление. Тем не менее, исследование, в котором рассматривается взаимосвязь между долговым бременем сектора домашних хозяйств и устойчивым потреблением в этом секторе, недостаточно освещено в научном сообществе Центральной Азии и в исследовательской среде Казахстана. Результаты исследования подчеркивают необходимость политики, обеспечивающей баланс между финансовой стабильностью и экологическими целями.

Ключевые слова: долговая нагрузка домохозяйств, цели устойчивого развития, ответственное производство, библиометрический подход, потребление домохозяйств.

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