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COLOUR SYMBOLISM IN FINANCE

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Abstract

Colour symbolism plays an important role in everyday life and science. The subject is interdisciplinary and receives significant attention in the literature. It is increasingly entering the field of economics and finance. The authors are the first to research the connotations and symbolism of colours in finance. The following research aims to: identify and determine the meaning of colours in connection with the word "finance", determine the popularity of the use of particular colours in relation to the word "finance", and identify the most popular subject areas in the literature related to the most commonly used colour in finance. Bibliometric and textual analyses were adopted as research methods. The main research conclusions are as follows. Of the 14 colours examined, only green, blue, brown, black and white showed connotations accurately portrayed in the text. Apart from the colour black, the symbolism is universal and unambiguous. For black, the symbolism is twofold, with one of the meanings going back to historical times. The dominant colour is green. The main research areas pursued under "green finance" include investing in and financing environmentally friendly projects (including various types of technology), developing financial instruments to support environmentally friendly activities and supporting clean energy projects.

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Introduction

Research on colours is interdisciplinary and concerns such scientific fields and disciplines as physics, biology, chemistry, psychology, philosophy, art, anthropology and linguistics. However, it should be noted that it is not a finite set, as the colour symbolism covers many more areas, including management sciences, economics, finance, etc. The human perception of colours is subjective and depends on the interpretation of electromagnetic waves in the human brain. Light-sensitive cells called cones and rods transmit signals to the brain when light enters the eyes. The rods interpret brightness and darkness, while the cones are responsible for interpreting different electromagnetic waves, which translates into the brain's perception of specific colours (Cugelman, 2020, p. 3). Each colour has specific attributes such as hue, saturation and brightness. At the same time, it is worth noting that colour sensations are influenced by many factors, such as various diseases, human development and age, cultural or linguistic factors and gender (Elliot et al., 2015). Research on colour categorisation dates back to ancient Greece and shows that different colour systems formed within communities, which also changed (Crone, 1999; Feisner & Reed, 2014; Maclaury et al., 2007). However, in the late 1960s, thanks to Berlin and Kay (1969), work began on a universalist approach to colour naming. Since then, two approaches have clashed in the literature, i.e. universalist and relativist approaches to colour naming (Dedrick, 1998). According to the former, there is a limited number of universal colours. In relation to them, it is possible to develop a certain consistency and accuracy in the use of vocabulary referring to given colours (Gonigroszek, 2008, p. 95). On the other hand, the relativist approach assumes that cultural and linguistic differences strongly influence the naming of colours, making it difficult to develop their generally recognised names. Some authors believe that the truth lies somewhere in the middle and deny the extremes of both theories (Gonigroszek, 2008, p. 99; Kay & Regier, 2007).

Colours can take on different connotations in given societies, change over time and differentially influence human behaviour and cognitive processes (Elliot & Maier, 2014). Moreover, in different cultures, the same colour can have positive or negative meanings (Yu, 2014). Therefore, research into colour symbolism is such an important issue. This article focuses on analysing the meaning of colours in finance. The interest in such a topic stems from the fact that it is becoming fashionable in economic, management or financial science research to use colours to describe an important area of exploration. Such combinations include, for example, the silver economy (Marcucci et al., 2021), green entrepreneurship (Ebrahimi & Mirbargkar, 2017) and green marketing (Papadas et al., 2017). Analogously, colours refer to the concept of "finance". This research aims to: 1) identify and determine the meaning of colours in connection with the word "finance", 2) determine the popularity of the use of particular colours in relation to the word "finance", 3) identify the most popular subject areas in the literature related to the most commonly used colour in finance. Bibliometric and textual analyses were adopted as research methods. This is the first study of its kind in finance, and its results made it possible to determine the symbolic character of colours in this scientific discipline.

Besides the introduction, the article structure is as follows. The second part outlines the theoretical background that introduces the research. It concerns issues related to colour symbolism. The next section presents the methodology. The research results can be found in Section 4. The last part discusses the study's findings and limitations.

Theoretical background

Colour has accompanied human beings since the dawn of time and is not only associated with aesthetics but also represents a particular message and meaning. In some instances, colour is a source of information for the audience and can also influence their behaviour (Elliot & Maier, 2012). Therefore, a research area called colour symbolism has developed in the literature. It deals with the representation of colour meanings in the context of certain things, beliefs and values (Gasparyan & Asatryan, 2019). Initially, colour symbolism was rooted in nature; in this view, it is timeless. Over time, it began to apply to more and more areas, including culture (Turganbayeva et al., 2014; Park, 2000), religion (Benz, 2005), history (Eagan, 2011), literature (Skard, 1946; Kibalka, 2013; Cong & Chistyakov, 2021), folklore (Raclavská, 2006; Nusratova, 2020), film (Kwon & Cho, 2008; Mcholland, 2019), art (Wheelock, 2005; Gholamreza, 2016), music (Leuders, 1958), theatre (Shahin, 2004), myths, legends (Yu, 2014), fashion (Wi & Choy, 2008), geography (Freant, 2013). Colours can convey sensibilities, values and ideas. The use of appropriate colours can influence, for example, emotions and feelings (Kaya & Epps, 2004) and, at the same time, people's behaviour, e.g. they can irritate, increase blood pressure, decrease or increase aggression (Schauss, 1979; https://www.colormatters.com/). Memory, experience, intelligence and cultural background influence how colours affect individuals (Feisner & Reed, 2014, p. 7). Colours can be employed in the creative education process (Markovic, 2014). It also turns out that individuals' perception and naming of colours is not identical and differs, among other things, according to gender (Webster 2015). When it comes to colour symbolism, it can be universal in cer-

tain areas and circles of people (Hovers et al., 2003; Tham et al., 2020). On the other hand, considering the meaning of colours in the world without giving a specific limiting framework is difficult, as it is not identical, changes over time and is culturally conditioned (Gage, 2000). For example, Pastoureau (2018) shows how the meaning of the colour blue has changed over time. In ancient Greece, it was associated with evil, later with Virgin Mary, then considered the colour of royalty, and next acquired political and military meaning during the French Revolution. In the modern era, this colour is also associated with romance. Similar analyses were carried out for other colours, e.g. red (Wreschner et al., 1980). A very comprehensive presentation of the symbolism of the primary colours is shown by Heller (2014) in her book Wie Farben wirken. Farbpsychologie. Farbsymbolik. Kreative Farbgestaltung. Depending on cultural backgrounds, the same colours can have both positive and negative connotations (Yu, 2014). After completing a questionnaire on the perception of the meaning of colours, the project entitled "Global Color Survey" (https://www.colorcom.com/global-color-survey) provides research results on the symbolism of colours and the differences in this area.

In economics, finance and management, there are many terms where a colour combined with another word represents a certain meaning or idea. This issue was discussed in a 2016 article by Rosyanova (2016), "Color-Symbolism in English Terminology". For example, blue chips refer to recognisable, financially sound and highly capitalised companies; the black market is a market where illegal products and services are traded; the black knight is an investor who plans a hostile takeover of a company. Within this research area, colours are also used in connection with specific disciplines or sub-disciplines, e.g. green marketing means marketing towards environmentally friendly and beneficial products and services; silver economy "covers economic opportunities arising from the public and consumer expenditure related to population ageing and the specific needs of the population over 50" (The Silver Economy. Opportunities from Ageing, 2015); green entrepreneurship is conscious entrepreneurial action taking into account social and environmental aspects; turquoise management is a concept proposed by F. Laloux or, most generally, a management style based on three pillars: self-management, wholeness and evolutionary purpose (Laloux, 2015). At the same time, it is worth adding that when it comes to management styles, many more colours are ascribed to them in the literature, e.g. red, amber, orange, green (Rutkowska, 2015). Similar connotations of colour with finance are found in the literature. However, no research has been done in this area yet. The authors, therefore, are the first to attempt to fill this research gap.

Methodology

The research was conducted in multiple stages. Firstly, a strategy was developed to search for publications on connotations of colours with the word finance or those derived from it (e.g. financial, financially). The colours analysed were considered the most popular and, based on the authors' knowledge, had connotations with other academic disciplines related to finance. A total of 14 colours were identified; they are included in Table 1. Next, the publication search strategy involved entering the phrase "colour Financ*" in the "Article title, Abstract, Keywords" field. These queries were searched on 15 October 2022. Scopus was used as the source of publications, as it is considered one of the most reliable databases in the scientific world. Stage I yielded the results shown in Table 1, from which it can be concluded that no publications with connotations were obtained for as many as six colours. In four cases, the number of records was 1 or 2, while 8 or 11 records were found for three colours. The dominant colour in this area is green.

Table 1: Scopus search outcomes

Colour	Search	Results from Scopus
Green	"Green Financ*"	941
Blue	"Blue Financ*"	11
White	"White Financ*"	8
Black	"Black Financ*"	8
Grey	"Grey Financ*"	2
Red	"Red Financ*"	1
Brown	"Brown Financ*"	1
Silver	"Silver Financ*"	1
Orange	"Orange Financ*"	0
Gold	"Golden Financ*"	0
Purple	"Purple Financ*"	0
Turquoise	"Turquoise Financ*"	0
Pink	"Pink Financ*"	0
Yellow	"Yellow Financ*"	0

Source: Author's own work.

Following the initial results, further research proceeded as follows.

Stage II – identification of the importance of colour connotations in finance; the texts containing white, black, blue, brown, red, silver and grey were examined in detail. In the case of the colour green, its importance in finance is well-established; therefore, Stages III and IV include extended analyses due to its popularity.

Stage III – a textual analysis of the ten most influential publications in terms of citability showing connotations of the colour green with finance. It aimed to identify research findings among the key green finance publications and determine their publication period, the type of publisher and the number of citations.

Stage IV – a citation bibliometric analysis to identify the main areas of interest in green finance.

Results

Meaning of colours

In the second stage, 31 records were analysed. The textual analyses for green were not included here, as these are in stages III and IV. Of the records identified, two overlapped for black and grey. This means that a total of 30 publications were assessed, of which only some contained colour connotations with finance. The literature sources and the meanings of these connotations are shown in Table 2.

Table 2: Meanings of colours in connotations with finance

Colour	Meaning	Source
White	White financial institutions – financial institutions that offer products to white people and discriminate against non-whites. Some publications focus on financial behaviour regarding borrowing, saving, investing and financial security issues between different races of people (e.g. white and black).	Wiese (1999) Rucks-Ahidiana (2017); Cho (2011)
Black	Black financial market – a market in which financial transactions are carried out illegally. Black finance – a term referring to illegal financial flows, e.g. money laundering. Black financial institutions – financial institutions that support African-Americans, e.g. banks where the majority of deposits come from African-Americans, the majority of loans are made to black individuals or entrepreneurs and are owned by black people.	Ivanova (2007) Masciandaro (2007) Hunter (2018); Black (1979)
Green	Green finance refers to actions in finance for eco-friendly initiatives and environmental sustainability.	Many publications
Blue	Activities designed to finance sustainable development and conservation projects in the ocean and coastal areas. Addresses the topic of finance in the marine industry. Blue finance is a subset of green finance that focuses on marine sustainability and clean water protection.	Thompson (2022); Nagisa et al. (2022); Tirumala & Tiwari (2022); Kuwae et al. (2022); Xu et al. (2021); Wabnitz and Blasiak (2019); Tian et al. (2019); Pascal et al. (2018) Turner and Rios (2022)
Brown	Opposite of green finance – financial measures to support projects with highly negative environmental impacts, e.g. high CO2 emissions.	Neisen et al. (2022)
Red	Lack of direct connotation Only: *To be in the red financially* means to sustain losses.	Makeenko (2013)
Silver	Lack of connotation	-
Grey	Lack of connotation	-

Source: Author's own work.

In addition to the colour green, direct connotations were found for blue, black, white and brown. In finance, blue denotes the application of various financial operations in the ocean and coastal areas. One author sees it as an element of green finance. The opposite of green finance is brown finance, which denotes the involvement of financial resources in environmentally damaging projects. Black finance has a twofold meaning, i.e. it is regarded as all kinds of financial operations carried out illegally or through the prism of racial differences, e.g. the provision of financial services only to black people. The opposite of the latter is white finance, i.e. offering financial products only to white people. One publication notes the combination of the colour red with the word financially. However, it does not provide meaning in the context of finance, as the previously mentioned colours do. It represents a common idiom used in the English financial language, i.e. to be in the red, which means to be in debt, to incur losses. The opposite of this phrase is to be in the black, which means to have money in the bank or to generate profits.

Textual Analysis of Top 10 "Green Finance" Articles

The search query "Green Financ*" returned a total of 941 articles. The textual analysis covered the top 10 articles by citation (following Chung et al., 2004; Fahimnia et al., 2015; Xu et al., 2018) from the most to the less cited as presented in Table 3. Speaking from an investment perspective, Taghizadeh-Hesary and Yoshino (2019) provided a framework for inducing private participation in green finance. Taghizadeh-Hesary and Yoshino (2020) argued that using the tax spillover to boost the rate of return on green initiatives, creating green loan guarantee strategies to reduce default risk, establishing society-based trust funds and acknowledging green portfolio risk through fiscal and policy derisking are ways to mitigate green investment risks. Lam and Law (2016) stated that crowdfunding could be a significant part of green financing for renewable energy projects. He et al. (2019) found green financial development has an adverse influence on bank loan issuing and, to some extent, hampers the improvement of renewable energy investment efficiency. Yu et al. (2021) reasoned that green credits are less likely to be made available to privately owned businesses, even though green finance regulations can effectively reduce the overall financial constraints for green innovation. However, despite their financial restrictions, these firms exhibit relatively high levels of innovation.

According to Zhang et al. (2021), in green finance from an energy perspective, government investment in human resources and green energy technology R&D stimulates the growth of a sustainable green financial system. Wang and Zhi (2016) showed how active financial instruments might be used to promote sustainable energy to accomplish environmental conservation.

From another perceptive of total factor productivity, (2022) show that the growth of green financing greatly raises theLee and Lee level of green productivity. From the environmental entrepreneurship perceptive, Sun et al. (2020) indicate that green entrepreneurship reduces environmental damage, whereas money per capita greatly increases it, implying that policymakers should enforce green financing. Finally, Zhang et al. (2019) performed a bibliometric analysis on green finance and found that climate change and climate finance are dominant in green finance research.

Table 3: Top 10 articles from search "Green Financ*"

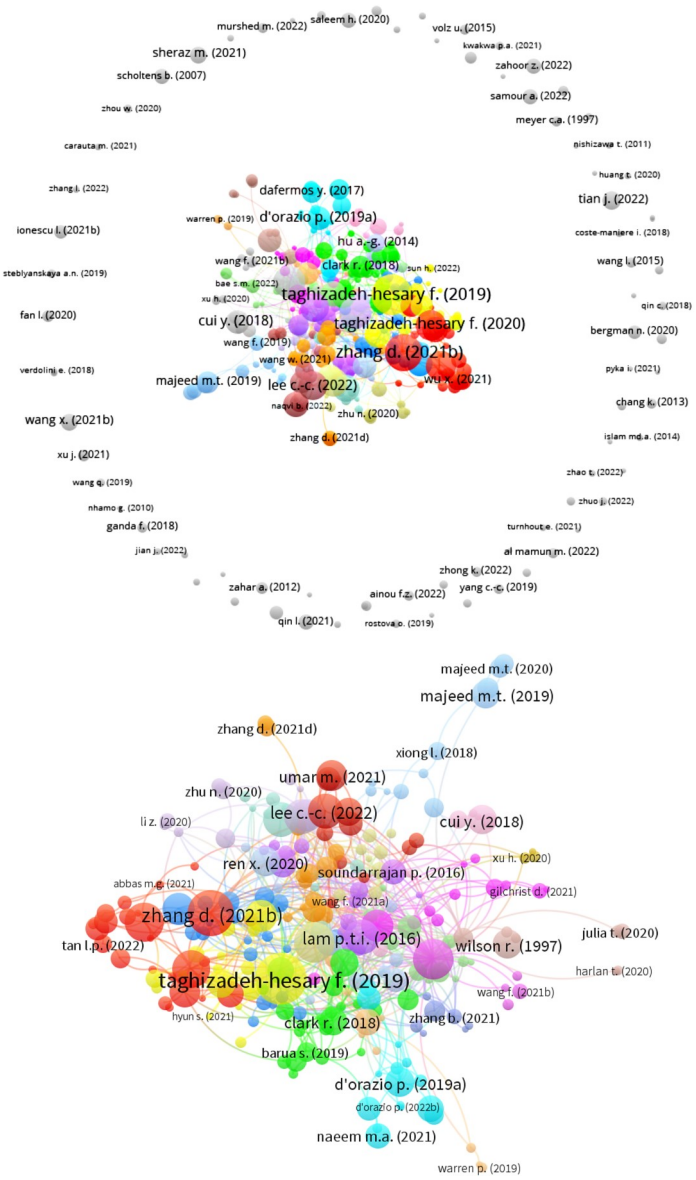
Author	Year	Journal	Citations
(Taghizadeh-Hesary & Yoshino, 2019)	2019	Finance Research Letters	225
(Zhang et al., 2021)	2021	Energy Policy	177
(Zhang et al., 2019)	2019	Finance Research Letters	145
(Wang & Zhi, 2016)	2016	Energy Procedia	137
(Sun et al., 2020)	2020	Science of the Total Environment	129
(Taghizadeh-Hesary & Yoshino, 2020)	2020	Energies	125
(Lee & Lee, 2022)	2022	Energy Economics	110
(Lam & Law, 2016)	2016	Renewable and Sustainable Energy Reviews	110
(He et al., 2019)	2019	Renewable Energy	109
(Yu et al., 2021)	2021	Energy Policy	103

Source: Author's own work.

Citation analysis

Based on the search results of Scopus, we performed a citation bibliometric analysis. It is a bibliometric research type that examines how frequently an article is cited. The threshold for minimum citations of 5 was set using VOSviewer. A total of 334 articles met the criteria; they are depicted in Figure 1 (a). However, 253 papers out of 334 were network-connected. Figure 1 (b) shows 21 clusters based on those 253 articles.

Figure 1: Results of citation analysis

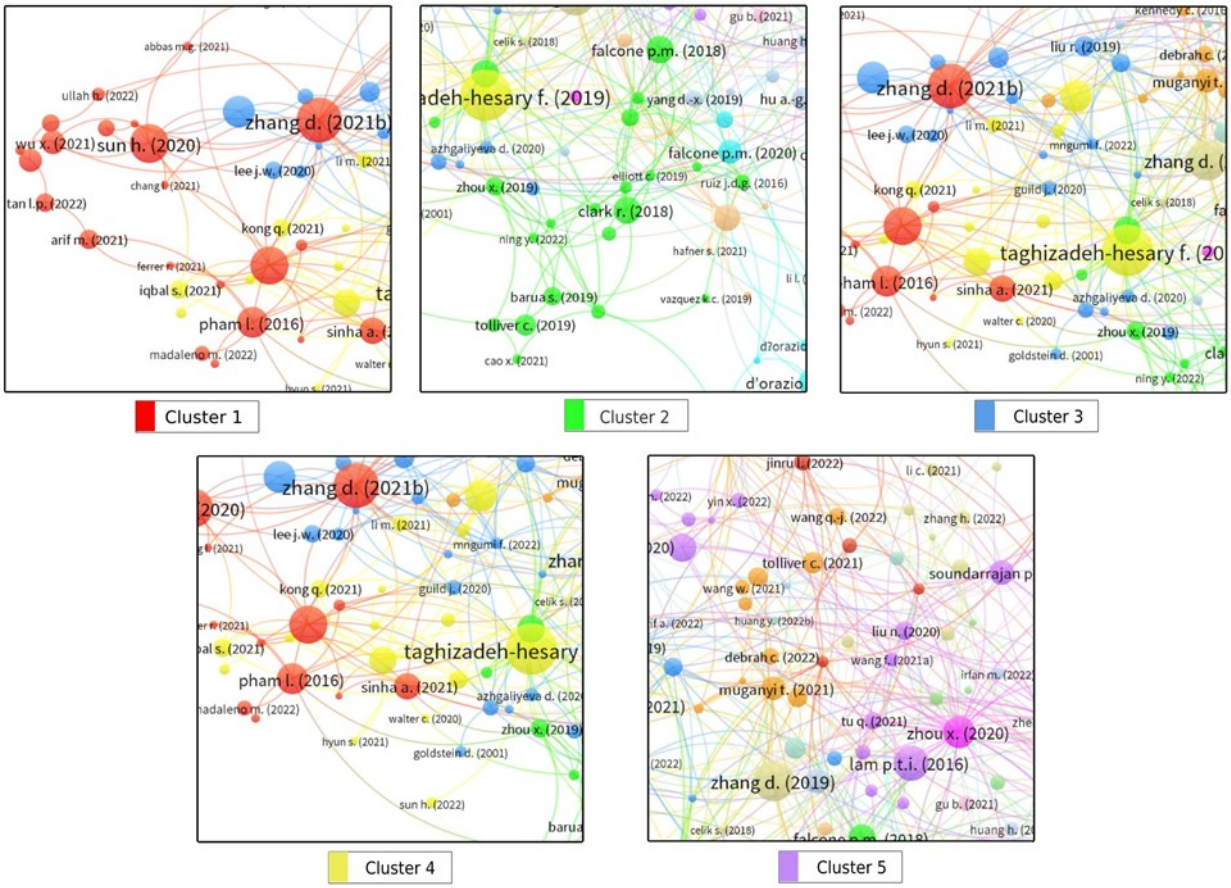


Source: Author's own work.

The top 5 clusters, as presented in Figure 2, were analysed to identify themes in the literature (see: Table 4). Cluster 1 includes 23 articles, mainly dominated by Pham, 2016; Sun et al., 2020; Taghizadeh-Hesary and Yoshino, 2020; Dongyang Zhang et al., 2021. The general theme of Cluster 1 concerns investments in green finance, including public and private spending (Chien et al., 2021; Pham, 2016; Taghizadeh-Hesary & Yoshino, 2020; Dongyang Zhang et al., 2021). Its secondary theme is the implementation of sustainable entrepreneurship to reduce environmental pollution (Iqbal et al., 2020; Sadiq et al., 2022; Sun et al., 2020).

Cluster 2 has 22 articles. It is dominated by Clark et al., 2018; Falcone et al., 2018; Ng, 2018; Tolliver et al., 2019. The common theme of this cluster is green bonds as an investment tool to promote sustainability (Cao et al., 2021; Clark et al., 2018; Mathews & Kidney, 2012; Ning et al., 2022; Tolliver et al., 2019; X. Zhou & Cui, 2019). The secondary theme is how the overall financial system needs to be "Green" (Batrancea et al., 2020; Falcone et al., 2018; Ng, 2018). Cluster 3 has 19 articles, mainly dominated by Hsu et al. (2021), focusing on green innovation. The themes included in Jin et al., 2021; Liu et al., 2019; Rasoulinezhad & Taghizadeh-Hesary, 2022 focus on efficiency, which concerns energy and green financing.

Figure 2: Top 5 clusters formed through citation analysis



Source: Author's own work.

Cluster 4 has 16 articles, and the works by Nawaz et al., 2021; Taghizadeh-Hesary & Yoshino, 2019; Yoshino et al., 2019 are prominent. The theme of the cluster can be identified as green financing for energy sources (Hyun et al., 2021; Li et al., 2021; Li et al., 2022). Cluster 5 is dominated by Lam and Law, (2016); As well as Soundarrajan and Vivek, (2016). Two themes can be noted in this cluster: the first one is green finance for sustainable development (Xu et al., 2022; Yin & Xu, 2022; Zhang et al., 2021; Zhou & Xu, 2022), and the second is green finance for green technology (Fang & Shao, 2022; Gong et al., 2020).

Table 4: Themes identified in the top 5 clusters

Cluster	Theme	Author(s)
Cluster 1	Investments in Green Finance	(Chien et al., 2021; Pham, 2016; Taghizadeh-Hesary & Yoshino, 2020; Zhang et al., 2021)
	Green Finance and Entrepreneurship	(Iqbal et al., 2020; Sadiq et al., 2022; Sun et al., 2020)
Cluster 2	Green Bonds as Investment Tool	(Cao et al., 2021; Clark et al., 2018; Mathews & Kidney, 2012; Ning et al., 2022; Tolliver et al., 2019; Zhou & Cui, 2019)
	Greening of Financial Systems	(Batrancea et al., 2020; Falcone et al., 2018; Ng, 2018)
Cluster 3	Green Finance and Green Efficiency	(Jin et al., 2021; Liu et al., 2019; Rasoulinezhad & Taghizadeh-Hesary, 2022)
Cluster 4	Green Finance for Energy	(Hyun et al., 2021; Li et al., 2021; Li et al., 2022)
Cluster 5	Green Finance for Green Sustainable Development	(Xu et al., 2022; Yin & Xu, 2022; Zhang et al., 2021; Zhou & Xu, 2022)
	Green Finance and Green Technology	(Fang & Shao, 2022; Gong et al., 2020)

Source: Author's own work.

Conclusions

The research carried out led to achieving the objectives set out in the introduction. The colours that show connotations with finance include green, blue, black, white and brown. Their meaning is presented in Table 2. Of these colours, green is dominant. This shows that the issues related to the financial aspects of environmental measures are critical and fit in with current trends in finance research. Among the other colours, blue and black were also significant. Regarding white and brown, only one publication each was identified that directly showed connotations. Most connotations were universal, i.e. they had similar meanings in the context of finance. However, in the case of the colour black, two meanings were identified, i.e. one related to illegal financial transactions and the other to the provision of financial services exclusively to black individuals. While the former can be seen as a universal meaning, the latter connotation relates to a specific territory (the United States) and time frame. A similar situation occurred with the colour white, and these connotations appeared in historical publications. In addition, it can be noted that most publications referring to the colours green, blue and brown have been published very recently, i.e. no later than 2018. This confirms that financial themes and research on environmental action, including seas, oceans and coastal areas, are now gaining importance. They fit into a broader research area called sustainable finance.

Given the bibliometric analysis results for the dominant colour, green, it can be seen that among the key areas of interest are: investments in green finance, green finance and entrepreneurship, green bonds as investment tools, greening of financial systems, green finance and green efficiency, green finance for energy, green finance for green sustainable development, green finance and green technology. The main focus areas are: investing in and financing environmentally friendly projects (including various types of technology), developing financial instruments to support environmentally friendly activities and supporting clean energy projects.

Limitations of this study include the fact that it only dealt with colour connotations with finance. Future research on colour symbolism may also concern disciplines or sub-disciplines such as economics, management, marketing, and entrepreneurship.

Disclosure statement

The authors report there are no competing interests to declare.

References

Batrancea, I., Batrancea, L., Rathnaswamy, M.M., Tulai, H., Fatacean, G. & Rus, M.I. (2020). Greening the Financial System in USA, Canada and Brazil: A Panel Data Analysis. Mathematics, 8(12), 2217, https://doi.org/10.3390/MATH8122217.

Black, H. (1979). Black financial institutions and urban revitalization, The Review of Black Political Economy, 10(1), 44-58, https://doi.org/10.1007/BF02689610.

Fourcade, M. & Schofer, E. (2016). Political structures and political mores: Varieties of politics in comparative perspective. Sociological Science, 3, 413-443.

Berlin, B. & Kay, P. (1969). Basic Color Terms, University of California Press, Berkeley.

Cao, X., Jin, C. & Ma, W. (2021). Motivation of Chinese commercial banks to issue green bonds: Financing costs or regulatory arbitrage? China Economic Review, 66, 101582, https://doi.org/10.1016/J.CHIECO.2020.101582.

Chien, F., Ngo, Q.T., Hsu, C.C., Chau, K.Y., & Iram, R. (2021). Assessing the mechanism of barriers towards green finance and public spending in small and medium enterprises from developed countries. Environmental Science and Pollution Research, 28(43), 60495–60510, https://doi.org/10.1007/S11356-021-14907-1/TABLES/5.

Cho, H. (2011). Racial Differences in the Prevalence of Intimate Partner Violence Against Women and Associated Factors, Journal of Interpersonal Violence, 27(2), 344-363. https://doi.org/10.1177/088626051141646.

Chung, K.J. & Liao, J.J. (2004). Lot-sizing decisions under trade credit depending on the ordering quantity. Computers & Operations Research, 31(6), 909-928.

Clark, R., Reed, J. & Sunderland, T. (2018). Bridging funding gaps for climate and sustainable development: Pitfalls, progress and potential of private finance. Land Use Policy, 71, 335–346, https://doi.org/10.1016/J.LANDUSEPOL.2017.12.013.

Cong, G., Chistyakov, A.V. (2021). O simbolismo de corn as obras de M.A. Bulgakov, Revista EntreLinguas, 7(5), 984-993, https://doi.org/10.29051/el.v7iesp.5.16032.

Crone R.A. (1999). A History of Color. The Evolution of Theories of Lights and Color, Kluwer Academic Publisher, Dordrecht.

Cugelman, B. (2020). Color Psychology, Second Edition, AlterSpark, Toronto.

Dedrick, D. (1998). The Foundations of the Universalist Tradition in Color-Naming Research (and Their Supposed Refutaion), Philosophy of the Social Sciences, 28(2), 179-204.

Eagan J.F. (2011). The Impact of Color Symbolism in Sir Gawain and the Green Knight, Kessinger Publishing, Whitefish.

Ebrahimi, P. & Mirbargkar, S.M. (2017). Green entrepreneurship and green innovation for SME development in market turbulence, Eurasian Business Review, 7(2), 203–228, https://doi.org/10.1007/s40821-017-0073-9.

Elliot, A.J., Fairchild M.D., Franklin A. (Eds.). (2015). Handbook of Color Psychology, Cambridge University Press, Cambridge.

Elliot, A.J. & Maier, M.A. (2014). Color Psychology: Effects of Perceiving Color on Psychological Functioning in Humans, Annual Review of Psychology, 65, 95-120, https://doi.org/10.1146/annurev-psych-010213-115035.

Elliot, A.J., & Maier, M.A. (2012). Color-in-context theory. In P. Devine & A. Plant (Eds.), Advances in experimental social psychology, Vol. 45, 61–125. Academic Press, https://doi.org/10.1016/B978-0-12-394286-9.00002-0.

Fahimnia, B., Sarkis, J. & Davarzani, H. (2015). Green supply chain management: A review and bibliometric analysis. International Journal of Production Economics, 162, 101-114.

Falcone, P.M., Morone, P. & Sica, E. (2018). Greening of the financial system and fuelling a sustainability transition: A discursive approach to assess landscape pressures on the Italian financial system. Technological Forecasting and Social Change, 127, 23–37, https://doi.org/10.1016/J.TECHFORE.2017.05.020.

Fang, Y. & Shao, Z. (2022). Whether Green Finance Can Effectively Moderate the Green Technology Innovation Effect of Heterogeneous Environmental Regulation. International Journal of Environmental Research and Public Health, 19(6), 3646, https://doi.org/10.3390/IJERPH19063646.

Feisner, E.A. & Reed, R. (2014). Color Studies, Fairchild Books, Third Edition, New York.

Freant, A.L. (2013). The Hidden Meanings of Maps: Design and Colors, https://geoawesomeness.com/hidden-meanings-maps-design-colors/ (Accessed: 24.02.2022).

Gage, J. (2000). Colour and Meaning. Art, Science and Symbolism, Thames & Hudson, London.

Gasparyan, N. & Asatryan, K. (2019). Color Symbolism and Its Cognitive Cultural Message, http://www.ysu.am/files/COLOUR-SYMBOLISM-AND-ITS.pdf (Accessed: 24.02.2022).

Gholamreza, M. (2016). The Colour in Islamic Art., Research Journal of Humanities and Social Sciences, 7(1), 25-28, https://doi.org/10.1515/9789048505388-010.

Gong, R., Wu, Y.Q., Chen, F.W. & Yan, T.H. (2020). Labor Costs, Market Environment and Green Technological Innovation: Evidence from High-Pollution Firms. International Journal of Environmental Research and Public Health, 17(2), 522, https://doi.org/10.3390/IJERPH17020522.

He, L., Liu, R., Zhong, Z., Wang, D. & Xia, Y. (2019). Can green financial development promote renewable energy investment efficiency? A consideration of bank credit. Renewable Energy, 143, 974–984, https://doi.org/10.1016/J.RENENE.2019.05.059.

Heller, E. (2014). Wie Farben wirken. Farbpsychologie. Farbsymbolik. Kreative Farbgestaltung, Rowohlt Taschenbuch, Hamburg.

Hovers, E., Ilani, S., Bar-Yosef, O. & Vandermeersch, B. (2003). An Early Case of Color Symbolism. Ochre Use by Modern Humans in Qafzeh Cave, Current Anthropology, 44(4), 491-522.

Hsu, C.C., Quang-Thanh, N., Chien, F.S., Li, L. & Mohsin, M. (2021). Evaluating green innovation and performance of financial development: mediating concerns of environmental regulation. Environmental Science and Pollution Research, 28(40), 57386–57397, https://doi.org/10.1007/S11356-021-14499-W/TABLES/5.

https://www.colorcom.com/global-color-survey (Accessed: 25.02.2022).

https://www.colormatters.com/ (Accessed: 25.02.2022).

Hunter, M.A. (2018). Seven Billion Reasons for Reparations, Souls, 20(4), 420-432, https://doi.org/10.1080/10999949.2018.1607483.

Hyun, S., Taghizadeh-Hesary, F. & Shim, H.S. (2021). Modeling solar energy system demand using household-level data in Myanmar. Economic Analysis and Policy, 69, 629–639, https://doi.org/10.1016/J.EAP.2021.01.011.

Iqbal, N., Khan, A., Gill, A.S. & Abbas, Q. (2020). Nexus between sustainable entrepreneurship and environmental pollution: evidence from developing economy. Environmental Science and Pollution Research, 27(29), 36242–36253, https://doi.org/10.1007/S11356-020-09642-Y/TABLES/4.

Ivanova, Y.V. (2007). Ethics in an unethical environment or absence of ethics? International Journal of Emerging Markets, 2(1), 84-91, https://doi.org/10.1108/17468800710718912.

Jin, Y., Gao, X. & Wang, M. (2021). The financing efficiency of listed energy conservation and environmental protection firms: Evidence and implications for green finance in China. Energy Policy, 153, 112254, https://doi.org/10.1016/J.ENPOL.2021.112254.

Kaya, N. & Epps, H.H. (2004). Color-Emotion Associations: Past Experience and Personal Preference. Proceedings of the AIC 2004 Color and Paints, Interim Meeting of the International Colour Association.

Kay, P. & Regier, T. (2007). Color naming universals: The case of Berinmo, Cognition, 102(2), 289-298, https://doi.org/10.1016/j.cognition.2005.12.008.

Khouw, N. (2012). Gender Differences. The Meaning of Color for Gender, https://www.colormatters.com/component/content/article/57-color-symbolism/7 (Accessed: 10.02.2022).

Kibalka, E. (2013). Color Symbolism in the Folk Fairy-Tale and Science Fiction Works by R. Bradbury, C. Simak, A. and B. Strugatsky, Journal of Danubian Studies and Research, 3(2), 264-274.

Kuwae, T., Watanabe, A., Yoshihara, S., Suehiro, F. & Sugimura, Y. (2022). Implementation of blue carbon offset crediting for seagrass meadows, macroalgal beds, and macroalgae farming in Japan, Marine Policy, 138, 104996, https://doi.org/10.1016/j.marpol.2022.104996.

Kwon, H.S. & Cho, K.H. (2008). A Study on the Costume and Color Symbolism of the Movie < Elizabeth: The Golden Age (2007), Journal of Fashion Business, 12(5), 126-140.

Laloux, F. (2015). Pracować inaczej. Nowatorski model organizacji inspirowany kolejnym etapem rozwoju ludzkiej świadomości, Wydawnictwo Studio EMKA, Warszawa.

Lam, P.T.I. & Law, A.O.K. (2016). Crowdfunding for renewable and sustainable energy projects: An exploratory case study approach. Renewable and Sustainable Energy Reviews, 60, 11–20 https://doi.org/10.1016/J.RSER.2016.01.046.

Lee, C.C. & Lee, C.C. (2022). How does green finance affect green total factor productivity? Evidence from China. Energy Economics, 107, 105863, https://doi.org/10.1016/J.ENECO.2022.105863.

Leuders, E. (1958). Color Symbolism in the Songs of the American Indians, Western Humanities Review, 12, 115-120.

Li, M., Hamawandy, N.M., Wahid, F., Rjoub, H. & Bao, Z. (2021). Renewable energy resources investment and green finance: Evidence from China. Resources Policy, 74, 102402, https://doi.org/10.1016/J.RESOURPOL.2021.102402.

Li, Z., Kuo, T.H., Siao-Yun, W. & The Vinh, L. (2022). Role of green finance, volatility and risk in promoting the investments in Renewable Energy Resources in the post-covid-19. Resources Policy, 76, 102563, https://doi.org/10.1016/J.RESOURPOL.2022.102563.

Liu, R., Wang, D., Zhang, L. & Zhang, L. (2019). Can green financial development promote regional ecological efficiency? A case study of China. Natural Hazards, 95(1–2), 325–341, https://doi.org/10.1007/S11069-018-3502-X/TABLES/4.

MacLaury, R., Paramei, G. & Dedrick, D. (2007). Anthropology of color: Interdisciplinary multilevel modeling. John Benjamins Publishing Company, Amsterdam.

Makeenko, M. (2013). Russia: Subsidies Between Industry Support and State Control. In: Murschetz, P. (Ed.). State Aid for Newspapers. Media Business and Innovation. Springer, Berlin, Heidelberg.

Marcucci, G., Ciarapica, F., Poler, R. & Sanchis, R. (2021). A Bibliometric Analysis of the Emerging Trends in Silver Economy, IFAC-PapersOnLine, 54(1), 936-941, doi: 10.1016/j.ifacol.2021.08.190.

Markovic, Z. (2014). Colour as an Element of the Creativity in Education of Design, Open Journal of Social Sciences, 2(5), 76-79, doi: 10.4236/jss.2014.25015.

Lomborg, B. (Ed.). (2007). Solutions for the world's biggest problems: costs and benefits. Cambridge University Press, Cambridge.

Mathews, J.A. & Kidney, S. (2012). Financing climate-friendly energy development through bonds. Development Southern Africa, 29(2), 337-349, https://doi.org/10.1080/0376835X.2012.675702.

Mcholland, M. (2019). Color in Film: An Analysis of Symbolic Color and Production Design in Motion Pictures, https://keep.lib.asu.edu/items/132972/metadata (Accessed: 10.02.2022).

Nagisa, S., Wu, H.H., Huang M.C. & Tanaka, H. (2022). How blue financing can sustain ocean conservation and development: A proposed conceptual framework for blue financing mechanism, Marine Policy, 139, 104575, Doi: 10.1016/j.marpol.2021.104575.

Nawaz, M.A., Seshadri, U., Kumar, P., Aqdas, R., Patwary, A.K. & Riaz, M. (2021). Nexus between green finance and climate change mitigation in N-11 and BRICS countries: Empirical estimation through difference in differences (DID) approach. Environmental Science and Pollution Research, 28(6), 6504–6519, https://doi.org/10.1007/S11356-020-10920-Y/FIGURES/7.

Neisen, M., Bruhn, B. & Lienland, D. (2022). ESG rating as an input for a sustanability capital buffer. Journal of Risk Management in Financial Institutions, 15(1), 72-84.

Ng, A.W. (2018). From sustainability accounting to a green financing system: Institutional legitimacy and market heterogeneity in a global financial centre. Journal of Cleaner Production, 195, 585–592, https://doi.org/10.1016/J.JCLEPRO.2018.05.250.

Ning, Y., Cherian, J., Sial, M.S., Álvarez-Otero, S., Comite, U. & Zia-Ud-Din, M. (2023). Green bond as a new determinant of sustainable green financing, energy efficiency investment, and economic growth: a global perspective. Environmental Science and Pollution Research, 30(22), 61324-61339, https://doi.org/10.1007/S11356-021-18454-7/TABLES/10.

Nusratova, A.C. (2020). Comparison of color symbolism in English, Russian and Uzbek folk tales, ISJ Theoretical & Applied Science, 2(82), 174-176, https://doi.org/10.15863/TAS.2020.02.82.32.

Papadas, K.K., Avlonitis, G. & Carrigan, M. (2017), Green Marketing Orientation: Conceptualization, Scale Development and Validation, Journal of Business Research, 80, 236-246, https://doi.org/10.1016/j.jbusres.2017.05.024.

Park, I.J. (2000). Color symbolism in Korean culture. Pusan University of Foreign Studies, 20, 183-204.

Pascal, N., Brathwaite, A., Philip, M. & Walsh, M. (2018). Impact Investment in marine conservation, Duke Environmental Law and Policy Forum, 28(2), 199-220.

Pastoureau, M. (2018). Blue: The History of a Color, Princeton University Press, Princeton.

Pham, L. (2016). Is it risky to go green? A volatility analysis of the green bond market, 6(4), 263–291, https://doi.org/10.1080/20430795.2016.1237244.

Raclavská, J. (2006). SYMBOLIKA KOLORÓW W PIEŚNIACH LUDOWYCH ŚLĄSKA CIESZYŃSKIEGO. Artistic Text: Understanding, Analysis, Interpretation, Meninis tekstas, Vol. 5, 341-347.

Rasoulinezhad, E. & Taghizadeh-Hesary, F. (2022). Role of green finance in improving energy efficiency and renewable energy development. Energy Efficiency, 15(2), 1–12, https://doi.org/10.1007/S12053-022-10021-4/TABLES/11.

Rosyanova, T.S. (2016). Color-Symbolism in English Economic Terminology, Administrative Consulting, 3, 121-128.

Rucks-Ahidiana, Z. (2017). Cultural implications of historical exclusion for the racial wealth gap: How ideal financial behavior varies by race, American Journal of Cultural Sociology, 5(1-2), 68-69, https://doi.org/0.1057/s41290-016-0013-7.

Rutkowska M. (2015). Management colors. In: Dziura, M., Jaki, A. & Rojek, T. (Eds.). Restructuring Management. Models - Changes - Development (pp. 15–22). Wydawnictwo Dom Organizatora, Toruń.

Sadiq, M., Nonthapot, S., Mohamad, S., Chee Keong, O., Ehsanullah, S. & Iqbal, N. (2022). Does green finance matter for sustainable entrepreneurship and environmental corporate social responsibility during COVID-19? China Finance Review International, 12(2), 317–333, https://doi.org/10.1108/CFRI-02-2021-0038/FULL/XML.

Schauss, A.G. (1979). Tranquilizing effect of color reduces aggressive behavior and potential violence, Journal of Orthomolecular Psychiatry, 8(4), 218–221.

Semchynska-Uhl, N. (2006). Color Symbolism in Ukrainian Political Discourse of the Beginning of the 21st Century, Semiotics, 142-151, https://doi.org/10.5840/cpsem200612.

Shahin, S. (2004). Color Symbolism in Theater, Literature, and the Rituals of Nations, Quarterly Honar-Ha-Ye-Ziba, 18, 99-108.

Skard, S. (1946). The Use of Color in Literature: A Survey of Research, Proceedings of the American Philosophical Society, 90(3), 163–249.

Soundarrajan, P. & Vivek, N. (2016). Green finance for sustainable green economic growth in India. Agricultural Economics, 62(1), 35-44, https://doi.org/10.17221/174/2014-AGRICECON.

Sun, H., Pofoura, A.K., Adjei Mensah, I., Li, L. & Mohsin, M. (2020). The role of environmental entrepreneurship for sustainable development: Evidence from 35 countries in Sub-Saharan Africa. Science of The Total Environment, 741, 140132, https://doi.org/10.1016/J.SCITOTENV.2020.140132.

Taghizadeh-Hesary, F. & Yoshino, N. (2019). The way to induce private participation in green finance and investment. Finance Research Letters, 31, 98–103, https://doi.org/10.1016/J.FRL.2019.04.016.

Tian, M., Yan, S., Tian, X., Zeng, X. & Xie, C. (2019). Financial support to marine economy in the big data era. Journal of Coastal Research, 94(SI), 609-612.

Tham, D.S.Y., Sowden, P.T., Grandison, A., Franklin, A., Lee, A.K.W., Ng, M., Park, J., Pang, W. & Zhao, J. (2020). A systematic investigation of conceptual color associations. Journal of Experimental Psychology: General, 149(7), 1311–1332, https://doi.org/10.1037/xge0000703.

The Silver Economy. Opportunities from Ageing (2015). European Parliament, https://www.europarl.europa.eu/EPRS/EPRS-Briefing-565872-The-silver-economy-FINAL.pdf (Accessed: 25.02.2022).

Thompson, B.S. (2022). Blue bonds for marine conservation and a sustainable ocean economy: Status, trends, and insights from green bonds, Marine Policy, 144, 105219, https://doi.org/10.1016/j.marpol.2022.105219.

Tirumala, R.D. & Tiwari, P. (2022). Innovative financing mechanism for blue economy projects, Marine Policy, 139, 104194, https://doi.org/10.1016/j.marpol.2020.104194.

Tolliver, C., Keeley, A.R. & Managi, S. (2019). Green bonds for the Paris agreement and sustainable development goals. Environmental Research Letters, 14(6), 064009, https://doi.org/10.1088/1748-9326/AB1118.

Turganbayeva, S.S., Stepanskaya, T.M., Asanova, S.Z., Asanova, A.E. & Asanova, B.E. (2014). The distinctive characteristics of color perception in the Eastern and Western cultural tradition, Life Science Journal, 11(10s), 544-547, https://doi.org/10.7537/marslsj1110s14.107.

Tummers, A. & Weststijn, T. (Eds.). (2005). Amsterdam: Amsterdam University Press, 99-100, https://doi.org/10.1515/9789048505388-010.

Turner, K.L. & Rios, L.M. (2022). IFC Release Guidelines for Blue Finance, Banking Law Journal, 139(6), 346-350.

Wabnitz, C.C.C. & Blasiak, R. (2019). The rapidly changing world of ocean finance, Marine Policy, 107, 103526, https://doi.org/10.1016/j.marpol.2019.103526.

Wang, Y. & Zhi, Q. (2016). The Role of Green Finance in Environmental Protection: Two Aspects of Market Mechanism and Policies. Energy Procedia, 104, 311–316, https://doi.org/10.1016/J.EGYPRO.2016.12.053.

Webster, M.A. (2015). Individual Differences in Color Vision. In: Elliot, A.J., Fairchild, M.D., Franklin, A. (Eds.). Handbook of Colour Psychology (pp. 197-215), Cambridge University Press, Cambridge.

Wheelock, A. (2005). Colour Symbolism in Seventeenth-Century Dutch Painting. In: Van den Doel, M., Van Eck, N., Korevaa, G. & Tummers A. (Eds.). The Learned Eye: Regarding Art, Theory, and the Artist's Reputation (pp. 99-110), Amsterdam University Press, Amsterdam.

Wi, M.K. & Choy, H.S. (2008). The Development of Fashion Design, Based on the Symbolism of Color White, International Journal of Costume and Fashion, 8(1), 18-35.

Wiese, A. (1999). Black Housing, White Finance: African American Housing and Home Ownership in Evaston, Illinois, before 1940, Journal of Social History, 33(2), 428-460, https://doi.org/10.1353/jsh.1999.0079.

Wreschner, E.E., Bolton, R., Butzer, K.W., Delporte, H., Häusler, A., Heinrich, A., Jacobson-Widding, A., Malinowski, T., Masset, C., Miller, S.F., Ronen, A., Solecki, R., Stephenson, P.H., Thomas, L.L. & Zollinger, H. (1980). Red Ochre and Human Evolution: A Case for Discussion [and Comments and Reply], Current Anthrpology, 21(5), 631-644, https://doi.org/10.1086/202541.

Xu, S., Lu, B. & Yue, Q. (2021). Impact of sci-tech finance on the innovation efficiency of China's marine industry, Marine Policy, 133, 104708, https://doi.org/10.1016/j.marpol.2021.104708.

Xu, Y., Li, S., Zhou, X., Shahzad, U. & Zhao, X. (2022). How environmental regulations affect the development of green finance: Recent evidence from polluting firms in China. Renewable Energy, 189, 917–926, https://doi.org/10.1016/J.RENENE.2022.03.020.

Xu, X., Chen, X., Jia, F., Brown, S., Gong, Y. & Xu, Y. (2018). Supply chain finance: A systematic literature review and bibliometric analysis. International Journal of Production Economics, 204, 160-173.

Yin, X. & Xu, Z. (2022). An empirical analysis of the coupling and coordinative development of China's green finance and economic growth. Resources Policy, 75, 102476, https://doi.org/10.1016/J.RESOURPOL.2021.102476.

Yoshino, N., Taghizadeh-Hesary, F. & Nakahigashi, M. (2019). Modelling the social funding and spill-over tax for addressing the green energy financing gap. Economic Modelling, 77, 34–41, https://doi.org/10.1016/J.ECONMOD.2018.11.018.

Yu, C.H., Wu, X., Zhang, D., Chen, S. & Zhao, J. (2021). Demand for green finance: Resolving financing constraints on green innovation in China. Energy Policy, 153, 112255, https://doi.org/10.1016/J.ENPOL.2021.112255.

Yu, H.C. (2014). A cross-cultural analysis of symbolic meanings of color. Chang Gung Journal of Humanities and Social Sciences, 7(1), 49-74.

Zhang, D., Zhang, Z. & Managi, S. (2019). A bibliometric analysis on green finance: Current status, development, and future directions. Finance Research Letters, 29, 425–430, https://doi.org/10.1016/J.FRL.2019.02.003.

Zhang, D., Mohsin, M., Rasheed, A. K., Chang, Y. & Taghizadeh-Hesary, F. (2021). Public spending and green economic growth in BRI region: Mediating role of green finance. Energy Policy, 153, 112256, https://doi.org/10.1016/J.ENPOL.2021.112256.

Zhang, S., Wu, Z., Wang, Y. & Hao, Y. (2021). Fostering green development with green finance: An empirical study on the environmental effect of green credit policy in China. Journal of Environmental Management, 296, 113159, https://doi.org/10.1016/J.JENVMAN.2021.113159.

Zhou, H. & Xu, G. (2022). Research on the impact of green finance on China's regional ecological development based on system GMM model. Resources Policy, 75, 102454, https://doi.org/10.1016/J.RESOURPOL.2021.102454.

Zhou, X. & Cui, Y. (2019). Green Bonds, Corporate Performance, and Corporate Social Responsibility. Sustainability 2019, 11(23), 6881, https://doi.org/10.3390/SU11236881.