

Integration of Sustainability in Logistical Approaches A Key Element in Designing University-wide Green Logistics Program

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Abstract: The present study aimed to investigate the integration of sustainability in logistical approaches within schools or universities, focusing on the development of a university-wide green logistics program. The study seeks to address the following research questions such as the profiles of the respondents in terms of age, gender, position classification, and years of employment. Furthermore, to what extent does the university integrate sustainability measures in logistic-related approaches, considering principles such as purpose, values, method, research, partnership, and dialogue and how do university members assess the impact of green logistics on cultivating a culture of sustainability, particularly in terms of trust, satisfaction, and commitment. Furthermore, the level of commitment among respondents towards adopting green logistics, specifically in the physical place, educational program, and organizational culture. Finally, based on the study results, the research aims to identify and propose sustainability measures that can be integrated into the design of a university-wide green logistics program. The study recommends to compare the level of integration and implementation of sustainability in green logistical approaches in secondary education with the leadership styles of school administrators who share similar profiles with the respondents, while also considering the academic performance of students. Additionally, conducting a study to examine the impact of different leadership styles on the integration of sustainability measures in logistic-related activities, with a focus on the principles for responsible management education, is recommended. Moreover, developing a series of faculty-student training and development programs on green logistics is essential to address physical, organizational, and cultural concerns within the institution. Furthermore, conducting capability training programs for school leaders and administrators to ensure proper implementation of sustainable measures and adopting a culture of green logistics practices is crucial. Regular satisfaction evaluations should be conducted to identify areas for improvement and necessary actions. Additionally, considering the strong positive correlation between the integration of sustainability measures and its influence on green logistics, the formulation and implementation of a comprehensive green logistics manual is recommended. Regular reviews of the manual should be conducted to ensure its effectiveness and relevance. Lastly, universities should revisit, review, and revise their existing sustainability measures and guidelines for green logistics implementation. An ongoing process of enhancing guidelines and conducting regular evaluations should be established. Furthermore, the proposed sustainable university-wide green logistics program should be considered as a guide for universities to develop and implement their own comprehensive and sustainable green logistics initiatives, taking into account the specific needs and context of each institution.

Keywords: Green Logistics, Key Element, Integration OF Sustainability, University.

1. Introduction

China's logistics development has increased over time through various reforms (Zhang, et. al., 2019). Such rapid rise needs continuous improvement because of the technological advancement and innovations which schools and universities are actively being involved to address the growing demands for education. Hence, sustainability measures is necessary as the 21st century continues to undertake a new round of technological innovations on various operations of universities wherein the logistical area forms a vital role.

Green logistics is also recognized as sustainable logistics wherein organizational practices are involved as regards to minimizing the environmental impact of the logistics activities, systems, network, and delivery of functions. Green logistics secure strong bottom line. Hence, universities pursuing green logistics embraces sustainability management without sacrificing students' satisfaction as well as the teachers, staff, administrators and other stakeholders. China's educational reforms incorporates school environment wherein logistics plays essential role. Moreover, shifting to green logistics can bring realization to improve profitability

and a primary driver to create good citizenship as a respond to the real-world results of climate change.

Green logistics is a step towards sustainable future. There are advantages of green logistics to include improved long-term sustainability, new or enhanced partnership, happy students and all other stakeholders, and stronger social responsibility reputation. However, to integrate sustainability in logistical approaches the use of green logistic is one of the best initiatives. Hence, application of green logistics in schools needs some strategies while mobilizing their limited resources. These strategies could be about collaboration, technological innovation, trainings, skills improvement and education of more sustainable choices.

Logistics efficiency is an important variable in measuring the level of development in schools and there is a need to determine factors affecting as well as influential variables that would contribute to successful implementation. Green logistics' goals is environmental protection and resource economization which requires attention to methods that would support school development. Moreover, green logistics has also economic benefits when everyone properly played their role. Schools' intention to plan for sustainable

development must be harmonious with environment. Hence, greener and customized logistics development can reduce cost and increase social value.

Green logistics creates innovation (Navavongsathian, et. al., 2020) since the ecological operations requires integration of logistics drive by regulatory, social and economic forces. Green logistics leads to green schools. A green school is defined as “a school that creates a healthy environment conducive to learning while saving energy, environmental resources and money (Boston Public School, 2023) wherein these may benefit students, teachers, parents and the community like health protection, increase student performance, saving energy, reduce greenhouse emissions, reduce water usage, improve teacher retention, provide a unique educational opportunity, create green jobs, among others. Hence, the present study aims to determine the sustainability measures and how it influence green logistics in school setting taking into consideration diverse identities and needs.

The present study is beneficial to many stakeholders particularly the school or university, teachers, staff and administrators as the importance of sustainability is a growing concern at the moment and taking into consideration application of green logistics in academic operations. Specifically, the study will be beneficial to the following;

1.For Chinese schools or universities, this will be a source for decision making, investment guide, and appreciation of concepts about sustainability and green logistics. The present study can contribute to the school's continuous improvement on their logistics services. This will serve as reference guide for policy formulation and procedures as well as improve training programs for personal and professional development;

2. For the teachers, staff and administrators of the school or universities, the present study can offer insights on the appropriate development activities for teachers, staff and administrators towards sustainable and green logistics centered towards school development. The research study will be a good contribution to knowledge and useful for further research ideas and accreditation purposes;

3.For the community, the present study will provide insights and create a society who are responsible and active towards a greener school; and

4.For future researchers, this study will provide encouragement to students and future researchers on conducting a similar study about the environment. This will motivate other researchers to engage in a follow-up study investigating an in-depth analysis on the policy formulation using other approaches or other issues. The findings in this research undertaking may reinforce consciousness pertinent to the value of continuously improving sustainable and green logistics practices towards personal and professional growth while supporting school development.

5. For students, this study will provide them a better school environment conducive for learning. They will also appreciate their responsibilities to contribute as stewards of the environment and become role model and active participants to improve green logistics in school while doing the best green practices applicable to their homes and the community.

6.For parents, this will provide realization that they choose the right school for their children. This will also provide them insights on how to appreciate and understand the importance of green logistics in school environment making their children safe and secure.

2. Discussions

This research study used descriptive-quantitative design and participated by the 305 respondents which is a mix of teachers, administrators and staffs from selected universities in China.

2.1. Statement of the Problem

The present study aims to determine how schools or universities integrate sustainability in their logistical approaches as a key element in designing a university-wide green logistics program. Specifically, the present study sought to answer the following questions;

1.What is the profile of the respondents in terms of: Age; Gender; Position Classification and; Number of Years Employed?

2.What is the level of integration by the university in carrying out their sustainability measures on logistic-related approaches in terms of the following principles: Purpose; Values; Method; Research; Partnership and; Dialogue?

3.Is there a significant difference in the integration of sustainability measures when profile variables are considered?

4.How do the members of the university assess the green logistics in cultivating a culture of sustainability in terms of: Trust; Satisfaction and; Commitment?

5.Is there a significant relationship between the integration of sustainability measures and its influence on green logistics?

6.What is the level of commitment of the respondents on sustainability towards adopting green logistics in terms of: Physical place; Educational program and; Organizational culture?

7.Based on the results of the study, what are the sustainability measures that can be integrated to design a university-wide green logistics program?

2.2. Methodology

This section presents the research design, research instrument, data gathering procedures, respondents of the study, sampling technique, and data analysis plan or statistical treatment.

This research study used descriptive-quantitative design wherein according to Aggarwal and Ranganathan (2019), “a descriptive study is one that is designed to describe the distribution of one or more variables, without regard to any causal or other hypothesis” which was employed in the present study. The researcher used the descriptive research method using survey questionnaire due to its appropriateness to the specified problems presented in this study and as well as information will be gathered, identified, assess, measured, described, and analyzed. Descriptive studies are valuable in providing facts on which scientific judgments may be used and targeting the appropriate participants will help avoid biases. In addition, As described by Fluet (2021), “It is a quantitative research method that is considered conclusive and is used to test specific hypotheses and describe characteristics or functions. Descriptive research should have a clear and accurate research questions, objectives and/or problems”. The researcher used the quantitative method because one of the primary sources of information came from a self-made survey questionnaire guided by the literature, studies and stated problems of the study which will be more comfortable to the respondents to provide the information that will be needed in this research study. The researcher employed stratified random sampling which refers to a

sampling method in which a population group is divided into distinct units classified based on shared behavior that explains the differences in characteristic (Corporate Finance Institute, 2022).

The survey questionnaire is used as the research instrument or as the main data-gathering tool based from empirical and direct data of set of questions. Before the survey will be administered, the instrument will be presented to the research adviser and academic or industry experts for content validation. The reliability test was measured through Cronbach's alpha formula and survey instrument was pilot tested to similar respondents. Cronbach's alpha is a "measure of internal consistency or how closely related set of items are as a group which is also considered as a measure of scale reliability" (University of Virginia Library, 2015). The result of the reliability test is .996. Suggestions and comments of the adviser and experts were considered. Also, the researcher used the specific objectives formulated for the study, the conceptual and theoretical frameworks, related literature and studies which will serve as guiding tools in designing the research instrument.

The survey was divided into parts; first it the profile of the respondents as regards to age, gender, position classification and number of years employed; Second is determination of sustainability measures that the university integrate in carrying out their logistic-related approaches in terms of the following principles; Purpose, Values, Method, Research, Partnership and Dialogue; third is assessment on how do these measures influence the members of the university to integrate green logistics in cultivating a culture of sustainability in terms of; Trust, Satisfaction and Commitment; and Fourth is determining the level of commitment of the respondents on sustainability towards adopting green logistics in terms of; Physical place, Educational program, and Organizational culture.

3. Conclusions

Based on the presentation, analysis, interpretation of data and summary of findings, the researcher formulated the following generalizations:

1.The study was participated majority by female teachers from selected universities in China, who are within the middle age group, employed for more than five (5) years and capable of contributing valuable information for the study.

2.The selected universities have slightly integrated in carrying out their sustainability measures on logistic-related activities and approaches in terms of their purpose, values, methods, research, partnership and dialogue.

3.The test of significant differences revealed that respondents' age and the number of years employed are factors that influence respondents' evaluation on the assessment of the school's integration of sustainability measures when profile variables are considered while gender and position classification are not factors to be considered that affects respondents' assessments.

4.The selected universities for this study have no further improvement made nor no cultivation at all on the green logistics that cultivate a culture of sustainability in terms of trust, satisfaction and commitment.

5.There is a very strong positive correlation between the integration of sustainability measures and its influence on green logistics, thus the two variables tested are significantly

related.

6.The level of commitment of the universities on sustainability towards adopting green logistics as assessed by the respondents turned out to be interpreted as not committed at all. Universities included in this study are seen not committed at all on sustainability towards adopting green logistics in terms of the physical place, educational program and organizational culture.

4. Recommendations

Based on the conclusions and generalization formulated by the researcher, the following are highly recommended:

1.Compare the level of integration and implementation of sustainability in green logistical approaches in secondary education with the leadership styles of school's administrators with same profile of the respondents to include the academic performance of the students.

2.Conduct a study that determine the impact of different leadership styles in the implementation and integration of sustainability measures on logistic-related activities in terms of the principles for responsible management education.

3.Formulate series of faculty-student training and development programs on green logistics that will improve the physical, organizational and cultural concerns of the institution. Programs must be sustainable and should be based on the needs of faculty, students, other stakeholders and the university.

4.Conduct capability training programs for school leaders and administrators on proper implementation of sustainable measures integrating and adopting the culture of green logistics practices. Then conduct a regular satisfaction evaluation of the green logistics practices to address necessary improvement and actions needed.

5.Due to evidence of having a very strong positive correlation between the integration of sustainability measures and its influence on green logistics, a formulation and implementation of green logistics manual is a must. Regular review of the manual should be conducted.

6.With the results of this study where universities assessed were seen not committed at all on sustainability towards adopting green logistics in terms of the physical place, educational program and organizational culture, it is recommended therefore that the universities should conduct a revisit, review and revision of an existing sustainability measures on green logistics implementation and guidelines of practices. Further, a guideline enhancement review and evaluation process should be regularly done.

References

- [1] Aggarwal, R. and Ranganathan, P (2019). Descriptive Research Design. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6371702/>
- [2] Agyabeng-Mensah, Y., et. al. (2020). Exploring financial performance and green logistics management practices: Examining the mediating influences of market, environmental, and social performances. Retrieved from <https://doi.org/10.1016/j.jclepro.2020.120613>
- [3] Aggarwal, R. and Ranganathan, P (2019). Descriptive Research Design. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6371702/>
- [4] Agyabeng-Mensah, Y., et. al. (2020). Exploring financial performance and green logistics management practices: Examining the mediating influences of market, environmental,

- and social performances. Retrieved from <https://doi.org/10.1016/j.jclepro.2020.120613>
- [5] Ali, A. H., et. al. (2022). Assessing the impact of sustainable logistics service quality on relationship quality: survey-based evidence in Egypt. Retrieved from <https://www.sciencedirect.com/science/article/pii/S2772390922000099>
- [6] Barr, S. K., et. al. (2014). The whole-school sustainability framework: Guiding principles for integrating sustainability into all aspects of a school organization. Retrieved from https://centerforgreenschools.org/sites/default/files/resource-files/Whole-School_Sustainability_Framework.pdf
- [7] Bautista-Puig, Núria, Sanz-Casado, Elías (2021) Sustainability practices in Spanish higher education institutions: An overview of status and implementation. *Cleaner Production*, Vol 295. <https://www.sciencedirect.com/science/article/pii/S0959652621005400>
- [8] Baxter, K. (2022). What are sustainable logistics practices? Retrieved from <https://blog.intekfreight-logistics.com/what-are-sustainable-logistics-practices>
- [9] Bento, A., et. al. (2022). Principles for Responsible Management Education (PRME): Collaboration among researchers. Retrieved from <https://www.sciencedirect.com/science/article/abs/pii/S1472811722000441>
- [10] Bloomberg Intelligence, (2021). ESG assets may hit USD 53 trillion by 2025, a third of global AUM” (link resides outside of ibm.com). [https://www.ibm.com/topics/business-sustainability#:~:text=Sustainability%20in%20business%20refers%20to%20a%20company's%20strategy%20to%20reduce,and%20governance%20\(ESG\)%20metrics.](https://www.ibm.com/topics/business-sustainability#:~:text=Sustainability%20in%20business%20refers%20to%20a%20company's%20strategy%20to%20reduce,and%20governance%20(ESG)%20metrics.)
- [11] BluGlacier. (2023). Why is sustainability important? <https://bluglacier.com/why-is-sustainability-important/#:~:text=Sustainability%20improves%20the%20quality%20of,to%20logistics%20to%20customer%20service.>
- [12] Boston Public Schools (2023). What is a green school? Retrieved from <https://bostongreenschools.org/what-is-a-green-school/>
- [13] Bouronikos, Vasilis (2022). The importance of cultural sustainability to achieve the SDGs. <https://ied.eu/blog/the-importance-of-cultural-sustainability-to-achieve-the-sdgs/#:~:text=Culture%20can%20promote%20economic%20growth,to%20a%20more%20sustainable%20future.>
- [14] Britannica, The Editors of Encyclopaedia (2021). "percentage". *Encyclopedia Britannica*. Retrieved from <https://www.britannica.com/topic/percentage>.
- [15] Carreras, Ignasi. (2019). Best practices for responsible people management. <https://dobetter.esade.edu/en/best-practices-responsible-people-management>
- [16] Chhabra, Atin (2022). An Introduction to sustainability management: objective, principles, advantages. <https://blog.se.com/sustainability/2022/06/27/an-introduction-to-sustainability-management-objective-principles-advantages/#:~:text=Sustainability%20management%20combines%20the%20concept,generations%20to%20do%20the%20same.>
- [17] Corporate Finance Institute (2021). What is weighted mean? Retrieved from <https://corporatefinanceinstitute.com/resources/knowledge/other/weighted-mean/>
- [18] Corporate Finance Institute (2022). Stratified Random Sampling. Retrieved from <https://corporatefinanceinstitute.com/resources/data-science/stratified-random-sampling/>
- [19] Danaher, A. (2013). The curriculum implementation. The Texas A&M System/PACT <https://pact.tarleton.edu/PACT/TranscriptPDFs/CurriculumImplementationModule.pdf>
- [20] Economic Times. (2021). Definition of Standard Deviation. Retrieved from <https://economictimes.indiatimes.com/definition/standard-deviation>
- [21] Edward, Beena (2017). Green logistics. <https://www.slideshare.net/BeenaEdward/green-logistics-73143941#2>
- [22] Ernst & Young Global Ltd. (2018). How an integrated sustainability strategy can help you stand out. https://www.ey.com/en_gl/assurance/how-an-integrated-sustainability-strategy-can-help-you-stand-out
- [23] EY (2021). The future of sustainability reporting standards” (PDF, 1.6 MB) (link resides outside of ibm.com) [https://www.ibm.com/topics/business-sustainability#:~:text=Sustainability%20in%20business%20refers%20to%20a%20company's%20strategy%20to%20reduce,and%20governance%20\(ESG\)%20metrics.](https://www.ibm.com/topics/business-sustainability#:~:text=Sustainability%20in%20business%20refers%20to%20a%20company's%20strategy%20to%20reduce,and%20governance%20(ESG)%20metrics.)
- [24] Fan, M. et., al (2022). Impact of green logistics performance on China’s Export Trade to regional Comprehensive Economic Partnership Countries. Retrieved from <https://www.frontiersin.org/articles/10.3389/fenvs.2022.879590/full>
- [25] Federal Highway Administration, INVEST (2022). How is sustainability measured? <https://www.sustainablehighways.org/99/how-is-sustainability-measured.html>
- [26] Fluet, B. (2021). What is Descriptive Research? Retrieved from <https://invoke.com/blog/what-is-descriptive-research.>
- [27] Garner, Bethany (2021). Why is sustainable management important? <https://www.businessbecause.com/news/insights/7870/sustainable-management?sponsored#:~:text=Sustainability%20is%20increasingly%20a%20priority,also%20improve%20their%20bottom%20line.>
- [28] Giovannelli, Lucia, Rotondo, Federico, Ezza, Alberto (2021). Business models for integration of sustainability in universities: An explorative analysis of Italian state universities. *Journal of Cleaner Production*, Vol 324. <https://www.sciencedirect.com/science/article/abs/pii/S0959652621034132>
- [29] Hadley, Gabi (2023). Sustainable logistics : best practices & benefits. <https://www.twill.net/knowledge-hub/logistics-know-how/sustainable-logistics>
- [30] Huld, A. (2023). China’s changing labor market – trends and future outlook. <https://www.china-briefing.com/news/chinas-labor-force-data-trends-and-future-outlook/#:~:text=Overview%20of%20China's%20labor%20force,last%20workforce%20survey%20was%20conducted>
- [31] IBM Institute for Business Value, (2021). Sustainability at a turning point” (PDF, 190 KB). [https://www.ibm.com/topics/business-sustainability#:~:text=Sustainability%20in%20business%20refers%20to%20a%20company's%20strategy%20to%20reduce,and%20governance%20\(ESG\)%20metrics.](https://www.ibm.com/topics/business-sustainability#:~:text=Sustainability%20in%20business%20refers%20to%20a%20company's%20strategy%20to%20reduce,and%20governance%20(ESG)%20metrics.)
- [32] Indeed Editorial Team (2023). Tenure in a job: definition, advantages and disadvantages. <https://www.indeed.com/career-advice/career-development/tenure-in-a-job#:~:text=Job%20tenure%20refers%20to%20the,for%20less%20than%20five%20years.>

- [33] Islam, M.S.; Tseng, M.-L.; Karia, N. (2019). Assessment of corporate culture in sustainability performance using a hierarchical framework and interdependence relations. *J. Clean. Prod.* 217, 676–690. [Google Scholar] [CrossRef]. <https://www.mdpi.com/2071-1050/14/13/7527#B21-sustainability-14-07527>
- [34] Kashima, Yoshihisa (2020). Current directions in psychological science. University of Melbourne, Australia. <https://www.psychologicalscience.org/observer/cultivating-cultures-sustainability>
- [35] Kim, S. T., Lee, H., and Hwang, T. (2020). Logistics Integration in the Supply Chain: A Resource Dependence Theory Perspective. Retrieved from <https://jqualityinnovation.springeropen.com/articles/10.1186/s40887-020-00039-w>
- [36] Kumar, S., Teichman, S., Timpernagel, T., (2012). A green supply chain is a requirement for profitability. *International Journal of Production Research* 50(5), 1278–1296. <https://dnb.info/1135716234/34>
- [37] Lackney, J.A. and Picus, L. O. (2023). School Facilities. Retrieved from <https://education.stateuniversity.com/pages/2394/School-Facilities.html>
- [38] Land, Andrew (2023). Our commitment to green logistics home. <https://www.vtlogistics.co.uk/our-commitment-to-green-logistics/>
- [39] Li, Y. (2019). An Analysis of Green Environment-Friendly Logistics Management Concept. *Advances in Social Science, Education and Humanities Research*, volume 309
- [40] Li, Yan, (2019). An Analysis of green environment-friendly logistics management concept. *Advances in Social Science, Education and Humanities Research*, volume 309; 1st International Symposium on Management and Social Sciences (ISMSS 2019). <file:///C:/Users/PCC%20Faculty/Downloads/55916222.pdf>
- [41] Liu, W. & Chen, J. (2021). Green spaces in Chinese schools enhance children’s environmental attitudes and pro-environmental behavior. *Children, Youth and Environments*, 31(1), 55-87. Retrieved https://www.researchgate.net/publication/350078139_Green_Spaces_in_Chinese_Schools_Enhance_Children's_Environmental_Attitudes_and_Pro-Environmental_Behavior
- [42] Lozano, R. (2013). Are Companies Planning their Organisational Changes for Corporate Sustainability? An Analysis of Three Case Studies on Resistance to Change and their Strategies to Overcome it. *Corp. Soc. Responsib. Environ. Manag.* 20, 275–295. [Google Scholar] [CrossRef] <https://www.mdpi.com/2071-1050/14/13/7527#B21-sustainability-14-07527>
- [43] Lukman, R.K.; Omahne, V.; Sheikh, L.T.e.; Glavič, P. Integrating Sustainability into Logistics Oriented Education in Europe. *Sustainability* 2021, 13, 1667. <https://doi.org/10.3390/su13041667>
- [44] Mackenzie, R. (2018). ANOVA: Differences, Assumptions and Hypotheses. Retrieved from <https://www.technologynetworks.com/informatics/articles/one-way-vs-two-way-anova-definition-differences-assumptions-and-hypotheses-306553>
- [45] Mak, Shawn (2022). Sustainability partnerships: your how-to guide for success. <https://www.anticsatplay.com/blog/sustainability-partnerships/#~:text=Sustainability%20partnerships%20are%20basically%20partnerships,Or%20both.>
- [46] Miashkova, Yulia (2022). Green logistics for greener supply chain management. <https://www.track-pod.com/blog/green-logistics-guide/#~:text=Green%20distribution%20is%20the%20basis,damage%20from%20outside%20the%20company.>
- [47] Mollenkamp, D. T. (2023). What is sustainability? How sustainabilities work, benefits and example. Retrieved from www.investopedia.com
- [48] Montiel, I.; Delgado-Ceballos, J. Defining and Measuring Corporate Sustainability. *Organ. Environ.* 2014, 27, 113–139. [Google Scholar] [CrossRef] <https://www.mdpi.com/2071-1050/14/13/7527#B8-sustainability-14-07527>
- [49] Navavongsathian, et. al., (2020). Study of Green Logistics Managing Potential and the Preparedness of Auto Parts Industries in Thailan. Retrieved from https://www.temjournal.com/content/94/TEMJournalNovember2020_1524_1534.pdf
- [50] Neubaum, D.O.; Zahra, S.A. Institutional Ownership and Corporate Social Performance: The Moderating Effects of Investment Horizon, Activism, and Coordination. *J. Manag.* 2006, 32, 108–131. [Google Scholar] [CrossRef] <https://www.mdpi.com/2071-1050/14/13/7527#B8-sustainability-14-07527>
- [51] Oh, K.-Y.; Kang, S.-Y.; Oh, Y.-G. The Moderating Effects of Eco-Friendliness between Logistics Service Quality and Customer Satisfaction in Cross-Border E-Commerce: Evidence from Overseas Direct Purchasers in Korea. *Sustainability* 2022, 14, 15084. <https://doi.org/10.3390/su142215084>
- [52] Pan, F., Liu, L., & Wang, Z. (2022). The Chinese University stakeholder satisfaction survey: Developing a customer-centered self-assessment tool for higher education quality management. <https://www.frontiersin.org/articles/10.3389/fpsyg.2022.1043417/full>