# RANKING OF THE SUSTAINABLE DEVELOPMENT GOALS BY BUSINESS STUDENTS

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**Abstract**
Research on the social aspects of sustainability problems uses a quite limited toolset. Q-methodology can be suggested as an additional survey method to explore definitive opinions in the field. The paper shows a methodological experiment by ranking the importance of the 17 Sustainable Development Goals. The case study is presented based on 20 responses from business students. The case shows the applicability of the Q-methodology for exploring opinion patterns. The results suggest that the majority of the respondents keep planet-related goals as the most important ones.

**Introduction**
Sustainability is a complex phenomenon derived from the increasingly urgent need to solve environmental problems [1]. Since social aspects must be considered, and even society can be marked as the source of the problem, the competing interests became challenging to overview. Excellent examples are the endeavors of the United Nations' conferences [2], where numerous principles and action plans were elaborated to cover the different needs of stakeholders and territories. Each case, action, or strategy can be assessed from various viewpoints; I believe there is no ultimate way. At the same time, the expanding knowledge base in the field provides background to make satisfactory decisions. Any contribution to this knowledge base is valuable, including local and general investigations, as well as engineering, social, managerial, and other results. The paper shows a methodological experiment using the Q-methodology [3] to explore sustainability issues. A pilot sample was selected from business and management students at one university to present the opportunities of the method. The results focus on the pattern of the majority opinion.
The objective of the study is the 17 Sustainable Development Goals (SDGs) by the United Nations [4] [5]. The goals and the 5 pillars model (people, planet, prosperity, peace, partnership) suggest building a comprehensive, transparent, and easy-to-use framework for strategy making and evaluation. Still, the number of goals, especially the related 169 targets, is spreading. The research question is how to define the importance of the SDGs.
Several methods can be used for the evaluation, but each has some limitations:
- Scale evaluation methods like the Likert scale or else [6] must consider distortions due to social expectations and usually lead to a left-skewed distribution of the responses, and the results can be meaningless. However, statistical tools are widely available, and great charts can be drawn, but the practical usability of the results is limited. Moreover, the relative importance often remains hidden.
- A direct ranking seems purposeful, but an increasing number of survey items makes the evaluation extremely difficult.
- Pairwise comparison methods can fix some problems mentioned above, but the related survey is long, collecting responses is time-consuming, and the ratio of responses with a clear preference order may be limited. Guilford's method [7] based on pairwise

comparison is not outdated, especially among experts, but the technique does not allow comparison between samples, which limits the generalization of the results.

An old, but nowadays again popular approach is the Q-methodology, which helps to rank a large number of statements and explore typical patterns of opinions. It was developed by a physicist and psychologist, William Stephenson, in the 1930s [3]. Qualitative and quantitative aspects are combined, and the design of the method considers the limitations of human thinking. The respondents express their views by sorting a set of statements from most agree to most disagree, and patterns of beliefs can be drawn. Beyond understanding individual attitudes, it can be used to explore group-level opinion patterns. The Q-methodology is based on the correlation matrix and groups the respondents [8].

The data collection method makes the relative opinion of a respondent about every statement concerning all other statements explicit, presenting a holistic order with integrated trade-offs [9]. Data recording can be managed manually by pre-printed cards of the statements and a blank pattern for organizing them, or software solutions can automate it. The steps of analysis can be summarized as follows based on the literature:

- preparing the initial data matrix of the evaluations,
- calculating correlations,
- selecting the number of factors based on the eigenvalues and the scree plot,
- calculating rotated factors loadings,
- determining factor weights and scores,
- analysis of distinguishing statements,
- presenting patterns of opinions by the final factors.

**Experimental**

The respondents were asked to organize the SDGs by the question, which is held more or less important compared to the others. The survey for the evaluation used a ready-made Q-sample, including a description of the goals. Normal distribution of the evaluations is assured by the forced sort pattern for the participants [10].

The results in this paper are based on a voluntary online questionnaire following the structure of Easy-htmlq version 2.0.3, and data processing was performed with the free Ken-Q Analysis Desktop Edition (KADE) software. A sample of 20 business and administration students was randomly selected from the database collected in the 2022/2023 academic year.

The factors were defined by principal component analysis with Varimax rotation for maximizing the sum of the variances of the squared correlations between variables and factors.

**Results and discussion**

The factor analysis shows 7 acceptable factors. The scree plot of the analysis suggests using 2 or 3 of them (Figure 1).

According to the 3-factor solution, the reliability of the questionnaire is good, the percentage of explained variance is 61%, and the correlation between the factors is low, meaning that different opinions are represented in them (Table 1). 18 of 20 respondents have a significant contribution to the patterns.
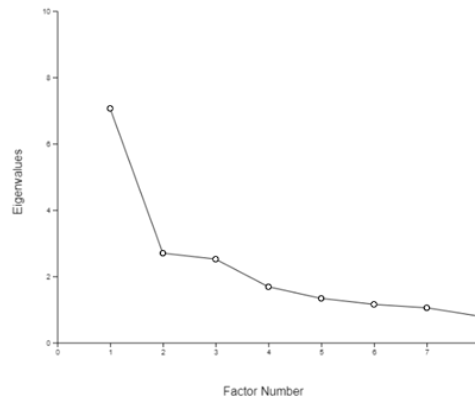
Figure 1. Scree plot of the analysis (KADE output)

Table 1. Factor characteristics (KADE output)

|  | Factor 1 | Factor 2 | Factor 3 |
|---|---|---|---|
| **No. of Defining Variables** | 9 | 4 | 5 |
| Avg. Rel. Coef. | 0.8 | 0.8 | 0.8 |
| Composite Reliability | 0.973 | 0.941 | 0.952 |
| S.E. of Factor Z-scores | 0.164 | 0.243 | 0.219 |
|  | Correlations | | |
| Factor 1 | - | 0.1717 | 0.2499 |
| Factor 2 | 0.1717 | - | 0.1055 |
| Factor 3 | 0.2499 | 0.1055 | - |

Factor scores and ranking are summarized in Table 2. The dataset presents the weight score and the rank order of the items by factors, ordered by the level of consensus. The first row shows the item with the highest agreement among the respondents, regardless of its position in the ranking. 'Quality education', 'Peace, justice and strong institutions', and 'Clean water and sanitation' were marked as significant consensus statements.

Table 2. Z-scores and ranking orders by factors (based on KADE output)

| Statement | 5P | Factor 1 Z-score (rank) | Factor 2 Z-score (rank) | Factor 3 Z-score (rank) |
|---|---|---|---|---|
| Quality education | People | 0.08 (9) | -0.14 (10) | -0.25 (10) |
| Peace, justice and strong institutions | Peace | -0.79 (14) | -0.06 (8) | -0.29 (11) |
| Clean water and sanitation | Planet | 1.35 (2) | 0.59 (6) | 0.93 (4) |
| Decent work and economic growth | Prosperity | -0.21 (12) | -0.56 (12) | 0.26 (8) |
| Partnership for the global | Partnership | -1.33 (15) | -0.42 (11) | -0.94 (15) |
| Climate action | Planet | 1.97 (1) | 1.04 (4) | 1.26 (3) |
| Responsible consumption and production | Planet | 0.46 (6) | 0.56 (7) | -0.48 (12) |
| Life on land | Planet | 0.8 (4) | -0.09 (9) | -0.67 (13) |
| Life below water | Planet | 0.38 (7) | -1.01 (16) | 0.63 (6) |
| Zero hunger | People | -0.1106 (10) | 1.46 (1) | 1.37 (2) |

| Statement | 5P | Factor 1 Z-score (rank) | Factor 2 Z-score (rank) | Factor 3 Z-score (rank) |
|---|---|---|---|---|
| Industry, innovation and infrastructure | Prosperity | -0.2 (11) | -0.96 (14) | -2.07 (17) |
| No poverty | People | -0.61 (13) | 1.4 (2) | 0.41 (7) |
| Affordable and clean energy | Prosperity | 0.13 (8) | -1.94 (17) | -0.03 (9) |
| Good health and well-being | People | 0.57 (5) | -0.95 (13) | 1.38 (1) |
| Gender equality | People | -1.84 (17) | -0.98 (15) | 0.7 (5) |
| Reduced inequalities | Prosperity | -1.42 (16) | 1.07 (3) | -0.79 (14) |
| Sustainable cities and communities | Prosperity | 0.83 (3) | 0.98 (5) | -1.42 (16) |

The majority opinion factor includes 9 respondents. In their view (Figure 2), 'Climate action', 'No Poverty', and 'Reduced inequalities' are considered the most important SDGs, while 'Affordable Energy', 'Gender equality', and 'Life below water' are at the bottom of the relative ranking.
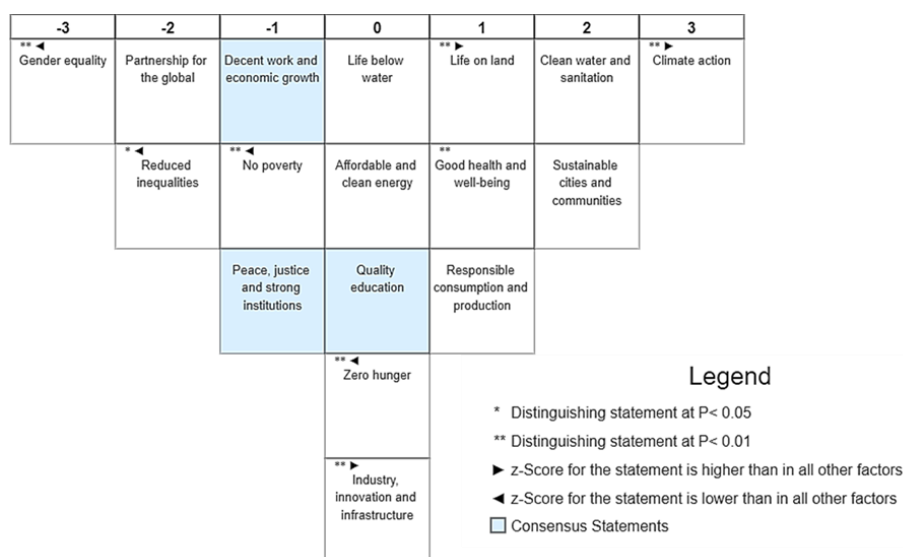


Figure 2. The q-sort pattern of the majority opinion factor

Translation of the results of the majority opinion pattern to the 5Ps is shown in Figure 3. The results suggest an emphasis on traditional environmental issues while people and prosperity show a scattered picture. Partnership and the need for peace are at the bottom of the list. It is to be noted that the 'less important' ranking does not mean the objection of the goal; it is just a relative order. Probably, a Likert-scale evaluation could show slight differences from other items. Factor 2 and Factor 3 give more emphasis to people-related issues than the majority opinion. However, partnership and peace are not among the highest positions in any case.

Learning the opinions of the respondents by Q-sort ranking valuable information can be gained about the shared values. From the viewpoint of management and leadership studies, the under-evaluation of partnership asks for further research since the discipline strongly emphasizes the role of collaboration.

| less important | | | | | | more important |
|---|---|---|---|---|---|---|
| People | Partnership | Prosperity | Planet | Planet | Planet | Planet |
| | Prosperity | People | Prosperity | People | Prosperity | |
| | | Peace | People | Planet | | |
| | | | People | | | |
| | | | Prosperity | | | |

Figure 3: Q-sort pattern by the 5Ps

## Conclusion

The results show that the majority opinion still keeps environmental ('Planet') issues as the most important ingredient of sustainability. At the same time, the limited sample selection does not allow this to be generally stated. The study aimed to show the methodological opportunities of the Q-sort ranking. This method provides an easy way to explore the preferences about an objective, in this case, the SDGs. Although several barriers to statistical analysis can be managed, this method also has serious limitations in presenting the results. I can suggest the application as a preparatory research element that allows further investigations with targeted questions. A practical implication of the study is that knowing the orientation of the respondent's thinking, especially the majority opinion, the strategic actions can be purposeful, highlighting the preferred values. The interrelations between the SDGs are obvious, and the same target may be available in different ways. A higher level of acceptance can be expected using common values in formulating the actions.

## Acknowledgments

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