

Instrument comparing Top Down and Bottom-Up approaches to the SDGs

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Abstract

The Top-Down approach is distinguished by its foundation of the policies issued by the State towards the governed. In an opposite sense, the Bottom-Up approach suggests a construction of demands and participation from citizens towards their authorities. Regarding the SDGs, both perspectives are of interest among the parties involved in a context of implementation in local institutions. The objective of this work was to compare both proposals in order to confirm their theoretical structure. A cross-sectional, psychometric, confirmatory and correlational study was carried out with a sample of university students selected for the implementation of the SDGs in their institutions. The results confirm two of the five factors of analysis. In relation to the state of the art, it is suggested to extend the study in order to confirm the factorial structure and anticipate implementation scenarios of policies circumscribed to the SDGs at a local level.

Keywords: confirmatory factor analysis; bottom up; structural equation model; sustainable development goals; top down

Introduction

The history and theory of capabilities is based on the work of economist and philosopher Amartya Sen and philosopher Martha Nussbaum (Jiménez-Aceituno et al., 2020). This approach is central to the field of human development and can be linked in important ways to the Sustainable Development Goals (SDGs), as both seek to improve people's quality of life in an inclusive, equitable, and sustainable way. Amartya Sen proposed this theory in the 1980s as an alternative to traditional approaches to development that focused primarily on economic growth or the satisfaction of basic needs (Espey, 2021). Sen argued that development should be measured by people's ability to lead lives they value, which includes their freedom to choose and act. Martha Nussbaum, building on Sen's ideas, expanded the approach with a list of core capabilities considered necessary for a dignified life, such as access to health, education, employment, and respect for human dignity. The United Nations Development Programme (UNDP) Human Development Report of 1990 incorporated Sen's ideas, introducing the Human Development Index (HDI), which measures people's capabilities based on health, education, and income (Kaiser, 2020). This marked a fundamental shift towards a more comprehensive view of development. The capabilities approach focuses on what people can "be" and "do" (Reuter, 2023). That is, capabilities represent the set of real opportunities that people have to lead a full life. Sen's approach emphasizes the real freedom of individuals to make meaningful decisions in their lives, considering that factors such as inequality, poverty or lack of rights can limit these opportunities. The theory focuses on both well-being

(material and non-material living conditions) and agency, which is the ability to act and make decisions to influence one's life and society. The Sustainable Development Goals (SDGs), adopted in 2015 by the United Nations, are designed to address the world's most pressing challenges, such as poverty, inequality, climate change, and education (Gau & Viswanathan, 2018). The capabilities approach is useful to understand how the SDGs seek to improve people's lives, as both approaches focus on creating environments that enable individuals to develop their potential. SDG 1 (No poverty) and SDG 10 (Reduced inequalities) are directly related to people's real freedom to escape situations of deprivation and poverty, which is central to capabilities theory. SDGs such as 3 (Good health and well-being) and 4 (Quality education) promote access to essential conditions for people to develop their capabilities and achieve a life they value. The agency's approach is reflected in SDGs such as 5 (Gender Equality) and 16 (Peace, Justice and Strong Institutions), which seek to empower people, particularly traditionally marginalized groups, to take an active role in their communities and in decision-making (Bilsky, Moreno & Fernández Tortosa, 2021). The capabilities theory shares with the SDGs a comprehensive approach to development. It is not just about economic growth or traditional development indicators, but about improving people's lives equitably and sustainably, in all aspects of their existence. The history and theory of capabilities provide a conceptual framework that complements the SDGs, focusing on how people can live dignified and meaningful lives, and under what conditions must be created for these capabilities to be fully developed. Capabilities are for each and

every person, without using any of them as a means for the capabilities of others or for those of the whole (Nussbaum, 2011: p. 55). Such capabilities must be granted at least by the State by treating individuals as equals and as agents of capabilities. Consequently, development means longevity, health and creativity. This indicates that women live less than men and only in one region in the north do they live longer because customs and traditions are reversed. The health system is delegated to the states and the care service is better because it impacts on the users (Nussbaum, 2011: p. 23). It is a system that limits the participation of women when they are not economically or academically empowered. The double shift consists of domestic work and child-rearing or palliative care. The capabilities approach is an evaluation of the quality of life and social justice. In this way, the faculties of self-definition of people prevail in the face of injustice and social inequalities. The approach is one of capabilities without referring to basic justice or human dignity. Capacity as substantive freedom or alternative combinations of functionings or totalities of choice opportunities in public spheres (Nussbaum, 2011: p. 40). Capabilities as internal instances and fluids of people, or social, economic and political interactions. It means that the development of capabilities is internal through education or family. Basic capabilities as the basis of tender capabilities and combined capabilities, but different from innate capabilities that do not require volitional interaction. In this sense, those who exceed the threshold are less worthy of attention than those who do not exceed the threshold. State functioning as the realization of capabilities (Nussbaum, 2011: p. 44). Functionings are beings and actions where capabilities are materialized. Capabilities as areas of freedom and choice. The State must treat people with respect and refrain from humiliating them. Mature capabilities as the development of basic, internal and combined capabilities. Dignity is a condition of universal equality in people because they are considered agents. Treating people as equals does not mean equalizing the conditions of existence. The capabilities approach as protection of areas of freedom. The freedom given by the State is inherent to human dignity. Each person is an end in itself (Nussbaum, 2011: p. 55). Therefore, social justice as dignity above the 10 thresholds that favor the development of capabilities. The best possible intervention in order to create a future in which people do not have to continue facing this kind of choice. The capacities of practical reason as organizers of internal, basic, combined and mature capacities. In this sense, membership is a social recognition of their capacities. The capabilities approach addresses distributive problems based on minimum dignity thresholds, but does not clarify how to proceed with injustice detected below these minimum dignity levels (Nussbaum, 2011: p. 60). Multilateral equality relative to capabilities inhibits local law and its autonomy from its respective contexts and histories. It functions fertile because it favors other capabilities. This means that corrosive disadvantage prevails because it limits capabilities. An attempt is made to outline the approach to capabilities based on their characterization as basic, internal, combined, mature or practical reasons (Goel, Yadav & Vishnoi, 2021). The exposition of the order of the capabilities mentioned when defining and placing them in diverse scenarios, but common to people. Some examples of groups whose rights and capabilities have been violated, but the theory is desirable rather than normative. The concept of capabilities is widely established in different contexts. At all times, the premises that capabilities underlie minimum thresholds granted by the State are defended, but when they are realized in practical freedoms, they are self-responsibilities of choice of individuals, even when asymmetries prevail between them. The relationship of citizens with the State will solve their minimum problems of distribution of resources and infrastructure for the development and consolidation of their capabilities. While it is true that the modern State was born with the mandate to intervene in security, the capabilities approach seems to overlook the fact that the State intervenes in a coercive rather than a persuasive way (Allen, Metternicht & Wiedmann, 2016). In this sense, the persuasive capabilities approach, according to which the coercive State grants freedoms that we can transform into all kinds of capabilities, seems to contravene the essence of the gendarme State. In fact, the claim of universality of the capabilities approach versus the autocratic coercion that distinguishes the intervening State seems to fit into a scenario in which individuals, even when they are called agents, are mere spectators of their security and the conditions that allow them to develop their capabilities. The capabilities approach seems to be the palliative that the coercive State

needs to convince voters that their security precedes their dignity (Ballerin & Bergh, 2021). Such a relationship is substantial, since dignity would be closer to freedom as a practical execution, even if it were established at minimum thresholds. On the other hand, security is inherent to the coercion of the State itself, which must be limited rather than opened up. If the State is coercive to guarantee security at best, then individuals in the development of their capabilities must limit the punitive initiatives and corrosive strategies that the State in its inefficiency in the provision of justice reaches when it dictates who should or should not be prosecuted, tried, or convicted. The capabilities approach focuses its attention on minimum thresholds of dignity and does not intend to solve the problem of distribution of resources and functions among people. The capabilities approach refers to minimum levels of personal dignity that can only emerge from the thresholds of state security (Allen, Metternicht & Wiedmann, 2017). Precisely, the capabilities approach seems contemplative in the face of the omnipresence and ubiquity of the State versus the individual responsibility for the development of capabilities or practical freedoms. Neither the State nor the individual seem to assume thresholds of responsibility that allow them to modify the relationship between the state gendarme that allows the development of individual capabilities only because such intervention results in practical reasoning. Such state and individual lightness, in Kundera's proposal (1984), would be resolved with the specific weight of responsibilities that anchor people and governments in a concrete and less symbolic purpose related to dignity. After security and capabilities, functioning and affiliation seem to be two underlying and collateral categories that seem to recall the importance of responsibility as an imperative of the consequences of decisions and actions. However, the discussion between Nozick, Rawls, Sen and Nussbaum are Top Down perspectives where decisions are established from the State (Günzel-Jensen *et al.*, 2020). A different approach is Bottom up from the bottom up with a high participation in public affairs. Therefore, the objective of this work was to compare the Top Down theory with the Bottom up perspective in order to establish the capacities related to the SDGs. Are there significant differences between the capabilities defined by a Top Down theory with respect to these emerging categories in the Bottom Up perspective?

This paper is based on the assumption that the Top Down perspective is distinguished from the Bottom Up perspective precisely in the concept of capabilities. Therefore, differences are expected even within Top Down theories.

Method

Design. A psychometric, confirmatory, cross-sectional and correlational study was conducted with a sample of 100 students selected for their affiliation with institutions committed to the SDGs as vocational training guidelines. **Instrument.** The Bottom Up Scale was used (see appendix A). It includes dimensions related to 1) freedom, 2) justice, 3) equity, 4) capabilities and 5) satisfaction. Reliability reached values above the minimum required of 0.60 with alphas and omegas between 0.762 and 0.780. Sphericity was significant and adequacy exceeded the minimum required of 0.60 with a KMO value of 0.760. Validity ranged between 0.345 and 0.547. **Procedure.** A communication of the project's objectives, responsibilities and functions was distributed via email to the sample surveyed. They were sent a letter to attend a focus group with the purpose of homogenizing the concepts of freedom, justice, equity, capabilities and satisfaction. They were invited to the Delphi study to evaluate the reagents and collect comments. The survey was applied at the facilities of the public university. **Analysis.** The coefficients of reliability, adequacy, sphericity, validity, adjustment and residual were estimated in order to contrast the null hypothesis regarding significant differences between the theoretical structure known as Top Down and an empirical study from the Bottom Up logic.

Results

The analysis of the factorial weights reveals the latent factors. The values exceed the threshold of 0.300 to consider the construct validity. The residual analysis indicates the degree of adjustment of the observed structure with respect to the empirical structure. The findings show significant values between half of the measurement errors, which indicates

the prevalence of one substructure over the other. In the case of the intercept analysis, which indicates the prediction of the factorial structure, the values were significant. On the other hand, the covariance and residual matrices reach values greater than one, which indicates the non-inclusion of other factors and indicators in the model. Finally, the analysis of the covariance matrix between the selected indicators includes a diagonal of zero, which indicates the non-inclusion of more variables in the model. Structural analysis of the relationships between factors, indicators and measurement errors suggests the parsimony of the model. The findings show three Heywood cases that suggest the reduction of the model to three indicators with their two respective factors.

The fit and residual values [$\chi^2 = 73.252$ (9gl) $p > 0.001$; GFI = 0.976; MFI = 0.725; RMSEA = 0.212] suggest the non-rejection of the null hypothesis regarding significant differences between the theoretical structure and the structure empirical. That is, there are differences between the Top Down approach and the Bottom UP perspective, although only two of the five possible factors are confirmed.

Discussion

The contribution of this work to the state of the art lies in the comparison between the factorial structure of the theoretical perspective known as Top Down with respect to the approximation considered Bottom Up. The results suggest the non-rejection of the null hypothesis relative to the differences between the perspectives, although it was only possible to confirm two of the five factors analyzed. The concept of freedom and equity is crucial in the context of the Sustainable Development Goals (SDGs). The National Strategy on Equity and Gender Equality emphasizes the importance of the idea that every individual should have equal opportunities (Nagati *et al.*, 2023). Equity, justice and the SDGs are interconnected, with justice being a key component in achieving equality, liberty and fraternity. Peace is also highlighted as a fundamental precondition for social and economic development, emphasizing the need for a peaceful environment to work towards equity and freedom. In the pursuit of sustainable development, organizations focus on enabling sustainable growth through strategic initiatives and partnerships that promote diversity and equity (Zhou *et al.*, 2023). The Sustainable Development Imperatives highlight the importance of needs, equity, and limits in guiding policymaking for a sustainable future. Intergenerational equity is also highlighted as a key indicator of sustainable development, and renewable energy plays a crucial role in achieving this goal. Furthermore, the link between human rights, climate change and sustainable development is highlighted, with efforts to limit the effects of climate change being necessary to achieve equity and poverty eradication (Mara, 2018). The commitment to achieving equity and opportunity through sustainable corporate practices further underscores the importance of incorporating these values into business strategies. In conclusion, the literature reviewed highlights the interconnection of freedom, equity and the SDGs in the pursuit of sustainable development. By prioritizing justice, peace and diversity, organizations and policymakers can work towards a more equitable and sustainable future for all people, leaving no one behind in the pursuit of health and well-being. Unlike the State of the art, which emphasizes the link between freedom and equity in relation to the SDGs from the perspective of organizations, this work demonstrated that the Bottom-up approach confirms the relationship between freedom and equity from a scenario of adoption of the SDGs. Therefore, the area of opportunity of this work lies in the extension of the sample in order to confirm the theoretical structure, as well as the exclusion of the reagents that measure the unconfirmed factors.

Conclusion

The objective of this work was to compare the theoretical structure known as Top Down with respect to the observation of a structure defined as Bottom up. The results confirm two of five factors and suggest the non-rejection of the null hypothesis regarding the differences between both structures in the context of the implementation of the SDGs in a public university in central Mexico. In relation to the consulted literature where the relationship between the two factors of booklet and equity is highlighted, this work suggests an external study in order to confirm the five theoretical factors reported in the state of the art.

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Annex A

Instructions:

Below you will find a series of statements. For each one, mark the level with which you agree, using the following scale:

1. Totally disagree
2. Disagree
3. Neutral
4. Agreed
5. Totally agree

Section 1: Justice and Freedom (Robert Nozick's Theory)

1. People should be free to accumulate and use their resources without interference from the State.
2. Justice is guaranteed when private property is protected without redistributing it.
3. Government intervention in the redistribution of resources reduces individual freedom.
4. The State should limit itself to protecting basic rights, such as private property and contracts.
5. There should be no redistribution mechanism to correct economic inequalities.

Section 2: Equity and Distributive Justice (John Rawls' Theory)

1. Social and economic inequalities are only fair if they benefit the least favored.
2. A fair system must ensure that all people have equal opportunities.
3. The State must intervene to correct the natural or social disadvantages of people.
4. Justice implies that resources and opportunities should be distributed equitably.
5. Access to education and health must be guaranteed for all, regardless of social or economic origin.

Section 3: Capabilities and Human Development (Amartya Sen's Theory)

1. True freedom is having the ability to live a life I value.
2. Beyond income, it is important that I am given opportunities to develop my skills and talents.
3. Public policies should focus on improving people's quality of life and real opportunities.
4. The well-being of a society is measured by the ability of its citizens to participate fully in social, political and economic life.
5. The distribution of resources is only a means to improve people's capabilities, not an end in itself.

Section 4: Core Capabilities (Martha Nussbaum's Theory)

1. The State must guarantee that all individuals have access to health, education and employment to live with dignity.
2. A dignified life includes actively participating in political decisions that affect my community.
3. People must have the freedom and ability to develop physically, emotionally and socially.
4. Women and minorities must be guaranteed equal rights and opportunities to develop their capabilities.
5. My personal well-being depends not only on material goods, but on opportunities to enjoy a full and meaningful life.

Section 5: Gender Equity and Social Justice

1. Access to opportunities must be equal for men and women, regardless of context.
2. Public policies should focus on eliminating barriers that prevent gender equality in all areas.

3. Social justice means ensuring that all marginalized groups have equitable access to resources.
4. The well-being of a society is achieved when all citizens, regardless of gender or social class, can participate in decisions that affect them.
5. Quality education for all is essential to building a fair and equitable society.

Section 6: Satisfaction with Justice and Capabilities in Today's Society

1. I believe that in my country people have enough freedom to develop their abilities without interference.
2. Current policies are effective in ensuring equity among different social groups.
3. Access to health and education is well distributed among all sectors of the population.
4. Public policies promote comprehensive human development that goes beyond economic growth.
5. Justice and equity in my country are reflected in the ability of everyone to participate fully in society.

Interpretation of the instrument:

- Section 1 (Nozick): Seeks to measure the perception of negative freedom and the non-intervention of the State in the redistribution of resources.
- Section 2 (Rawls): Evaluates the perception of distributive justice and the principle of equity.
- Section 3 (Sen): Assesses the understanding and importance of capabilities as a basis for real freedom and human development.
- Section 4 (Nussbaum): Measures the perception of the need to ensure a list of core capabilities for all individuals.
- Section 5: Explores perceptions on gender equity and social justice within the capabilities framework.
- Section 6: Evaluates respondents' satisfaction with the current state of justice and human development policies in their society.

Appendix B

```
# Install required libraries
!pip install factor_analyzer

# Import the libraries
import pandas as pd
from factor_analyzer import ConfirmatoryFactorAnalyzer, ModelSpecificationParser
import numpy as np

# Upload the file (already uploaded in your case)
file_path = '/path_to_your_file/SEM CFA Capabilities.ods'
data = pd.read_excel(file_path, sheet_name='Sheet 1')

# Select the variables that belong to the theoretical dimensions
# Adjust these variables according to the factors you want to analyze
justice_vars = ['justice1', 'justice2', 'justice3']
liberty_vars = ['liberty1', 'liberty2', 'liberty3']
equity_vars = ['equity1', 'equity2']
capability_vars = ['capability1', 'capability2', 'capability3']
satisfaction_vars = ['satisfaction1', 'satisfaction2', 'satisfaction3']

# Combine the variables into a single dataset for the CFA
cfa_data = data[justice_vars + liberty_vars + equity_vars + capability_vars + satisfaction_vars]

# Define the model based on the theoretical dimensions
model_dict = {
    'Justice': justice_vars,
    'Liberty': liberty_vars,
    'Equity': equity_vars,
    'Capability': capability_vars,
    'Satisfaction': satisfaction_vars
}

# Convert the model to a structure compatible for analysis
```

```
model_spec = ModelSpecificationParser.parse_model_specification_from_dict(cfa_data, model_dict)
```

```
# Create the CFA model
```

```
cfa = ConfirmatoryFactorAnalyzer(model_spec, disp=True)
```

```
cfa.fit(cfa_data)
```

```
# Get CFA results
```

```
loadings = cfa.loadings_
```

```
print("Factor loadings:\n", loadings)
```

```
# Check model fit
```

```
print("Chi-square of model:", cfa.chi_square_)
```

```
print("Degrees of freedom:", cfa.df_)
```

```
print("p-value:", cfa.p_value_)
```

```
print("RMSEA:", cfa.rmsea_)
```

```
print("CFI:", cfa.cfi_)
```

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