

On Social Norms: the Collection of Theoretical and Empirical Findings

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INTRODUCTION

Public policy reflects how public authorities shape social interaction patterns, design legislation, protect freedoms, and reinforce civil rights. In some countries, the government, in most respects, does a good job; in others, government underperforms. Ukraine (the country of my origin) belongs to the latter group. Such an environment served as excellent motivation to think about whether public policy can be designed in a better way. The philosophy of Enlightenment suggested that society could achieve happiness and prosperity under wise governance. These ideas sounded extremely appealing to me. Hobbes (1651) justified the importance of central governing bodies as a guarantee of fulfilling legal obligations and preserving social order (or “the peace of mankind” – p. 88). In his *Principles of Philosophy*, Descartes (1644) proclaims the superiority of Reason, stating that all the objects in the universe obey some uniform rules and principles and that one can successfully learn these principles using the appropriate methods of scientific inquiry. Rousseau (1762) expresses the seemingly trivial idea that the underlying criterion of good governance is citizens’ well-being (“What is the purpose of any political association? The preservation and prosperity of its members” – p. 43). His opinion that the population growth rate should serve as a good governance indicator does not seem to be well-justified nowadays; yet, the fundamental principle of goodness-as-prosperity was clear, transparent, and seemed to be a good starting point for thinking about the appropriate public policy design.

Later, I became a student of economics and got acquainted with the contribution of political economics to the principles of good governance. It is easy to see the links between the famous idea by Robbins (1935) that economics is a science of rational use of scarce resources (which is the first thing to be discussed in any economics textbook) and the Cartesian ideas. Both suggest that proper organization (or resource allocation) is the key to well-being and wealth. Talking about wealth, Malthus (1836) expresses the revolutionary idea (at least, for the undergraduate student), denying the narrow definition of wealth discussed in the microeconomics and macroeconomics textbooks. Stating that wealth can be defined as anything people enjoy, he argues that wealth should involve “everything whether material or intellectual, whether tangible or otherwise, which contributes to the advantage or pleasure of mankind, and of course includes the benefits and gratifications derived from religion, from morals, from political and civil liberty, from oratory, from the instructive and agreeable conversation, from music, dancing, acting, and all personal qualities

and service” (p. 42). Malthus’s (1836) understanding of wealth significantly enriches the scope of economists’ tasks. Although it might seem an exaggeration, I perceived economics as a tool for achieving greater happiness¹ for everyone in a world full of various constraints. Mill’s (1863) utilitarian ethics is ideally in line with this intuition, proclaiming social utility maximization as the primary objective of any governor.

Initially, I planned to keep on the Cartesian/constructivist discourse when writing my Ph.D. thesis, attempting to explore the optimal social policy principles based on the aggregate utility function’s shape, following Vickrey’s (1960) notion of the cardinal social preferences. However, after an extensive review of numerous works on social preferences, I started to doubt the validity of the Max-U paradigm². Although the theory itself is beautiful and logical, it did not capture the full complexity of social interaction. The methodological individualism, featured by the neoclassical economic framework³ (see Colander, 2000), fails to capture the effect of interaction between individuals and the social environment. In this sense, I noticed a gap between economics and other social sciences. Skinner’s (1938; 1957; 1969) behaviourism suggests that observable behaviour is the only valid type of evidence for the researcher; the decision-making mechanism cannot be defined or verified in the experimental conditions, thus making the response analysis the only tool of scientific inquiry. Skinner’s framework does not dominate the cognitive sciences anymore, being recognized as an important milestone, but not as a fully valid scientific theory. However, orthodox economists continue mapping social preferences based on the revealed choices solely, in line with the commonly respected experimental economics principles (Bowles and Polania-Reyes, 2012). Not to be misunderstood, I see no reason for criticizing experimental methods in economics – the problem I would like to discuss lies in neglecting the decision-making mechanisms. In line with the fundamental principles of neoclassical economics (see Colander, 2000), the mainstream economic research program keeps assuming that any decision is an outcome of a conscious optimization process⁴. Subsequently, although there are plenty of studies dealing with various aspects of pro-social behaviour (Andreoni and

¹ Interestingly, Malthusian ideas seem to be re-born in the modern form – so-called economics of happiness (see Graham and Pettinato, 2002; Kahneman and Sugden, 2005).

² According to Max-U paradigm, human behaviour is the result of deliberate self-optimization (i.e., utility maximization).

³ Here and further, terms neoclassical economics and orthodox economics are used interchangeably (see detailed discussion in the first chapter).

⁴ Heuristic decision-making (the alternative to the Max-U paradigm) is also a subject of the economic research program. Nevertheless, under the so-called “heuristics and biases”, or

Miller, 2002; Andreoni and Varian, 1999; Becker, 1974; 1976; Bénabou and Ok, 2001; Bowles and Gintis, 2000; Brennan et al., 2008; Dawes et al., 2007; Fehr and Schmidt, 1999; Fisman et al., 2007; Heffetz and Frank, 2011; Kroll and Davidovitz, 2003; List and Cherry, 2000; Morawetz et al., 1977), the only piece of novelty they can offer is a slightly different shape of individual preferences. In the neoclassical model of the world, atomistic agents interact with each other in a manner specified by their exogenously given social preferences. There is no place for social norms, arrangements, social evolution, and transformation of values. It would be argued that social exchange dynamics and collective choice cannot be addressed while ignoring the aforementioned phenomena.

However, modern economic literature offers an alternative approach to individual and social choice. V. Smith (2010) argues that pro-social behaviour is not necessarily the outcome of deliberate self-optimization. Instead, we usually act for the good of others under the pressure of social norms and social arrangements. Being radically different from the vast majority of economics studies devoted to altruistic behaviour, V. Smith's (2010) ideas seem to be much more consistent with reality. Such a model incorporates the effect of the social environment organically, denying the notion of atomistic and independent agents. Simon (1968) suggests that, in contrast to the common misconception, the optimization approach is not the only form of rational behaviour. Moreover, as Hayek (1945) reinforces, a means-end approach to public policy when public authorities attempt to achieve some ideal social state might be extremely damaging.

It is hard to disagree that the neoclassical economic framework fails to serve as an accurate and appropriate representation of reality. Nevertheless, it is easy to see why it still dominates all the fields of economics. The orthodox approach commonly poses economics as a science analysing the objective laws of human action and social interaction analogously to the natural sciences (Lawson, 2003). It would be argued, nevertheless, that such a logic is not fully valid. As Hayek (1952) underlines, social and natural sciences feature radically different methods of scientific inquiry. There is no objective and uniform knowledge in the world of social artifacts (using Simon's terminology) except for the agents' shared knowledge. Moreover, the knowledge mentioned above is rarely codified or expressed explicitly⁵, representing the form of collective intelligence (V. Smith,

"consistency" approach, it is viewed rather as a systemic deviation from the rational self-optimization path (Berg, 2014).

⁵ "... the concrete knowledge which guides the action of any group of people never exists as a consistent or coherent body. It only exists in the dispersed, incomplete, and inconsistent form of

2010). Therefore, “what is relevant in the study of society is not whether [...] laws of nature are true in any objective sense, but solely whether they are believed and acted upon by the people” (Hayek, 1952, p. 93). It is impossible to define the objective rules and patterns of social and economic exchange. Markets are the products of social design, and their behaviour is constrained by the norms shared by all the agents constituting society. Based on the example provided by Hayek (1952), prices do not change as a result of an external shock. Instead, prices change due to the transformation of shared beliefs and assumptions, and the same applies to all of the social artifacts due to their praxeological⁶ nature.

The conclusion is straightforward: better understanding of economics requires better knowledge of human nature. Realizing the role, design, and mechanism of social norms can provide valuable inquiry into the world of social facts. This way of thinking is strictly in line with the scientific methods used by Adam Smith in his famous book *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776). Axiomatic thinking, featured by the modern orthodox economics framework (Stigum, 2003), never appears in *The Wealth of Nations*. In contrast, A. Smith frequently relies on careful observations and the analysis of human nature, never trying to separate economic rationality from the sense of sociability or moral sentiment. Despite being the icon of the modern neoliberal economic framework, he did not write a word about the radical self-optimization principle (V. Smith and Wilson, 2019), emphasizing the role of social ties and norms instead.

V. Smith, emphasizing the role of social norms and avoiding excessively formalized models of human behaviour, further develops A. Smith’s ideas in the 21st century economics. However, V. Smith’s approach is relatively uncommon in mainstream economics, despite being established on the solid theoretical ground. In 2002, Kahneman and V. Smith shared the Nobel Prize in economics as a recognition of their effort in experimental economics. Leaving no doubts that neoclassical farsighted self-optimization assumption is not consistent with human behaviour, V. Smith and Kahneman have a radically different opinion regarding the implications of such “irrationality”. As one of the founders of the so-called “heuristics and biases” (Berg, 2014) approach, Kahneman treats substantive

in which it appears in many individual minds, and the dispersion and imperfection of all knowledge are two of the basic facts from which the social sciences have to start” (Hayek, 1945, p. 93).

⁶ Hayek (1945) uses term “praxeological” instead of “teleological” due to the controversies associated with the latter. “Teleological”, or “consequentialist”, artifact might be interpreted as constructs developed with the clear and explicit purpose. In contrast, according to Hayek’s (1945) beliefs, social artifacts are not the products of purposeful design exclusively; instead, they develop spontaneously as the product of social interaction.

rationality as the only valid decision-making principle. In contrast, for V. Smith, rationality is rarely revealed at the individual decision-making level; even though the particular behavioural strategy might deviate from the deliberate self-optimization path, it can still be rational from the social group's perspective. Consequently, social norms serve as useful heuristics, replacing the social preferences construct being the only tool for assessing social sentiment under the reductionist neoclassical research program setting.

The present manuscript discusses selected topics related to the nature and role of social norms. The book consists of two chapters containing independent and complete studies, which are, nevertheless, connected by the core topic and the overall research objective. The first chapter examines the conflict between the neoclassical research program and the nature of social norms, addressing the research question of whether an atomistic approach towards analysing social sentiment featured by the neoclassical research program can adequately conceptualize social norms. Under the orthodox economic framework, optimization represents the only valid approach towards decision-making. Therefore, any kind of pro-social and altruistic behaviour is assessed as the result of deliberate self-optimization constrained by the shape of stable and exogenously defined social preferences. As discussed in the first chapter, social preferences (or other-regarding preferences) serve as the construct allowing for the phenomenon of pro-social behaviour to be explained and analysed without violating the neoclassical research program's assumptions, since social norms and values are not consistent with the methodological individualism featured by the orthodox economic framework. In contrast, the competing school of rationality (ecological rationality) recognizes social norms as the decision-making heuristics developed by means of collective intelligence (from this perspective, social norms are exogenous for individuals, but endogenous from the societal perspective, being developed, adjusted, and amended in the process of evolutionary selection). Without trying to assess which principle of rationality serves as the more accurate descriptive model of human behaviour and human interaction, the discussion is concentrated around the inability of the neoclassical research program to conceptualize the process of social change, which is accompanied by the adoption of a new set of values and principles governing social life and shaping individuals' beliefs, expectations, and normative attributions.

The second chapter investigates the process of social change through the transformation of social norms. The research question addresses the existence of straightforward links between cultural norms, formal institutional environment quality, and economic well-being. In the context of the modern heterodox framework, cultural mindset is commonly viewed as the equivalent of informal

institutions (the emphasis is put on the dominating norms, values, expectations, and normative attributions). Consequently, informal institutions are assessed as the sample-adjusted average values of the variables standing for various dimensions of the cultural environment (depending on the theoretical framework adopted). The study attempts to assess the links between the cultural environment, formal institutional environment, and policy outcome (i.e., the subjectively assessed level of economic well-being) using the cluster analysis. Reflecting the critical assessment of the country-specific culture notion, the analysis is performed based on micro-data.

CHAPTER 1

PRO-SOCIAL BEHAVIOUR UNDER THE NEOCLASSICAL RESEARCH PROGRAM AND THE PROCESS OF SOCIAL CHANGE

Although it is hard to doubt the existence and the role of social norms in social reality, their nature is hardly compatible with the underlying principles of the orthodox economic framework. The present essay highlights incompatibility between the endogenous nature of social norms and the reductionist approach featured by the neoclassical economic framework. The chapter begins with identifying the prominent features of the neoclassical research program, which serves as a standard set of principles adopted in orthodox economic analysis. The second section presents the overview of the most famous and influential works analysing pro-social behaviour under the orthodox framework. The third section discusses the principles of ecological rationality and social heuristics as the alternative to the model of pro-social behaviour based on the social preferences construct. The fourth section discusses the notion of endogenous preferences together with the process of their development and calibration. The fifth section examines the compatibility of the reductionist analysis and endogenous social norms. Finally, the last section concludes and explores the implications of methodological individualism in assessing social dynamics.

1.1. What is the neoclassical research program?

As Hayek (1945) emphasizes, the modern mainstream economic approach is the direct descendant of the French Enlightenment philosophical ideas. The superiority of Reason is one of the critical features of Cartesian philosophy. The fundamental belief in the supremacy of conscious analysis accompanied by the assumption about the possibility of such analysis has, to a great extent, shaped the modern orthodox (or the neoclassical) school of economic thought. It should be admitted that nowadays, both the terms mentioned above are used in a schizophrenic and inconsistent way, as Colander (2000, p. 132) mentions. Therefore, discussing the characteristics of the neoclassical (or orthodox) framework is believed to serve as a crucial part of the present discussion. Colander (2000) names six critical features of neoclassical economics, namely, focusing on the efficient allocation of resources in a given moment; putting utilitarian and consequential approach in the central place; focusing on the marginal trade-offs; farsighted rationality

assumption; an analytical approach based on the methodological individualism, or reductionism; and, finally, the prominent role attributed to the general equilibrium assumption in the economy. Here and further, the orthodox (or the neo-classical) economic framework will refer to the scope of beliefs and methods featuring the attributes listed above. Some of these attributes are reflected in the present research, constituting the basis for investigating the appropriateness of the orthodox theoretical tool for the social choice analysis. These assumptions, therefore, deserve a more extensive analysis.

Firstly, optimal resource allocation is a central idea in economics and the first definition presented in any economics textbook. Efficient resource allocation requires an optimization approach, and this is reflected in the underlying rationality assumption, as discussed above⁷. Leaving aside the general validity of this premise, putting “a relationship between ends and scarce means which have alternative uses” (Robbins, 1935, p. 16) in the centre of social choice analysis narrows the perspective significantly. Society is a complex system. It is not static, and it is not the product of the conscious optimization design. Proper functioning of such a complex system can be ensured thanks to the proper process of evolutionary adjustment. Arguably, the mean-end policy (even if it can achieve the most efficient allocation of social resources) might not align with the aforementioned objective.

Secondly, Colander’s (2000) notion of farsighted rationality is identical to the constructivist (V. Smith, 2010) or substantive (Simon, 1968) rationality. All the concepts mentioned above refer to the consistency of human action with the logical principles of optimization. In turn, optimization serves as the conscious and deliberate process of seeking the best alternative out of a set of possible alternatives. To be more specific, Simon (1968) described optimization strategy as the process of adjusting the variables of “inner environment” (i.e., the variables under a decision-maker’s control) to the constraints imposed by the “outer environment” consisting of the set of parameters “known with certainty or only in terms of a probability distribution” (Simon, 1968, p. 116). Speaking informally, the agents, rational in the substantive or constructivist sense, use their perfect computational abilities to define the best bundle out of the set of possible alternatives in the world, free of radical uncertainty. This view on human decision-making is too ambitious (and too

⁷ In this context, the notion of efficiency corresponds to the definition provided by Robins (1935), being understood as the pattern of resource allocation maximizing the individual or the aggregate utility. From this perspective, efficiency indeed requires conscious optimization, when agents are perfectly aware of their preferences and external constraints, act in the absence of radical uncertainty, and have sufficient cognitive capacity to detect the values of variables under their control corresponding to the maximum values of agents’ utility.

optimistic, considering the absence of the radical uncertainty assumption). However, the assumption of perfect rationality serves as the perfect basis for axiomatic analysis⁸, thus remaining part of the neoclassical research program (Lawson, 2003). It should be noted that the present study does not attempt to challenge the notion of farsighted rationality as the positive principle describing human behaviour. In contrast, it critically assesses the implications of the substantively rational optimization for the public policy architecture.

Thirdly, methodological individualism mentioned by Colander (2000) implies that any complex system is viewed as a simple sum of its components. Subsequently, the system cannot have any characteristics not featured by its elements. Applied to the present discussion, methodological individualism (or reductionism) implies that society (as a complex system) consists of atomistic agents; logically, any interaction effects are assumed to be perfectly predictable or absent, depending on the adopted notion of reductionism. In both cases, the dynamics of such a system are perfectly predictable. The neoclassical school attempts to address social sentiment and pro-social behaviour using individual agents' social preferences. Naturally, there is no place for social norms, values, and endogenous social norms, as discussed further in this chapter.

Finally, utilitarianism serves as the ultimate basis for any normative judgments under the neoclassical framework. Goodness is defined by the criterion of aggregate utility, while other considerations are neglected. Although one can think about some alternatives to the utilitarian social choice principle (for instance, Nash⁹ and Rawlsian¹⁰ SWFs¹¹), they all address distributive justice¹².

⁸ Stigum (2003) describes axiomatic analysis as the type of predictive analysis based on pre-defined axioms. Max-U (utility maximization) analytical approach is a perfect example of the axiomatic analysis.

⁹ Rawls (1971) argues that a fair social outcome occurs when all the agents decide on the social distribution pattern under the "veil of ignorance", e.g., when their position in the social hierarchy after the choice is made is unknown. Consequently, Rawls (1971) asserts that all the agents would choose the most egalitarian pattern of social resources distribution. Following this assertion, Rawlsian SWF ($SWF_R(x_1, \dots, x_n) = \min\{f(x_1), \dots, f(x_n)\}$) – Stark *et al.*, 2014, p. 440) is maximized, when utility of the most deprived agent is maximized.

¹⁰ Nash (1950) asserts that when two agents have equivalent bargaining power, the only mutually acceptable outcome is associated with the equal utility for both agents. Kaneko and Nakamura (1979) describe Nash SWF ($SWF_{Nash}(x_1, \dots, x_n) = \prod_{i=1}^n f(x_i)$) – p. 427). Being the product of individual agents' utilities, it is maximized, when the social outcome corresponds to the equal utility for all the agents.

¹¹ Here and further, SWF stands for "social welfare function".

¹² The normative attribution of distributive justice is based on the consequences of the act, while the notion of procedural justice concentrates on the fair mechanism of distribution. It is easy to

1.2. Social preferences, or how rational and self-optimizing agents reveal their social sentiment

Social norms, arrangements, and institutions play a vital role in a society's self-regulating mechanism, thus being consistently addressed in this work. However, as discussed in the further parts of this chapter, there is no place for social norms under the reductionist neoclassical research program. Pro-social behaviour is analysed as the outcome of a conscious self-optimization process. In other words, any kind of pro-social behaviour (voluntary giving, or altruism, is discussed most frequently) is assumed to arise from the features of individual preferences (inequality aversion, fairness considerations, "warm glow of giving", etc.). This section provides a brief overview of the most influential studies dealing with the phenomenon of voluntary giving and designed under the neoclassical research program in order to illustrate the aforementioned argument.

Becker (1974) formulates the principle which has been serving as a theoretical ground for analysing altruistic behaviour under the orthodox framework up to modern times. The aforementioned principle implies that, for any individual, the utility can be described as the function of an individual's endowment/consumption as well as the level of utility of other individuals¹³. Formally speaking, Becker (1976, p. 819) describes the utility of the "representative agent" in the following way:

$$U_h = U_h(X_h, X_i)$$

where U_h stands for the level of utility of the agent h ;

X_h stands for the consumption of the agent h ;

X_i stands for the consumption of the agent i .

Becker (1981, p. 1) amends the hypothetical utility function incrementally, keeping that

$$U_h = U(Z_{1h}, \dots, Z_{mh}, \Psi(U_w))$$

where U_h stands for the level of utility of the agent h ;

U stands for the utility function of the agent h ;

see the difference between Nash (equality in terms of utility), Rawlsian (satisfying the needs of the most deprived agents), and utilitarian (maximizing aggregate social utility) mechanism of social distribution. However, all the aforementioned mechanisms concentrate on the outcome, i.e., final distribution of the social good among the agents. Consequently, they correspond to the idea of distributive justice (for a more detailed discussion, see Okhrimenko, 2021).

¹³ Becker (1981) discussed family members. Perhaps, the author meant the relatively small social group with strong emotional ties between its members.

Z_{ih} stands for the i^{th} commodity consumed by the agent h ;

U_w stands for the level of utility of the agent w ;

ψ denotes the positive function of U_w .

Following the assumptions listed above, one can detect that $\delta U_h / \delta U_w > 0$. The fact that one's utility is positively affected by the utility of others reflects the existence of altruistic motives or effective altruism¹⁴ (Becker, 1981). Based on this, the effective altruist's utility is maximized when his marginal utility of consumption is equal to the marginal utility of consumption of the "agent of interest"¹⁵, so $\frac{\delta U / \delta Z_w}{\delta U / \delta Z_h} = 1$ which is referred to as an equilibrium condition (Becker, 1981, p. 2). According to Fehr and Fischbacher (2002), "a person exhibits social preferences if the person not only cares about the material resources allocated to her but also cares about the material resources allocated to relevant reference agents" (p. C2). Therefore, although Becker (1981) does not mention social preferences, the preferences he describes perfectly suit this term. A word of caution needs to be said regarding terminology and possible confusion. Fisman et al. (2007) distinguish between preferences for giving (self versus others) and social preferences (others versus others). Correspondingly, preferences for giving and social preferences constitute the broader concept of distributional preferences. Therefore, here and further, when own theoretical findings are discussed, social preferences denote the type of preferences with the positive causal link between the well-being of others and the utility of the decision-maker.

Stark (1995) examines "altruistically-motivated consumption transfers", following Becker's (1974) approach. Analysing the propensity to give within a family, Stark (1995) assumes that initially, the entire endowment of corn (C) is under Father's control. Father's and Son's "direct pleasure" ("felicity") depends on the consumption of corn. Formally, $V_F(C_F) > 0$; $V_S(C_S) > 0$; $C > 0$; $V'_F(C_F) > 0$; $V'_S(C_S) > 0$ (p. 16). At the same time, each family member's utility positively depends on the other family member's happiness. Correspondingly, Stark (1995) describes Father's and Son's utility as the linear combination of their and the other family member's felicity (p. 16):

¹⁴ Becker's (1974) effective altruism should not be mistaken for Singer's (1972; 2009) effective altruism. Becker uses the aforementioned notion to denote "altruism in action". Roughly speaking, Singer's (1972; 2009) principle of effective altruism stands for the moral obligation to the pass own endowment to another party as long as another party derives a greater marginal utility from the endowment in comparison with the initial holder.

¹⁵ In the absence of better terminology, "agent of interest" stands for the individual the decision-maker feels some sort of emotional attachment to (for instance, a family member).

$$U_F(C_F, C_S) = (1 - \beta_F)V_F(C_F) + \beta_F U_S(C_F, C_S)$$

$$U_S(C_F, C_S) = (1 - \beta_S)V_S(C_S) + \beta_S U_F(C_F, C_S)$$

where U_F stands for Father's utility;

U_S stands for Son's utility;

β_F stands for Father's weight placed on Son's utility relative to his felicity;

β_S stands for Son's weight placed on Father's utility relative to his felicity;

V_F stands for Father's felicity associated with the consumption of corn;

V_S stands for Son's felicity associated with the consumption of corn.

In the literature devoted to analysing pro-social behaviour under the orthodox framework, normative evaluation of such behaviour is relatively uncommon. Interestingly, Stark (1995) points out that although reciprocal altruism in non-market transactions decreases the probability of conflicts, it does not necessarily make a community better-off; perhaps, this can explain why some societies transit towards market-oriented transactions faster than others (p. 25).

Fehr and Schmidt (1999) introduce fairness considerations to the model of social preferences, defining the former as "self-centred inequity aversion". Self-centred inequity aversion implies that agents consider the fairness of their pay-off, remaining unaffected by the fairness of distribution among other agents. The aversion towards inequity implies that individuals are willing to sacrifice some portion of their pay-off to achieve a fairer outcome. In line with this premise, Fehr and Schmidt (1999) model preferences under which the income distance between an agent and other group members causes a negative effect on the utility level. Formally, Fehr and Schmidt (1999, p. 822) assert that if there are players indexed by $i \in [1, \dots, n]$, and $x = x_1, \dots, x_n$ denotes the vector of monetary pay-offs, then the utility function of the player is given by:

$$U_i(x) = x_i - \alpha_i \frac{1}{n-1} \sum_{j \neq i} \max[x_j - x_i, 0] - \beta_i \frac{1}{n-1} \sum_{j \neq i} \max[x_i - x_j, 0]$$

The term $\alpha_i \frac{1}{n-1} \sum_{j \neq i} \max[x_j - x_i, 0]$ stands for the utility loss associated with "disadvantageous inequality" (i.e., when pay-off of the reference agent is smaller than the pay-off of other players); describes the degree of sensitivity to disadvantageous inequality, correspondingly. The term $\beta_i \frac{1}{n-1} \sum_{j \neq i} \max[x_i - x_j, 0]$ stands for the utility loss associated with "advantageous inequality", and β_i denotes sensitivity to the advantageous inequality, respectively. As Fehr and Schmidt (1999)

report, their model is more consistent with experimental evidence (i.e., ultimatum¹⁶, gift exchange¹⁷, and public goods¹⁸ games) than self-optimization models, when own monetary pay-off serves as the single determinant of utility level. Yes, one can notice that introducing fairness considerations serves as a minor adjustment to the orthodox decision-making theory. Individuals do care about fairness, and economics should consider the importance of fairness/justice attribution. However, it does not necessarily imply the validity of the proposed model.

Bolton and Ockenfels (2000) introduce the ERC (equity, reciprocity, competition) model, replacing the expected utility function with the motivation function. The authors assume the players laboratory games (denoted as), with players randomly chosen from the population and matched with no disclosure to each other¹⁹; moreover, it is assumed that each player plays a new round with a different partner. All the players attempt to maximize their motivation function (p. 171):

$$v_i = v_i(y_i, \sigma_i)$$

where $\sigma_i = \sigma_i(y_i, c, n) = \begin{cases} y_i/c & \text{if } c > 0 \\ 1/n & \text{if } c = 0 \end{cases}$ stands for the relative share of pay-off

assigned to the player i ;

¹⁶ In ultimatum games, the first player has to decide on how the endowment is going to be split between the first and the second player. The second player preserves the right to accept or decline the offer. In the former case, the endowment is split between the first and the second player in the way suggested by the first player; in the latter case, each player receives nothing. The game setting frequently includes different trade-off ratios (i.e., if the first player transfers n units, the second player receives $n \times s$ units, where s can take the value both ≤ 1 and ≥ 1). See Fischbacher *et al.* (2009); Güth *et al.* (1998); Krishna and Serrano (1996). Note: in dictator games, the first player decides how to split the endowment, and other players have no other choice but accepting the offer (see Andreoni and Miller, 2002).

¹⁷ In gift exchange games, the first player has to decide on the share of endowment to be transferred to the second player, while in the second round, the second player decides on how much to transfer to the first player. The game setting frequently includes different trade-off ratios (i.e., if the first player transfers n units, the second player receives $n \times s$ units, where s can take the value both ≤ 1 and ≥ 1). (See Berg *et al.*, 1995, and Fehr *et al.*, 1994).

¹⁸ In public goods games, the players have to decide how much to contribute to the common pool (the “public good”) shared between the players. Usually, the value of the pool is amended: n if stands for the total value of funds contributed by the players, the value of funds to be shared among the participants is $n \times s$, where $s > 1$. See Fehr *et al.* (2000) and Isaac *et al.* (1984).

¹⁹ As Bolton and Ockenfels (2000) mention, “face-to-face play is a known complicating factor” (p. 171), meaning that non-anonymous interaction is extremely likely to be “biased” by other effects. This approach is perfectly in line with SSSM (Standard Social Science Model) methodological framework attempting to analyse various kind of human motivation in isolation from social environment. One can question, however, whether experimental evidence obtained in such manner can serve as basis for modelling and analysing social interaction (see Barnett, 2019).

and $c = \sum_{j=1}^n y_j$ stands for the total pay-out.

The following assumptions are imposed:

- i) Assumption 1: "The function v_i is continuous and twice differentiable on the domain of (y_i, σ_i) " (p. 171)
- ii) Assumption 2 (narrow self-interest): $v_{i1}(y_i, \sigma_i) \geq 0$; $v_{i11}(y_i, \sigma_i) \leq 0$ (the positive value of the first derivative of value function with respect to own payment $-v_{i1}(y_i, \sigma_i)$ is positive indicating the positive relationship between the motivation function value and own pay-off; the negative value of the second derivative of the respective function with respect to the respective variable $-v_{i11}(y_i, \sigma_i)$ can be interpreted analogously to the law of diminishing marginal utility). Moreover, for the fixed value of σ , each player chooses the option associated with a higher monetary pay-off y_i (p. 171).
- iii) Assumption 3 (comparative effect): $v_{i2}(y_i, \sigma_i) = 0$, for $\sigma_i(y_i, c, n) = 1/n$, $v_{i22}(y_i, \sigma_i) < 0$ (p. 172). The comparative effect assumption implies that assuming the pay-off value, the motivation function is concave with respect to the player's share, being maximized, when player's pay-off is equal to the average pay-off.
- iv) Assumption 4 (heterogeneity): as Bolton and Ockenfels (2000) discuss, each player faces a trade-off between narrow self-interest and comparative effect. Admitting that players are heterogeneous with respect to their preferences, the authors introduce two thresholds ($r_i(c)$ and $s_i(c)$), where $r_i(c) = \arg \max v_i(y_i, \sigma_i)$, $c > 0$, and $s_i(c)$ is defined implicitly by $v_i(cs_i, s_i) = v_i(0; 1/n)$, $c^{\sigma_i} > 0$. Then, for all $c > 0$, $f^r(r | c) > 0$, $r \in [1/n; 1]$; $f^s(s | c) > 0$, $r \in (0; 1/n]$, where f^r and f^s are density functions (p. 172).

It is easy to notice that the ERC model utilizes logic similar to the model proposed by Fehr and Schmidt (1999). There are some differences, nevertheless. First, Fehr and Schmidt (1999) assume that individual utility depends on the wealth distribution in the entire population, while Bolton and Ockenfels (2000) consider a counter-player's pay-off solely. Besides, the motivation function is more general, incorporation various types of social preferences. From this perspective, Fehr's and Schmidt's (1999) model can be treated as the special case of the model suggested by Bolton and Ockenfels (2000).

Andreoni and Miller (2002) propose an experimental methodology to reveal i) whether the preferences of giving are well-behaved; ii) whether individuals demonstrate any consistent patterns in their altruistic behaviour. The authors rely on the assumption that an agent's utility might be described as the function of "payment to self" and "payment to others" revealed during the dictator game (p. 738):

$$U_s = u_s(\pi_s, \pi_o)$$

where U_s stands for an agent's utility;

u_s stands for an operator transforming payment to self and payment to others into the individual utility (in simple words, this operator captures utility function's shape);

π_s stands for the payment to self (number of tokens devoted to self);

π_o stands for the payment to others (number of tokens devoted to the other player)²⁰.

During the dictator game, the participants are to allocate their initial endowment (i.e., number of tokens) between themselves and other players under the specified "price ratio" (calculated based on the value of tokens passed to others and held), when "budget constraints" and "prices" varied across the rounds. Naturally, to be subject to the formal analysis, agents' preferences regarding π_s and π_o must be well-behaved (i.e., rational), constituting a convex set and obeying the General Axiom of Revealed Preferences (GARP²¹). Andreoni and Miller (2002) report that the vast majority of agents have GARP-consistent (hence, rational) preferences, and out of them, almost a half of the participants are characterized by the "standard" (i.e., Leontief²², selfish²³, or utilitarian²⁴) shapes of the utility function. The non-standard preferences are captured by the Constant Elasticity of Substitution (CES) function²⁵. The authors, therefore, conclude that

²⁰ Andreoni and Miller (2002) emphasize that variables denoting payment to self and payment to others represent marginal consumption (i.e., change in consumption), underlying that they do not attempt to analyse the preferences regarding total consumption. At the same time, they pose a premise that if preferences regarding the overall consumption are "well-behaved" (i.e., represented by the convex utility function), preferences regarding the incremental consumption should be well-behaved as well (please note there is no reverse causal link).

²¹ "If A is indirectly revealed preferred to B, then B is not strictly directly revealed preferred to A, that is, A is not strictly within the budget set when B is chosen" (Andreoni and Miller, 2002, p. 739).

²² Leontief preferences imply that agents allocate equal number of tokens to themselves and others, treating "own good" and "good of others" as complements, so $U(\pi_s, \pi_o) = \min\{\pi_s; \pi_o\}$ (Andreoni and Miller, 2002, p. 745).

²³ Perfectly selfish individuals never give to others, regardless of the pay-offs ratio; therefore, their preferences are depicted as $U(\pi_s, \pi_o) = \pi_s$ (Andreoni and Miller, 2002, p. 744).

²⁴ The principle of utilitarianism might be described as "Greatest Happiness Principle" (Mill 1863, p. 10) or "rightness consist[ing] in maximal goodness" (Brink 1986, p. 419). I.e., utilitarian individuals maximize aggregate social utility regardless of the effect on their individual utility. Subsequently, Andreoni and Miller (2002) depict utilitarian preferences as such preferences, under which payment to self and payment to others are perfect substitutes, and de-factor choice between them is determined solely by the "price" (i.e., pay-off ratio): $U(\pi_s, \pi_o) = \pi_s + \pi_o$ (p. 745).

²⁵ $U_s = (\alpha\pi_s^\rho + (1-\alpha)\pi_o^\rho)^{1/\rho}$, where parameter serves as the indicator for selfishness, and captures the convexity of preferences defining the elasticity of substitution $\sigma = \frac{1}{\rho-1}$ (Andreoni and Miller, 2002, p. 746).

“possible to capture altruistic choices with quasi-concave utility functions for individuals – altruism is rational” (Andreoni and Miller 2002, p. 750). Andreoni and Miller (2002) understand rationality as consistency with the neoclassical principles of rational choice. At the same time, there is no insight into the nature and mechanism of giving. From this perspective, *Giving according to GARP* is not radically different from the “first generation” of neoclassicism-spirited studies described earlier, since the process of social preferences formation is completely neglected (which is typical of the neoclassical framework – Berg and Gigerenzer, 2010). In other words, pro-social/altruistic behaviour is assumed to be implied by the “built-in” features of the self-optimizing agents, perfectly suiting the orthodox framework.

Fisman *et al.* (2007) propose the modified version of the *Giving according to GARP* experiment. The authors distinguish between preferences for giving and social preferences. The former is described as the pattern of allocating resources between self and others (π_s and π_o , respectively) while the former denotes the pattern of allocating resources between others (π_A and π_B , when $\pi_o = [\pi_A, \pi_B]$). The independence of the preferences for giving and social preferences (so, if $\pi_o \succ \pi'_o$ for some π_s , then $\pi_o \succ \pi'_o$ for all π_s) is the crucial assumption (p. 1860). Fisman *et al.* (2007) report that well-behaved preferences characterize the majority of participants; moreover, the participants tend to exhibit so-called social welfare preferences when the utility is positively dependent on both π_s and π_o ²⁶.

1.3. The procedure specifying public choice and its criticism

Bergson (1938) defines social welfare as the function of “the amounts of each of the factors of production, other than labour, employed in different production units, the amounts of various commodities consumed, the amounts of different kinds of work done, and the production unit for which this work is performed by each individual in the community during that period of time” (p. 311). Criticizing the utility calculus approach based on value judgements, Bergson (1938) argues that four conditions are sufficient for social welfare maximization, namely:

²⁶ Social welfare preferences can be described using Becker’s (1981) “effectively altruistic” preferences. The remaining broad types of preferences reported by Fisman *et al.* (2007) include i) competitive preferences (when utility increases in the difference between payment to self and payment to others); ii) narrow selfish preferences (when utility depends solely on the payment to self); iii) difference aversion (when utility increases in payment to self, but decreases in the difference between payment to self and payment to others); and iv) lexsself preferences (lexicographic preferences, consistent regarding payment to self solely).

- i) the marginal economic welfare per the “dollar worth” of the commodity should be equal for all the commodities and all the agents constituting the society;
- ii) the marginal economic diswelfare per “dollar’s worth” of labour should be equalized for all the types of labour and all the agents constituting the society;
- iii) wages should be equalized to the marginal value productivity for all the types of labour;
- iv) the marginal value productivity should be equalized to the cost for all the commodities (p. 315).

Speaking informally, Bergson (1938) refuses to apply the notion of utility maximization due to the unavoidable ethical and methodological ambiguity associated with interpersonal utility comparison²⁷. Therefore, the underpinning idea behind Bergson’s (1938) analysis of social welfare is that achieving allocative efficiency serves as a sufficient condition for social welfare maximization.

In Arrow’s (1951) model, the notion of individual values takes over Bergson’s (1938) individual tastes. Such a change makes Arrow’s (1951) approach more pervasive since it can be applied to any community without “any prior knowledge of the tastes of individuals” (p. 24). In line with the amendment mentioned above, Arrow (1951) proposes the following definition of the SWF:

By a social welfare function will be meant a process or rule which, for each set of individual orderings R_1, \dots, R_n for alternative social states (one ordering for each individual), states a corresponding social ordering of alternative social states, R (Arrow, 1951, p. 23).

Arrow (1951) imposes five conditions for the SWF, namely:

- i) Condition 1 (admissible set of individual orderings): “Among all the alternatives there is a set S of three alternatives such that, for any set of individual orderings T_1, \dots, T_n of the alternatives in S , there is an admissible set of individual orderings R_1, \dots, R_n of all the alternatives such that, for each individual i , $x R_i y$ if and only if $x T_i y$ for x and y in S ” (p. 24).
- ii) Condition 2 (positive association of social and individual values): “Let R_1, \dots, R_n and R'_1, \dots, R'_n be two sets of individual ordering relations, R and R' the corresponding social orderings, and P and P' the corresponding social preferences relations. Suppose that for each the two individual ordering relations are connected in the following ways: for x' and y'

²⁷ For a more detailed discussion, see Okhrimenko (2021).

distinct from a given alternative x , $x' R'_i y'$ if and only if $x' R'_i y'$; for y' , $x R_i y'$ implies $x R'_i y'$; for all y' , $x P_i y'$ implies $x P'_i y'$. Then, $x P y$ if and only if $x P' y$ " (p. 26).

- iii) Condition 3 (the independence of irrelevant alternatives): "Let R_1, \dots, R_n and R'_1, \dots, R'_n be two sets of individual orderings and let $C(S)$ and $C'(S)$ be the corresponding social choice functions. If, for all individuals and all and in a given environment S , $x R_i y$ if and only if $x R'_i y$, then $C(S)$ and $C'(S)$ are the same" (p. 27).
- iv) Condition 4 (citizens' sovereignty condition): SWF should not be imposed (p. 29); SWF is imposed if "for some pair of distinct alternatives x and y , $x R y$ for any set of individual orderings R_1, \dots, R_n where R is the social ordering corresponding to R_1, \dots, R_n " (p. 28).
- v) Condition 5 (condition of non-dictatorship): SWF should not be dictatorial (p. 30); SWF is dictatorial if "there exists an individual such that, for all x and y , $x P_i y$ implies $x P y$ regardless of the orderings R_1, \dots, R_n of all individuals other than i , where P is the social preference corresponding to R_1, \dots, R_n " (p. 30)²⁸.

In order to prevent IUC²⁹ in the SWF analysis, Arrow (1951) introduces the conditions of individual preferences admissibility and independence of irrelevant alternatives. The famous General Possibility Theorem (also known as Impossibility Theorem) asserts that if the number of available options exceeds two, and the social welfare function fulfils two criteria mentioned above, it might be either imposed or dictatorial.

Evidently, Arrow's (1951) approach opened the space for analysing social choice from the lens of individual values or social preferences. As Suzumura (2019) points out, "Arrow's social choice theory asks whether there exists a social aggregation procedure embodying several normative desiderata, through which a social value is endogenously constructed based on individual values. In other words, social aggregation procedure *à la* Arrow is not exogenously given; it is an endogenous variable to be rationally designed and socially chosen". To illustrate the aforementioned idea, let us consider the following example. As Rawls (1971, p. 32–33) states, the society faces a trade-off between a higher degree of equality and higher total social welfare (in this case, welfare stands for the overall level of consumption and quality of life rather than for aggregate social utility). Assuming that all the individuals constituting a society keep strongly egalitarian views,

²⁸ The implications of these assumptions are discussed in detail in Okhrimenko (2021).

²⁹ Inter-personal utility comparison, i.e., assessing utilities of different agents associated with the identical or different goods using the same scale.

they unanimously prefer equality to efficiency. If this is true, then, according to Arrow's (1951) framework, social welfare is maximized when social resources are allocated in an egalitarian manner. Correspondingly, the egalitarian distribution should be treated as the social choice or social optimum point. In contrast, Bergson's (1938) EWF³⁰ formulation assumes that the total social welfare depends on the overall level of welfare in a sense it is described by Rawls (1971)³¹.

Perhaps, it is possible to say that Arrow's (1951) framework for social choice analysis preserves the spirit of the utilitarian attribution. The egalitarian pattern of the social resources allocation is perfectly legible as long as it satisfies the conditions specified by Arrow (1951). In other words, if egalitarian choice maximizes the aggregate social well-being (since SWF is viewed as the aggregate of individual orderings), it is qualified as the social choice. Therefore, although Arrow's SWF is not required to take the form of the Benthamite SWF, it incorporates the purely utilitarian objective of social utility maximization (although the elements of deontological reasoning are clearly present in Arrow's framework).

At this point, let us analyse the implications of Arrow's (1951) SWF formulation in the context of social exchange and social dynamics. Asserting that formal institutional environment describes the fundamental principles specifying the patterns of distribution and redistribution of social goods (Should richer individuals be subject to higher average tax rates? Should the government provide affordable medical care? Should the government subsidize education? And to what extent?). As discussed in the previous section, the neoclassical research program recognizes a kind of social sentiment in the form of an assumption that individual utility is positively dependent on the utility of other "agents of interest". Provided that the social planner is a benevolent and selfless agent, whose decisions are always in favour of the society and who treats all the agents equally (i.e., provided that SWF is not imposed, not dictatorial, and no inter-personal utility comparison is allowed), Arrow's framework implies that public policy design perfectly reflects the shape of the exogenous social preferences of agents constituting the population. Perhaps, this idea seems pretty trivial at this point. However, it has important implications for explaining and conceptualizing the process of social change and institutional evolution – we will get back to it at the end of this chapter.

³⁰ Bergson (1938) uses the term "economic welfare function", or EWF.

³¹ Rawls (1971) discusses the trade-off between welfare and equality, understanding welfare as agents' utility derived from consumption. In contrast to the aforementioned relatively narrow definition of welfare, Arrow's (1951) framework does not concentrate on the agents' underlying motives, emphasizing their "orderings" solely. Consequently, the agents might derive utility from consumption or the fact the society functions in accordance with the agents' normative attributions.

1.4. Procedural and ecological rationality as the alternative to the optimization paradigm

Gigerenzer *et al.* (1999) understand ecological rationality as the feature of heuristic strategy, asserting that the degree of ecological rationality depends on the degree to which the subject is adapted to the structure of the external environment. Less formally, the ecological rationality criterion addresses the agents' ability to design, transform, and adjust their behavioural strategies constrained to their habitat. Under the aforementioned theory, substantive rationality does not operate as the normative principle of rational human behaviour anymore. Ecological rationality is a descendant of the procedural rationality concept developed by Simon (1968), who emphasized that operating in the conditions of uncertainty requires human beings to rely both on conscious analysis and feedback from the external environment (Simon, 1990). Under the neoclassical framework, the necessary condition of rationality is achieving the best possible outcome (a utility-maximizing consumption bundle, a cost-minimizing combination of inputs, a social welfare-maximizing public policy, etc.).

In contrast, under the procedural rationality framework, human rationality is revealed in the process of designing an intelligent strategy of interaction with the external environment and the ability to interpret the signals coming from the external environment. The ecological rationality framework might be treated as Simon's (1968) abstract concept of procedural rationality utilized in applied decision-making science. Due to the complexity of the external environment and the lack of certainty (Gigerenzer, 2000; 2007; 2008a; 2015), agents pursuing the appropriate principles of communication and interaction have better chances for survival than agents rational in the substantive sense.

The ecological rationality paradigm is argued to serve as the appropriate theoretical foundation for both the individual patterns of conduct and decision-making (Gigerenzer, 2000; 2007; 2008a; 2008b; 2015) and social interaction (V. Smith, 2003; 2010) analysis. Such uniformity might be mistaken for heterogeneousness: for instance, Dekker and Remic (2008) assert that "there are two different conceptions of ecological rationality, which represent different ways of integrating psychology and economics" (p. 303), represented by G. Gigerenzer and V. Smith, respectively. This claim can be, to some extent, justified by the fact that, for Gigerenzer (2000; 2007; 2008a; 2008b; 2015), the central area of interest is the process of selecting, transforming, and adjusting the strategies by individuals, while V. Smith (2003; 2010) concentrates on the nature and role of "spontaneously developed social structures" ("collective intelligence"). However, following social norms represents a particular type of heuristic strategy (see Blythe

et al., 1999; Rand *et al.*, 2014; Rand *et al.*, 2016), and only functional social norms successfully pass the selection process, being shaped by the “collective intelligence”. Therefore, unlike the substantive rationality framework, the ecological rationality framework does not demonstrate any inconsistency between the micro- and macro-level analysis. Correspondingly, there is no need to draw a borderline between “two different conceptions of ecological rationality”.

1.5. The nature of social norms

Before discussing the nature of social norms and institutions, one should start with terms and definitions (since there is much controversy in this field). North (1990; 1991) defines institutions as “the humanly devised constraints that structure political, economic and social interaction” (North, 1991, p. 97). From North’s (1991) perspective, the principal function of institutions is reduction of uncertainty through establishing unified “rules of the game” for all the agents. Wealth-maximizing agents are likely to cooperate during the repeated games, under perfect information, and provided that the number of players is relatively small. However, in a complex and uncertain environment, the opportunities for cooperation diminish. Institutions serve as mechanisms “solving the problems of human cooperation” (p. 98). Under North’s (1991) framework, the term “institutions” is general enough to involve “both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct) and formal rules (constitutions, laws, property rights)” (p. 97). Aoki (2007) defines institutions as a “self-sustaining, salient pattern of social interaction, as represented by meaningful rules that every agent knows, and incorporated as agents’ shared beliefs about the ways the game is to be played” (p. 6), emphasizing the endogenous nature of institutional changes.

For the sake of clarity, hereafter, formal institutions stand for rules of conduct introduced, supervised, and reinforced by central authorities. In contrast, social norms are understood as uncodified rules, principles, and values governing the process of social exchange and social interaction, according to V. Smith (2010). The necessity to distinguish between the social norms and formal institutions instead of elaborating on North’s (1990; 1991) classification arises from the inconsistency between the North’s (1990; 1991) institutional exogeneity assumption (Aoki 2007) and the entire principle of evolutionary change discussed by Simon (1968) and V. Smith (2010). Besides, denoting social norms and formal institutions using the same term means ignoring the fact that solely formal institutions are subject to central authorities’ supervision and reinforcement.

Albeit one cannot doubt the existence of social norms and their role in regulating the social exchange process, they are hardly compatible with the reductionist manner of the orthodox research program. As discussed in the previous section, social preferences serve as the only tool the neoclassical research program has at its disposal for assessing and analysing the phenomenon of pro-social behaviour, assuming “selfless” behaviour to arise from agents’ deliberate self-optimization. The framework proposed by V. Smith (2010) leaves more room for the analysis of social norm development and calibration. As he argues, “other-regarding behaviour does not require other-regarding utility” (p. 21), undermining the neoclassicists’ attempts to explain pro-social behaviour through the prism of self-optimization. V. Smith (2010) proposes a framework under which institutions (I) are understood as “rules of message exchange and contract in a market” (V. Smith, 2010, p. 31) assumed to construe “the mapping of messages [M] into outcomes [X]” (V. Smith, 2010, p. 31):

$$I : M \rightarrow X$$

Agents’ messages are understood as revealed terms of the contract offered to the other participants of social exchange. The process of choosing messages (behaviour B) is constrained by the character of environment E depicting the scope of agents’ characteristics and qualities, which is conditional to the rules of conduct I :

$$B(E | I) \rightarrow M$$

Under the framework discussed above, institutions serve as “algorithms whose property right rules define outcomes, given messages, whereas agent behaviour is represented by decision algorithms for choosing messages, given the agents’ environment and the institution” (p. 31). As V. Smith (2010) discusses, fundamental institutions are the product of an evolutionary selection of the behavioural patterns facilitating the process of social exchange, thus reinforcing the objective of social prosperity and survival. For instance, property rights guarantee that some proportion of income, which is not consumed, can be utilized in the future as a production input; in other words, property rights make capital accumulation possible. An additional exciting point is that V. Smith (2010) recognizes the role of constructivist rationality³² in generating a variety of institutions,

³² Simon (1968) distinguishes between substantive and procedural rationality. While the latter stands for the ability to choose the appropriate course of decision-making, including the capability

while ecological rationality is revealed in the process of their selection. Interestingly, this coincides with the ideas expressed by institutionalists, such as Hindriks and Guala (2014). They distinguish between “real” and “nominal” rules, where the latter stands for the meaningless rules of conduct, which are not respected by the agents (i.e., the rules, which have not survived the process of evolutionary selection). Similarly, as Aoki (2007) mentions, “even when the objective existence of a statutory law in the books is unquestionable, if nobody believes it to be implementable or enforceable, it will not prevail as an institution” (p. 8).

It shall be noticed that V. Smith (2010) does not provide any further insight into the process of institutions design, except for expressing the idea that the existence and character of formal institutions are justified by the importance of social exchange. Therefore, one might notice a kind of contradiction: on the one hand, institutions are shaped and calibrated in the context of social exchange and inter-human interaction; on the other hand, when it comes to the links between agents’ behaviour, agents’ environment (also incorporating social norms), and institutions, the latter seems to play the role of exogenously defined constraints (as implied by the formal model setting presented above). Any further insight regarding the effect of agents’ environment (including social norms and values) seems to be missing.

According to Aoki (2007), the process of institutions’ development reflects the view of the nature of institutions. One of the approaches (referred to as “institutions as rules in a hierarchical order” – p.1) implies the exogenous character of institutions. Under this paradigm, the institutional environment and economic environment are separated: “rules of the game” (i.e., legal rules and social norms) are treated as pre-determined constraints. At the same time, presumably efficient and rational markets attempt to achieve their goals under the aforementioned constraints. Using Simon’s (1968) terminology, institutions might be treated as a part of the “outer environment”, while the economic objectives of the market agents constitute the “inner environment”. The rivalrous paradigm views institutions as “institutionalized rules as something spontaneously and/or endogenously shaped and sustained in the repeated operational plays of the game itself” (Aoki, 2007, p. 2). As the author argues, the critical feature of institutions is their duality: institutions are part of the objective reality; at the same time, to be part of the actual reality, they should constitute some aspects of mental models shared by the agents. Under

to interpret signals from the external environment and adjust one’s actions path accordingly, the former corresponds to rationality in a sense adopted by the orthodox economic framework, i.e., the ability to make the optimal decision. V. Smith’s (2010) notion of constructivist rationality mostly corresponds to Simon’s (1968) substantive rationality (it should be mentioned, however, that V. Smith frequently puts an emphasis on the ability to pursue narrowly defined self-interest when he refers to constructivist rationality).

such a framework, institutions develop in the process of approaching a game equilibrium, then being crystallized as explicit objective rules.

The important thing to underline is that the approach suggested by Aoki (2007) does not contradict V. Smith's (2010) view of institutions. However, V. Smith's (2010) framework seems to be more relevant to the present discussion. It naturally incorporates both the notions of constructivist and ecological rationality in governing the process of social exchange, putting more emphasis on the formal institutional framework design. Respectively, the formal institutional environment is assumed to be exogenous in the short-run perspective, being the product of central authorities' design and carrying the role of the "variety generator". Correspondingly, social norms, triggered by the changes in the external environment, are adjusted and calibrated. Still, formal institutions are also subject to natural selection in the long-run perspective: unless they are not designed in line with the principles of social sustainability, sooner or later, there will be no society to serve as a medium for the particular formal institutional framework³³.

1.6. The principles of reductionism and methodological individualism in the neoclassical research program

Verschuren (2001) describes the reductionist approach as the paradigm based on the idea that any complex system can be decomposed into the basic elements and studied through analysing the elements mentioned above. According to Trout, "reduction is often formulated as the claim that some object, state, process, event, or property "is just" or "is nothing more than" the physical ingredients that compose it" (Trout, 1991, p. 387). Following the notion of predicate reductionism (Trout, 1991), no complex system can possess any features other than features of its components. Silberstein and McGeever (1999) distinguish between the strong and the weak form of ontological reductionism. The former entails that the complex system is nothing but the sum of its elements, while the latter also incorporates the effects of interactions between the agents. Nevertheless, the perfect micro-determination is assumed. To make this more relevant to the present discussion, the process of social interaction is frequently assessed under the conventional game theory framework under the neoclassical research program. Although such a framework includes the

³³ Although Smith (2010) attributes the role of variety generator to constructivist rationality, leaving the task for appropriate institutions selection to ecological rationality revealed in the process of social exchange, the latter idea about natural selection of formal institutions is not presented explicitly. Nevertheless, since it naturally arises from what Smith (2010) discusses, it shall not be presented as the product of own effort.

effects of strategic interaction (i.e., the agents deliberately and consciously maximize their expected pay-offs, keeping in mind that the pay-offs are determined not only by their strategies but also by the strategies pursued by the counter-players), the game framework remains unchanged. In other words, perfectly rational agents are still perfectly predictable; their interaction cannot result in any outcome besides the set of outcomes specified by the exogenous game setting.

Some examples of the weak form of reductionism in economic research arise, for instance, from introducing the element of game theory to the analysis of social exchange (see, for instance, Hoffman *et al.*, 1994). However, as long as perfectly rational and perfectly predictable agents act under the exogenously defined rules, there is no place for evolution and spontaneous structures. In other words, the system remains perfectly predictable. According to Chorafakis (2020), atomistic aggregativity (interpreted in the same way as Trout's reductionism and Colander's methodological individualism) is one of the prominent features of the neoclassical research program.

Verschuren (2001) juxtaposes reductionism to holism, defining the latter as "the tendency to look at an object as a whole" (p. 393). However, as the author admits, the ability to perceive the phenomena holistically is beyond the capacity of a human mind: even when trying to assess a phenomenon comprehensively, we cannot concentrate on all its aspects simultaneously. "True holism" is rather an idealistic concept; therefore, in the present discussion, the terms "holistic" and "holism" are used to indicate the denial to apply the reductionist logic to analysing social phenomena. Chorafakis (2002) opposes reductionism to emergentism, explaining it based on Wimsatt's (2000) notion of non-aggregativity³⁴.

Under the neoclassical framework, assessing the preferences of the "representative individual" is assumed to be sufficient for analysing social exchange dynamics. Perfectly rational agents (in the sense of the choice consistency) are perfectly predictable. Consequently, the dynamics of the complex social system can be assessed through the process of individual agents' self-optimization. Since altruism and pro-social behaviour are the undeniable social reality facts, the neoclassical framework cannot neglect these phenomena. However, due to its reductionist nature, the aforementioned framework cannot assume any social environment traits which are not featured by individual agents (i.e., elements of the complex system). Informally, pro-social and altruistic behaviour arises exclusively from deliberate

³⁴ "A system which is aggregative for a given decomposition is almost trivially mechanistically explicable: the parts all have the property in question, and enter into the explanation of how the system has it in the same simple way. Relationships with other parts are usually either monadic (i.e., non-existent) or of relatively low order, and would tend to meet strong conditions of symmetry and homogeneity" (Wimsatt, 2000, p. 288).

self-optimization. Therefore, in line with the previous statement, other-regarding preferences serve as the mechanism allowing for an analysis of the benevolent attitude while adhering to the conventional economic theory principles.

1.7. Social preferences or social norms?

The modern social choice theory was developed under the shield of the neoclassical research program. The dominating principle of methodological individualism naturally shapes the way in which collective choice is addressed by orthodox economics. The collective choice is viewed as the simple aggregation of the individual preferences while neglecting the interaction effects (or assuming that all the interaction effects are perfectly deterministic). Exogenous social preferences (or other-regarding preferences) are the only possible way to account for the existence of social sentiment and its role in shaping the social exchange dynamics while preserving the fundamental principles of neoclassical economics. From this perspective, any act of pro-social behaviour is the result of deliberate self-optimization. In effect, it implies replacing the strong form of ontological reductionism with a weak one, following Silberstein's and McGeever's (1999) terminology. The key argument addressed in this chapter is not related to whether social preferences are indeed rational (i.e., consistent), general suitability of methodological individualism (reductionism) in the field of analysing a social interaction, or the application of the optimization approach towards formulating social policy. Instead, the aim is to examine the policy biases resulting from the dominance of methodological individualism towards formulating social policy.

Assuming exogenous social preferences (and assuming that the notion of social preferences can roughly account for the entire scope of values, beliefs, principles, and norms), we must give up on any attempt to conceptualize the process of social change (or the long-run social exchange dynamics). Under the mainstream approach, the interaction between the agents is depicted through the prism of the conventional game theory, when perfectly rational agents deliberately maximize their pay-off under the perfect information (i.e., under the absence of radical uncertainty). Consequently, the role of the public authorities in shaping the long-run social exchange dynamics is limited to ensuring credibility and contract reinforcement, pretty much in line with North's (1990) ideas of good institutions. Properly formulated public policy (or a properly designed set of formal institutions) can help to achieve the Pareto-efficient outcome. Nevertheless, it cannot (and is not expected to) change the entire game setting.

Institutional change requires a transformation of beliefs, expectations, and normative attributions. However, the neoclassical model of society is utterly atomistic, leaving no space for spontaneously developed social arrangements or common intelligence. In other words, any kind of institutional change (the guarantee of equal rights, widening the scope of civil rights, establishing animals' rights, criminalization of domestic violence, and so on, and so forth) can be only conceptualized as i) radical exogenous change in social preferences; or ii) violating the principles of the collective choice under the orthodox economic framework. In contrast, admitting to the idea that social exchange is governed by social norms, at the same time contributing to their creation, makes things make much more sense. And this is the main argument against the neoclassical social choice theory pursued in this chapter.

1.8. Conclusion

Under the mainstream economic framework, pro-social behaviour can be only conceptualized, explained, and analysed as the product of conscious self-optimization. Consequently, stable and exogenously defined social preferences serve as the mechanism incorporating altruistic motives to the neoclassical research program due to the reductionist approach featured by the latter. The rivalrous approach – ecological rationality school – denies the Max-U decision-making principle, e.g., the idea that decision-making can be conceptualized as the deliberate self-optimization process. From this point of view, pro-social behaviour is viewed as following social heuristics, which is subject to endogenous development and evolutionary selection. Not attempting to question the ontological ground of the neoclassical social preferences and public choice framework, the present discussion addressed the question of whether the process of social change (i.e., the transformation of informal institutional environment and individuals' normative attributions) can be adequately explained under the orthodox research program. Under the neoclassical framework, the process of informal institutional environment metamorphosis can only occur under the exogenous change in social preferences (i.e., individuals' values) or under violating the SWF assumptions of non-dictatorship and non-imposition. In other words, there is no way to assess the evolution of social norms as the endogenous process. Moreover, the very idea of social norms is not compatible with the atomistic approach to social exchange and social interaction. Therefore, one can conclude that the neoclassical research program is unable to incorporate the pro-social behaviour phenomenon.

CHAPTER 2

CULTURAL ENVIRONMENT, VALUES, AND WELL-BEING – A CLUSTERING ANALYSIS

While the orthodox economic framework is unable to incorporate and explain the links between the informal institutions, formal institutions, and policy outcome, the heterodox research program offers a variety of theories (frequently conflicting, as discussed in this chapter). The present study attempts to investigate the links between culture, the quality of the formal institutional environment, and subjectively assessed well-being using unsupervised machine learning methods. The key idea is to investigate whether cultural environment homogeneity implies similarity in terms of formal institutional environment quality and the level of well-being. Instead of using country-level aggregates, this study relies on the micro-level data (i.e., individual observations) provided by the World Values Survey (WVS) database (Wave 7). The structure of the chapter is as follows. The first section examines the links between cultural environment, formal institutions, and well-being, discussing the nature and typology of culture, the links between culture and informal institution design alongside the cultural and institutional determinants of economic development. The second section discusses methodology, including data, clustering algorithms, and preliminary data analysis. The third section presents and interprets the results. Finally, the last section provides a conclusion.

2.1. Cultural environment, formal institutions, and well-being

2.1.1. The nature and typology of culture.

During the last couple of centuries, the understanding of culture has changed dramatically; having originated as the normative concept (i.e., the desired set of beliefs, values, and behavioural patterns), nowadays, the notion of culture serves rather as an attribute of a particular group, society, or community (Johnson, 2013). Frequently quoted Kluckhohn's (1951) definition of culture suggests that "culture consists in patterned ways of thinking, feeling and reacting, acquired and transmitted mainly by symbols, constituting the distinctive achievements of human groups, including their embodiments in artifacts; the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially

their attached values” (p. 86). Hofstede (1991) describes culture as “the collective programming of the mind which distinguishes the members of one group or category of people from another” (p. 5). From Matsumoto’s (1996) perspective, culture serves as “the set of attitudes, values, beliefs, and behaviours shared by a group of people, but different for each individual, communicated from one generation to the next” (p. 16). When discussing the nature of culture, Geertz (1973) warns against perceiving culture as “power, something to which social events, behaviours, institutions, or processes can be causally attributed” (p. 14). Instead, culture is “best seen not as complexes of concrete behaviour patterns – customs, usages, traditions, habit clusters”, but “as a set of control mechanisms – plans, recipes, rules, instructions (what computer engineers call «program») – for the governing of behaviour” (Geertz, 1973, p. 44). From such a perspective, visible and measurable aspects of human interaction in the social group can only serve as the rough proxies for principles determining social exchange and interaction patterns. The present discussion concentrates on the role and nature of the social self-regulating mechanisms and outcomes associated with the different kinds of the aforementioned mechanisms. Geertz’s (1973) definition, although neglecting some aspects of the cultural environment, emphasizes the role of implicit uncodified rules, beliefs, and values. Therefore, in further discussion, interpretation of culture coincides with Geertz’s (1973) definition of culture.

The present research addresses the links between culture, formal institutions, and well-being. When trying to assess the cultural traits determining the quality of formal institutional environment and well-being, identifying the principal dimensions of the cultural environment seems to be a crucial stage. Schwartz (2014) states that the character of cultural environment can be assessed based on normative attributions – “conceptions of what is good and desirable”, or values (p. 548). In line with this statement, all the cultural typology systems emphasize different sets of core values dominating society.

Hofstede and Bond (1988) design a five-dimensional typology of culture, which includes:

- power distance: the degree to which parties disposing of a minor degree of power accept such power inequality; “it suggests that a society’s level of inequality is endorsed by its followers as much as by its leaders” (p. 10);
- individualism vs. collectivism: “the degree to which individuals are integrated into groups” (p. 10);
- masculinity vs. femininity: the dimension reflecting the gap between “assertive” and “nurturing” poles;
- uncertainty avoidance: the degree to which individuals can act effectively in the unanticipated situations;

- and long-term vs. short-term orientation (initially discussed solely in the context of so-called “Confucian dynamism”): the dimension reflecting time orientation (future vs. present and past).

Hofstede *et al.* (2010) enrich the scope of cultural dimensions adding the indulgence vs. restraint aspect, representing the scale between gratification and control of human desires.

Inglehart and Welzel (2005) view self-expression vs. collectivism as the principal determinant of cross-country cultural heterogeneity (and level of development variation, as discussed in the next section). Self-expressive values are closely associated with general emancipative values, such a secular-rational values, while the essence of collectivism lies in conformity, which, subsequently, leads to a more traditionalist mindset.

Schwartz (2014) introduces the cultural dimensions map based on “Weberian ideal types”. The author specifies three dimensions of cultural values, namely:

- autonomy vs. embeddedness: the dimension reflecting the degree of autonomy accepted in the society, when autonomy is understood as the degree to which cultural environment “encourage[s] people to cultivate and express their own preferences, feelings, ideas, and abilities, and to find meaning in their own uniqueness” (p. 551);
- egalitarianism vs. hierarchy: the dimension reflecting the methods of ensuring coordination on the society, when egalitarian cultures “urge people to recognize one another as moral equals who share basic interests as human beings [and] socialize people to internalize a commitment to cooperate, to feel concerned for the welfare of all, and to act voluntarily to benefit others” (p. 551), while cultures featuring a strong sense of hierarchy “rely on hierarchical systems of ascribed roles to insure responsible, productive behaviour [and] define the unequal distribution of power, roles, and resources as legitimate and even desirable” (p. 552);
- mastery vs. harmony: the dimension describing the extent to which intervention to the natural and social environment is justifiable; while cultures with harmony orientation “emphasize fitting into rather than exploiting the social and natural world, accepting, preserving, and appreciating the way things are rather than trying to change them” (p. 552), cultures with mastery orientation “encourage active self-assertion by individuals or groups in order to master, direct, and change the natural and social environment, and thereby to attain group or personal goals” (p. 552).

2.1.2. On the idea of country-specific culture

Minkov and Hofstede (2011) address the question of whether the aggregated micro-level data can serve as the appropriate indicator for the cultural environment in the country. In a broader sense, their study addresses whether the national culture is a valid concept in the light of regional heterogeneity. The authors cluster 299 regions from 29 countries located in East and Southeast Asia, sub-Saharan Africa, Latin America (the samples were clustered separately). The clusters obtained were mostly consistent with the national borders, thus confirming the validity of the national culture concept. However, the samples for clustering were pre-specified in accordance with existing regional cultural maps; similarly, the number of clusters was specified in accordance with the number of countries constituting the sample. Such a strategy, naturally, worked in favour of the conclusions of the study. However, even assuming that Minkov's and Hofstede's (2011) findings are reliable and robust, the criticism of the national culture can go beyond the issue of regional heterogeneity.

Hofstede *et al.* (2010), Minkov and Hofstede (2011), Inglehart and Welzel (2005), Schwartz (2014), and the vast majority of studies dealing with cultural mapping (Shoham and Alon, 2010; Mensah and Chen, 2012; Ronen and Shenkar, 2013; van Vlimmeren *et al.*, 2017) assess the cultural environment and cultural clusters of countries based on the aggregate country-level data. Although the country-level indicators are computed based on the individual responses (and using the weights corresponding to the socio-demographic characteristics of the respondents and the entire population – see WVS methodological notes), such a strategy is still easy to challenge (even assuming that research samples are perfectly representative). One can consider the following examples. Let us assume that, in country A, the views on whether abortions (or homosexuality, divorce, euthanasia, military intervention, public healthcare for drug-addicts, etc.) are justifiable are extremely polarized: while half of the population considers the right to abortion a basic human right, the other half argues that abortions should be criminalized. In country B, all the individuals keep less radical views, thinking that abortions are definitely not desirable but can be justified in some cases. Let us consider that, on average, the scores of acceptance are equal in the two countries. However, it does not imply that we shall expect similar societal development dynamics in both countries.

2.1.2. Culture or informal institutions?

North's (1990) typology of formal and informal institutions is a standard nowadays. The aforementioned typology distinguishes between formal and informal

institutions, where the former describes the rules reinforced by the central authorities, and the latter stands for the set of uncodified rules. In the previous chapter, informal institutions were conceptualized as a set of social norms. Social norms can be described as a sort of heuristics, providing some ready-to-use solutions in the complex multi-agent and uncertain social environment. Social norms are endogenous in the sense of being a product of social arrangements and negotiations rather than deliberate optimization design by central authorities. The notion of social norms was juxtaposed to the social preference constraint which serves as the only way to assess social sentiment without violating principles of the neo-classical research program. While social preferences are the attributes of individual agents, social norms are the product of common intelligence, being subject to evolutionary selection, adjustment, and transformation. Although social norms seem to be an appropriate concept for the purely theoretical inquiry, sticking to the same notion might be extremely challenging when performing the empirical analysis. In contrast to the formal institutions, social norms are not codified, and (to the author's best knowledge), there seems to be no uniformly recognized method of assessing the character of the social norms dominating the society. Therefore, the empirical inquiry into the links between informal institutions, formal institutions, and policy outcomes would require defining different operating concepts for the informal institutional environment.

Alesina and Giuliano (2015), addressing the links between cultural environment and formal institutions, argue that the notion of culture captures the traits traditionally associated with informal institutions, i.e., self-reinforcing values and beliefs. Therefore, the authors refuse to use the notion of formal institutions (since it creates an impression of subordination of informal institutions to the formal institutions) and assess characteristics of culture as the features of the informal institutional environment. This study adopts a similar methodology, assessing the character of informal institutions based on the broader concept of culture.

2.1.3. The links between cultural environment and the design of formal institutions

There is plenty of evidence demonstrating both how culture shapes formal institutional norms and how changes in the formal institutional environment can trigger informal institutional environment transformation. Fischer (1989) explains cultural and institutional heterogeneity in the United States by analysing dominant views and norms among four massive waves of immigration. The first wave took place in 1629–1640 and was mostly represented by British

Puritans relocating to Massachusetts. Fisher (1989) asserts that their norms and values can be explained based on four liberties: “collective liberty, individual liberties, soul liberty and freedom from the tyranny of circumstances” constituting the “ordered liberty” and “public liberty”. The respect for public liberty was associated with imposing numerous restrictions on individuals and relying on collectively made decisions which were later reflected by laws reinforcing universal justice and local government organization in Massachusetts. The second wave of immigration (1642–1675) was the migration of the Royalist elite and their servants to Virginia. Fisher (1989) characterizes their normative attributions as “hegemonic liberty”, which can be described as the “power to rule, and not to be overruled by others”. The aforementioned type of liberty is radically anti-egalitarian, treating some individuals as naturally superior to others (in this sense, a “natural” state of affairs means that it shall not be questioned or require any further justification). Consequently, the system featuring the minimal role of the government and inadequate mechanisms of income redistribution, at the same time, preserving the rights of the elite, became dominant in the region. The third wave was the relocation of Quakers to the Delaware Valley (1675–1725). Attributing great importance to universal equality and justice, they were the first group to condemn slavery in the United States. The last large wave of migration took place in 1718–1775 when people from Northern England, Ireland, and Scotland were moving to the Appalachian back-country. Fischer (1989) describes their views as “natural liberty”, describing it as the most radical notion of liberty (and very different from the Puritan notion of public liberty associated with numerous restrictions and constraints for individuals). Pretty intuitively, the idea of a strong government is not consistent with such a mindset, which resulted in establishing a system with minimum government intervention in the region.

Mautner (2011) discusses the approach featured by the German historical school of law, which treats culture as the primary determinant of the legal system design: “law begins as culture, eventually becoming the law of the nation” (p. 844). While the French Enlightenment movement supported the idea of legislation that promoted some universally accepted principles and doctrines allowing for rational social life organization, the German historical school of law viewed legislation as endogenously developing constraint originated in norms and beliefs shared by the individuals or culture. Admitting that such an approach might be out of date, Mautner (2011), nevertheless, agrees that it might be helpful in the context of retrospective analysis of the modern juridical systems roots. Geertz (1983) expresses quite the opposite view, treating law as one of the “local knowledge” dimensions:

If one looks at law this way, as a view of the way things are, like, say, science or religion or ideology or art – together, in this case, with a set of practical attitudes toward the management of controversy such a view seems to entail to those wedded to it – then the whole fact/law problem appears in an altered light. The dialectic that seemed to be between brute fact and considered judgment, between what is so and what is right, turns out to be between, as I put it earlier, a language, however vague and unintegral, of general coherence and one, however opportunistic and unmethodical, of specific consequence (p. 184).

Such a perspective implies that law, or formal institutions, serves as a source of meaning for individuals, shaping the way they interpret facts, and their normative attributions, accordingly. In defence of this argument, Mautner (2011) describes the process of legal system transformation in the United States, when abandoning legal formalism in favour of the legal realism, facilitated the adoption of the “constitutive” rather than “instrumental” view on the legal system. In other words, a formal institutional environment might serve as a trigger for cultural change and transformation. In contrast, North’s (1990) view rooted in the orthodox economic framework suggests that “informal constraints that are culturally derived will not change immediately in reaction to changes in the formal rules” (p. 45). Formal institutions can be exogenously changed, while informal institutions are shaped by cultural inheritance. This point of view suggests that adopting a new set of formal institutions might not lead to the desired policy outcome due to informal constraints. As discussed earlier, such a view, although hypothetically implying the process of social norms evolution, is unable to explain or conceptualize it.

Becker *et al.* (2015) use the historical evidence, juxtaposing the quality of governance in the Habsburg Empire to other Eastern European countries under different regimes (Ottoman and Russian Empire). The authors assert that supremacy of the formal institutional environment in the territories subordinate to the Habsburg Empire facilitated the development of trust towards government up to modern days since former Habsburg territories feature a significantly higher degree of trust towards government even nowadays.

2.1.4. Institutional and cultural determinants of economic development

Sen (1999), being one of the pioneering theorists of economic development, views it as a process of expanding and enriching human freedom. Although the common proxies for economic development such as national output per capita, the degree of industrialization, or technological advance are essential indicators

of development (since they might serve as the means for developing human freedom), they should not be mistaken for the essence of economic development. Sen (1999) defends his development-as-freedom views using two arguments. The evaluative reason asserts that progress should be judged based on whether the degree of human freedom is enhanced, while effectiveness reason states that “free and sustainable agency emerges as a major engine of development” (p. 5).

When discussing the role of formal and informal institutions in promoting economic development (directly or instrumentally, i.e., through the development of commerce and technological progress leading to output growth), the very existence of social norms and formal institutions is commonly justified by their regulatory role. Hobbes (1651) argues that uniform social arrangements are developed and reinforced by the central authorities for the sake of human self-preservation when deliberate acceptance of the social norms is the most rational choice. Hume (1739) asserts that stability of possession, transference by consent, and performance of promises develop naturally in any society, as the aforementioned norms serve as the prerequisites for social exchange. When societies become larger and more complex, these natural norms are replaced with legal norms. North (1990) argues that institutions serve as the uniform rules of the game, reducing uncertainty and facilitating Pareto-efficient equilibria occurrence. From this perspective, well-established property rights and contract reinforcement serve as the principal aspects of the favourable institutional environment.

In contrast to this view, Acemoglu *et al.* (2005) distinguish between political institutions (formal regulations) and distribution of resources (wealth inequality) as the determinants of the de-jure and de-facto institutions, respectively, arguing that institutions are the product of social conflict, not the mechanism of Pareto-optimal social equilibrium. Acemoglu *et al.* (2005) assert that good institutions allow for transforming production processes and innovation when such transformation conflicts with ruling the social groups’ objectives. Ownership of resources determines de-facto power, which can be used for enhancing the de-jure power, and so on. The authors, however, do not provide any conceptual model for the institutional change, arguing that it frequently depends on the unique historical opportunity.

Schwartz (2014) refers to the cultural orientations as “normative responses”, arguing that “they prescribe how institutions should function and how people should behave in order best to deal with the key problems societies face” (p. 551). From this perspective, the cultural environment serves as the exogenous constraint for the formal institutional environment. Inglehart and Welzel (2005) adopt a different perspective, arguing that certain cultural traits are more desirable than others, and, assuming that dominating values and norms are endogenous (at

least, in the context of the intergenerational change), social development can be promoted through reinforcing the self-expression values. As the authors argue,

The rise of emancipative orientations, such as individualism, autonomy, promotion orientation, and self-expression values, reflects the process of human development. This has desirable civic consequences, because rising emphasis on autonomous human choice is inherently conducive to anti-discriminatory conceptions of human well-being. Finally, emancipative orientations are inherently people-centred, which is a major reason why rising emphasis on self-expression values is strongly linked with democracy (Inglehart and Welzel, 2005, p. 145).

Therefore, the process of social and human development is viewed as the transition from collectivist values (justified by the survival objective) towards emancipative values.

Rodrik and Mukard (2020) view political rights, property rights, and civil rights as the principal aspects of liberal democracy. While most of the modern elective democracies feature a sufficient degree of respect towards political and property rights, achieving civil rights requires quite a unique combination of factors since civil rights constitute the main value for the most deprived and alienated members of the society, who do not have sufficient power to pursue their interests. Under the conceptual model developed by Rodrik and Mukard (2020), the success in achieving civil rights depends on the depth of “identity cleavage” or the degree of social fragmentation. In this sense, social capital and social trust might be viewed as the drivers of liberal democracy and enhancing human freedoms. Interestingly, it is quite easy to find the links between Rodrik’s and Mukard’s (2020) views and Inglehart’s and Welzel’s (2005) argument about self-expressing values (since they are associated with diminishing importance of group conformity and adopting broader views on human values). Tebaldi and Mohan (2010) and Asongu and Kodila-Tedika (2018)³⁵ emphasize the role of political stability, effective government, and the well-designed legal systems preventing rent-seeking behaviour as the main factors contributing to economic growth and reducing inequality alongside poverty. At the same time, Rodrik (2008) argues that there is no uniform appropriate formal institutional design. For instance, in spite of North’s (1990) premise regarding the crucial role

³⁵ Replication of Tebaldi’s and Mohan’s (2010) study replacing monetary poverty with multi-dimensional poverty index. The study reports findings consistent with the prior results: democracy reduces poverty through raising the average income (rather than reducing income inequality) channel.

of property rights and credibility, commerce can successfully develop even under the absence of these “fundamental institutions” thanks to the informal settlements. The evidence brought by Rodrik (2008) can be treated as the argument in favour of Hayek’s (1945) premise regarding the role of “spontaneous social arrangements”.

2.2. Research strategy description

The literature review has demonstrated that there is no consensus regarding the links between culture and formal institutional design: while some researchers view culture as a stable and exogenous (yet endogenously developed) constraint (North, 1990), others conceptualize formal institutions (including legal institutions) as a potential trigger of the cultural change (Mautner, 2011; Becker *et al.*, 2015). Analogously, it is hard to come up with a model of interaction between culture, formal institutions, and economic development. Nevertheless, all the pieces of evidence discussed in the previous section consistently emphasize the primary role of endogenous cultural change.

The present research attempts to explore the aforementioned links utilizing the data clustering method. Clustering analysis is frequently applied for the sake of structuring massive multi-dimensional datasets. Alternatively, it can be identified as a method of classifying objects into groups without making any prior assumptions regarding the precise selection criteria. In the context of the present study, clustering analysis is used for several purposes, namely:

- i) investigating whether a unique country-specific environment exists;
- ii) assessing the groups of countries sharing similar cultural values;
- iii) assessing the groups of countries sharing similar features of the formal institutional environment;
- iv) assessing the groups of countries with a similar level of well-being;
- v) contrasting results obtained during stage ii) and stage iii) in order to assess the links between culture (informal institutions) and the quality of formal institutional environment;
- vi) contrasting results obtained during stages ii), iii), and iv) in order to assess whether the links between culture and formal institutional environment as well as the links between culture, formal institutions, and well-being exist.

The data provided by Hofstede *et al.* (2010) are used as the benchmark for further analysis. The data for assessing various aspects of cultural and formal institutional environment was alongside subjective well-being provided by The World Values Survey (Haerpfer *et al.*, 2020). As discussed earlier, the vast majority of studies

dealing with cross-country cultural homo-/heterogeneity use country-level data for designing the clusters, where all the variables denoting various cultural environment dimensions are calculated as country-level aggregates. Since such a strategy ignores cultural environment heterogeneity within the country, the different methodology is followed in this study. The individual-level responses are used in order to design clusters. Then, the composition of clusters is analysed for each national sub-group, while the final classification is performed based on the dominating cluster (i.e., the cluster with the greater proportion of respondents from a particular country).

2.3. Data processing method

Adolfsson *et al.* (2018) describe the generalized form of the clustering algorithm. The stages of the clustering analysis include data pre-processing, clusterability evaluation, algorithm selection and execution, and quality evaluation. This section describes all the stages of the clustering analysis in line with the aforementioned guideline.

2.3.1. Data pre-processing

The present research attempts to assess the links between cultural and formal institutional environments by comparing the relevant classification of the economies analysed. It should be noted that in some cases, the variables were classified into different datasets intuitively. All the variables describing the shared values and beliefs were classified as cultural traits, in line with Geertz's (1973) definition of culture. The questions dealing with the perceived quality of the formal institutional environment constituted a separate dataset (the principal criterion was whether agents' satisfaction with or opinion about the particular aspects of how the society functions are strongly dependent on the central authorities' policy). Finally, answers to all the questions dealing with respondents' satisfaction with life were classified as well-being indicators. Below, the list of the datasets alongside the information about data specification is provided.

- **Dataset 1.** The classification of countries according to cultural dimensions proposed by Hofstede *et al.* (2010) – 113 observations in total; the data provided by Hofstede *et al.* (2015).
- **Dataset 2.** WVS indices, individual responses: the dataset includes 35 555 observations for responses from different countries. The range of variables includes all WVS indices, except for trust in the army, trust in the police, and

trust in courts (since the aforementioned values are determined not only by the character of the cultural environment but also by the trustworthiness of the governmental institutions). The list of variables included in the dataset is presented in Appendix 2.

- **Dataset 3.** Variables describing the character of the cultural environment: individual responses: the dataset consists of variables describing the character of the cultural environment. The variables correspond to the “Core variables” from the WVS dataset and consist of the following subgroups, following the original WVS classification: social values, norms, and stereotypes; social capital, trust, and organizational membership; economic values; perceptions of migration; index of postmaterialism; perceptions of science and technology; religious values; ethical values; and political culture, interest, and participation. The variables related to characteristics of the formal institutional environment (e.g., the perception of corruption, trust in governmental institutions) have been excluded from the dataset. WVS Wave 7 survey is still not complete; therefore, although the inclusion of the variables dealing with gender norms was initially intended, it proved impossible. The complete list of variables representing each subgroup is presented in Appendix 3.
- **Dataset 4.** Variables indicating the characteristics of the formal institutions (i.e., subjective opinion regarding all the possible aspects of the interaction between citizens and authorities). The list of variables is presented in Appendix 4.
- **Dataset 5.** Variables indicating subjective well-being. The list of variables is presented in Appendix 5.

The WVS dataset consists of 70 867 individual observations collected in 49 countries (see the list in Appendix 1). In the further analysis, when using the WVS dataset (i.e., when using Dataset 2, 3, 4, and 5), a randomly selected sample of 5000 observations is used due to the constraints of computational capabilities. Since there are numerous gaps in WVS, the following procedure has been adopted: i) first, the sub-sets containing the variables of interest solely (WVS indices, cultural environment dimensions, quality of formal institutional environment, and the level of well-being) have been designed; ii) second, all of the observations with missing data have been removed; iii) finally, 5000 observations have been picked from each sub-set. All the datasets have been standardized prior to any further analysis.

2.3.2. Preliminary data analysis and clusterability assessment

The dataset consisting of random values with no cluster structure will still demonstrate the aforementioned structure if one applies a clustering algorithm. Therefore, before discussing the cluster structure of the data, one shall first verify whether data indeed have such a cluster structure. Adolfsson *et al.* (2018) name several approaches towards testing clusterability, depending on the adopted notion of clusterability:

- Data reduction methods. Performing the cluster analysis of the high dimensional data might be challenging; therefore, the first step of analysing highly dimensional data usually includes dimension reduction. The Principal Component Analysis (PCA) is one of the frequently applied methods of dimension reduction. In the case of high-dimensional data, extracting the principal components is a recommended (yet not required) procedure. The principal component analysis is performed as the preliminary analysis. Appendix 6 demonstrates the distributions of the eigenvalues according to the principal component for each of the datasets analysed. In each case, the first principal component is characterized by the highest eigenvalue. In the case of the well-being indicator dataset (Dataset 5), the first component explains slightly below 50% of the variance, while the first principal component of the cultural environment dataset (Dataset 3) explains approximately 13% of the variance. In the remaining cases, the proportion of variance explained by the first component is approximately equal to 30%.
- Testing clusterability vs. spatial randomness. Hopkins statistics is a standard method for assessing the spatial randomness of data. The null hypothesis of the test assumes that the dataset has been generated by the Poisson process, thus showing no cluster tendency. Hopkins statistics takes the value between 0 (uniformly distributed data) and 1 (dataset with a strong clusterability tendency).
- Classic methods (testing original data for multimodality). The essence of the method lies in verifying whether the distances calculated are based on the original (i.e., non-reduced) scaled data.
- New clusterability methods (as proposed by Adolfsson *et al.*, 2018), including Silverman's test on dissimilarities, dip test on principal component, and dip test on a principal curve.

As Adolfsson *et al.* (2018) discuss, in the case of high dimensional data, testing clusterability via spatial randomness tends to produce biased results, indicating datasets with *a priori* clusterable structure as datasets featuring spatial randomness. Considered a significant number of variables analysed within a single database, the Hopkins test is suspected of reporting the absence of the cluster structure in

the data analysed. Therefore, the conclusions regarding clusterability structure are to be derived from the results of Hartigan's dip unimodality/multimodality tests computed for different distances. Consequently, the clustering algorithm is to be performed solely for distances featuring the multi-modal distribution. The present study would attempt to make minimal initial transformation of the data; thus, no pre-clustering dimension reduction is performed. The algorithm of the test is pretty simple and takes two stages: i) calculating the distance measures; ii) testing the obtained measures for unimodality using Hartigan's dip test.

As discussed in the later parts of the study, there is no consensus regarding the most appropriate distance measure to be used, and there are plenty of options. Due to the limited data computational capacity, eight popular distance measures are picked: five classical measures (Euclidean, Manhattan, Maximum, Canberra, and Minkowski) measuring the distance between coordinates and three correlation-based distances (Pearson, Kendall, and Spearman). The additional explanations regarding computing the aforementioned distances are provided in the next sections.

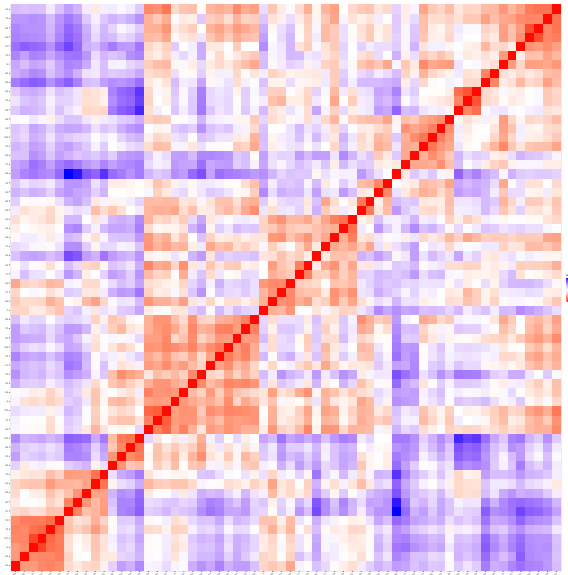
2.3.2.1. Cultural dimensions proposed by Hofstede *et al.* (2010)

Figure 1 presents the heatmap of distances when Hofstede *et al.* (2010) cultural dimensions are considered. Hopkins statistics indicate the absence of the cluster structure, although the visual assessment of the clusterability tendency (see Figure 1) allows the detection of clusters alongside the grid. The results of Hartigan's dip unimodality/multimodality test (see Table 2) demonstrate that maximum, Spearman, and Kendall distances feature a multimodal distribution.

Figure 2 presents the location of the countries analysed, together with information about importance of a component for each observation (typically referred to as the quality of representation). The countries with a satisfactory quality of representation³⁶ constitute several groups, namely: Latin American countries (Venezuela, Colombia, El Salvador, Mexico, Trinidad i Tobago), countries with prevalent Anglo-Saxon values (U.S., Canada, New Zealand, Ireland, and the United Kingdom), Eastern European countries (Serbia, Romania, Bulgaria, and Russia), and Central-Eastern European countries (Czech Republic, Estonia, and Lithuania).

³⁶ Here and further, the quality of representation is measured using squared cosine of a component with an observation. There is uniformly accepted critical value of the squared cosine, so, following the rule of thumb, the discussion concentrates on observations featuring the value of $\cos^2 > 0.5$.

Figure 1. The heatmap of the Euclidean distances computed based on dataset containing variables describing the character of the cultural environment specified by Hofstede *et al.* (2010) (power distance; individualism vs. collectivism; masculinity vs. femininity; uncertainty avoidance; long-term vs. short-term orientation; indulgence vs. restraint, country-level aggregates – Dataset 1) (n=50; Hopkins statistics ≈ 0.31)



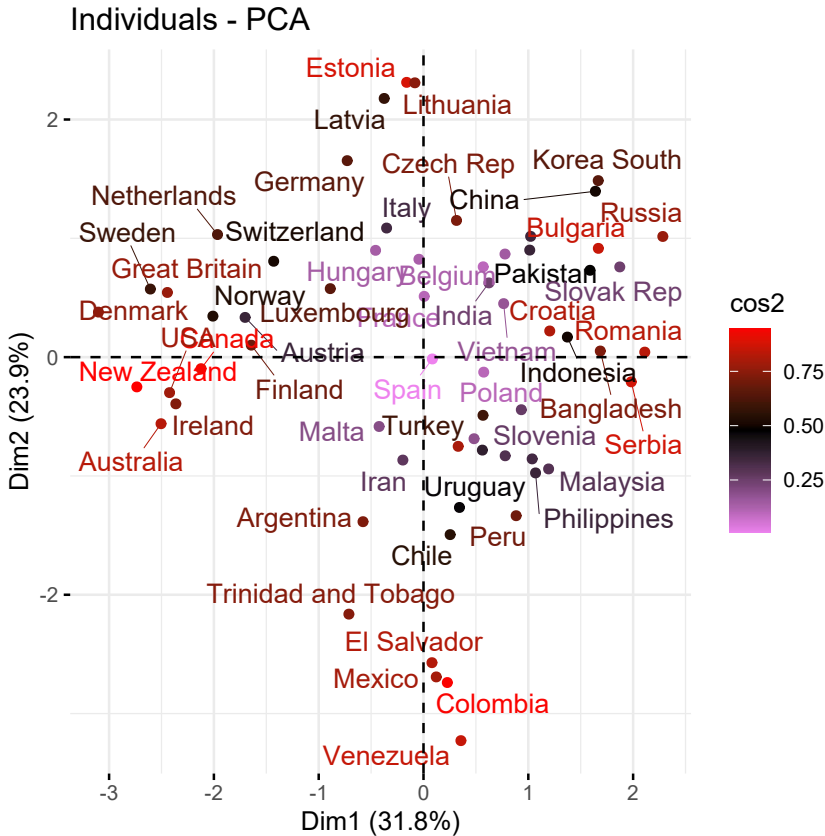
Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Table 1. Results of the Hartigan's dip test for unimodality/multimodality computed for different distances (variables describing the character of the cultural environment specified by Hofstede *et al.*, 2010: power distance; individualism vs. collectivism; masculinity vs. femininity; uncertainty avoidance; long-term vs. short-term orientation; indulgence vs. restraint, country-level aggregates – Dataset 1)

Algorithm for distances computation	D statistics	p-value of the test
Euclidean	0.004213	≈ 1
Manhattan	0.006851	0.809
Maximum	0.016346	<0.01
Canberra	0.005216	≈ 1
Minkowski	0.004213	≈ 1
Pearson	0.006229	0.915
Spearman	0.018891	<0.01
Kendall	0.043269	<0.01

Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020; *diptest* package, Maechler, 2021).

Figure 2. Grouping the countries according to cultural dimensions specified by Hofstede *et al.* (2010) (power distance; individualism vs. collectivism; masculinity vs. femininity; uncertainty avoidance; long-term vs. short-term orientation; indulgence vs. restraint, country-level aggregates – Dataset 1)³⁷



Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

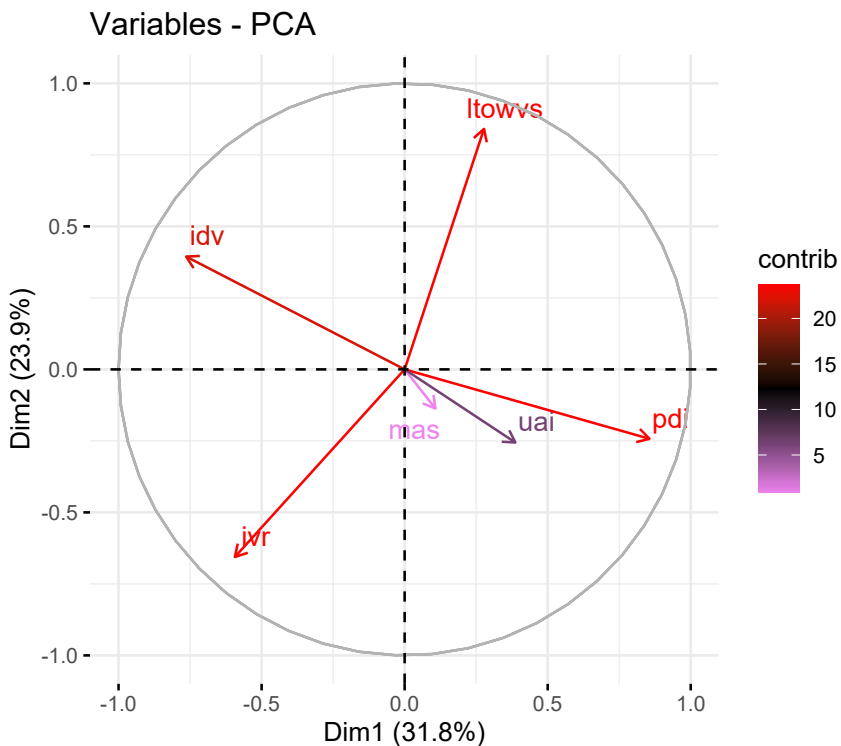
Figure 3 presents the correlation of cultural dimensions together with the indication of their contribution to the principal component³⁸. Masculinity vs. femininity (*mas*) and uncertainty avoidance (*uai*) are minor contributors in comparison with the remaining four cultural dimensions. Indulgence vs. restraint (*ivr*), the value

³⁷ Here and further, Dim1 and Dim2 denote two leading components.

³⁸ Here and further, the variable's contribution to the component (*contrib*) is calculated as the ratio of the squared cosine of the variable multiplied by 100 to the total squared cosine of the component. Following the rule of thumb, the discussion concentrates on the *contrib* variables with the highest values of the variable (NB: the values of *contrib* vary across the datasets and cannot be used to assess the relative explanatory power of the variables from different datasets).

of which denotes the importance attributed to satisfying human desires and hedonism, is negatively correlated with the long-term vs. short-term normative orientation (*ltowvs*), the value of which denotes the importance attributed to modernization, for instance, in the fields of business and education. Individualism vs. collectivism (*idv*), the value of which denotes the importance of autonomy (and inverse importance attributed to the sense of social group belonging), and power distance (*pdi*), the value of which denotes the existing social hierarchy acceptance alongside a degree of tolerance towards power distribution inequality, are negatively correlated (which makes a perfect sense).

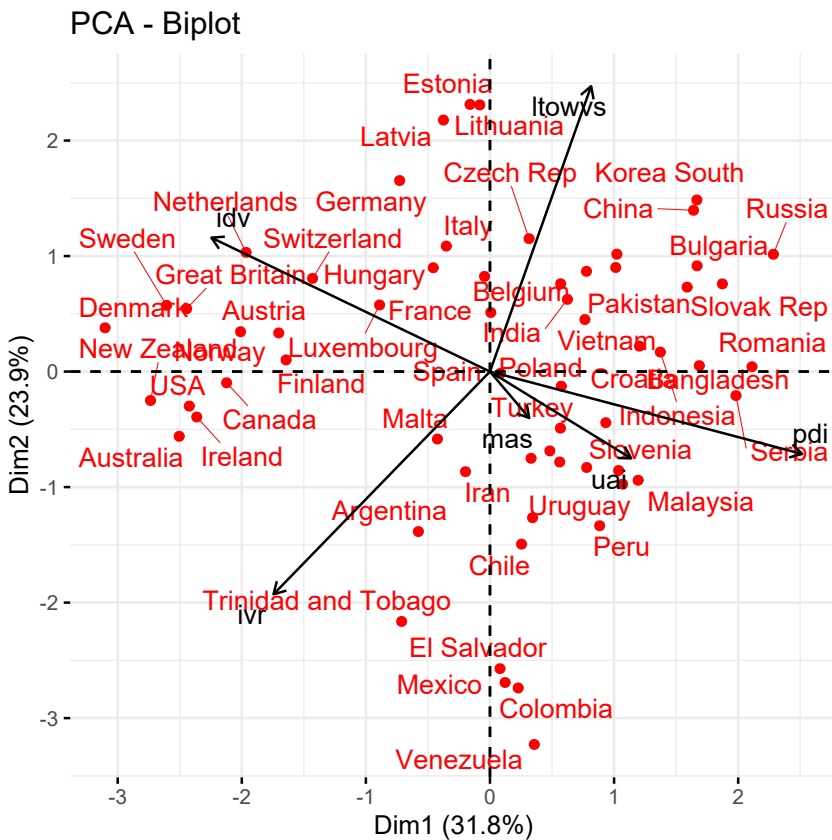
Figure 3. Correlation of cultural dimensions specified by Hofstede *et al.* (2010) (power distance; individualism vs. collectivism; masculinity vs. femininity; uncertainty avoidance; long-term vs. short-term orientation; indulgence vs. restraint, country-level aggregates – Dataset 1) together with their contributions to the principal components



Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Figure 4 presents the biplot of countries and cultural dimensions. Interestingly, all Asian countries present in the sample (Japan, Singapore, Taiwan, Hong Kong, Vietnam, and China) together with India, Pakistan, Czech Republic, Russia, Lithuania, Slovakia, and Croatia feature a high degree of retrospective normative attribution (which corresponds to the side of the restraint on the indulgence-restraints spectrum).

Figure 4. Biplot of countries and cultural dimensions specified by Hofstede *et al.* (2010) (power distance; individualism vs. collectivism; masculinity vs. femininity; uncertainty avoidance; long-term vs. short-term orientation; indulgence vs. restraint, country-level aggregates – Dataset 1) together with their contributions to the principal components

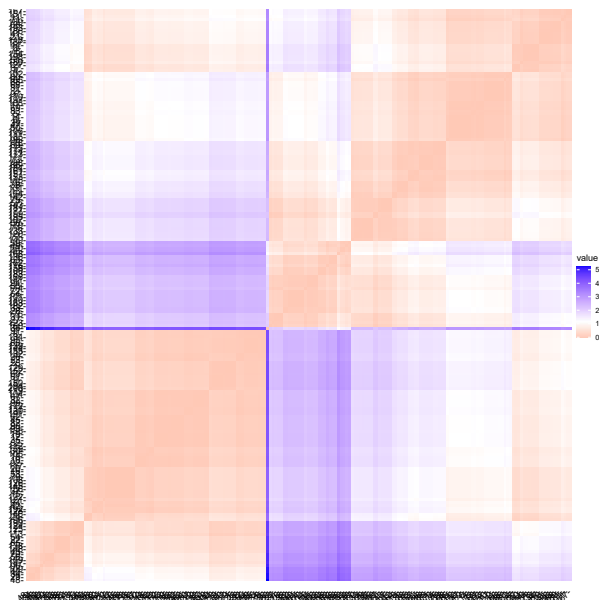


Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

2.3.2.2. WVS indices

Figure 5 presents the heatmap of distances when WVS indices constitute the dataset. It is possible to see several clusters along the grid, although Hopkins statistics is well below 0.5, indicating that the dataset is not clusterable. The results of Hartigan's unimodality dip test computed for WVS and for different distances are presented in Table 2. The results indicate that the null hypothesis about uni-modality can be rejected only for maximum (Chebyshev) distances. In other words, it is possible to cluster the dataset, but only provided that maximum distances are specified (since only maximum distances are not uni-modal).

Figure 5. The heatmap of the Euclidean distances computed based on dataset containing variables describing the character of the cultural environment: WVS indices, individual responses – Dataset 2 (n =100; Hopkins statistics \approx 0.31)



Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

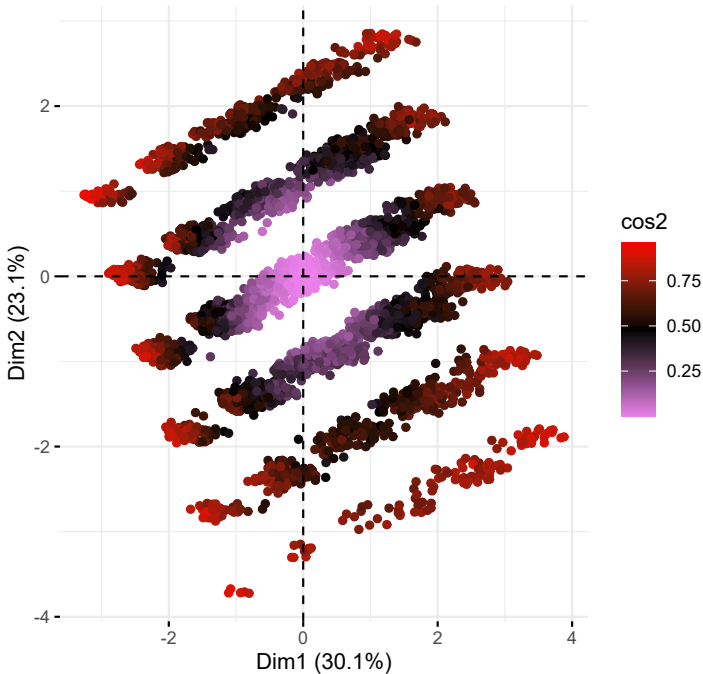
Proceeding to the principal components analysis, most respondents make a minor contribution to the principal component. It is interesting to mention, nevertheless, that major contributors from the same country are grouped together (see Figure 6).

Table 2. Results of the Hartigan's dip test for unimodality/multimodality computed for different distances (variables describing the character of the cultural environment: WVS indices, individual responses – Dataset 2)

Algorithm for distances computation	D statistics	p-value of the test
Euclidean	≈ 0	≈ 1
Manhattan	≈ 0	≈ 1
Maximum	0.05277	<0.01
Canberra	0.00021	<0.01
Minkowski	≈ 0	≈ 1
Pearson	≈ 0	≈ 1
Kendall	0.00467	<0.01
Spearman	0.00036	<0.01

Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020; *diptest* package, Maechler, 2021).

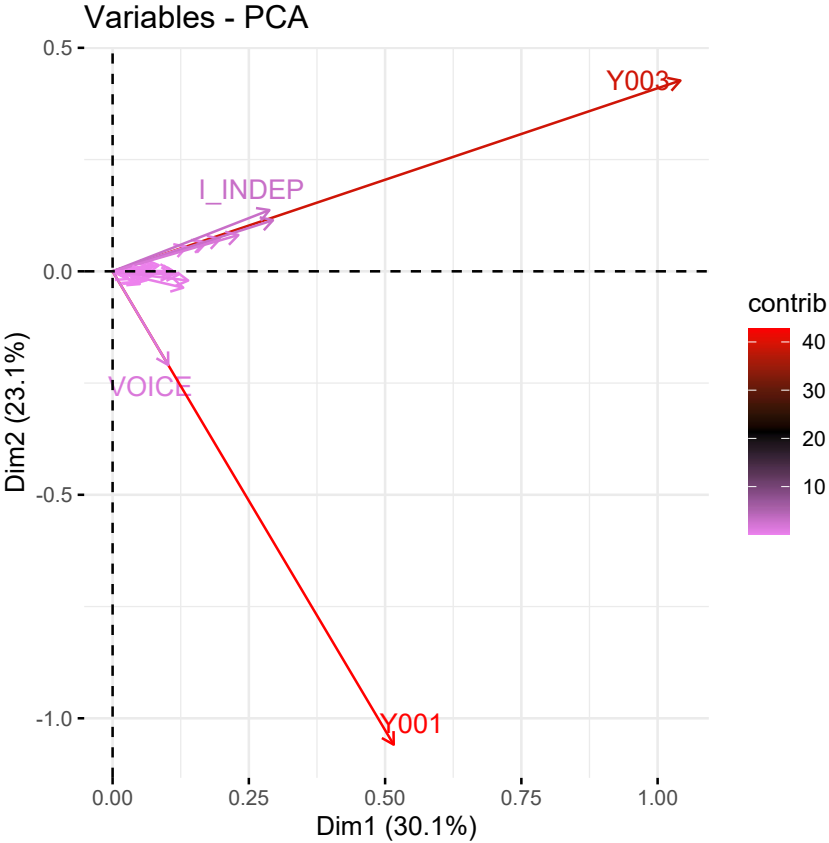
Figure 6. Grouping the respondents according to WVS indices (individual responses – Dataset 2) together with their contributions to the principal components



Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Figure 7 indicates that two indices being the major contributors to the principal component Y001 and Y003 are weakly correlated. The remaining variables feature a minor contribution to the principal components.

Figure 7. Correlation of WVS indices (individual responses – Dataset 2) together with their contributions to the principal components

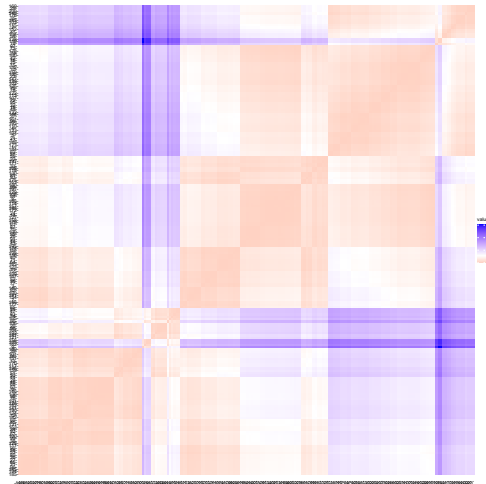


Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

2.3.2.3. Dimensions of the cultural environment

Figure 8 describes the heatmap of the distances computed for the variables describing the character of the cultural environment based on individual questions. The value of Hopkins statistics indicates the dataset cannot pass the test for non-random distribution, while the results of Hartigan's dip test (see Table 3) show that maximum and Kendall distances are not unimodal, thus implying clusterable structure of the data.

Figure 8. The heatmap of the Euclidean distances computed based on dataset containing variables describing the character of the cultural environment (social values, norms, and stereotypes; social capital, trust, and organizational membership; economic values; perceptions of migration; perceptions of security; index of postmaterialism; perceptions of science and technology; religious values; ethical values; and political culture, interest, and participation, individual responses – Dataset 3) (n=100; Hopkins statistics ≈ 0.46)



Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Table 3. Results of the Hartigan's dip test for unimodality/multimodality computed for different distances (variables describing the character of the cultural environment: social values, norms, and stereotypes; social capital, trust, and organizational membership; economic values; perceptions of migration; perceptions of security; index of postmaterialism; perceptions of science and technology; religious values; ethical values; and political culture, interest, and participation, individual responses – Dataset 3)

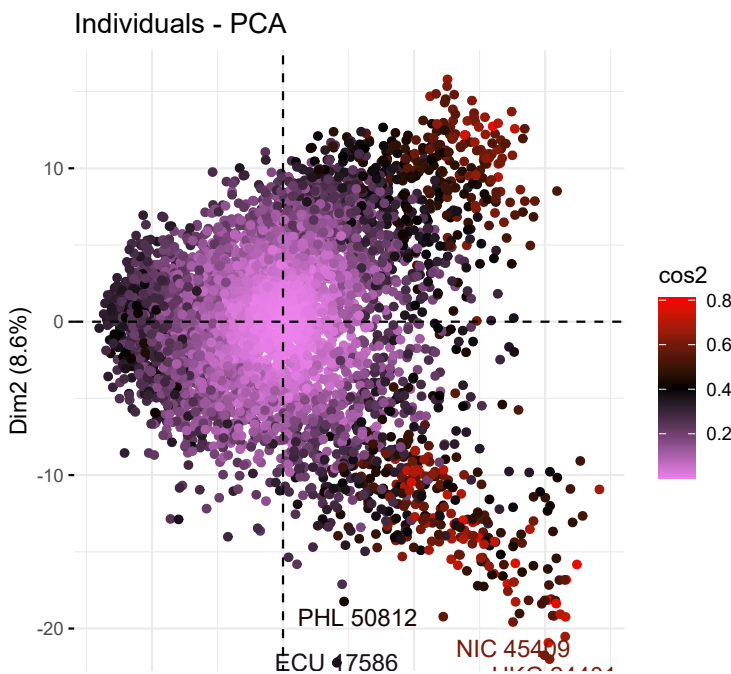
Algorithm for distances computation	D statistics	p-value of the test
Euclidean	≈ 0	≈ 1
Manhattan	≈ 0	≈ 1

Algorithm for distances computation	D statistics	p-value of the test
Maximum	0.03677	<0.01
Canberra	≈ 0	≈ 1
Minkowski	≈ 0	≈ 1
Pearson	≈ 0	≈ 1
Kendall	0.00027	<0.01
Spearman	≈ 0	≈ 1

Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020; *diptest* package, Maechler, 2021).

Figure 9 indicates that most of the responses make a minor contribution to the principal component. However, analogously to the WVS indices database, the major contributors from the same country tend to be grouped close to each other.

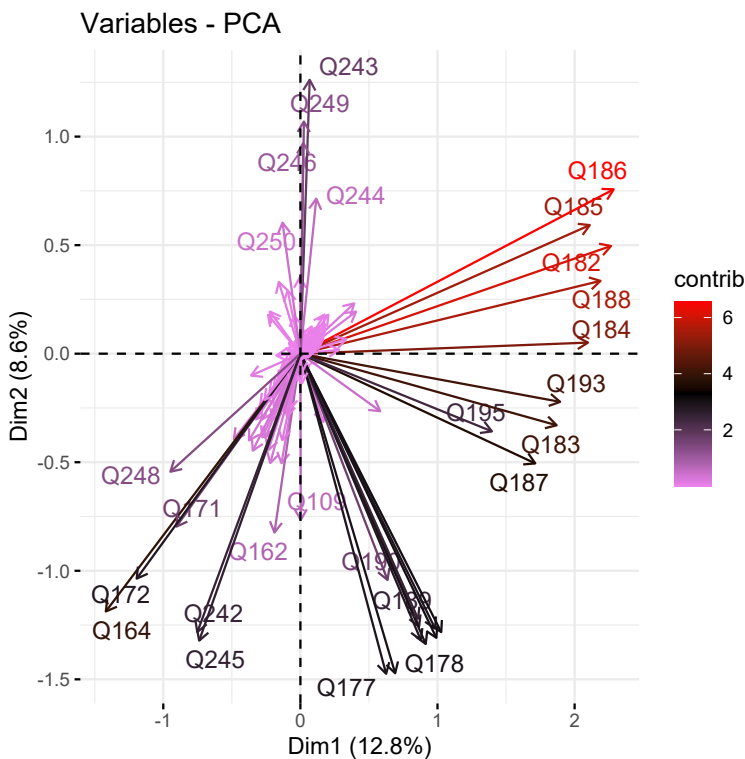
Figure 9. Grouping the respondents according to variables describing the character of the cultural environment (social values, norms, and stereotypes; social capital, trust, and organizational membership; economic values; perceptions of migration; perceptions of security; index of postmaterialism; perceptions of science and technology; religious values; ethical values; and political culture, interest, and participation, individual responses – Dataset 3) together with their contributions to the principal components



Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Figure 10 demonstrates the correlation between the variables together with their contributions to the principal components. The variables Q182 (acceptance of homosexuality), Q185 (acceptance of divorce), Q186 (acceptance of sex before marriage), and Q188 (acceptance of euthanasia) are positively correlated with each other and negatively correlated with Q164 (importance of God), Q172 (frequency of praying), Q242 (the degree to which respondents agree that religious authorities should interpret the law) and Q245 (the degree to which respondents agree that the army should take over when the government is incompetent).

Figure 10. Correlation of variables describing the character of the cultural environment (social values, norms, and stereotypes; social capital, trust, and organizational membership; economic values; perceptions of migration; perceptions of security; index of postmaterialism; perceptions of science and technology; religious values; ethical values; and political culture, interest, and participation, individual responses – Dataset 3) together with their contributions to the principal components



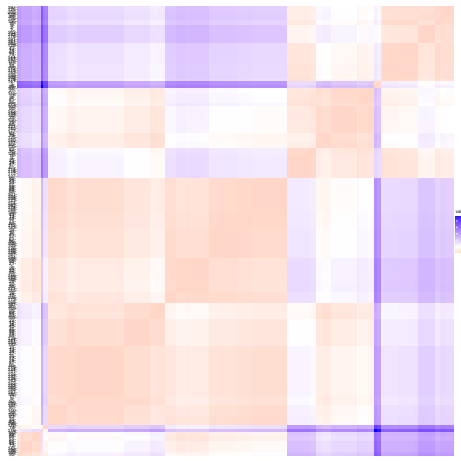
Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

The additional group of highly correlated variables featuring a significant contribution to the principal component includes Q177 (the degree to which the respondents agree that claiming social benefits to which one is not entitled is justifiable), Q178 (the degree to which respondents agree that avoiding a fare on public transport is justifiable), Q179 (the degree to which respondents agree that stealing property is justifiable), Q180 (the degree to which respondents agree that cheating on taxes is justifiable), Q181 (the degree to which respondents agree that accepting a bribe in the course of one's duties is justifiable), Q189 (the degree to which respondents agree that it is justifiable for a man to beat his wife), Q191 (the degree to which respondents agree that violence against other people is justifiable), Q192 (the degree to which respondents agree that terrorism as a political, ideological or religious means is justifiable), and Q194 (the degree to which respondents agree that political violence is justifiable).

2.3.2.4. Formal institutional environment

Figure 11 presents the heatmap of distances for the formal institutional environment dataset. As for each high dimensional dataset previously analysed, Hopkins statistics indicates the random data distribution. However, the results of Hartigan's dip test (see Table 4) indicate that maximum and Kendall distances are not uni-modal.

Figure 11. The heatmap of the Euclidean distances computed based on dataset containing variables describing the subjective perception of the formal institutional environment (social capital, trust, and organizational membership; perceptions of security; perceptions of corruption; political interest and political participation; political culture and political regimes, individual responses – Dataset 4) ($n=100$; Hopkins statistics ≈ 0.42)



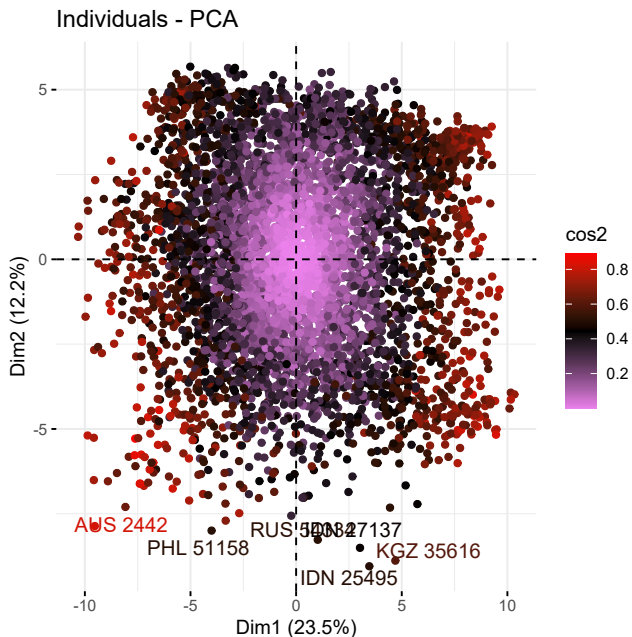
Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Table 4. Results of the Hartigan's dip test for unimodality/multimodality computed for different distances (variables describing the subjective perception of formal institutional environment: social capital, trust, and organizational membership; perceptions of security; perceptions of corruption; political interest and political participation; political culture and political regimes, individual responses – Dataset 4)

Algorithm for distances computation	D statistics	p-value of the test
Euclidean	≈ 0	≈ 1
Manhattan	≈ 0	≈ 1
Maximum	0.05089	<0.01
Canberra	≈ 0	≈ 1
Minkowski	≈ 0	≈ 1
Pearson	≈ 0	≈ 1
Kendall	0.00198	<0.01
Spearman	0.00011	0.52

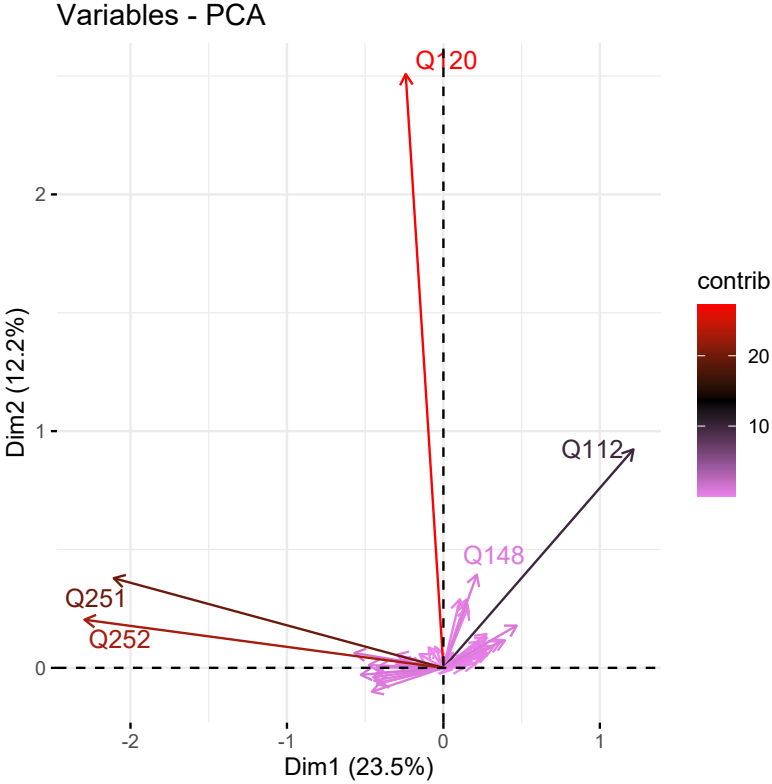
Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020; *diptest* package, Maechler, 2021).

Figure 12. Grouping the respondents according to variables describing the character of the formal institutional environment (social capital, trust, and organizational membership; perceptions of security; perceptions of corruption; political interest and political participation; political culture and political regimes, individual responses – Dataset 4) together with their contributions to the principal components



Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Figure 13. Correlation of variables describing the character of the formal institutional environment (social capital, trust, and organizational membership; perceptions of security; perceptions of corruption; political interest and political participation; political culture and political regimes, individual responses – Dataset 4) together with their contributions to the principal components



Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

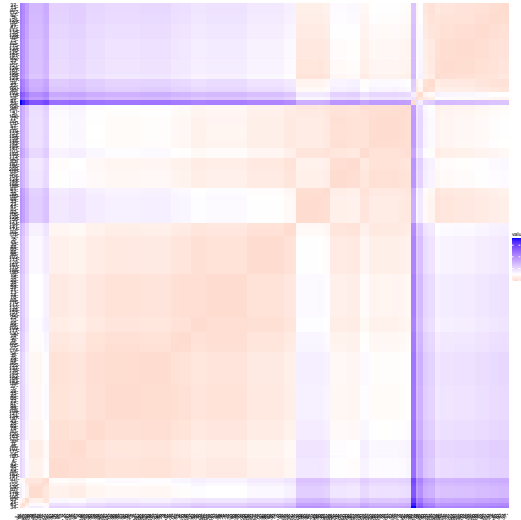
As Figure 13 shows, there are four variables characterized by the above-average contribution to the principal component: Q112 (perception of corruption in the country), Q120 (perceived risk of being held accountable for giving or receiving a bribe), Q251 (respondents’ opinion regarding how democratically their countries are governed), and Q252 (satisfaction with the performance of the political system). Q120, Q251, and Q252 are positively correlated.

2.3.2.5. Well-being

The variables denoting happiness and well-being constitute the last dataset to be analysed. Figure 14 presents the heatmap of distances. Although it is possible to

detect at least three clusters, Hopkins statistics suggests a random data structure. The results of Hartigan's dip test (see Table 5) indicate that the dataset is clusterable for each of the distances analysed, except for the Pearson distances.

Figure 14. The heatmap of the Euclidean distances computed based on dataset containing variables describing the level of happiness and well-being, individual responses – Dataset 5 (n=100; Hopkins statistics ≈ 0.33)



Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

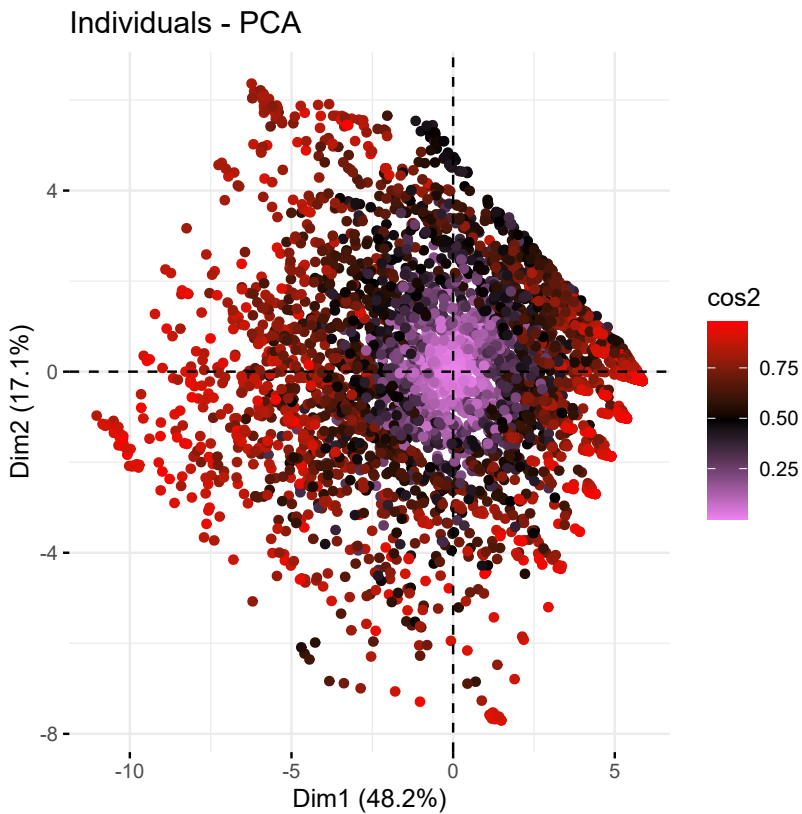
Table 5. Results of the Hartigan's dip test for unimodality/multimodality computed for different distances (variables describing the level of happiness and well-being, individual responses – Dataset 5)

Algorithm for distances computation	D statistics	p-value of the test
Euclidean	0.00054	<0.01
Manhattan	0.00061	<0.01
Maximum	0.04511	<0.01
Canberra	0.01182	<0.01
Minkowski	0.00054	<0.01
Pearson	0.00012	0.27
Kendall	0.02153	<0.01
Spearman	0.00405	<0.01

Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020; *diptest* package, Maechler, 2021).

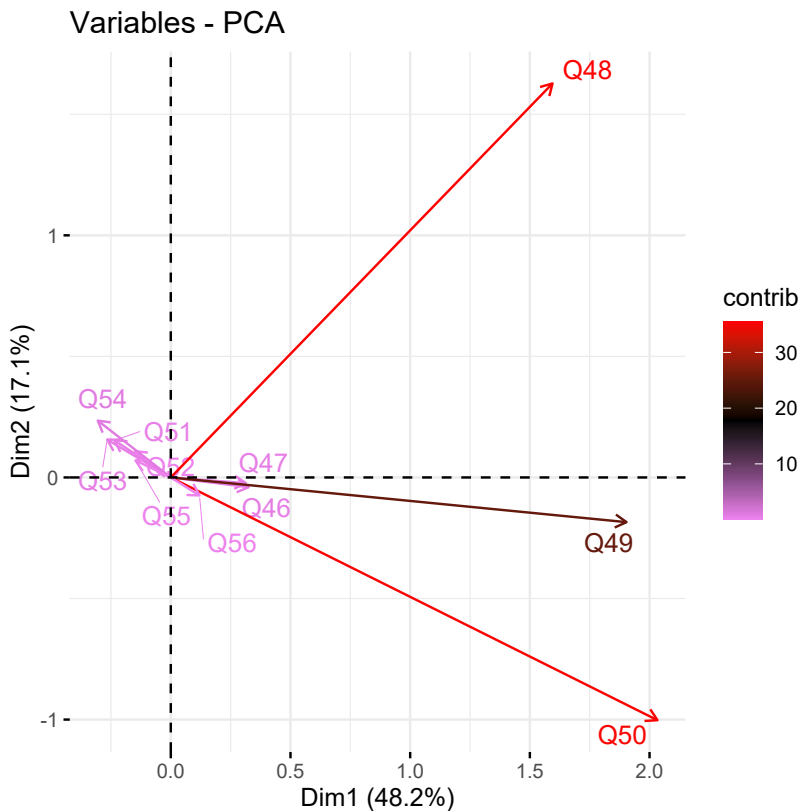
Figure 15 suggests that individuals are characterized by a better quality of representation in terms of well-being indicators in comparison with the previously analysed datasets (however, such a result might also be constrained by a significantly smaller number of dimensions analysed).

Figure 15. Grouping the respondents according to the describing the level of happiness and well-being (individual responses – Dataset 5) together with their contributions to the principal components



Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Figure 16. Correlation of variables describing the level of happiness and well-being (individual responses – Dataset 5) together with their contributions to the principal components



Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Figure 16 allows the specification of variables characterized by the most significant contribution to the principal component, which are Q48 (freedom of choice and control), Q49 (satisfaction with life), and Q50 (satisfaction with a household's financial situation). Two latter variables are positively correlated.

2.3.3. Selecting and executing the appropriate algorithm & quality evaluation

Saxena *et al.* (2017) distinguish between two types of clustering, namely, hierarchical and partitional clustering. The essence of the first method lies in designing the clusters through the iterative splitting of the patterns using either the top-down or the bottom-up approach, which are known as agglomerative and divisive

clustering. The partition clustering does not assume any hierarchical structure of the data, classifying objects to the clusters while optimizing the criterion function.

Regardless of the algorithm applied, the objects are decomposed into clusters based on their similarity. There are plenty of methods for identifying the distances between the objects, as mentioned earlier. Therefore, five classical measures (Euclidean, Manhattan, Maximum, Canberra, and Minkowski) measuring the distance between coordinates and three correlation-based distances (Pearson, Kendall, and Spearman) are computed. The study assesses the continuous and quasi-continuous data; therefore, the distances compatible with the binary and mixed data are omitted. Appendix 7 summarizes the formulas in accordance with which the aforementioned distances were calculated.

As demonstrated in the previous section, maximum (Chebyshev) and Kendall distances were only non-unimodal distances common for all of the datasets analysed. In order to preserve consistency, the uniform clustering method is used for all of the datasets for as long as possible. Consequently, the choice of the clustering algorithms would be narrowed down to methods compatible and consistent with the Chebyshev and Kendall distances.

Appendix 8 presents the results of the preliminary cluster validity analysis computed for the sake of selecting the appropriate clustering algorithm and the optimal number of clusters based on the internal validity and stability measures. Internal validity is assessed based on three indicators: Connectivity, Dunn index, and Silhouette index, while the list of stability measures includes APN, AD, ADM, and FOM. For the dataset provided by Hofstede *et al.* (2010), nine clusters were computed using the k-means algorithm since it was detected as the optimal one based on the Silhouette statistics (internal validity measure) and FOM (external validity measure). For the rest of the datasets, hierarchical clustering appeared to provide optimal scores in terms of the internal validity measures, while k-means method featured optimal stability scores. Nevertheless, in each case, internal validity results for the k-means algorithm were not significantly different from the hierarchical clustering scores (while the opposite was not true). Therefore, it was decided to conduct the clustering procedure using the k-means algorithm (see additional details in Appendix 8).

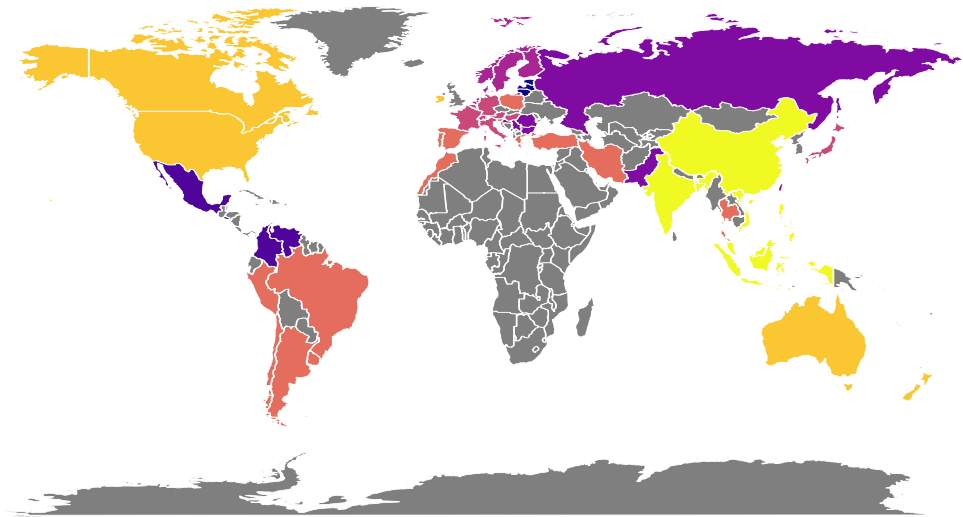
2.4. Results and discussion

Hofstede *et al.* (2010) provide the aggregate country-level data. Therefore, the results are presented based on the output of divisive clustering when countries from the same cluster are depicted in the same colour. All the remaining datasets

consist of micro-level data (individual responses). For each country, the proportion of individuals ending up in the particular cluster is calculated. Then, the dominant cluster (i.e., the cluster with the greatest share of respondents from a particular country) is determined. The cultural map is designed based on the dominant cluster. It should be mentioned that some countries seem to be more homogenous in terms of the cultural environment than others; it means that the majority of respondents tended to concentrate in one cluster, while for other countries, respondents were distributed more uniformly across the clusters. Therefore, the notion of a “dominant cluster” is a bit artificial and should be interpreted together with the distribution of respondents across the clusters.

Figure 17 presents the cultural map created based on the data provided by Hofstede *et al.* (2010). The results are pretty in line with the traditional regional clusters, although not being that cohesive. New Zealand, Canada, and the United States share the same cluster due to the common British colonial past, and Latin American countries are in the same cluster as Spain for pretty similar reasons. Besides, Norway, Finland, and Sweden are also frequently classified as countries sharing the same cultural background, and this study reports similar results.

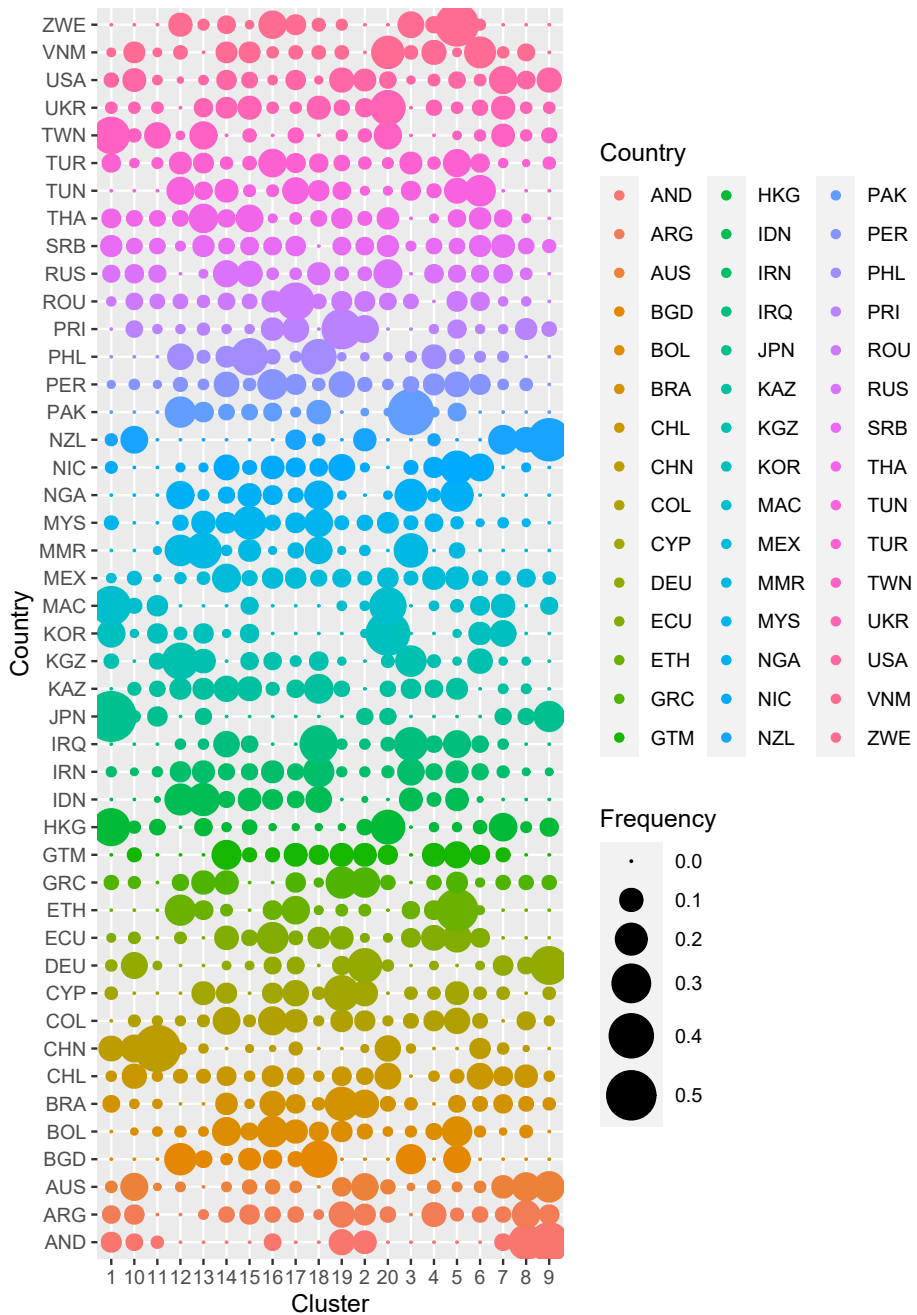
Figure 17. The cultural map of the world according to cultural dimensions specified by Hofstede *et al.* (2010) (power distance; individualism vs. collectivism; masculinity vs. femininity; uncertainty avoidance; long-term vs. short-term orientation; indulgence vs. restraint, country-level aggregates – Dataset 1)



Note: omitted countries are indicated in grey.

Source: own elaboration using R-cran (*maps* package, Becker *et al.*, 2018).

Figure 18. Distribution of respondents from different countries across clusters (WVS indices, individual responses – Dataset 2)



Source: own elaboration using R-cran.

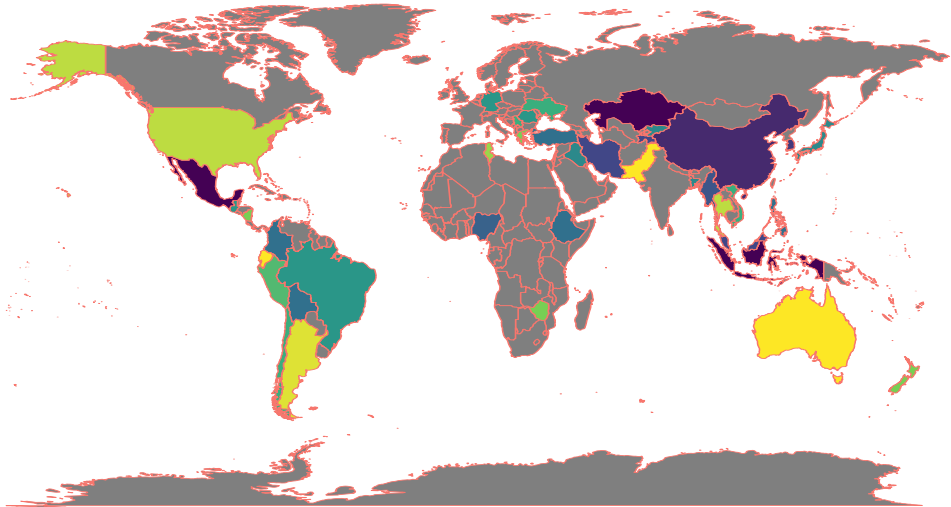
Figure 18 presents the distribution of respondents from different countries across the clusters computed using WVS indices. Earlier, the idea of measuring country-specific cultural environments based on the average values was criticized, and the results obtained support this criticism. There are only several societies where respondents feature a sufficient degree of cultural homogeneity (i.e., where at least 30% of respondents are located within the same cluster): Japan (51% of respondents assigned to the first cluster), China (44% of respondents assigned to the eleventh cluster), Pakistan (42% of respondents assigned to the third cluster), South Korea (39% of respondents assigned to the twentieth cluster), Zimbabwe (37% of respondents assigned to the fifth cluster), New Zealand (36% of respondents assigned to the ninth cluster), Ethiopia (35% of respondents assigned to the fifth cluster), Puerto Rico (31% of respondents assigned to the nineteenth cluster), and Andorra (31% of respondents assigned to the ninth cluster).

Alternatively, the degree of cultural homogeneity can be assessed based on the Herfindahl-Hirschman index (HHI)³⁹ values computed for each country based on the proportion of respondents from the particular country assigned to each cluster (see Appendix 9). Usually, the value of HHI above 2500 indicates a highly concentrated market. Using the same threshold value, the list of countries with a significant degree of cultural homogeneity includes Japan (HHI = 3077) solely.

Figure 19 presents the cultural map drawn based on the dominant cluster criterion. Perhaps, due to the high degree of cultural heterogeneity in the countries analysed, it is hard to detect any regional cultural clusters, except for the African cluster, consisting of Zimbabwe and Ethiopia (37% and 35% of respondents, respectively, assigned to the fifth cluster) and the cluster consisting of the New Zealand and Andorra (36% and 31% of respondents, respectively, assigned to the ninth cluster).

³⁹ The Herfindahl-Hirschman index is frequently used for measuring the degree of market concentration, being calculated as a sum of squares of each firm's market share. In the present study, the index assesses the degree of concentration of respondents from a particular country across the clusters, being calculated according to the following formula: $HHI_i = S_i^1 + S_i^2 + \dots + S_i^n$, where HHI_i stands for the value of the Herfindahl-Hirschman index computed for country i , and S_i^n stands for the share of respondents from country i assigned to cluster n (out of the total number of respondents from country i).

Figure 19. The cultural map of the world according to the WVS indices (individual responses – Dataset 2)

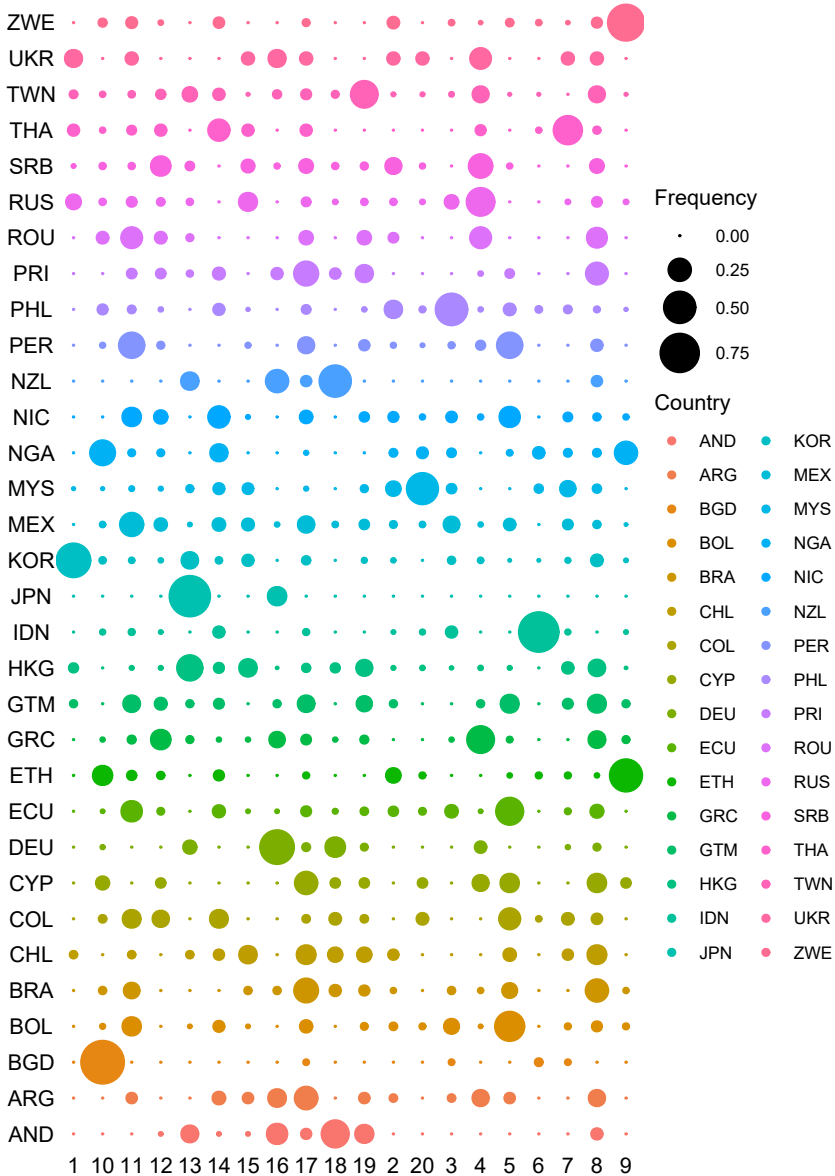


Note: omitted countries are indicated in grey.

Source: own elaboration using R-cran (*maps* package, Becker et al., 2018).

The additional attempt to draw the cultural map of the world based on individual responses was performed based on the “raw” data (i.e., more than 170 non-indexed scores describing various normative attitudes, beliefs, and perceptions – see Appendix 3). Figure 20 demonstrates the distribution of respondents from different countries across clusters. The results obtained from the dataset are, in general, more consistent with the notion of national culture since the distribution of respondents from the same country is less uniform. The list of countries with at least 50% of respondents assigned to the same cluster includes Bangladesh (93% of respondents assigned to the tenth cluster), Japan (83% of respondents assigned to the thirteenth cluster), India (80% of respondents assigned to the sixth cluster), Germany (58% of respondents assigned to the sixteenth cluster), South Korea (58% of respondents assigned to the first cluster), and Ethiopia (52% of respondents assigned to the ninth cluster).

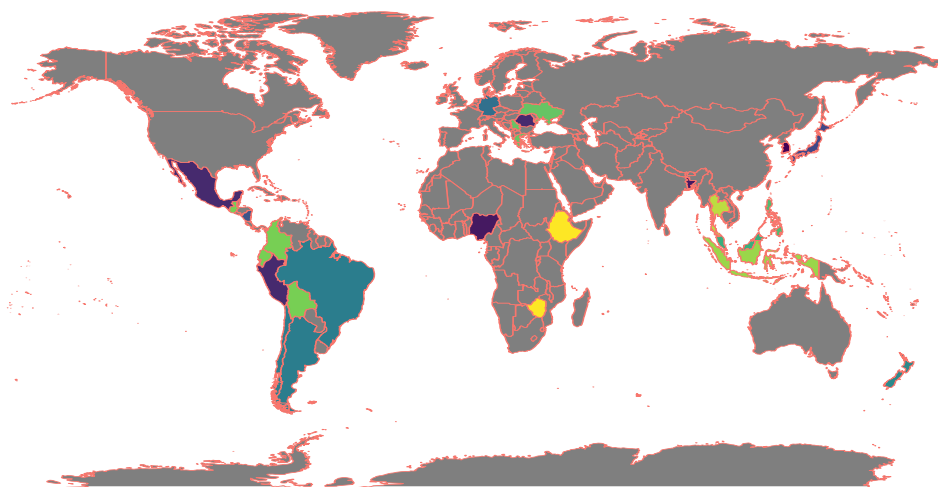
Figure 20. Distribution of respondents from different countries across clusters (variables describing the character of the cultural environment: social values, norms, and stereotypes; social capital, trust, and organizational membership; economic values; perceptions of corruption; perceptions of migration; perceptions of security; index of postmaterialism; perceptions of science and technology; religious values; ethical values; and political culture, interest, and participation, individual responses – Dataset 3)



Source: own elaboration using R-cran.

The list of countries where at least 30% of respondents ended up within the same cluster also includes Bolivia (43% of respondents assigned to the fifth cluster), Andorra (37% of respondents assigned to the eighteenth cluster), Ecuador (37% of respondents assigned to the fifth cluster), Greece (36% of respondents assigned to the fourth cluster), and Hong Kong (32% of respondents assigned to the thirteenth cluster). Appendix 10 presents the values of HHI for each country computed based on the clustering output of Dataset 3 (variables describing the character of the cultural environment: social values, norms, and stereotypes; social capital, trust, and organizational membership; economic values; perceptions of migration; perceptions of security; index of postmaterialism; perceptions of science and technology; religious values; ethical values; and political culture, interest, and participation). It is interesting to note that values of HHI also indicate that using the highly dimensional cultural dataset (Dataset 3) instead of the WVS indices provides a higher degree of cultural homogeneity across the countries analysed. According to HHI, the list of countries featuring a significant degree of cultural homogeneity includes Bangladesh (HHI = 8690), Japan (HHI = 7222), India (HHI = 6464), Zimbabwe (HHI = 4515), Germany (HHI = 3826), South Korea (HHI = 3604), New Zealand (HHI = 3400), Ethiopia (HHI = 3239), Philippines (HHI = 2938), and Malaysia (HHI = 2770).

Figure 21. The cultural map of the world according to variables describing the character of the cultural environment (social values, norms, and stereotypes; social capital, trust, and organizational membership; economic values; perceptions of migration; perceptions of security; index of postmaterialism; perceptions of science and technology; religious values; ethical values; and political culture, interest, and participation, individual responses – Dataset 3)

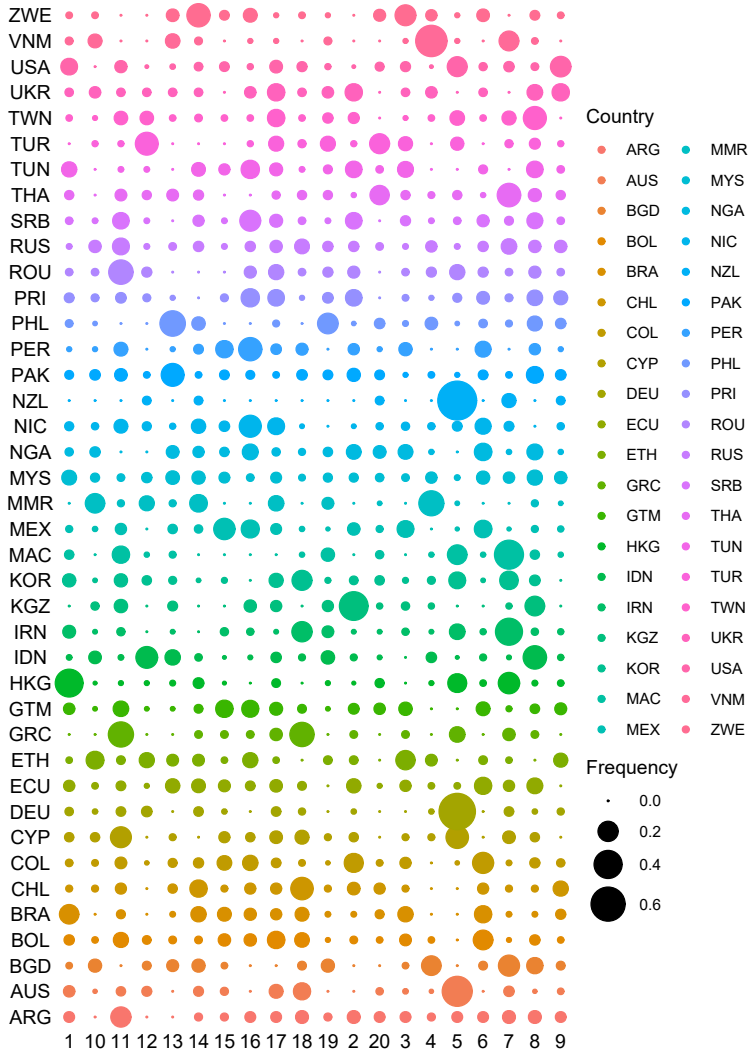


Note: omitted countries are indicated in grey.

Source: own elaboration using R-cran (*maps* package, Becker et al., 2018).

Figure 21 presents the cultural map designed on the basis of the dominant cluster computed based on the more extensive non-indexed dataset. Considering only the countries with a sufficiently high degree of cultural homogeneity, one can distinguish only one regional cluster, namely, Asian cluster, consisting of Japan and Hong Kong (83% and 32% of respondents, respectively, assigned to the thirteenth cluster).

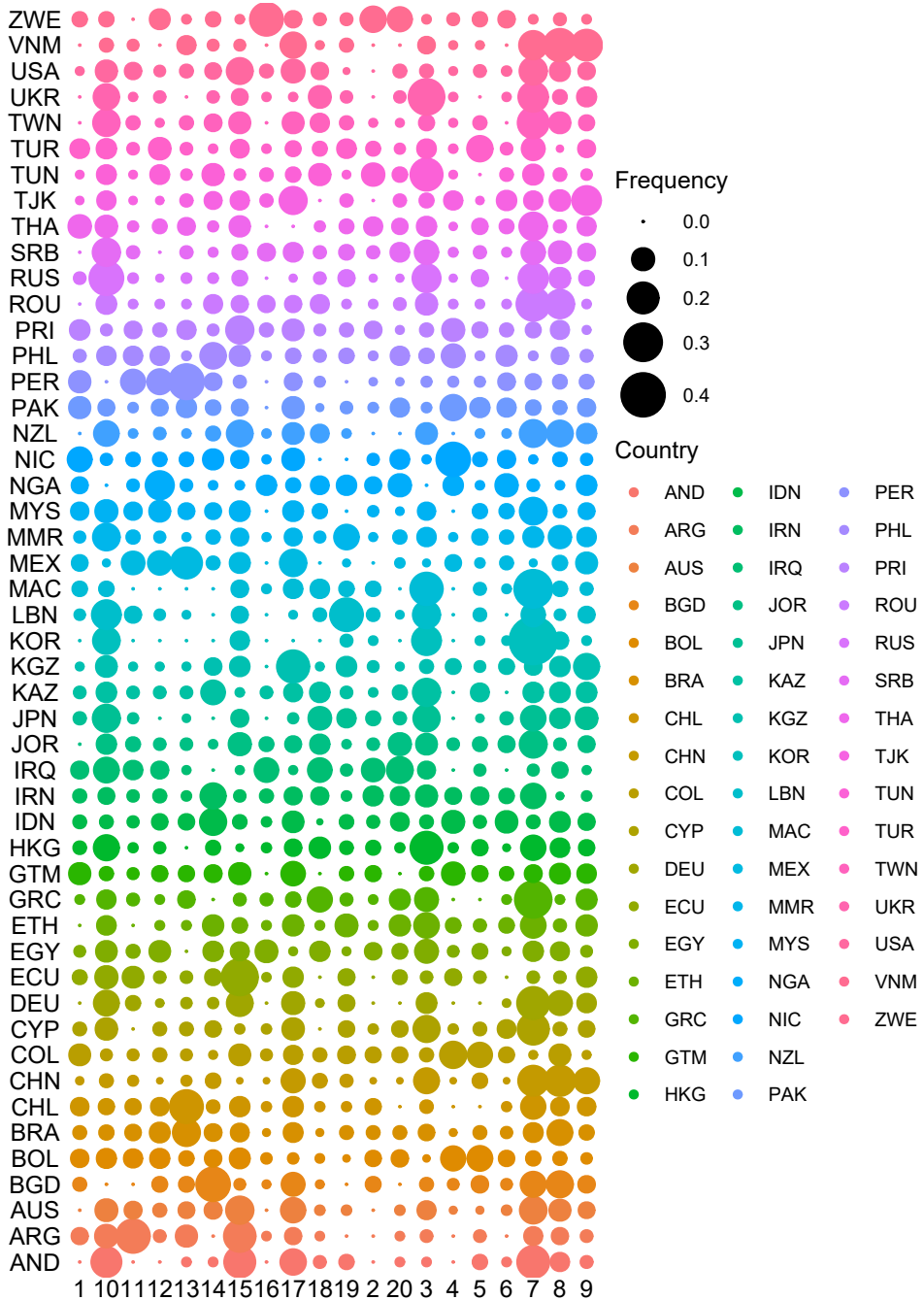
Figure 22. Distribution of respondents from different countries across clusters (variables describing the character of the formal institutional environment: social capital, trust, and organizational membership; perceptions of security; perceptions of corruption; political interest and political participation; political culture and political regimes, individual responses – Dataset 4)



Source: own elaboration using R-cran.

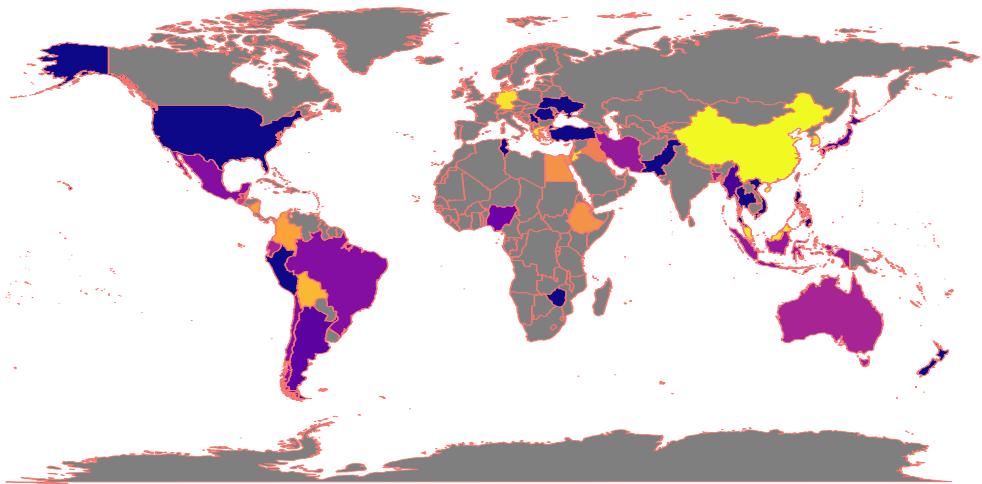
namely, South Korea, Macao, Greece, Germany, Andorra, and Cyprus (48%, 30%, 28%, 23%, 22%, 21%, and 20% of respondents, respectively, assigned to the seventh cluster); Ecuador and Argentina (28% and 21% of respondents, respectively, assigned to the fifteenth cluster); Peru, Chile, and Mexico (26%, 23%, and 20% of respondents, respectively, assigned to the thirteenth cluster); and Macao and Hong Kong (22% and 21% of respondents, respectively, assigned to third cluster). Interestingly, some of the obtained clusters coincide with the conventional regional map. However, the seventh cluster includes respondents from the countries characterized by the different cultural background, government policy design, and even legal system.

Figure 24. Distribution of respondents from different countries across clusters (variables describing the level of happiness well-being, individual responses – Dataset 5)



Source: own elaboration using R-cran.

Figure 25. The map of the world according to variables describing the level of happiness and well-being (individual responses – Dataset 5)



Note: omitted countries are indicated in grey.

Source: own elaboration using R-cran (*maps* package, Becker et al., 2018).

2.5. Conclusion

The present research attempted to assess the links between cultural environment, formal institutional environment and well-being using clustering analysis. While the majority of studies rely on the country-level analysis based on the aggregate indices, the first attempt was made to assess whether the notion of national cultural environment makes sense, i.e., whether informal institutional environment (i.e., the scope of norms and values shared by individuals) is sufficiently homogeneous (i.e., whether the notion of the national cultural environment makes sense). The analysis was performed based on the individual data provided by the WVS, where the prior stage of the classification was assigning a cluster to individual respondents.

The principal component analysis conducted prior to the study has demonstrated that Welzel's autonomy and post-materialism index contributed the most to the principal component yet being weakly correlated. When examining a more extensive dataset (i.e., the dataset consisting of more than 170 variables), the variables characterized by the most significant contribution to the principal component and positively correlated with each other were acceptance of homosexuality, acceptance of divorce, acceptance of sex before marriage, and acceptance

of euthanasia. The aforementioned variables are negatively correlated with the importance of God, frequency of praying, acceptance of religious authorities interpreting the law, and acceptance of the army taking over when the government is incompetent. The additional group of positively correlated variables included the degree to which the respondents agree that claiming social benefits to which one is not entitled is justifiable, the degree to which respondents agree that avoiding a fare on public transport is justifiable, the degree to which respondents agree that stealing property is justifiable, the degree to which respondents agree that cheating on taxes is justifiable, the degree to which respondents agree that accepting a bribe in the course of one's duties is justifiable, the degree to which respondents agree that it is justifiable for a man to beat his wife, the degree to which respondents agree that violence against other people is justifiable, the degree to which respondents agree that terrorism as a political, ideological or religious means is justifiable, and the degree to which respondents agree that political violence is justifiable. The quality of the formal institutional environment was assessed based on respondents' opinions regarding the various aspects of social life reflecting the quality of governance (more than 50 variables in total). The analysis of principal components has demonstrated that perception of corruption in the country, perceived risk to be held accountable for giving or receiving a bribe, respondents' opinion regarding how democratically their countries are governed, and satisfaction with the performance of a political system are characterized by the greatest contribution to the principal component. The latter three variables are positively correlated. Finally, out of the variables describing respondents' well-being (12 variables in total), freedom of choice and control, satisfaction with life, and satisfaction with a household's financial situation contribute the most to the principal component, and two latter variables are positively correlated.

It was found out that while some countries are characterized by a high degree of cultural homogeneity (when most of the individuals from a country are located within the same cluster), other countries are relatively heterogeneous (i.e., individuals from these countries tend to be distributed more uniformly across the clusters). For each of the countries, the dominant cluster was identified (i.e., the cluster with the highest share of respondents from the particular country). Considering the aforementioned cultural heterogeneity, the notion of the dominant cluster should be interpreted with cautiousness (obviously, it makes much more sense in the countries with the majority of individuals being located within a single cluster).

The cluster analysis computed based on the dataset consisting of WVS indices did not allow for drawing any conclusions about regional cultural clusters since the countries analysed did not feature a sufficient degree of cultural

homogeneity. In fact, there is only one regional cultural cluster corresponding to the traditional division, namely, the African cluster consisting of Zimbabwe and Ethiopia. Nevertheless, clustering based on a more extensive cultural dataset resulted in a less uniform distribution of respondents from the same country across different clusters. It is interesting to notice (although the result obtained would require a more extensive and careful analysis and interpretation) that countries featuring the highest degree of cultural homogeneity are Asian societies, which are traditionally referred to as more traditionalist (Bangladesh, Japan, Indonesia, South Korea, Philippines, and Malaysia). However, the list of countries featuring a relatively high degree of cultural homogeneity also included Germany, New Zealand, Ethiopia, and Zimbabwe, which implies that Eastern traditionalism and collectivism cannot be taken as a satisfactory explanation. Considering only the countries with a sufficiently high degree of cultural homogeneity, there is only one regional cluster consisting of Hong Kong and Japan. The attempt to classify the countries based on the perceived quality of the formal institutional environment and well-being was less successful. Firstly, countries demonstrated a much smaller extent of homogeneity in terms of formal institutional environment quality and the level of economic well-being in comparison with the cultural environment (i.e., the distribution of respondents across clusters was more uniform in the former cases). Secondly, countries sharing the same clusters based on the quality of formal institutional environment variables were sometimes pretty different from the perspective of the legal system and political regime (which are frequently used as the proxies for the formal institutional environment). The overall conclusion is that countries sharing similar cultural traits did not demonstrate similarity in terms of the formal institutional environment and the level of economic well-being (alternatively, countries sharing the same clusters designed based on the cultural environment variables mostly ended up in the different clusters designed based on the quality of formal institutional environment and the level of economic well-being variables).

It shall be admitted that the results were obtained using the WVS Wave 7 dataset which is not complete yet. On the one hand, it allowed for analysing the most up-to-date data; on the other hand, it significantly narrowed down the sample of countries as well as the range of variables. Besides, it is important to keep in mind that the datasets used for the clustering analysis (e.g., cultural dimensions, quality of formal institutional environment, and aspects of economic well-being) did not contain the same number of countries (in other words, the full dataset could provide more consistent results regarding whether sharing similar cultural traits implies similar formal institutional environment and/

or a similar level of economic well-being). Moreover, it shall be admitted that the analysis of cultural homogeneity (although, to the author's best knowledge, there has been no attempt to question the appropriateness of country-average cultural dimensions indicators based on the empirical data so far) was a bit naïve. The degree of cultural homogeneity was roughly analysed based on the shares of respondents from a particular country in a single cluster as well as using the Herfindahl-Hirschman index computed for a single country. Further elaborations on the problem of cultural homogeneity might, perhaps, utilize more sophisticated measures. Finally, the conclusions about the links between cultural traits, quality of the formal institutional environment, and economic well-being were drawn based on the concentration of individuals from particular countries in the joint clusters solely. The use of correlation measures would not be valid since, being conducted on the basis of micro-level data, it would not explain the country-level similarities, while the use of aggregate country-level cultural indicators is not appropriate in the light of country-specific cultural environment indicators discussed earlier in the study. Perhaps, to provide clearer conclusions regarding the links between culture, formal institutions, and well-being based on the micro-level data, further studies on the topic might utilize the Fowlkes-Mallows index computed based on several hierarchical clusterings designed using cultural, institutional, and well-being datasets, analogously to the present study.

Nevertheless, the present study provided several important implications. Firstly, the study provided some additional criticism towards assessing the character of the cultural environment in the country based on the aggregate indicators (or the idea of the country-specific national environment, in general). For most countries, it would be impossible to detect the respondents who originated in this country since the distribution of respondents across clusters was relatively uniform. Secondly, the study demonstrated (although it was not the primary aim) that certain countries feature a higher degree of cultural homogeneity than others (nevertheless, the results obtained require further verification and interpretation). Finally, although it was possible to detect some regional cultural clusters based on the cluster analysis, it is not possible to draw any links between the character of informal institutions, quality of the institutional environment, and well-being. The results obtained do not imply an absence of links between the aforementioned variables. Alternatively, they demonstrate that multiple outcomes are possible even given a similar set of informal and/or formal institutions might lead to a variety of outcomes.

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APPENDICES

Appendix 1. Country codes (World Values Survey, Wave 7)

AND – Andorra	COL – Colombia	TJK – Tajikistan
MAC – Macao	PER – Peru	IDN – Indonesia
SAR PRC	CYP – Cyprus	THA – Thailand
ARG – Argentina	PHL – Philippines	IRN – Iran
MYS – Malaysia	ECU – Ecuador	TUN – Tunisia
AUS – Australia	PRI – Puerto Rico	IRQ – Iraq
MEX – Mexico	EGY – Egypt	TUR – Turkey
BGD – Bangladesh	ROU – Romania	JPN – Japan
MMR – Myanmar	ETH – Ethiopia	UKR – Ukraine
BOL – Bolivia	RUS – Russian Federation	JOR – Jordan
NZL – New Zealand	DEU – Germany	USA – United States
BRA – Brazil	SRB – Serbia	KAZ – Kazakhstan
NIC – Nicaragua	GRC – Greece	VNM – Vietnam
CHL – Chile	KOR – South Korea	KGZ – Kyrgyzstan
NGA – Nigeria	GTM – Guatemala	ZWE – Zimbabwe
CHN – China	TWN – Taiwan ROC	
PAK – Pakistan	HKG – Hong Kong SAR PRC	

Source: The World Values Survey Association, World Values Survey Wave 7 (2017–2020) Variables Report, <https://www.worldvaluessurvey.org/WVSDocumentationWV7.jsp> (accessed 10.02.2021).

Appendix 2. Variables used for assessing the cultural environment – WVS indices, individual responses (World Values Survey, Wave 7)

Variables and description
• Post-Materialist index 12-item (Y001)
• Autonomy Index (Y003)
• Welzel Overall Secular Values (SACSECVAL)
• Welzel emancipative values (RESEMAVAL)
• Welzel defiance – 1: Inverse respect for authority (I_AUTHORITY)
• Welzel defiance – 2: Inverse national pride (I_NATIONALISM)
• Welzel defiance – 3: Inverse devoutness (I_DEVOUT)

Variables and description
• Welzel defiance sub-index (DEFIANCE)
• Welzel disbelief1: Inverse importance of religion (I_RELIGIMP)
• Welzel disbelief2: Inverse religious person (I_RELIGBEL)
• Welzel disbelief3: Inverse religious practice (I_RELIGPRAC)
• Welzel disbelief sub-index (DISBELIEF)
• Welzel relativism – 1: Inverse norm conform1 (I_NORM1)
• Welzel relativism – 2: Inverse norm conform2 (I_NORM2)
• Welzel relativism – 3: Inverse norm conform3 (I_NORM3)
• Welzel relativism (RELATIVISM)
• Welzel autonomy – 1: Independence as kid quality (I_INDEP)
• Welzel autonomy – 2: Imagination as kid quality (I_IMAGIN)
• Emancipative Values – 1: Obedience not kid quality (I_NONOBED)
• Welzel Autonomy sub index (AUTONOMY)
• Welzel equality – 1: Gender equality: job (I_WOMJOB)
• Welzel equality – 2: Gender equality: politics (I_WOMPOL)
• Welzel equality – 3: Gender equality: education (I_WOMEDU)
• Emancipative Values – 2: Equality sub-index (EQUALITY)
• Welzel choice – 1: Homosexuality acceptance (I_HOMOLIB)
• Welzel choice – 2: Abortion acceptable (I_ABORTLIB)
• Welzel choice – 3: Divorce acceptable (I_DIVORLIB)
• Welzel choice subindex (CHOICE)
• Welzel voice subindex (VOICE)

Source: The World Values Survey Association, World Values Survey Wave 7 (2017–2020) Variables Report, <https://www.worldvaluessurvey.org/WVSDocumentationWV7.jsp> (accessed 10.06.2021).

Appendix 3. Variables used for assessing the cultural environment – individual responses (World Values Survey, Wave 7)

Sub-dataset	Description
<p>Social values, norms, and stereotypes</p>	<ul style="list-style-type: none"> • Important in life: Family (Q1) • Important in life: Friends (Q2) • Important in life: Leisure time (Q3) • Important in life: Politics (Q4) • Important in life: Work (Q5) • Important in life: Religion (Q6) • Important child qualities: Good manners (Q7) • Important child qualities: Independence (Q8) • Important child qualities: Hard work (Q9) • Important child qualities: Feeling of responsibility (Q10) • Important child qualities: Imagination (Q11) • Important child qualities: Tolerance and respect for other people (Q12) • Important child qualities: Thrift saving money and things (Q13) • Important child qualities: Determination perseverance (Q14) • Important child qualities: Religious faith (Q15) • Important child qualities: Unselfishness (Q16) • Important child qualities: Obedience (Q17) • Neighbors: Drug addicts (Q18) • Neighbors: People of a different race (Q19) • Neighbors: People who have AIDS (Q20) • Neighbors: Immigrants/foreign workers (Q21) • Neighbors: Homosexuals (Q22) • Neighbors: People of a different religion (Q23) • Neighbors: Heavy drinkers (Q24) • Neighbors: Unmarried couples living together (Q25) • Neighbors: People who speak a different language (Q26) • One of main goals in life has been to make my parents proud (Q27) • Pre-school child suffers with working mother (Q28) • Men make better political leaders than women do (Q29) • University is more important for a boy than for a girl (Q30) • Men make better business executives than women do (Q31) • Being a housewife just as fulfilling (Q32)

Sub-dataset	Description
	<ul style="list-style-type: none"> • Jobs scarce: Men should have more right to a job than women (Q33) • Jobs scarce: Employers should give priority to (nation) people than immigrants (Q34) • Problem if women have more income than husband (Q35) • Homosexual couples are as good parents as other couples (Q36) • Duty towards society to have children (Q37) • It is children duty to take care of ill parent (Q38) • People who don't work turn lazy (Q39) • Work is a duty towards society (Q40) • Work should always come first even if it means less spare time (Q41) • Basic kinds of attitudes concerning society (Q42) • Future changes: Less importance placed on work (Q43) • Future changes: More emphasis on technology (Q44) • Future changes: Greater respect for authority (Q45)
Social capital, trust, and organizational membership	<ul style="list-style-type: none"> • Most people can be trusted (Q57) • How much you trust: Your family (Q58) • Trust: Your neighborhood (Q59) • Trust: People you know personally (Q60) • Trust: People you meet for the first time (Q61) • Trust: People of another religion (Q62) • Trust: People of another nationality (Q63) • Confidence: Churches (Q64) • Active/Inactive membership: Church or religious organization (Q94) • Active/Inactive membership: sport or recreational organization (Q95) • Active/Inactive membership: art, music, educational organization (Q96) • Active/Inactive membership: Labor union (Q97) • Active/Inactive membership: Political party (Q98) • Active/Inactive membership: Environmental organization (Q99) • Active/Inactive membership: professional organization (Q100) • Active/Inactive membership: charitable/humanitarian organization (Q101) • Active/Inactive membership: consumer organization (Q102)

Sub-dataset	Description
	<ul style="list-style-type: none"> • Active/Inactive membership: Self-help group, mutual aid group (Q103) • Active/Inactive membership: women's group (Q104) • Active/Inactive membership: other organization (Q105)
Economic values	<ul style="list-style-type: none"> • Income equality vs larger income differences (Q106) • Private vs state ownership of business (Q107) • Government's vs individual's responsibility (Q108) • Competition good or harmful (Q109) • Success: hard work vs luck (Q110) • Protecting environment vs. Economic growth (Q111)
Perceptions of migration	<ul style="list-style-type: none"> • Impact of immigrants on the development of the country (Q121) • Immigration in your country: Fills useful jobs in the workforce (Q122) • Immigration in your country: Strengthens cultural diversity (Q123) • Immigration in your country: Increases the crime rate (Q124) • Immigration in your country: Gives asylum to political refugees (Q125) • Immigration in your country: Increases the risks of terrorism (Q126) • Immigration in your country: Helps poor people establish new lives (Q127) • Immigration in your country: Increases unemployment (Q128) • Immigration in your country: Leads to social conflict (Q129) • Immigration policy preference (Q130)
Perceptions of security	<ul style="list-style-type: none"> • Freedom and Equality – Which more important (Q149) • Freedom and security – Which more important (Q150) • Willingness to fight for country (Q151)
Index of post materialism	<ul style="list-style-type: none"> • Aims of country: first choice (Q152) • Aims of country: second choice (Q153) • Aims of respondent: first choice (Q154) • Aims of respondent: second choice (Q155) • Most important: first choice (Q156) • Most important: second choice (Q157)

Sub-dataset	Description
Perceptions about science and technology	<ul style="list-style-type: none"> • Science and technology are making our lives healthier, easier, and more comfortable (Q158) • Because of science and technology, there will be more opportunities for the next generation (Q159) • We depend too much on science and not enough on faith (Q160) • One of the bad effects of science is that it breaks down people's ideas of right and wrong (Q161) • It is not important for me to know about science in my daily life (Q162) • The world is better off, or worse off, because of science and technology (Q163)
Religious values	<ul style="list-style-type: none"> • Importance of God (Q164) • Believe in: God (Q165) • Believe in: life after death (Q166) • Believe in: hell (Q167) • Believe in: heaven (Q168) • Whenever science and religion conflict, religion is always right (Q169) • The only acceptable religion is my religion (Q170) • How often do you attend religious services (Q171) • How often to you pray (Q172) • Religious person (Q173) • Meaning of religion: To follow religious norms and ceremonies vs To do good to other people (Q174) • Meaning of religion: To make sense of life after death vs To make sense of life in this world (Q175)
Ethical values	<ul style="list-style-type: none"> • Degree of agreement: Nowadays one often has trouble deciding which moral rules are the right ones to follow (Q176) • Justifiable: Claiming government benefits to which you are not entitled (Q177) • Justifiable: Avoiding a fare on public transport (Q178) • Justifiable: Stealing property (Q179) • Justifiable: Cheating on taxes (Q180) • Justifiable: Someone accepting a bribe in the course of their duties (Q181) • Justifiable: Homosexuality (Q182) • Justifiable: Prostitution (Q183) • Justifiable: Abortion (Q184) • Justifiable: Divorce (Q185) • Justifiable: Sex before marriage (Q186)

Sub-dataset	Description
	<ul style="list-style-type: none"> • Justifiable: Suicide (Q187) • Justifiable: Euthanasia (Q188) • Justifiable: For a man to beat his wife (Q189) • Justifiable: Parents beating children (Q190) • Justifiable: Violence against other people (Q191) • Justifiable: Terrorism as a political, ideological or religious means (Q192) • Justifiable: Having casual sex (Q193) • Justifiable: Political violence (Q194) • Justifiable: Death penalty (Q195) • Government has the right: Keep people under video surveillance in public areas (Q196) • Government has the right: Monitor all e-mails and any other information exchanged on the Internet (Q197) • Government has the right: Collect information about anyone living in this country without their knowledge (Q198)
<p>Political culture, interest, and participation</p>	<ul style="list-style-type: none"> • Interest in politics (Q199) • How often discusses political matters with friends (Q200) • Information source: Daily newspaper (Q201) • Information source: TV news (Q202) • Information source: Radio news (Q203) • Information source: Mobile phone (Q204) • Information source: Email (Q205) • Information source: Internet (Q206) • Information source: social media (Facebook, Twitter, etc.) (Q207) • Information source: Talk with friends or colleagues (Q208) • Political action: Signing a petition (Q209) • Political action: joining in boycotts (Q210) • Political action: attending lawful/peaceful demonstrations (Q211) • Political action: joining unofficial strikes (Q212) • Social activism: Donating to a group or campaign (Q213) • Social activism: Contacting a government official (Q214) • Social activism: Encouraging others to take action about political issues (Q215) • Social activism: Encouraging others to vote (Q216) • Political actions online: Searching information about politics and political events (Q217)

Sub-dataset	Description
	<ul style="list-style-type: none"> • Political actions online: Signing an electronic petition (Q218) • Political actions online: Encouraging other people to take any form of political action (Q219) • Political actions online: Organizing political activities, events, protests (Q220) • Vote in elections: local level (Q221) • Vote in elections: National level (Q222) • Political system: Having a strong leader who does not have to bother with parliament and elections (Q235) • Political system: Having experts, not government, make decisions according to what they think is best for the country (Q236) • Political system: Having the army rule (Q237) • Political system: Having a democratic political system (Q238) • Political system: Having a system governed by religious law in which there are no political parties or elections (Q239) • Left-right political scale (Q240) • Democracy: Governments tax the rich and subsidize the poor (Q241) • Democracy: Religious authorities interpret the laws (Q242) • Democracy: People choose their leaders in free elections (Q243) • Democracy: People receive state aid for unemployment (Q244) • Democracy: The army takes over when government is incompetent (Q245) • Democracy: Civil rights protect people's liberty against oppression (Q246) • Democracy: The state makes people's incomes equal (Q247) • Democracy: People obey their rulers (Q248) • Democracy: Women have the same rights as men (Q249) • Importance of democracy (Q250)

Source: The World Values Survey Association, World Values Survey Wave 7 (2017–2020) Variables Report, <https://www.worldvaluessurvey.org/WVSDocumentationWV7.jsp> (accessed 10.06.2021).

Appendix 4. Variables used for assessing the perceived quality of the formal institutional environment – individual responses (World Values Survey, Wave 7)

Sub-dataset	Description
Social capital, trust, and organizational membership	<ul style="list-style-type: none"> • Confidence: Armed Forces (Q65) • Confidence: The Press (Q66) • Confidence: Television (Q67) • Confidence: The Police (Q68) • Confidence: Justice System/Courts (Q69) • Confidence: The Government (Q70) • Confidence: The Political Parties (Q71) • Confidence: Parliament (Q72) • Confidence: The Civil Services (Q73) • Confidence: Election (Q76)
Perceptions of security	<ul style="list-style-type: none"> • Secure in neighborhood (Q131) • Frequency in your neighborhood: Robberies (Q132) • Frequency in your neighborhood: Alcohol consumed in the streets (Q133) • Frequency in your neighborhood: Police or military interfere with people’s private life (Q134) • Frequency in your neighborhood: Racist behavior (Q135) • Frequency in your neighborhood: Drug sale in streets (Q136) • Frequency in your neighborhood: Street violence and fights (Q137) • Frequency in your neighborhood: Sexual harassment (Q138) • Things done for reasons of security: Didn’t carry much money (Q139) • Things done for reasons of security: Preferred not to go out at night (Q140) • Things done for reasons of security: Carried a knife, gun or other weapon (Q141) • Worries: Losing my job or not finding a job (Q142) • Worries: Not being able to give one’s children a good education (Q143) • Respondent was victim of a crime during the past year (Q144) • Respondent’s family was victim of a crime during last year (Q145) • Worries: A war involving my country (Q146) • Worries: A terrorist attack (Q147) • Worries: A civil war (Q148)

Sub-dataset	Description
Perceptions of corruption	<ul style="list-style-type: none"> • Perceptions of corruption in the country (Q112) • Involved in corruption: State authorities (Q113) • Involved in corruption: Business executives (Q114) • Involved in corruption: Local authorities (Q115) • Involved in corruption: Civil service providers (Q116) • Involved in corruption: Journalists and media (Q117) • Frequency ordinary people pay a bribe, give a gift or do a favor to local officials/service providers in order to get services (Q118) • Degree of agreement: On the whole, women are less corrupt than men (Q119) • Risk to be held accountable for giving or receiving a bribe (Q120)
Political interest and political participation	<ul style="list-style-type: none"> • How often in country's elections: Votes are counted fairly (Q224) • How often in country's elections: Opposition candidates are prevented from running (Q225) • How often in country's elections: TV news favors the governing party (Q226) • How often in country's elections: Voters are bribed (Q227) • How often in country's elections: Journalists provide fair coverage of elections (Q228) • How often in country's elections: Election officials are fair (Q229) • How often in country's elections: Rich people buy elections (Q230) • How often in country's elections: Voters are threatened with violence at the polls (Q231) • How often in country's elections: Voters are offered a genuine choice in the elections (Q232) • How often in country's elections: Women have equal opportunities to run the office (Q233)
Political culture and political regimes	<ul style="list-style-type: none"> • How democratically is this country being governed today (Q251) • Satisfaction with the political system performance (Q252) • Respect for individual human rights nowadays (Q253)

Source: The World Values Survey Association, World Values Survey Wave 7 (2017–2020) Variables Report, <https://www.worldvaluessurvey.org/WVSDocumentationWV7.jsp> (accessed 10.06.2021).

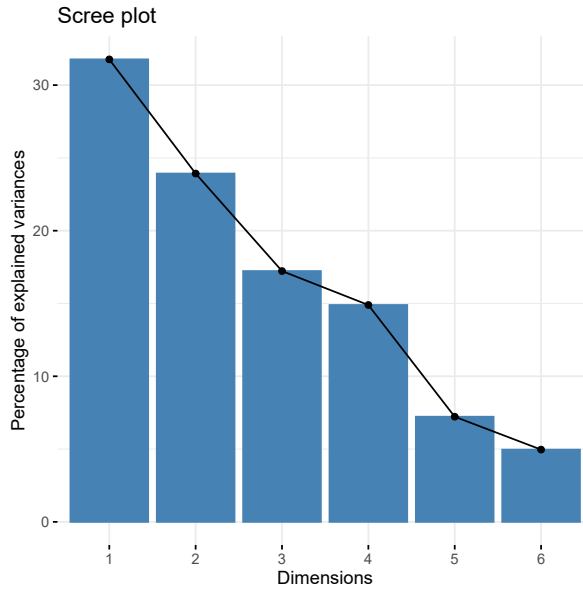
Appendix 5. Variables used for assessing well-being – individual responses (World Values Survey, Wave 7)

Sub-dataset	Description
Happiness and Wellbeing	<ul style="list-style-type: none"> • Feeling of happiness (Q46) • State of health (subjective) (Q47) • How much freedom of choice and control (Q48) • Satisfaction with your life (Q49) • Satisfaction with financial situation of household (Q50) • Frequency you/family (last 12 month): Gone without enough food to eat (Q51) • Frequency you/family (last 12 month): Felt unsafe from crime in your own home (Q52) • Frequency you/family (last 12 month): Gone without needed medicine or treatment that you needed (Q53) • Frequency you/family (last 12 month): Gone without a cash income (Q54) • In the last 12 months, how often have you or your family: Gone without a safe shelter over your head (Q55) • Standard of living comparing with your parents (Q56)

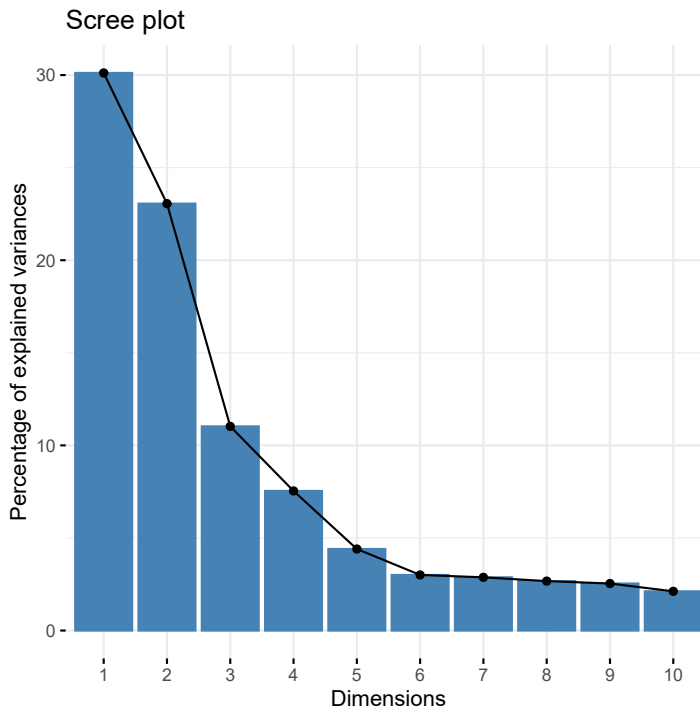
Source: The World Values Survey Association, World Values Survey Wave 7 (2017–2020) Variables Report, <https://www.worldvaluessurvey.org/WVSDocumentationWV7.jsp> (accessed 10.06.2021).

Appendix 6. Eigenvalues visualization; the proportion of variance explained by each principal component

Figure A6.1. Eigenvalues distribution for the cultural dimensions specified by Hofstede *et al.* (2010) (Dataset 1)

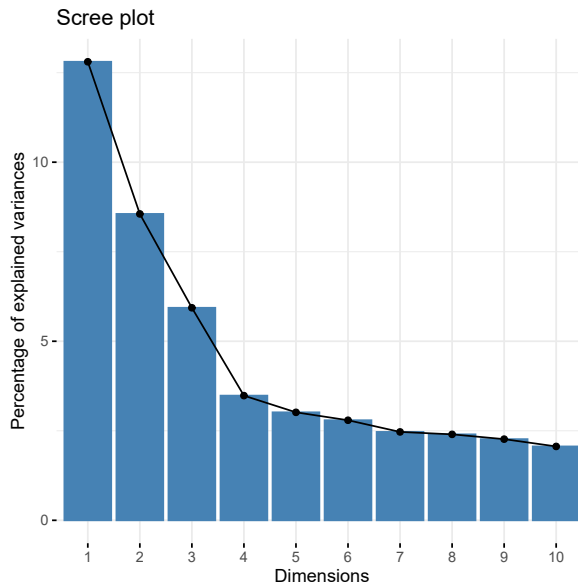


Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Figure A6.2. Eigenvalues distribution for the WVS indices (Dataset 2)

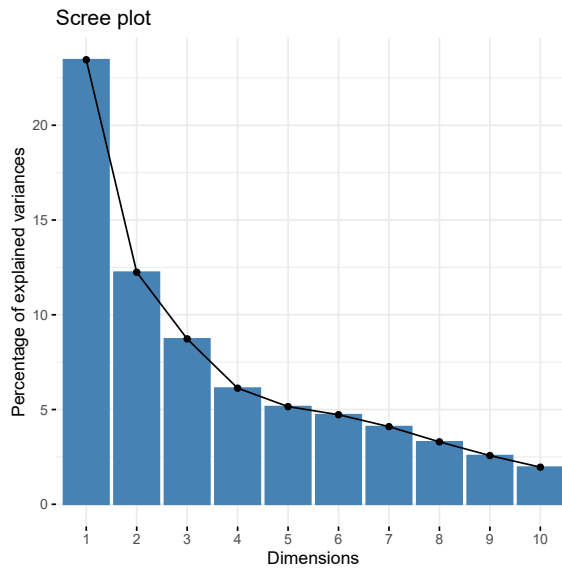
Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Figure A6.3. Eigenvalues distribution for the variables describing the character of cultural environment (Dataset 3)

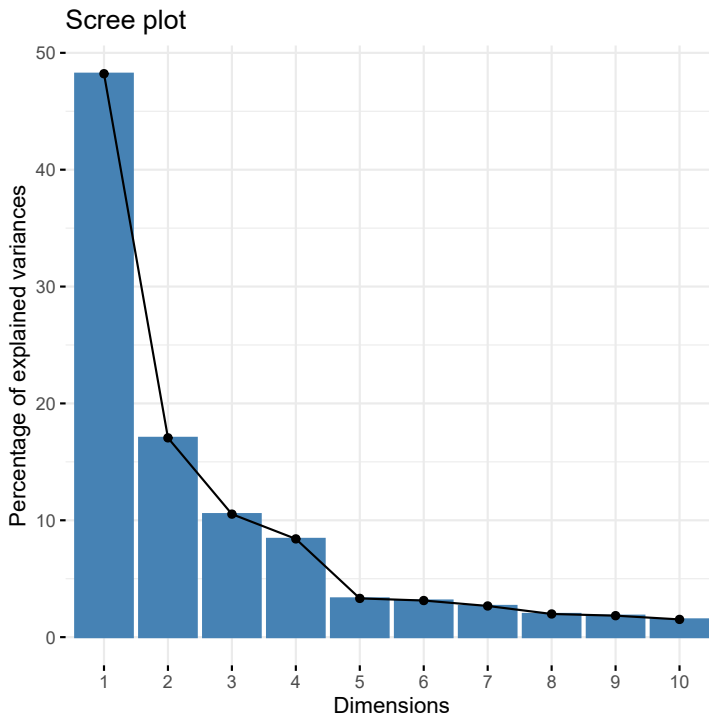


Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Figure A6.4. Eigenvalues distribution for the variables describing the character of formal institutional environment (Dataset 4)



Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Figure A6.5. Eigenvalues distribution for the variables describing well-being (Dataset 5)

Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Appendix 7. Summary on the distance measures used in the study

Distance	Formula
Euclidean	$d_{Euclidean} = \left(\sum_{i=1}^n x_i - y_i ^m \right)^{1/2}$
Manhattan	$d_{Manhattan} = \sum_{i=1}^n x_i - y_i $
Chebyshev (maximum)	$d_{Chebyshev} = \max x_i - y_i $
Canberra	$d_{Canberra} = \sum_{i=1}^n \frac{ x_i - y_i }{(x_i + y_i)}$
Minkowski	$d_{Minkowski} = \left(\sum_{i=1}^n x_i - y_i ^m \right)^{1/m}$
Pearson	$d_{Pearson} = \frac{\sum_{i=1}^n (x_i - \mu_x)(y_i - \mu_y)}{\sqrt{\sum_{i=1}^n (x_i - \mu_x)^2 \sum_{i=1}^n (y_i - \mu_y)^2}}$
Kendall	$d_{Kendall} = 1 - \frac{n_c - n_d}{\frac{1}{2}n(n-1)}$ <p>Where n_c stands for the number of concordant pairs; n_d stands for the number of discordant pairs; n stands for the total number of observations.</p>
Spearman	$d_{Spearman} = 1 - \frac{\sum_{i=1}^n (x'_i - \bar{x}') (y'_i - \bar{y}')}{\sqrt{\sum_{i=1}^n (x'_i - \bar{x}')^2 \sum_{i=1}^n (y'_i - \bar{y}')^2}}$ <p>Where x'_i stands for the rank of x_i and y'_i stands for the rank of y_i</p>

Appendix 8. Cluster validity

Table 8A.1. Cluster validation indicators for the cultural dimensions specified by Hofstede *et al.* (2010) (Dataset 1)

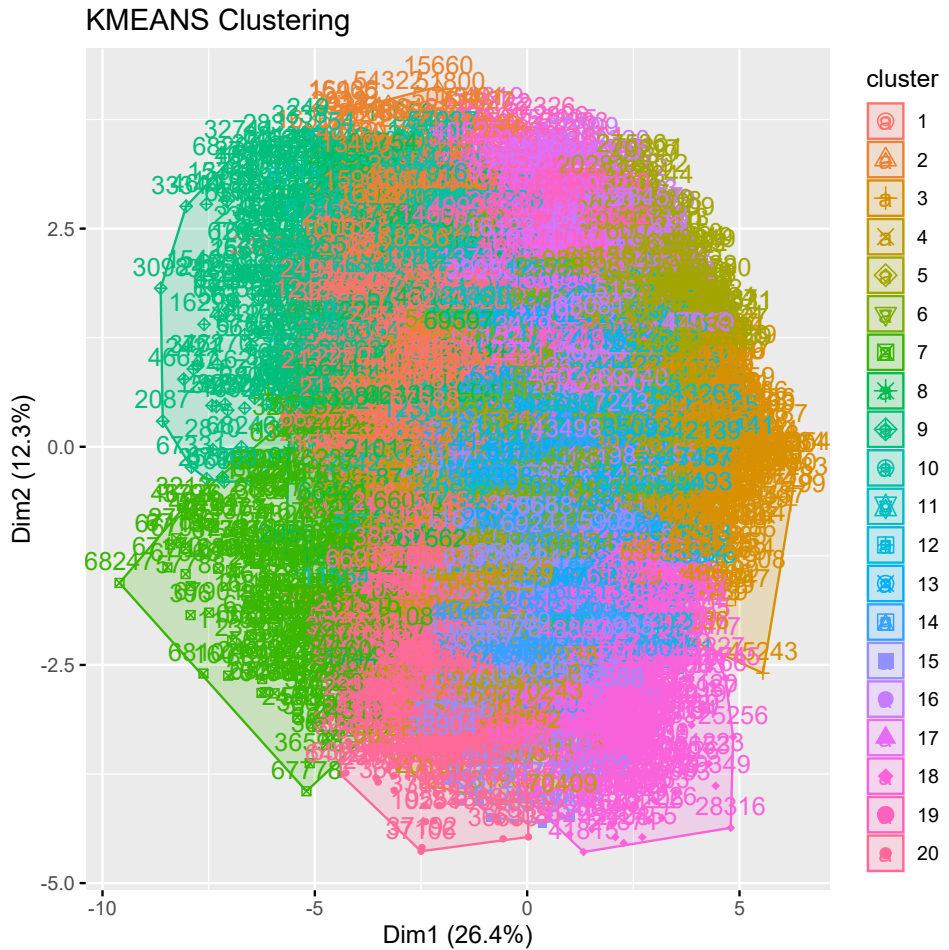
	Score	Method	Clusters
Criterion: internal			
Connectivity	3.0540	Hierarchical	2
Dunn	0.4596	Hierarchical	2
Silhouette	0.3163	K-means	9
Criterion: stability			
APN	0.0448	Hierarchical	2
AD	37.9639	K-means	10
ADM	3.6065	Hierarchical	2
FOM	17.8111	K-means	9

Source: own elaboration using R-cran (*clValid* package, Brock *et al.*, 2020).

	Score	Method	Clusters
Criterion: stability			
APN	0.0409	Hierarchical	2
AD	5.7064	K-means	20
ADM	0.2007	K-means	2
FOM	0.8043	K-means	20

Source: own elaboration using R-cran (*clValid* package, Brock et al., 2020).

Figure 8A.2. K-means clusters for the WVS indices (Dataset 2)



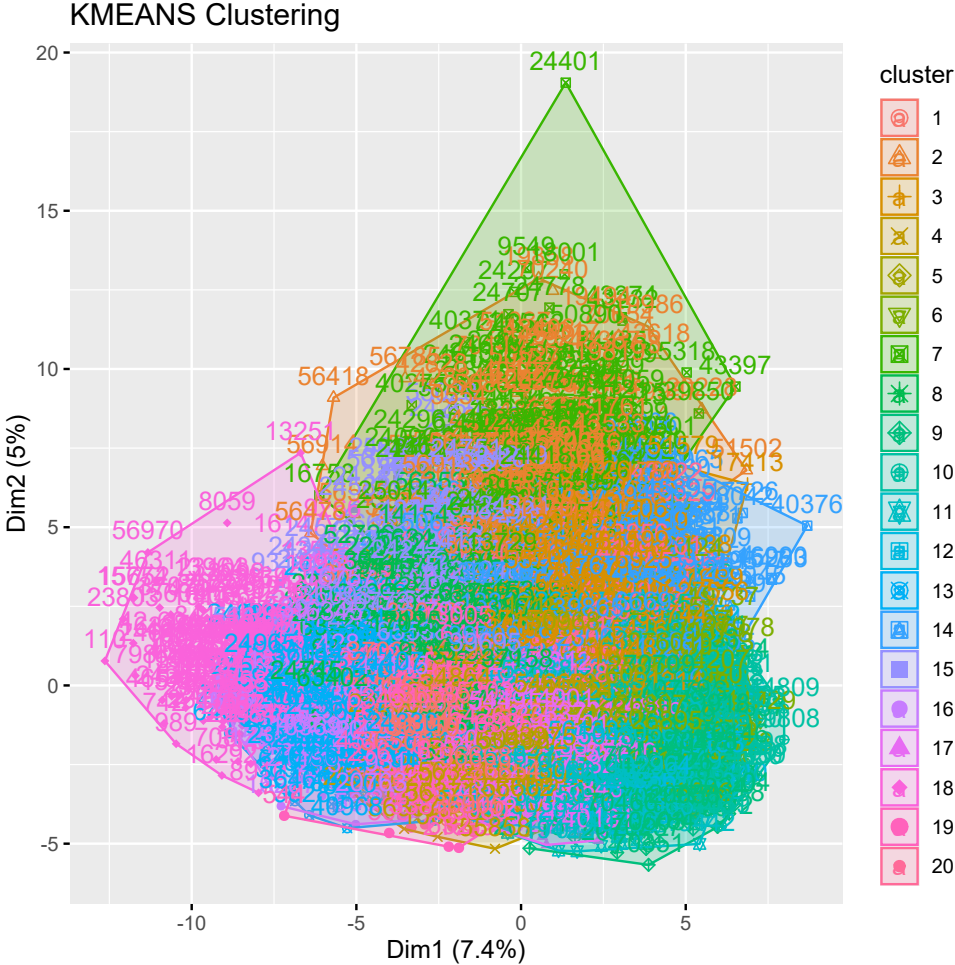
Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Table 8A.3. Cluster validation indicators for the variables indicating the character of cultural environment (Dataset 3)

	Score	Method	Clusters
Criterion: internal			
Connectivity	2.9290	Hierarchical	2
Dunn	0.6257	Hierarchical	2
Silhouette	0.2348	Hierarchical	2
Criterion: stability			
APN	0.0004	Hierarchical	2
AD	16.8130	K-means	18
ADM	0.0105	Hierarchical	2
FOM	0.9242	K-means	20

Source: own elaboration using R-cran (*clValid* package, Brock *et al.*, 2020).

Figure 8A.3. K-means clusters for the variables indicating the character of cultural environment (Dataset 3)



Source: own elaboration using R-cran (factoextra package, Kassambara and Mundt, 2020).

Table 8A.4. Cluster validation indicators for the variables indicating the character of formal institutional environment (Dataset 4)

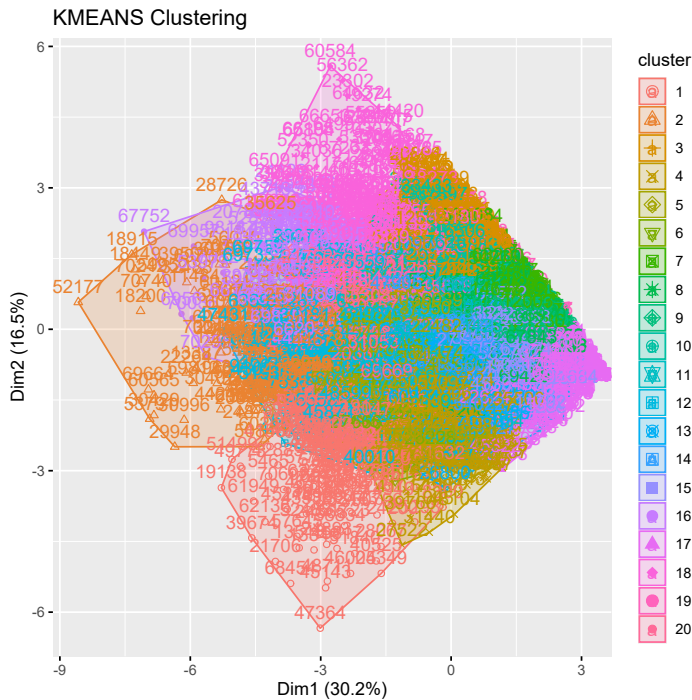
	Score	Method	Clusters
Criterion: internal			
Connectivity	2.9290	Hierarchical	2
Dunn	0.4183	Hierarchical	2

Table 8A.5. Cluster validation indicators for the variables indicating the level of well-being (Dataset 5)

	Score	Method	Clusters
Criterion: internal			
Connectivity	2.9290	Hierarchical	2
Dunn	0.3190	Hierarchical	2
Silhouette	0.3593	Hierarchical	2
Criterion: stability			
APN	0.0501	Hierarchical	3
AD	3.2835	PAM	20
ADM	0.2468	K-means	2
FOM	0.8841	K-means	20

Source: own elaboration using R-cran (*clValid* package, Brock et al., 2020).

Figure 8A.5. K-means clusters for the variables indicating the level of well-being (Dataset 5)



Source: own elaboration using R-cran (*factoextra* package, Kassambara and Mundt, 2020).

Appendix 9. Herfindahl-Hirschman indices computed based on the clustering analysis output (WVS indices – Dataset 2)

Country code	HH index	Country code	HH index
CHN	3049	BOL	1184
PAK	2527	NIC	1178
JPN	2515	MYS	1157
NZL	2244	GTM	1156
ZWE	1922	KGZ	1081
ETH	1883	UKR	1072
VNM	1873	BRA	1064
KOR	1816	KAZ	1031
HKG	1762	COL	1022
MMR	1727	USA	1007
PRI	1701	ECU	991
PHL	1666	MEX	986
AND	1638	RUS	981
DEU	1625	GRC	971
AUS	1617	IRN	952
NGA	1613	THA	929
IRQ	1544	ARG	922
BGD	1513	PER	904
TWN	1447	TUN	898
CYP	1354	TUR	889
MAC	1327	SRB	878
IDN	1271	CHL	860

Appendix 10. Herfindahl-Hirschman indices computed based on the clustering analysis output (variables describing the character of the cultural environment – Dataset 3)

Country code	HH index	Country code	HH index
BGD	8439	NGA	2231
JPN	7222	ECU	2158
IDN	6542	PRI	1923
NZL	5734	BRA	1888
ZWE	4525	HKG	1857
KOR	3757	THA	1772
ETH	3705	UKR	1733
DEU	3403	CYP	1607
AND	3277	MEX	1599
TWN	3122	CHL	1505
PER	3018	NIC	1406
MYS	2967	RUS	1374
PHL	2864	GTM	1302
GRC	2690	COL	1294
BOL	2546	SRB	1190
ARG	2439	ROU	1163

"On Social Norms: the Collection of Theoretical and Empirical Findings" raises a very important and topical subject of opportunities for conducting research on social norms in contemporary economics.

dr Tomasz Kwarciński

The monograph takes up [...] an interesting topic of interrelations between social norms, institutions, cultural dimensions, and values deemed important by selected societies and nations. The author [...] skilfully connects theoretical issues with the original empirical approach based on the analysis of the main components as well as the cluster analysis method. All this makes the reviewed paper an undoubtedly important reading both for researchers of these phenomena and for more advanced students of institutional economics.

dr hab. Piotr Stanek, prof. UEK



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