How to manage cultural differences?

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1. Introduction

The trend is toward a global world, in which borders are becoming less important, both in an economic and social context. There are still nations that have isolated themselves, mostly for political reasons, but these are exceptions rather than the rule. Despite this progress there is still space for national values. How is globalization seen in practice? Traditionally, formal agreements are enablers for free trade, easy travelling, and cultural exchange. Nowadays, the importance of informal channels has become more important: the internet provides a platform for a wide variety of applications and social networking, which accelerate global access to the same services and functionalities. Simultaneously, the growth of economic welfare makes use of services, as well as the opportunity to travel for a growing share of the world population; long distances have become short both in the physical and cyber world, and digitalization has replaced physical products and services with their digital counterparts. Globalization provides opportunities, but simultaneously it creates dependencies between counterparts; national becomes international, cultural means multicultural and cross-cultural. *Business strategies* must consider global and networking aspects: typical manifestations of the progress are outsourcing on national level (*subcontracting*), neighborhood level (*nearshoring* to the countries in the neighborhood), *offshoring* (worldwide distribution of the operations). As an example of nearshoring, a Finnish ICT company Tieto (currently Tietoevry) established a new branch in the Czech Republic, in the city of Ostrava (near to the VSB-TU Ostrava campus), in 2004. Currently it has 2.600 employees. The main reason to select (offshore to) this location was the available close collaboration with the University and a skilled, well-educated workforce. Typical phenomena also include recruiting experts from the international workforce instead of the national market and a global market for products. On a human level, typical manifestations are seen in increasing travel to foreign countries, globalization of entertainment services, organized student exchange programs among universities (foreign internship as part of study programs) and scientific collaboration, which extends the level of multicultural collaboration.

The progress of globalization is measured by the globalization index. Economists have developed different approaches to this topic. One of the most commonly referred to is the *KOF (Konjunkturforschungsstelle, ETH Zürich) Globalization Index*, which was introduced by Axel Dreher in 2006 (Dreher 2006). A revised version has been published by Cygli (2019). In this index, globalization is divided into three categories: *economic, social, and political*. The globalization drivers are further divided into two main classes: *de facto* globalization measures actual international flows and activities (how it is seen in practice), and *de jure* globalization measures policies and conditions that enable, facilitate, and foster flows and activities. The *economic* category covers trade and financial aspects; *social* globalization covers interpersonal, informational, and cultural dimensions; *political* globalization deals with mainly official and organizational issues. The index data is maintained by ETH Zürich, and it covers data from 195 countries from 1970 until the present day (ETH 2022). The national level of globalization is measured by the index with a value of 0-100 and calculated from 42

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separate factors. The tool (in ETH 2022) allows analysis with different focuses and geographical areas, as well as comparisons between countries and continents. Figure 1 illustrates the progress of *social globalization* (covering interpersonal, information, cultural); this focus was selected in view of the *goal of this paper*, which is to understand and manage cultural differences in multicultural, distributed global collaboration.

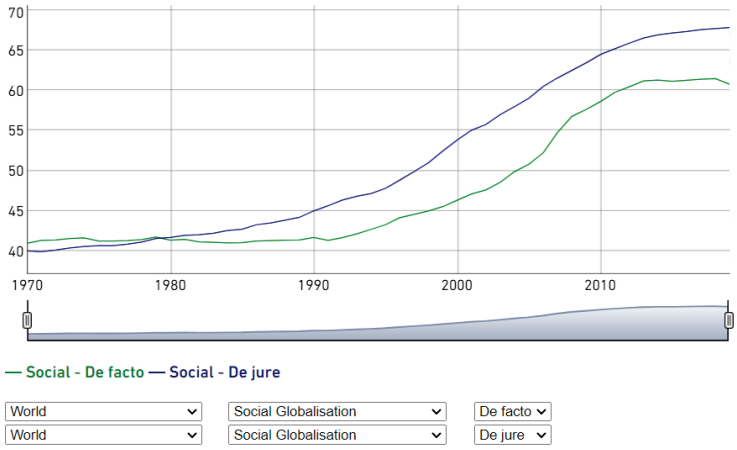

Figure 1. Social globalization in the world 1970-2019 (ETH 2022)

The fastest growth in globalization was triggered by the collapse of the Soviet Union and the liberation of the Eastern Bloc in Europe; the growth reversed at the end of the first decade of 2000 due to the economic crisis (Taskinen, 2020). This was also the fastest period as the main *motivation* to reach a cheaper cost level. Nowadays the trend has become the opposite – *insourcing* activities back to the home country. For example, the latest available (2019) social globalization index of *Finland is 85.84* and that of the *Czech Republic 84.85*. As a comparison, the index of *China, 57.96,* is reasonably low, although it has been one of the fast-growing targets of offshoring (in past decades). In the records of Statista (2022), Finland was in position 9 (value 87.68) in the overall globalization index values among the fifty top countries in the world; the Czech Republic was in position 15 (value 84.85). China is ranked 85 .

The discussion above is background and motivation for the actual topic of this paper. Despite acting as part of the global community, every nationality has its own *national culture*, which defines the behavioral patterns and interactions of individuals. In a *multicultural environment* this might be a source of conflicts and problems in daily situations – "Cultures Collide". Additional complexity comes from the distribution of work, and physical and temporal distance between the collaborating parties.

This paper is focused on *multicultural distributed collaboration* in a global environment – how to manage and recognize the problems related to it. The experience base comes from *software development,* which is the author's area of expertise. Some of the findings are derived from experiences based on over fifty years of co-operation with a wide base of *software companies* and on the author's research output (with international collaborators). *Finland* and *the Czech Republic* are used as case countries[2], in consideration of the context of the Publication Forum (and Professor

[2] The topic of this contribution to the Festschrift for Marie Duží characterizes the long-standing rapport with her Japanese colleagues, in which Marie as a Czech and I as a Finn have been active partners. Additional European partners have come from Germany and two other Finnish universities. The collaboration started in 2000, when Marie was an invited speaker at the 10th European-Japanese Conference on Information Modelling and Knowledge Bases held in Finland. The Japanese

Marie Duží); for the same reason some references to Japan as a country steeped in Asian culture are used. Despite the selections, the findings are scalable and transferrable to other sectors of business and societies, and partially to other cultures as well.

Distributed multicultural collaboration in a global context holds problems that are complex to manage, or even to recognize in time to avoid them. Because of the different behavioral patterns of the collaborating parties, misunderstandings exist, and people do not meet the expectations of others in typical collaboration situations. This fact comprises the *research problem* of this paper. Understanding cultural differences helps to avoid problems in cultural complexity and aid adaptation in daily situations. From this starting point the following research questions are derived.

RQ1: What are the key elements of (national) culture and are there other dimensions (apart from nationality) to consider?

RQ2: Are there any frameworks applicable for understanding cultural differences?

RQ3: If there are such frameworks, how to apply these in practice?

The rest of the paper is structured in three sections, according to the research questions. Section 2 discusses the characteristics of the concept "culture". Section 3 responds to RQ2 and introduces two selected frameworks of cultural differences. Section 4 deals with some additional aspects on culture. Section 5 summarizes the paper.

2. What is Culture?

2.1. Culture Defined

The concept of culture has a wide range (hundreds, if not thousands) of definitions. In this paper we have adopted the approach of Geert Hofstede, who is one of the pioneers in the "practical" research of cultures. Hofstede et al. (2010) define (national) culture as "*The collective programming of the mind which distinguishes the members of one human group from another – Software of the Mind*". He started the work on cultures in the 1960s in the HRM organization of IBM, which employed people all around the world. To illustrate the role of culture as part of the human mind, Hofstede introduced two (meta)models: the pyramid and onion models of culture (Figure 2).

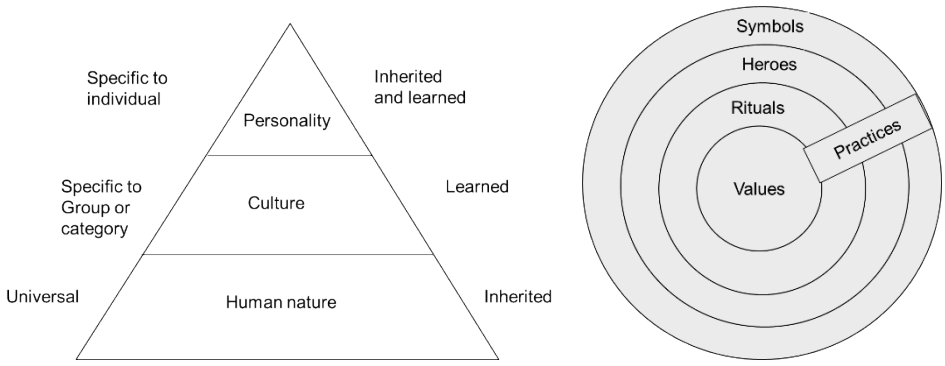

Figure 2. Pyramid and Onion Models of Culture (Hofstede et al. 2010).

The pyramid model (Figure 1, left side) consists of three layers. The lowest layer (*Human nature*) is common to all human beings. It is inherited and universal – culture independent. Hofstede uses the

partners represent several research institutes, among which the Keio University plays a key role. Through it several Asian partners joined the collaboration, which further increased the multicultural dimension.

term “Operating System of the Mind”. The *Culture* layer is collective and learned by a specific group or category (nation, geographical area) of people. It is something that human beings learn from their parents and from the surrounding society. Hofstede calls it “*Collective program of the Mind*”. The top layer is *personality*, which is specific to individuals, partially inherited and partially learned. In this part, *personal mental programs*, the social environment plays an important role.

The onion model (Figure 1, right side) illustrates some of the key elements of culture – how *practices* (behavior, way of thinking, attitude) as manifestations of a culture are built. People in the same culture typically share the same (learned) *values*, which are the core of the culture and the preferred states over others. *Rituals* are collective activities, which are based on the values and essential in a culture (e.g., attitude to religion). *Heroes* are highly prized persons of the culture, which emphasize togetherness and are typical to one culture (these would be persons such as national poets, admired successful sportsmen, etc.). *Symbols*, the outermost layer of the onion, are words, gestures, and objects that are common to those who share the culture (e.g., religious symbols).

2.2 Culture is Stored and Dynamic

Culture is *learned* under the influence of the surrounding society. However, human beings are learning all their life and perceiving new things. Culture is

- re-learned and incremental: on the individual level, new experiences “update” and enrich the culture
- clustered and multidimensional: the same person has different culture roles
- dynamic: on macro-level temporal changes appear in the environment and modify the culture
- adapted: external pressure, e.g., a long stay in a foreign culture, modifies the culture on individual level

In summary, the culture of an individual is the ‘*stock’ of lifetime experiences*.

Multidimensional and clustered culture

The *clustered character* of the culture may have different dimensions. Based on the area where people live, this may be regional, subregional, tribe, and family culture, which represent minor variations of the national culture. People are also representatives of their active life environment, which is seen as the cultural aspects from an organization, sub-organization, site, project, and team. A sub-culture may also be functional, with dependence on education or school, and profession. This multidimensional character allows an individual to appear in different *roles* in different situations. The same person may be a strong manager (company culture), a soft family man (family culture), and a schoolmate (school culture) with different values and practices depending on the respective role and the context of the activity.

Temporal dynamics of the national culture

The World Values Survey (WVS) is an international research organization conducting studies of the social, political, economic, religious, and cultural values of people in a worldwide scope (WVS 2020). WVS has collected worldwide data on people’s values to see the ongoing cultural changes and the persistence of distinctive cultural traditions on the national level. The data indicates the long-term temporal *dynamics of national cultures;* the dynamics have been visualized by Ronald Inglehart and Christian Welzel in a two-dimensional map called the *Inglehart–Welzel Cultural Map*. Countries are located in a two-dimensional space with the dimensions Traditional values versus Secular-rational values, and Survival values versus Self-expression values.

A low score in the *y-dimension* indicates the importance of *traditional values*, which cover tight parent-child ties, deference to authority, family and traditions, high levels of national pride, and a nationalistic outlook. A high score in contrast indicates s*ecular-rational values (materialism),* which are opposite preferences to the traditional values. These are typical in countries with a long history of social democratic or socialist policy, and where the population has a high level of education.

A low score in the *x-dimension* indicates the importance of s*urvival values,* which cover an emphasis on economic and physical security. It is linked with a relatively ethnocentric outlook and low levels of trust and tolerance. A high score in turn indicates the importance of s*elf-expression values.* These cover high priority given to environmental protection, high tolerance of foreigners and unusual phenomena, gender equality, demands for democratic participation in decision-making in economic and political life. These are characteristics of Western world democratic countries and liberal post-industrial economies in the Western world.

The current map (Figure 3) reports the situation in 2020 (WVS 2022, in the subsection "Findings and Insights"). In addition, a visualization of temporal changes in the period of 1981-2015 is given there (also in https://youtu.be/ABWYOcru7js). It indicates the changes in 35 years and provides an opportunity to analyze the reasons behind the changes.

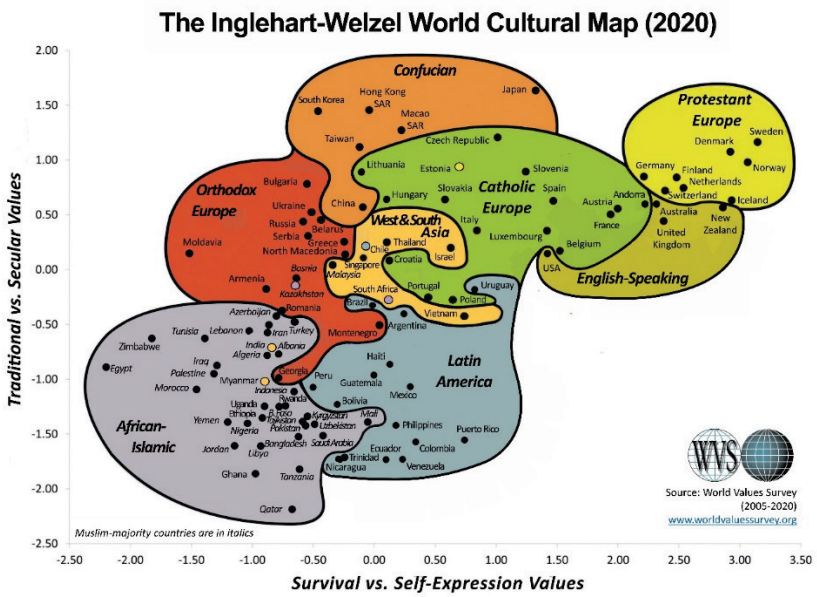

Figure 3. Cultural map - WVS wave 7 (2017-2021). (WVS 2022, subsection "Findings and Insights").

Typical factors keeping a country in the *lower left* corner are low welfare and tight control by the authorities. Traditions (e.g., strong rule-based religion) are a means to survive in these conditions. These countries are emergent with future opportunities, in case obstructive factors will disappear. The alternative path is toward chaos, as seen in (too) many cases. Typical examples in this category are African-Islamic countries.

Countries in the *upper left* corner have high education and acceptable welfare, but the society still has some less-developed features, like an authoritarian administration, limited human rights, lack of equality, or corruption. Welfare is acceptable but life is still somewhat controlled, compared to well-developed democratic societies. Examples in this segment are some former Eastern Bloc countries.

Societies in the *lower right* corner have a reasonably high degree of freedom, are flexible but still controlled by traditions instead of rational policies. People may suffer from an unpredictable

unstable political environment and disorderly conditions of life. Despite that, the degree of freedom is high. Examples are Latin-American countries.

The societies in the *upper right* corner are mature and have high welfare, the degree of freedom is high, and administration is well-organized and democratic. Traditions dominating peoples' lives are minimal, if any. Typical countries in this category are European Protestant countries, Australia, and USA.

3. How to Increase Understanding of Cultural Differences?

3.1 Culture stereotypes

Culture has been defined as "*the collective programming of the mind which distinguishes the members of one human group from another*". The common features typical to a culture build a *stereotypical* approach to culture, which builds the impression that all the members of the same culture behave in the same way. However, culture is not a stable concept; continuous learning changes it, it is clustered and multidimensional. Personal characteristics reinforce differences between individuals. Are stereotype-based generalizations useful at all for recognizing cultural differences?

Stereotypes do not fit everybody. The behavior of two members of one national culture may differ from each other more than the behavior of representatives of two different cultures. However, stereotype models are the results of systematic analysis of the selected properties typical in a culture, measured from big masses of people, and organized in the form of an applicable framework. Despite their shortcomings, these generalizations provide a means to understand the features that are somewhere in the *culture kernel* of individuals. An essential part of human behavior is bound to the social control of the society and its institutions and becomes true latest for a big mass of people. Good examples can be found in everyday occasions: shaking hands in Europe vs. making a deep bow (Japan), how to greet a woman, the role of members in a delegation (age, position), interpretation of silence (no response). Also, spoken and written language (characters, reading direction) has implications for the formation of concepts and structures (Asian visual vs. Western linear), as well as the use of body language in communication differs between cultures.

Culture has implications for numerous everyday phenomena. Typical sources of issues in the work context appear in:

- *Communication*: misunderstanding, language barrier, creation of concepts and structures varies, the way of communication is different (hidden meanings).
- *Leadership* practices: people management, providing feedback, mentoring, need for control, solving conflicts.
- *Management*: organizing work, responsibilities, decision making practices.
- *Trust creation*: building up internal and external relationships, the role and importance of trust and trusted relationships.
- *Management of change*: attitude to changes, resistance and ability to accept changes.
- *Motivation and loyalty*: motivation factors, loyalty to stakeholders.
- *Competence differences*: existence and ability to see competence differences in an organization, self-evaluation skills, truthfulness of the individual's skill profile (trying to look better than one really is).

The reasons in the background of the issues are manifold: attitude to more powerful colleagues, acceptance of equality, fear of losing face, acceptance of a flexible truth. Differences between

emergent and mature societies exist, and the role of church and organized religion in society also has an important role. Where problems are ultimately simple solutions are also relatively easy to realize, provided that the root causes (characteristics typical to cultures) are understood.

To provide a means for understanding and analyzing the differences between cultures, the rest of this section introduces two stereotype-based models of culture:

- *Hofstede Six Dimension Model*, which is based on the calculated scores of six cultural dimensions for the (national) culture (sub-section 3.2).
- *Lewis model*, which defines three basic culture stereotypes and combined cultures based on these (sub-section 3.3).

These models have been selected because they are the ones most commonly used and referred to. Additional models, like *Trompenaars* Seven Dimension Culture Model or the GLOBE model of *Robert House* do not bring any remarkably added value to the discussion. Both Hofstede and Lewis have made studies in organizational culture; these are not handled here.

3.2. The Hofstede Six Dimension Model

Geert Hofstede is a Dutch social psychologist who started to collect systematic data from the employees of IBM in forty countries; currently the geographical coverage is high. Hofstede noticed systematic differences between nations. He classified the differences in measurable and organized classes, called *cultural dimensions*, in a framework (model) providing a multidimensional culture profile of national cultures. The first version of the model had four dimensions, two were added gradually later. The close connection to IBM and white-collar workers has been a source of criticism against the model. However, the model is supplemented by data from other sources to make it organization-independent and to increase its overall validity.

The model is based on culture dependent scores given to each dimension. The scale of score values is from 0 to 100 with 50 in the middle; values below 50 mean low and above it a high score in each dimension. The absolute score value is not meaningful in the model, which is developed to compare countries to each other; the score scale is *relative*, not arithmetically linear (the distance of two values is not the difference between them). The model details are available in the book (Hofstede et al. 2010) and in the resource pages (Hofstede Insight 2022; Hofstede & Hofstede 2022).

The six dimensions in the Hofstede model are (cited and modified from the original sources):

- *Power Distance (PDI):* the extent to which power differences are accepted in society.
- *Individualism* / *Collectivism* (IDV): the extent to which a society emphasizes the individual or the group.
- *Masculinity / Femininity (MAS)*: the dominance of general values in society – hard vs. soft values.
- *Uncertainty avoidance (UAI):* the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity.
- *Long-term / Short-term orientation (LTO):* the extent to which the delayed gratification of material, social, and emotional needs is accepted.
- *Indulgence / Restraint (IND, earlier IVR):* acceptance of enjoying life and having fun vs. controlling life by strict social norms.

A more detailed description of the dimensions is available in Hofstede Insight (2022)[3].

[3] Direct access: https://hi.hofstede-insights.com/national-culture .

What can we read from the score values? Examples of practical implications are:

- PDI: Democratic (low) vs. hierarchical, centralized (high) decision making; flat (low) vs. hierarchical organization (high); extent of bureaucracy - complex (high), flexible (low); need for supervision and control (high) vs. independence (low); power to make decisions - need confirmation of higher authorities (high) vs. delegated (low).
- IDV: collective (low) or individual (high) decisions; fear of losing face as a member of the collective group (low); importance of the collective (subjective) sources of data (low) in decision making instead of facts (high); collectivism (low score) combined with a high UAI indicates sensitivity to losing face and fear of taking responsibility.
- MAS: dominance of hard values (high) – money, visible welfare, visible power - vs. soft values (low) – family life over work, importance of leisure time, money not important; in decision-making economic aspects (high) vs. societal consequences (low); deviance from normal accepted (low) or not accepted (high); high MAS combined with low LTO supports short-term hard values in decision making (e.g., discharging employees instead of other adjustments and carrying social responsibility); equality (low) vs. inequality (high) in the society; femininity (low score) correlates to the welfare of the society – see Inglehart-Wenzel map.
- UAI: need for rules and norms (high); merged with high PDI indicates bureaucracy and management by power; resistance to change (high); inability to accept differences and exceptional behavior (high); risk avoidance (high).
- LTO: traditions dominate in decision making (high); ability to wait for profits in business and long-term development of companies (high); short-term positive consequences dominate in decision making (low); high LTO is typically combined with low IDV, high MAS, and high PDI.
- IND: acceptance of visible happiness and joy (high); dominance of norms and rules in everyday life (low); optimistic (high) vs. pessimistic (low) attitude; work (low) vs. leisure (high); importance of religious values (low).

In addition to national cultures, Hofstede has studied the role of national cultures in organizations on both organization and team level.

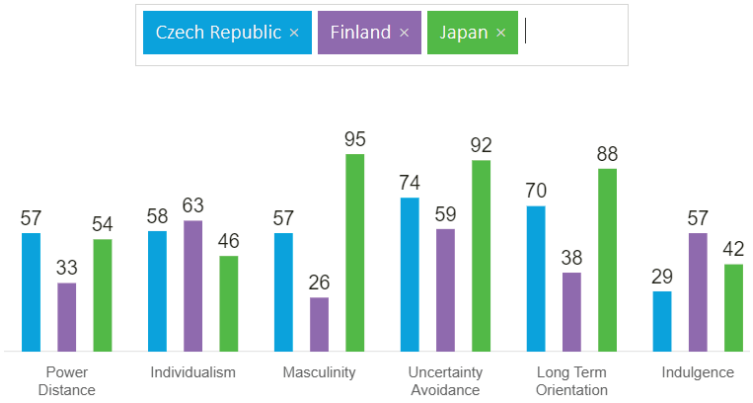

Figure 4. Country comparison of three selected countries, Hofstede model (Hofstede 2022a).

The Hofstede model provides score values in six dimensions for national cultures. The combination of values provides a means for looking into a *national culture profile*, especially for comparing the differences of selected cultures. The differences recognized and understood support success in multicultural collaboration and communication. Hofstede Insight (2022) provides a *Country Comparison Tool* to conduct such comparisons. A similar tool is also available for mobile devices -

Hofstede Insights (former Culture Compass) for both Android and IOS. The resource pages (Hofstede Insights 2022; Hofstede 20223) provide a lot of model related readings and reports, which are worth studying.

The respective national cultures of Czech Republic, Finland, and Japan are compared in Figure 4. *Finland* is an individualistic country (IDV) having a democratic work culture (PDI). At work, a low level of supervision is needed (PDI), employees can modify work plans and guidelines (PDI, IDV), and are willing to participate in important decisions (PDI). A high level of equality exists in the society and workplace (MAS). In leadership, open and direct feedback is accepted (PDI, IDV). People will act in a well-organized environment (UAI) and avoid lack of order.

The Czech Republic is also an individualistic country (IDV), in which some level of authoritarian management culture exists. People are used to working in a well-organized environment (UAI) and accept some level of inequality both at work and in society (MAS). In leadership, open feedback is accepted (IDV) but is not desirable (UAI). The level of organizational control over peoples' work is higher than in Finland (PDI). The long-term orientation (LTO) value is high, which indicates readiness for long-term plans to reach the goal. According to the Inglehart-Wenzel temporal animation, the Czech Republic has been floating around its current location having all the time a high secular value score, first growing self-expression score (closer to the Protestant Europe island), but recently moving backwards slightly on the self-expression score. The nearness to the average European culture base is clear, however.

Both Finland and the Czech Republic have a lot of similarity in their cultures. The author of this paper as well as the inspiration of the publication (Professor Marie Duží) have a long-standing experience collaborating with the Japanese research community. Japan is a strongly collectivist culture (importance of the social group). An authoritarian and multi-layer decision culture dominates; respect for more experienced, older, and wealthier people is visible and present in decision making. Inequality (MAS) is acceptable and exists. Japan is very bound to rules and organizations (UAI, PDI). Conflicting situations with European partners may appear in leadership (fear of losing face), decision making (individualistic vs. hierarchical collective), organizing the work (linear, chunk based), responsibilities, and flexibility at work in relation to rules.

3.3 The Lewis Model

Richard Lewis is a British cross-cultural communication researcher and cosmopolite, who has lived in several countries, including Finland and Japan. He speaks half a dozen languages, and his experience base comes from actions in practice. The *Lewis culture model* is based on an analysis of working patterns, first in the IT branch but gradually extended to cover experiences in organizational cultures in general. The focus of the model is on *communication, organizing the work, handling facts, and data*. Lewis has published details and applications of his model in a wide variety of books; the kernel is the book (Lewis 2011) which covers the general aspects of the model. It is supplemented by a country analysis, books on culture and organizations, etc. The resource page (CrossCulture 2022) provides general information about the model and the CultureActive page (CultureActive 2022) has access to detailed material on national cultures.

The Lewis model is based on three basic stereotypes (descriptions cited and modified from the original):

- *Linear-active*: task-oriented, technical competence is important, highly organized societies; level-headed, factual, and decisive planners; fact-based data sources.

- *Multi-active*: extrovert, human force is an inspirational factor, doing many things at one time in an unplanned order, people-oriented; warm, emotional, loquacious, and impulsive.
- *Reactive*: people-oriented, dominated by (wide scale, even subjective) knowledge, patience and quiet control, listening before reacting; courteous, amiable, accommodating, compromiser, and being good listeners.

Examples of typical features of each basic stereotype are listed in Table 1. The model itself is simple: it is a triangle with the basic stereotypes as the corners (Figure 5).

Table 1. Characteristics of cultural stereotypes according to the Lewis model (Lewis 2011; modified).

Linear-active	**Multi-Active**	**Reactive**
introvert	extrovert	introvert
patient	impatient	patient
plans ahead	plans grand outline	looks at general principles
does one thing at a time	does several things at once	reacts
punctual	not punctual	punctual
compartmentalizes activities	one activity influences another	sees whole picture
sticks to plans	changes plans	makes slight changes
sticks to facts	juggles facts	statements are promises
information from official sources	prefers oral information	information from official and oral sources
follows correct procedures	pulls strings	networks
completes action changes	completes human transactions	reacts to partners
likes fixed agendas	interrelates everything	thoughtful
uses memoranda	rarely writes memos	plans slowly
dislikes losing face	has ready excuses	must not lose face

The national cultures in the Lewis model are located either at the corners (representatives of the pure basic stereotypes) or on the sides as representatives of mixed cultures. The national culture of *Finland* is strongly linear-active, but it has some features (e.g., listening, silence) of the reactive behavior. The Czech Republic is also a strongly linear-active culture but is located on the side towards the dialogue-oriented culture. Japan (as with many Asian countries) is strongly reactive but has some features of linear-active culture.

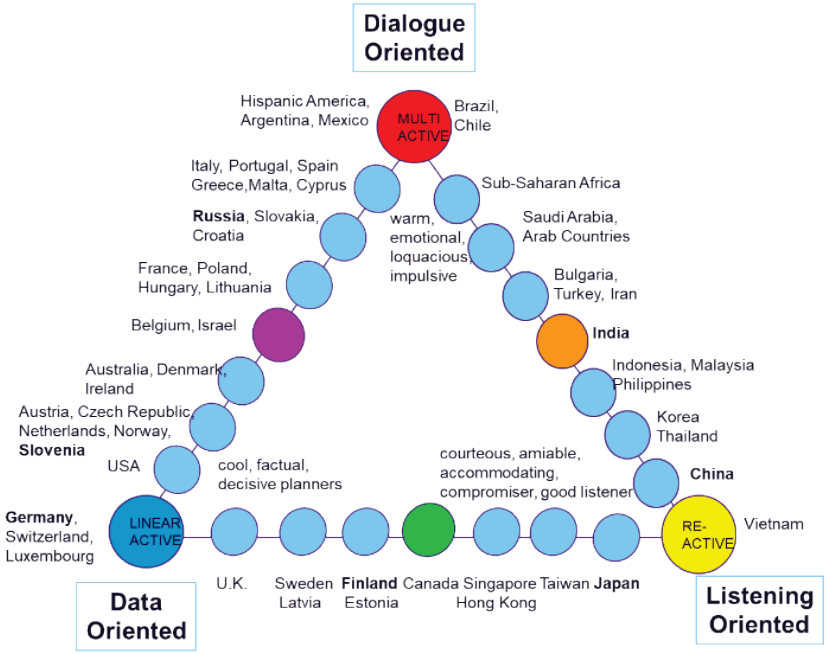

Figure 5. Lewis model of national cultures (Lewis 2011; CrossCulture 2022; CultureActive 2022).

A detailed description of each culture is available in the books by Lewis (e.g., Lewis 2011) and on the resource page (CultureActive 2022), which has unfortunately restricted access (paid registration needed). Every culture description covers general facts about the country, data on the values and core beliefs (iceberg), culture in general (classification and overview), concept of time (organizing the tasks), concept of space, communication pattern, listening habits, and interaction (e.g., behavior in meetings). The descriptions include text and visualizations.

Based on the Lewis culture analysis, *Finland* is linear-active and data oriented (fact-based sources). **Concept of time**: Tasks are executed in linear order. Finns are punctual; they value good timekeeping; time is divided and used for maximum efficiency. **Listening**: Finns are good listeners (do not speak much) and react when sufficient grounds for a decision exist (ref. Hofstede UAI). **Communication**: Meeting behavior is based on silence, listening, minimal speech, and saying only that which is necessary (UAI). They repeat, summarize, and decide. **Concept of space**: They feel uncomfortable by any attempt to limit their personal space; face-to-face communication distance is at least 1.2 meters; this rule is also followed in bus queues. Equality and personal independence are important.

The *Czech Republic* is also a linear-active culture, but towards a dialogue-oriented instead of listening culture (Finland). This indicates a lot of similarities but, being "around the corner," also differences between the countries. **Concept of time**: Basic structure is linear, similarly to Finland. Czechs come to appointments on time and tasks are executed in a linear order. **Listening**: Dutiful listeners, polite, and courteous. They do not interrupt, and their feedback is minimal. They do not like digressive discussions. **Communication**: Soft speakers, they communicate in a thoughtful manner. Meetings are prepared internally to anticipate difficulties. They do not show their feelings; their humor is dry and black. Seek compromise, reasoned decisions. **Concept of space**: Hand shaking is mandatory. Distance of comfort is over 1 meter. Bus queues are disciplined and orderly.

Both case countries are ultimately very similar. When approaching the *dialogue-oriented* corner in the triangle, behavioral patterns change. Feelings affect behavior, having visible external implications, dialogues with people and data from unofficial sources replace facts, tasks are executed in no particular order – in reorganized dynamic chunks instead of a predefined order. Even meetings may become chaotic, and the concept of time is fluid. When approaching the *listening-oriented* corner (Japan, for instance), politeness, diplomacy, and harmony beat rationality and sometimes also the truth. *Trust creation* is important – serious collaboration is possible with *trusted partners*. Data sources are rich and also cover subjective sources. Time has value. Typical of collective cultures, in which people are used to living together, short distances are accepted. Organizing tasks is similar to dialogue-oriented cultures but executed in a more organized way.

There are some similarities between the Hofstede and Lewis models, but mainly, because of the different viewpoints, they supplement each other. Whereas the Hofstede model is based on general aspects of a culture, Lewis provides a means for everyday practices in communication and collaboration. Lewis also provides a tool to compare the difference between individual (personal) characteristics and the national generalizations, including sixteen culture related factors.

4. Additional approaches and Aspects of Culture

4.1. The Hall Model – High and Low Context Cultures

In his book (Hall 1976), the American anthropologist Edward Hall introduced an idea about differences in communication between cultures. He defined two cultural classes and the corresponding styles of communication – *high and low context cultures*. This complements the models introduced above, especially from the point of view of verbal and written communication, although it cannot be classified in the category of stereotype models for cultures.

In a *high-context culture* many things are left unsaid. Messaging is implicit, and less formal information is given in written and spoken form; part of the information is hidden, wordless, "between the lines". Understanding the message is based on internalized understanding of the message context by the target group. This is based on the long-term relationship between the communicating parties. Knowledge is situational and relational, depending on the context that is recognized only by the insiders.

In a *low-context culture*, everything is included in the message and said directly (explicit messaging). People play by external rules, known by everybody. Knowledge is codified, public, accessible, and transferable. No additional information is needed to understand the meaning of the message.

Table 2. High and low context cultures compared (Jaakkola & Thalheim 2018).

	Low context	**High context**
Example countries	USA, UK, Canada, Germany, Denmark, Norway	Japan, China, Egypt, Saudi Arabia, France, Italy, Spain
Business outlook	Competitive	Cooperative
Work ethic	Task-oriented	Relationship-oriented
Work style	Individualistic	Team-oriented
Employees desires	Individual achievement	Team achievement
Relationship	Many. looser, short-term	Fewer, tighter, long-term
Decision process	Logical, linear, rule-oriented	Intuitive, relational
Communication	Verbal over non-verbal	None-verbal over verbal
Planning horizons	More explicit, written, formal	More implicit, oral, informal
Sense of time	Prenset/future-oriented	Deep respect for the past
View of change	Change over tradition	Tradition over change
Knowledge	Explicit, conscious	Implicit, not full conscious
Learning	Knowledge is transferable	Knowledge is situational

Table 2 lists the differences between high and low context cultures. It is based on Gisela Schmalz' (non-published) presentation and modified by the authors of the reference (Jaakkola & Thalheim 2018). Looking at the row of example countries, it is easy to find a correlation between this classification to Hofstede's IDV dimension and Lewis' linear-active culture (low context). Both Finland and Czech Republic are low context cultures.

4.2. Adapted and Extended National Culture

Katharina Reinecke is one of the pioneers in studying the consequences caused by staying under the strong influence of a foreign culture. She defines the term "*user's extended national culture*" for the storage of the influence of foreign culture on the (original) national one when a person is living in a foreign culture. Experiences from a foreign culture are gradually adopted as changes and enrichments to the existing cultural patterns; the original national culture remains the kernel, but the outer layer gradually adapts to the features of the foreign culture as a function of time. The changed and enriched culture is also called the *adapted culture*.

The adaptation has been measured by testing user preferences in the use of information systems. The paper (Reinecke & Bernstein 2011) introduces the test environment MOCCA, which provides 39, 366 variations of the same information system. Changes in user preferences are measured over a long time frame in a group of multicultural users. Changes in the user preferences are registered by the system's internal user model, in which the adaptation to a foreign culture is measured in Hofstede dimension scores. In long-term use, the changes in scores indicate the adaptation of the user.

Table 3. Hofstede's dimensions and User Interface Preferences (Reinecke & Bernstein 2013).

Interface aspect	Linked to	Low	Medium	High
Information density	**LTO**	To-do items provide little information at first sight, requiring a user to click before seeing more information	To-do list shows all in-formation at first sight	Complex version that additionally presents encoded information with big icons
Navigation	**PDI**	Tree menu and to-dos in a list view, allows nested sorting	Flat navigation and list view, or tree menu and icon-represented to-do list	Flat navigation and icon-represented to-do list
Accessibility of functions	**PDI**	Functionalities are always accessible but grayed out if not needed	Functionalities appear on mouse-over	Functionalities are always accessible
Guidance	**UAI**	While users enter a dialog, all other information on the UI retains visible and accessible	Information other than the current dialog is still visible, but inaccessible	Unnecessary informa-tion is hidden in order to force users to concentrate on a currently active dialog
Structure	**PDI**	Minimum structure: Different elements of the UI are only structured through alignment	Elements are separated and each color- coded for better distinction	Maximum structure: Elements are bordered and affiliations between information is accen-tuated across elements
Colorfulness	**IDV**	Many different colors	A medium number of colors	The UI is homogene-ously colored
Saturation	**MAS**	Pastel colors with little saturation	Medium saturation and contrast	Highly contrasting, bright colors
Support	**UAI**	On-site support with the help of short tool- tips	The UI offers question mark buttons that expand into help bubbles	An adaptive wizard that is always visible

The correlation between UI properties and national cultures are introduced in Table 3. Although the origin of this table comes from the test environment described above, it points out the importance of culture as part of the information system itself, in addition to the information system development, which is based on collaboration between the developers and other interest groups.

Although the work of Reinecke concerns the use of information systems and cultural adaptation of the users, its results can be generalized to include the effects of foreign culture as a change factor even at a general level.

4.3. Non-verbal Signs of Culture and Culture Independent Interaction

Colors (even the extent of the color map) and images may have hidden meanings: their level of relevance and semantics varies between cultures. A discussion of the correlation between colors and emotions is available in several texts[4]. Understanding these differences is important when designing user interfaces, web content, and advertisements. Mental connections to the human mind may also appear in *symbols*. These dependences are stronger in Asian (nature religions and philosophies) and Southern American and European (strongly bound to religion) than in Western liberal cultures. The role of colors as symbols of cultures has been studied by Professor Kiyoki (one of our collaborating parties) and his research group at Keio University, Japan. The semantics of color (emotional experience: 'Kansei' in Japanese) is analyzed by means of semantic computing (based on

[4] Color map: (Allison 2017). Meanings of colors: (Alida 2022) ; Color psychology: (Racoma 2019); Color preferences: (Viková and Vik 2015); Colors in design: (Cousins 2012).

comparisons of the semantic space of colors and conceptual structure) and has been reported in several papers, e.g., (Itabashi 2014). In Kiyoki's work, colors are also used as a common (intermediate) language to transfer knowledge from one context to another.

In communication, the encoded concept structures are transferred between the communication parties. However, *the formation of concepts and concept structures* varies between cultures, which might cause misunderstanding of the message. The reasons vary – one might be the written language - visual vs. linear writing and reading order (from left -from right; up-down). Duží addresses this topic in her papers (Duží 2014) and (Heimbürger, Duží et al. 2014). She argues the thesis that human communication is based on *procedurally structured abstract concepts* that people learn, execute, and discover. This process plays a central role in human communication in all cultures, although its external manifestation may look different; people tend to build their inner world of thought driven by external expression. To substantiate her thesis, Duží compares three different (visual) communication structures - Egyptian hieroglyphs, pictures, and Inca knot writing (khipu), which has different ways to encode meanings. The "character set" of hieroglyphs consists of 5000 characters, which covers the expressive power of written language of concrete concepts; abstract concepts are left out (at least partially) of the written language, but of course, not from human communication. Khipu (Inca knot-writing) indicates the message bound to it in binary coded form, as units of structured information in a similar way to the computer of today. The coding system cannot be analyzed within the traditional approach to semantics. A third example comes from pictures: a picture is seen as the whole of its parts, in which parts of it are not separable and cannot be interpreted as separate concepts. Based on the analysis of these three very different approaches in communication, Duží draws the conclusion that these very different writing systems encode *procedurally structured concepts*, which consist of a finite number of constituents executable in any possible world at any time. Duží finds similarity between these structures and the key elements of *Transparent Intensional Logic (TIL).* TIL forms a culture- and language-independent approach for specifying and understanding conceptual structures. In several papers, she has introduced the use of TIL in *Natural Language Processing (NLP*) as a culture-independent intermediate form for communication and messages (concept structures).

TIL is an example of the interpreted formal languages that can be seen as a means for *culture-independent communication*. People are used to communicating in natural languages – using their native language or a commonly accepted foreign language. If an exact transfer of information is needed, natural language is not the best option – it is imprecise and requires long-winded expression to specify the contents exactly. The use of formal or semiformal languages (like UML) is commonly used in a software engineering context, especially in requirements engineering, but also in the transfer of common understanding between different interest groups. The use of standardized messages – a format that consists of predefined components – represents the same approach and is commonly used, for example, in outsourced helpdesk services in the ICT sector.

The paper (Heimbürger, Duží et al. 2014) also covers a discussion of the use of *icons* to support multicultural communication without depending on one specific culture. Generally known icons are traffic signs that are more or less the same around the world. However, culture dependency exists even here. Warnings of kangaroos or koalas are not valid in Finland and the Czech Republic, whereas warnings about moose and deer might be. Heimbürger introduced the concept of the "*intelligent icon (I-icon)*" to support multicultural communication with icons. I-Icons have application domain sensitive areas and can include computational functions such as linking to collections of Web resources, searching and discovering deeper cross-cultural knowledge. The paper also introduces an extension of UML using icons to be used in requirements engineering.

5. Conclusions

Globalization indicates an increasing need for communication and collaboration independently across geographical borders and nationalities (cultures) between the collaborating parties. Even in the academic world, research projects are funded to an increasing degree by international sources and based on collaboration between partners from different countries. The experience base of this paper has reported on three-way collaboration between the Czech Republic, Finland and Japan; in fact, partners from Germany and Indonesia were also part of the collaborating team. The interest in understanding cultural differences inside this multicultural collaborating team triggered the author's culture studies.

The purpose of this paper was to report some findings of the author's work, to provide the means and preparation to survive and thrive in a multicultural global context. Work having similar goals has been done by the collaborating partners of the author in the Czech Republic, Germany and Japan. The paper looked at the progress of globalization and pointed out, as a *research problem*, the growing requirements needed to act in this continuously changing environment. The resulting research questions were:

- RQ1: *What are the key elements of (national) culture, and are there other dimensions (apart from nationality) to consider*? The characteristics of the concept were handled in Section 2.
- RQ2: *Are there any frameworks applicable for understanding cultural differences*? Two frameworks and additional aspects were introduced in Section 3.
- RQ3: *If there are such frameworks, how to apply these in practice?* The examples of application practices were embedded in the discussions throughout the paper.

Naturally, the models introduced only provide support for surviving in the global multicultural environment. It remains for everybody who acts in such an environment to decide how to use this information in a beneficial way.

The author (with collaborating partners from different cultures) has dealt with this subject in a dozen peer-reviewed publications, which focus on different aspects of information system development and usage. While the role of information systems in modern society has grown, simultaneously the complexity of the systems has grown (exponentially, in fact), especially in point of development. Instead of one system the goal is to achieve a network of collaborating systems of systems, developed for the global market and for an unknown client base. The implementation work of these systems is made by distributed multicultural teams, they include open-source components (on a black-box basis) and are distributed over the cloud, without physical contact to the end user. The key element in these systems of systems is fluent collaboration between its individual components by communicating via open interfaces in an expected way toward the common goal. The analogy between human collaboration in system development and the integrity of such a complex artifact is clear.

Cultural differences have been discussed in this paper. The difference between two cultures could be defined by the term *cultural difference*. It is an abstract concept and hard to turn into an absolute value. On abstract level it is easy to accept that a bigger cultural difference in the models handled means higher complexity in collaboration and communication. The *Hofstede model* provides scores as a measure in six dimensions. The values are relative, and the scale is not valid for arithmetic comparisons. However, the visualized profile of six dimensions in a country comparison provides some means to see a profile difference between countries. The *Lewis model* indicates that nearby cultures have a shorter cultural distance, and that distance increases remarkably when the partner is

on another side of the triangle. In *combined analysis* (integration of analysis results from different sources) visualizations like a *Kiviat graph* would be helpful and provide a two-dimensional culture profile for comparison purposes.

Culture is dynamic – changes happen inside the culture but especially because of external influences. Nowadays data is global, cultural offerings are global, and foreign language studies open a window to foreign cultures. Intercommunication with foreigners is both easy and inevitable. What is the future – will cultures unify or will they remain separate? The latter alternative is more plausible. Simultaneously with globalization progress, national values, the cornerstones of culture-related values, are becoming more important. People want to know their roots, not as a citizen of the world, but as a member of the culture in which their roots lie.

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