Proceedings of the 35th European Safety and Reliability & the 33rd Society for Risk Analysis Europe Conference
Edited by Eirik Bjorheim Abrahamsen, Terje Aven, Frederic Bouder, Roger Flage, Marja Ylönen
 Published by Research Publishing, Singapore.
doi: 10.3850/978-981-94-3281-3_ESREL-SRA-E2025-P8589-cd

Are Human Reliability Analysis's techniques able to account for cultural dimensions?

Caroline Morais

National Oil, Natural Gas and Biofuels Regulator (ANP), Brazil. E-mail: cmorais@anp.gov.br

Carmen Migueles

Brazilian School of Public and Business Administration (EBAPE), Fundação Getúlio Vargas (FGV), Brazil. E-mail: carmen.migueles@fgv.br

Human reliability Analysis (HRA) is a method to evaluate human error risk in critical safety tasks, according to influencing factors such as time available, human-machine interfaces, layout and training. The set of performance influencing factors varies depending on the technique used. Checking the dataset used to validate the quantified relation between human errors and influencing factors, it was noticed that most of the data points were obtained in few countries, especially in the northern hemisphere. Are those relations valid for other countries? Could culture be an influencing factor per se?

There is a way to dimensionalise cultures, according to Hofstede's model (2011), which consists of the measurement of: Power distance index (PDI), Individualism vs collectivism (IDV), Uncertainty avoidance (UAI), Motivation towards Achievement and Success (formerly Masculinity vs femininity - MAS), Long-term orientation (LTO) vs short-term orientation, Indulgence vs restraint (RES). Recent research has found evidence relating two of those outcomes to propensity to trust (PT) with negative effect on safety outcomes in Brazil.

Based on the hypothesis that cultural dimensions can affect some influencing factors, this paper evaluated the correlation of those three Hofstede dimensions from Migueles and Zanini's research (2024) against each performance influencing factor from Petro-HRA, the most used HRA method in oil & gas installations in Brazil in 2024. The authors discuss the importance of extending this study to the original datasets used for HRA before researchers consider creating a new method or an extension of an HRA technique that accounts for culture.

Keywords: Human Reliability Analysis, culture, trust, performance influencing factors, safety outcomes.

1. Introduction

Human reliability Analysis (HRA) is a method to evaluate the risk of human error in safety critical tasks, according to performance influencing factors, such as time available, human-machine interfaces, layout and training. The 'set' of performance influencing factors (PIFs, also known as performance shaping factors, PSFs) vary depending on the technique used. Checking the dataset used to validate the quantified relation between human errors and influencing factors, it could be noticed that the majority of the datapoints were obtained in a few countries, especially in the northern hemisphere. This makes some of the HRA users wonder: are those relations valid for other countries? Could culture be an influencing factor per se? If the quality and availability of information are key for the functioning of the methods, can culture interfere with the capacity to acquire, treat and evaluate information? Research on the effect of culture on safety shows that culture may affect not only the speed, quality and quantity of information, but also the capacity to interpret and deploy it.

The search for a neutral, rational and generalizable method is necessary and valid. However, recognizing the limits of neutrality may indeed open the way for the refining of the approach and for the development of complementary ways to seek for even more precise risk reduction alternatives. In this paper, we propose a strategy to think of how to integrate culture as a relevant aspect of human reliability analysis without getting lost on the complexity of the subject. For this purpose, it may be useful to resort to Eco (1997) semiological study to differentiate between human and machine communication systems. According to Eco (1997), the core difference between machine and human communication is related to the difference between denotation and connotation, in which the first transmits information according to a previously constructed mathematical scheme with an objective, precise and planned interpretation outcomes, mostly based on a binary digit system.

The second works on a connotation base, that is related to the meaning of an information in a certain system of social relations. Eco´s (1997) classical example of this difference is the interpretation of the colour scheme of the level of water on a dam. For the machine, the sensors scheme defines low water level as green, middle as yellow and high as red. With adequate redundancy (ex. For the case of an electric shortage), the information flows occur without deviation and meaning is limited and precise. The same information, when interpreted by a human, opens on several connatation possibilities – ex. For the green light: the night shift will be light today, it is possible to nap! For the red light: "our maintenance is not ok! The structure may fail? or: we were not expecting it! I am new here and I am not prepared to handle it. I forgot the training instruction about it, and I cannot confess this to my superior..." – the social implication of the information tends to prevail over the planned strategy for each case. Culture is the main scheme that guides connotation.

Understanding and modelling for the most probable cultural responses may be a way to increase the reliability of the systems. However, the interpretative scheme of culture is path dependent – the meaning of each sign is constituted and interpreted throughout experience in a certain society and group of people and related to a certain communicative context – therefore it is unlikely to succeed to anticipate all the effects of culture through a predetermined scheme, due to difficulties in anticipating and modelling all variation possibilities. Observations demonstrate that the HRA methods could benefit from an expanded risk perception perspective, that includes the perceived social and political risks associated with culture. The challenge is how to reduce equiprobabilities of variation to design an applicable framework that does not distort the main goals of HRA. While the objective approach to human reliability analysis focuses on the operational and process risks, providing a system of precise, objective and quantified information, the cultural aspect of human interaction remains a subjective and ill-understood variable. Studies on aviation safety (Weber, 2021; Helmreich, Merritt, & Wilhelm, 2017; Hofstede, 2001, p. 115; Harris & Li, 2008; Li, Harris, & Chen, 2007; Fischer & Orasanu, 1999; Hayward, 1997) have observed how high PDI works to reduce communication efficacy between pilots and co-pilots. Helmreich, Merritt, & Wilhelm (2017) show it is possible to isolate aspects of culture with higher impact on safety and develop adequate redundancies and trainings to improve the capacity of people to assure the desired outcome of safety methodologies. Redmond (2000) describes the relationship between high PDI, stress and communication competencies. Loi, Lam and Chan (2022) found that high PDI lead to avoidance of communication with superiors.

2. Cultural dimensions

There is a way to dimensionalise cultures, according to Hofstede's model (2011), which consists in the measurement of 5 relevant cultural dimensions, described below. Recent research has found evidence relating three cultural dimensions to safety outcomes in Brazil (Migueles and Zanini, 2024). Based on the hypothesis that cultural dimensions can affect some influencing factors, this paper evaluated the correlation of the cultural dimensions from Migueles and Zanini' research (2024) against each performance influencing factor from Petro-HRA (Bye at al., 2022), the top most used HRA method in practice in Oil & Gas installations in Brazilin 2023, according with the Brazilian oil & gas regulator (ANP) data. The authors discuss the importance of extending this study to the original datasets used to HRA, before considering the creation of a new method or an extension of an HRA technique that accounts for culture. The selection of Hofstede (2001) for this inquire is due to: 1) It is an extensive, scholarly work based on a survey that started on 1968, on 50 countries, and continued, on IBM subsidiaries in 72 countries, with more than 116.000 questionnaires answered in search of patterns and regularities that allows predictions regarding how people will tend to respond in several situations. Culture is defined as mental programs that are developed in the family and reinforced in schools and organizations. It is most clearly expressed in the different values that predominate among people from different cultures. Based on this study and theoretical research, the author selected 6 main dimensions on which country cultures differ and reflect the basic problems any society has to cope with and the different ways each society has found to cope with the necessary solutions.

Those dimensions are: 1) Power distance index (PDI) is the cultural dimension which expresses the attitude of the culture towards the inequalities amongst individuals in societies. According to the culture factor group (2025), PDI is defined as "the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is undistributed unequally." In practice, it reveals how much a society accepts/tolerates inequality and authoritarianism. On organizational behaviour, it expresses itself on the following way: the highest the PDI, the less voice the shopfloor worker would have regarding their own activity, the less importance is perceived on the contribution of the subordinates, the less autonomy individuals and teams have to perform their task independently and the more discretion leaders may use in relevant decisions. 2) Uncertainty avoidance (UA) is related to the level of stress in society in the face of an unknown future. On high UA contexts, there is a tendency to increase rules and controls, with various consequences for the behaviour in organizations. The confluence between HPD (high power distance) and HUA (high uncertainty avoidance) have different effects on organizations. The authority of the rules is different from the authority of people. The first relates to UA, the second, to PD. This confluence tends to have negative effects on people´s autonomous judgement and leads them to do things they would normally consider bad (Hofstede 2001, p. 147). 3) Individualism vs. collectivism is related to the integration of individuals into primary groups. It is also related to education for autonomy (the ethics of self-government, in Low PD countries, versus education for heteronomy, the ethics of obedience, that prevails in PD countries). There are two types of collectivism: the Asian, the values individual self-sacrifice for a community, and the Latin-American, the in-group collectivism, oriented to mutual protection in small groups. 4) Motivation towards Achievement and Success (formerly Masculinity vs. femininity) ranks society according to the division of emotional roles between man and women as well as how much a society is oriented towards competitiveness versus care. 5) Long-term orientation vs. short-term orientation, relates to the focus of people´s effort in present vs. future. 6) Indulgence vs. restraint, where indulgence encourages free expression of desires and emotions, values leisure time, personal control, individual happiness and well-being, and restraint cultures value suppression of gratification of needs and acceptance of social controls, emphasize moderation and controlled behaviour, value thrift, savings and practical necessities.

As a basis of comparison, Figure 1 shows the power distance index of eleven countries which are part of the International Regulators Forum (IRF). The indexes' figures were taken from the culture factor group website, which uses Hofstede's indexes[a]. IRF is a group of safety regulators that was formed back in 1993 to exchange information about their offshore oil and gas safety regulatory practices, their industry health and safety performance, lessons from incidents, and industry practices (IRF, 2025a). To be part of this forum, a regulator must prove it is capable of independent decision-making, separate from the operations that they regulate and from royalty collection (IRF, 2025b). The countries are (at the moment of publishing this paper): Australia, Canada, Denmark, Ireland, Mexico, The Netherlands, New Zealand, Norway, United Kingdom, United States. It is interesting to compare their cultural dimensions to understand how this might impact their regulatory practices and safety performance trends, registered on their website since 2007 (IRF, 2025c). The graph in Figure 1 shows how much difference there is regarding this dimension amongst those countries.

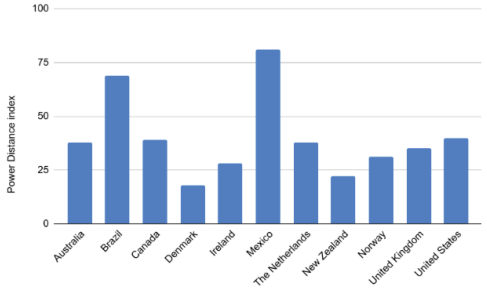

Figure 1-Power distance index of IRF country members

Figure 2 compares these countries' uncertainty avoidance indexes. According to The Culture Factor Group (2025) the dimension Uncertainty Avoidance reflects "the extent to which the members of a culture feel threatened by ambiguous

[a] https://www.theculturefactor.com/country-comparison-tool

or unknown situations and have created beliefs and institutions that try to avoid these".

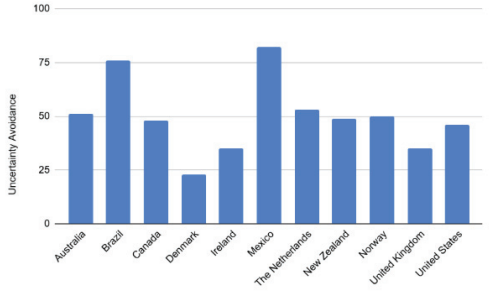

Figure 2 - Uncertainty avoidance index of IRF countries

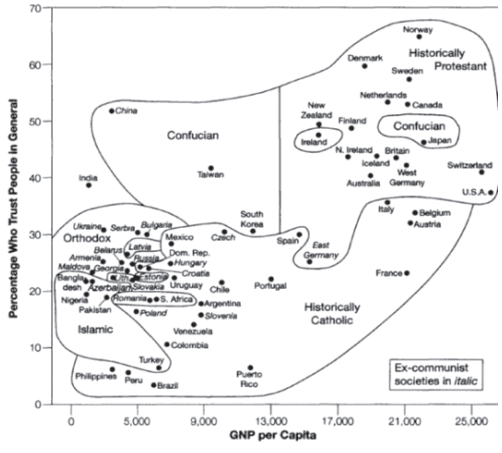

Figure 3-The relationship between trust and economic performance (Source: Beinhocker, 2006)

Figure 3 shows that Brazil is positioned on the lower level of trust among all the countries shown in the graphic. According to Hofstede (2001), High PDI reduces the propensity to trust, and Migueles and Zanini (2024) show how it negatively affects information sharing and collaborative efforts for accident prevention. Trust enhances cooperation, engagement, motivation, and easier risk acceptance and innovation. However, efforts in understanding the relation between national culture and trust are still in their early stages (Schoorman, Mayer & Davis, 2007) and considerable effort is still needed to progress in this direction. As World Values Survey shows, there is an enormous variation on propensity to trust among countries (Inglehart, R. at all, 2014), different methodologies to measure and evaluate it and an increasing understanding of its centrality for economic development (Dirks & de Jong, 2022; Beinhocker; 2006; Ostrom,1990; Inglehart & Welzel, 2005; Zak & Knack, 2001). Trust is fundamental for cooperation and cooperative norms act as constraints on narrow self-interest and opportunism, with a positive impact on both business performance and on the quality of institutions. Economic activities that require the agents to rely on future actions of others are accomplished at lower cost in a higher-trust environment (Knack & Keefer, 2003, Ostrom, 1990). Mayer, Davis and Schoorman (1995), define trust as a willingness to be vulnerable to another party and note that the propensities to trust develop from geographic, industry and economic history (p. 346) and that it affects the perception of ability, benevolence and integrity of individuals (p. 351) thus affecting this willingness in ways still not well understood. Luhmann (1979) suggests that trust reduces complexity, somehow stabilizing interaction. High PDI seems to produce a negative effect on the stabilization of interaction, with negative affect on trust in its various dimensions: trust in leaders, trust in teams and trust in individual colleagues.

Since Hofstede's (2001) seminal work, scholars have observed the negative impact of PDI orientation on organizational variables (i.e., Rhee, Dedahanov and Lee, 2014; Khatri, 2009; Kirkman et al., 2009; Farh, Hackett & Liang, 2007; Francesco & Chen, 2000). For example, Khatri (2009) examines the impact of PDI orientation on employee behaviours within organizations. Common traits are observable on high PDI organizational contexts, among them: employees are unwilling to participate in decision-making and expect their managers to make the decisions; communication is vertical, from the top down, while overall communication is 'anaemic'. The author observes a large communication gap between superiors and their subordinates in such a context because it is hard for subordinates to have a voice and express their views. Rhee, Dedahanov and Lee (2014) observed that high PDI induce acquiescent silence, and managers tend to have discretionary power and control over subordinates. Consequently, due to the lack of communication, information sharing and the lack of participation in decision-making processes, the quality of the decisions that are taken is poor. Besides, the confluence between high UAI, high PDI and LT leads to excessive focus on monitoring and controls. It negatively affects the search for better ways to think and act, generating circularities of

thought and action that prevent evolution. It leads to asymmetry of information between individuals that is reduced in a trusting relationship. Brazil is amongst the countries with the least propensity to trust (Beinhocker; 2006; Inglehart & Welzel; 2005; Zak & Knack, 2001; Knack & Keefer, 1997), and it has comparatively lower performance than other countries, with less efficiency on the use of human capital (Schwab & Martin, 2016; Cornell University, INSEAD & WIPO, 2022). This may significantly increase the probability of human errors. Norway, where the Petro-HRA method was mostly sponsored and developed, on the other hand, is the country with the highest propensity to trust those studies.

Clearer analysis of this relation and its impact on organizational performance can produce evidence of the negative results of this sort of arrangement and increase rationality on the treatment of these issues. It can also provide important insight to improve governance studies.

3. Research methodology

The performance influencing factors (PIFs) selected for this paper are those from the Petro-HRA human reliability technique. It was selected for being the most used in Brazil in Oil & Gas at the moment this paper was written (2024/2025), and also for being an adaptation from SPAR-H (which is one of the three most used HRA techniques in the world considering different industry sectors (i.e. nuclear, chemical, oil & gas, aviation, railway, maritime, healthcare and mining) according to Morais et al (2023). SPAR-H, THERP and HEART, the top 3 leading techniques were not considered in this paper due to its length limitation. Further research will encompass their PIFs.

Petro-HRA has 9 PIFs: Available time, Threat stress, Task complexity, Experience/training, Procedures, Human-machine interface; Attitudes to Safety, Work and Management Support; Teamwork, Physical working environment. There are levels for each PSF with the respective level description.

For this research, a selection of PIFs was made by checking the description of each influencing factor against a list of the negative effects of High PDI, High UAI and LT on its relevant antecedents, to verify if the influencing factors could be affected by the cultural dimensions found to have a negative effect on safety.

The data for the cultural analysis was collected and treated by Migueles and Zanini (2024). Complemented by data collected on the classroom debates of 17 classes with 35 participants on the FGV MBA for Rio de Janeiro firefighters. The exercise question was: How communication flows throughout the hierarchy? Please describe up-down and down-up flows. Consider its consequences for performance. The responses were the result of 3 members 'group discussion uploaded on the eclass link. In three years, there was a total of 168 valid exercises. The difficulties on bottom-up communication were mentioned/described by all the groups as well as the negative impact on problem-solving, planning, anticipation of critical situations and provision of adequate resources. Lack of bottom-up communication channels, distance between leaders and the lead, absence of consulting the executor regarding possible improvements on the tasks, absence of groups discussion/debates/ reasoning together on how to improve activities, and absence of knowledge management efforts where the most present barriers presented on the exercises were the most mentioned barriers for problem-solving capabilities. This confirms Hofstede (2001) finding that high PDI have a negative effect on the voice/participation of lower-level employees and the voice of subordinates in relation to the leader. The total universe of Military Firefighters in Rio de Janeiro is 11.364. Our sample comprises 595 individuals selected for the MBA. The data analysis was accomplished by the manual construction of a typology of response items ordered by frequency of mentions.

4. Findings

4.1. *Regarding PIFs descriptions*

Table 1 presents the correlation between Petro-HRA Performance influencing factors and the cultural dimensions which are the most impacting in Brazil. The table shows examples of how those traits may influence relevant antecedents of each PIF.

The Petro-HRA PIFs selected which are directly affected by high PDI, high UAI and Low trust are: available time, treat stress, task complexity, procedures, teamwork (i.e. mutual performance monitoring, backup behaviour, team orientation, shared mental models, mutual trust and close loop communication) and attitudes regarding safety, work and management support.

Petro-HRA Performance Influencing Factors	PDI (power distance index)	UAI (uncertainty avoidance index)	TRUST
Available time	Feeling that the leaders want the task to be completed as soon as possible, despite the time planned for the activity.	Pressure to accomplish the task as planned above, without feedback regarding the real task.	No/little participation on task planning, no active search for information/support.
Threat stress	Perception of political risks.	Focus on avoiding conflict with the leader.	Acquiescent silence regarding doubts and support.
Task complexity	Information asymmetry, low voice, low participation in planning.	Expectation that superiors will provide clear guidance.	No autonomy in demanding information and support.
Procedures	No or little participation in the procedures improvements.	Tendency to follow procedures without clarity regarding their objectives.	No questioning or bringing up problems.
Teamwork	Fear that identifying mistakes from other members may be disloyalty/creation of vulnerabilities.	Preference for clear and detailed directions.	Low participation in uncomfortable information sharing, focus on the team´s harmony. Mistrust in leaders/ managers.
Attitudes regarding safety, work and management support	Attitudes are related to freedom to act, that presupposes autonomy. Heteronomy tends to be the rule in High PDI contexts.	Freedom to act presupposes flexibility in relation to rules/controls. High UA increases controls.	Spaces for reasoning and acting presuppose trust and positive expectancies related to it. Low trust inhibits it.

4.2. *Human reliability Datasets*

The descriptions of the PIFs were derived from the datasets used to evaluate the relation between the factors and how they influence human errors. Regarding the datasets used to inform Petro-HRA levels, it was found in the volume 2 of Petro-HRA guideline that the majority of the experiments were conducted within researchers and subjects from few countries such as United States of America (US), United Kingdom, Norway, South Korea, The Netherlands, China, Germany, Switzerland (cited here in order of frequency and then in alphabetic order) (Bye at al, 2017).

Figure 4 shows the uncertainty avoidance and power distance indices between Brazil and these countries where data collection was carried out. The cultural differences in the figures make one wonder if these differences might affect the research hypothesis, subjects' performance and the conclusions being drawn from the results.

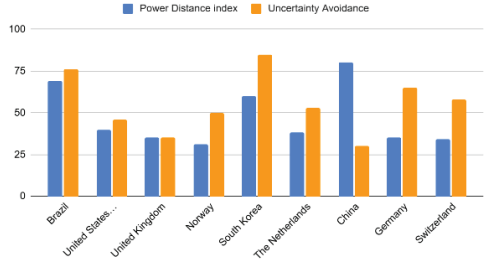

Figure 4 – Brazil cultural dimensions x Countries were HRA data was collected

5. Methodological notes on Hofstede´s dimensions and PIFs

To evaluate the possible effect of culture on PIFs, questions related to one objective, such as "Available time" were interpreted according to its desired goal (optimum response time) against responses regarding intervening factors emerging on interviews and checking if it corresponds to Hofstede´s (2001) descriptions. Interviews on Brazilian industries and the firefighters reveal that

availability of time is strongly influenced by the degree of preparedness, planning, training, distance to the event and provision of the necessary means for the task performance. High PDI may affect all the antecedents of adequate time provision except in the case of human-machine direct interface without the need of the above preceding factors. Hofstede (2001, p. 377) notes that high PDI and high UAI affect the distance between conception/planning and execution and tend to produce stiff pyramidal organizations, inhibiting the voice of the lower-level employees and their inclusion in decision-making. Our data shows that it also decreases their opportunity to participate on studies and simulations. Firefighters, who act in non-modelled situations, abundantly report issues of repeated difficulties in timely response for critical events due to difficulties in influencing higher-level leaders to address observable and repeated failures in timely response to critical events and the need to increase adequate simulations to improve corresponding planning and preparedness. They also report their powerlessness to solve those issues at their level of influence.

It increases threat stress, negatively affecting a**ttitudes regarding safety** (increasing demand for improvises at the level of real task and ill-calculated risk-taking), and reduces trust and the perception of **work and management support.** The political risks in hierarchical relationships emerged as a strong mediator between safety as a value and safe behaviour. The low propensity to trust in management negatively affects the functioning of the teams, consequently the trust in its members reduces, with negative effect on information sharing and cooperation. The political risks negatively affect attention on technical and operational risks.

Power concentration also seems to have a negative effect on **Teamwork.** Pyramidal organizations tend to reduce the support and influence to operational **team leaders** – negatively affecting their ability to direct and coordinate the activity of other team members, assess team performance, assign tasks – towards a desirable goal (being goal defined as A goal is an overall aim which can be achieved by a varying range of tasks, based on set objectives to achieve the goal – PetroHRA pg. 4)

Low trust may significantly affect how goals are achieved. Especially if there are hierarchical differences, that negatively affect the willingness of subordinates to share information with leaders. It also affects **Mutual performance monitoring** – On LT environments, mutual performance monitoring is often perceived as a possibility of exposing the mistakes and vulnerabilities of colleagues. It may be affected by another dimension of Hofstede´s analysis that is in-group collectivism, leading to political mutual protection. Instead of identifying mistakes and lapses on other team members´ actions, it may lead to mutual hiding of lapses and mistakes. It appears on the data; however, the analysis has not been carried out to investigate in depth this possibility. The data treatment for the Individualism Vs Collectivism was not adequately treated by Migueles and Zanini (2024) and is a suggestion for future research.

All the following attributes of teamwork are negatively affected by HPD, HUA and LT: providing feedback regarding team member action to facilitate self-correction, backup behaviour, adaptability, team orientation (taking into account alternative solutions provided by the team-mates and appraising their input to determine what is correct), increase task involvement, information sharing, strategizing and participatory goal setting, closed loop communication for good team alignment, good information sharing, knowledge sharing and trust, backup behaviour and adaptability have in common the need for trust and a prerequisite and the capacity to develop good horizontal coordination, that are negatively affected by HPD, HUA and LT.

6. Conclusion

The information of cultural differences provided in this work intends to support Petro-HRA assessors during their discussions with the sharp-end crew about the critical tasks executed and the performance influencing factors which most impact them.

This paper proposes that for the PIFs available time, treat stress, task complexity, procedures, teamwork and attitudes regarding safety, work and management support, the assessors bring to the discussion the cultural dimensions uncertainty avoidance, power distance and low trust - especially if they are being used for installations being operated in countries which these dimensions indexes differ significantly compared to those countries where the human reliability data has been collected, such as Brazil – as can be

concluded by Figures 1, 2, 3 and 4. This paper information combined with the discussion with the sharp-end workers might help HRA assessors to choose different PIF levels that they might have considered in another culture.

For future work, we propose to extend the experiments conducted for these PIFs data collection, to include diverse countries such as Brazil to evaluate if the level multipliers have to be modified according to the country cultural dimension. The confluence of high PDI, high UAI and low trust seems critical for the adequate responses in critical situations. Further research is needed to neutralize its effects on safety.

References

Alcadipani, Rafael, Farzad Rafi Khan, Ernesto Gantman, and Stella Nkomo. "Southern voices in management and organization knowledge." *Organization* 19, no. 2 (2012): 131-143.

Beinhocker, E. D. "Origin of Wealth", Harvard Business. (2006).

Blackett, Claire, Jan Erik Farbrot, Sondre Øie, and Marius Fernander. "The Petro-HRA Guideline, Rev. 1, Vol. 2." *IFE/E* (2022).

Cornell University, INSEAD, and WIPO. The Global Innovation Index 2022: What is the future of innovation-driven growth? Ithaca, Fontainebleau, and Geneva (2022).

Culture factor group, webpage https://www.theculturefactor.com/country-comparison-tool, accessed on 15 January 2025

Dirks, Kurt T., and Bart de Jong. "Trust within the workplace: A review of two waves of research and a glimpse of the third." *Annual Review of Organizational Psychology and Organizational Behavior* 9, no. 1 (2022): 247-276.

ECO, Umberto. "Umberto. A Estrutura Ausente." (1997).

Farh, Jiing-Lih, Rick D. Hackett, and Jian Liang. "Individual-level cultural values as moderators of perceived organizational support–employee outcome relationships in China: Comparing the effects of power distance and traditionality." *Academy of management journal* 50, no. 3 (2007): 715-729.

Fischer, Ute, and Judith Orasanu. "Cultural diversity and crew communication." In *IAF, International Astronautical Congress, 50 th, Amsterdam, Netherlands*. 1999.

Francesco, Anne Marie, and Zhenxiong Chen. *" Cross-cultural" Differences Within a Single Culture: Power Distance as a Moderator of the Participation-outcome Relationship in the People's Republic of China*. Kowloon, Hong Kong: Business Research Centre, School of Business, Hong Kong Baptist University, 2000.

Harris, Deneen, and W. Li. "Cockpit design and cross-cultural issues underlying failures in crew resource management." *Aviation Space and Environmental Medicine* 79, no. 5 (2008): 537.

Hayward, Brent. "Culture, CRM and aviation safety." *Reason* 1991 (1990): 1993-1994.

Helmreich, Robert L., Ashleigh C. Merritt, and John A. Wilhelm. "The evolution of crew resource management training in commercial aviation." In *Human error in aviation*, pp. 275-288. Routledge, 2017.

Hofstede, Geert. *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Sage publications, 2001.

Hofstede, Geert. "Dimensionalizing cultures: The Hofstede model in context." *Online readings in psychology and culture* 2, no. 1 (2011): 8.

Inglehart, R., Welzel, C., Modernization, Cultural Change, and Democracy – The Human Development Sequence. Cambridge Univ Press (2005).

Inglehart, R., Haerpfer, C., Moreno, A., Welzel, C., Kizilova, K., Diez-Medrano, J. & Puranen, B. (2014). World values survey: All rounds - Country-pooled datafile version. JD Systems Institute. https://www.worldvaluessurvey.org/WVSDocumentationWVL.jsp. Madrid: JD Systems Institute.

IRFa, international regulators forum history, source: https://irfoffshoresafety.com/about-irf/, accessed on 15 Jan 25

IRFb, international regulators forum charter, https://irfoffshoresafety.com/wp-content/uploads/2018/08/IRF-Charter.pdf, accessed on 15 Jan 25

IRFc, international regulators forum countries performances, https://irfoffshoresafety.com/country-performance/, accessed on 15 Jan. 25

Khatri, Naresh. "Consequences of power distance orientation in organisations." *Vision* 13, no. 1 (2009): 1-9.

Kirkman, Bradley L., Gilad Chen, Jiing-Lih Farh, Zhen Xiong Chen, and Kevin B. Lowe. "Individual power distance orientation and follower reactions to transformational leaders: A cross-level, cross-cultural examination." *Academy of management journal* 52, no. 4 (2009): 744-764.

Knack, Stephen, and Philip Keefer. "Does social capital have an economic payoff? A cross-country investigation." *The Quarterly journal of economics* 112, no. 4 (1997): 1251-1288.

Loi, R. Lam, L. Chan, K. "Coping with Job Insecurity: The Role of Procedural Justice, Ethical Leadership and Power Distance Orientation". *J Bus Ethics*. 108 (2012): 361–372

Luhmann, N. Trust and Power. John Wiley and Sons, 1979.

Migueles, C. Lafraia, J.R. e Costa, G. Criando o hábito da excelência. Rj, Qualitymark ed., 2007.

Migueles, C.P. and Zanini, M.T.F., The effects of national culture on safety: insights from a multi-case study. Safety science, 173, (2024) p.106447.

Morais, C., Moura, R. and Ramos, M., 2023. Which human reliability analysis methods are most used in industrial practice?–A preliminary systematic review. ESREL Conference proceedings, 2023.

Ostrom, E., Governing the commons: The evolution of institutions for collective action. Cambridge University Press. 1990.

Redmond, M. Cultural distance as a mediating factor between stress and intercultural communication competence. International Journal of Intercultural Relations 24, (2000) 151-159.

Rhee, J., Dedahanov, A., Lee, D., Relationships among power distance, collectivism, punishment, and acquiescent, defensive, or prosocial silence. Soc. Behav. Personal. Int. J. 42 (5), (2014) 705–720.

Schoorman, Mayer, R. C., & Davis, J. H. An Integrative Model of Organizational Trust: Past, Present, and Future. The Academy of Management Review, 32(2), (2007) 344-354.

Schwab, K., & Martın, S. I. X. The global competitiveness report 2016-2017.Geneva: World Economic Forum, 2016.

Zak, P.J., Knack, S., Trust and Growth. Econ. J. 111 (470), (2001) 295–321.