

Synergistic effects of Culture and Good Governance on Innovation: A European Union Comprehensive Correlational Approach

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Abstract Studies on culture and innovation might view their interactions as separate entities, overlooking the potential relations among the cultural dimensions themselves, and their potential synergies and interactions with innovation. Additionally, governance indicators might be treated as independent entities, lacking further country background. Cultural dimensions interact with country governance contexts, which might exert a direct effect between the components of country good governance indicators and cultural dimensions, on innovation.

The present research develops a comprehensive framework by examining the potential synergies among the cultural dimensions and their effect on innovation, as well as the potential synergies among the good governance indicators to foster innovation and the combined effect of cultural dimensions and good governance indicators on innovation. The study builds upon and goes beyond the existing research on the relationship between cultural profiles and country innovation performance, while understanding the governance context in which these cultural dimensions are embedded.

Keywords: governance, culture, policy, innovation, strategy.

JEL classification: O38, O10, G38, M14.

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1. Introduction

There is ample literature on the relationship between cultural dimensions (CC) and innovation, and a more reduced amount that explores country good governance (GG), and innovation. However, these relationships have been studied independently, and to the best of our knowledge, no research addresses the potential synergies among the variables that compose cultural dimensions and good governance and their combined effect on innovation. Country culture is a concept well defined and rooted in the heritage of every region. It might seem like a fixed set of attributes related to the ideas, customs, and social behavior of specific regions or groups of persons. Nevertheless, although very gradual, ideas, customs, and social behaviors change over time as the research of [Beugelsdijk, S. et al. \(2015\)](#), as well as [Beugelsdijk and Welzel \(2018\)](#), among others report. Data from country good governance indicators have been collected just over the last 25 years, and although it might be more complex to evaluate its evolution due to the short time span, it might be assumed as well that these indicators have a degree of plasticity over a certain period.

While cultural dimension indicators for each country change over time, it would be a very ineffective and highly controversial endeavor for governments attempting to act upon these cultural dimensions to foster innovation. On the other hand, country leaders might find it more effective to act upon the good governance indicators whose presence foments country innovation. One of the purposes of the present research consists of developing a comprehensive approach to innovation from a cultural dimension perspective, as well as a good governance framework, and identifying the potential synergies that might arise from both sets of indicators. This might allow identifying short and long-term strategies that could foster country innovation. Countries with specific cultural dimensions might find it more effective to act upon country governance indicators, allowing a more efficient allocation of resources. As [Fernandez et al. \(2018\)](#) as well as [Ibanez and Sisodia \(2020\)](#) report, policies should reflect and adapt to country-specific cultural, political, and economic contexts, adapting their strategies to their strengths and resources. The present research also develops a profile of the most innovative countries based on their cultural dimensions and good governance indicators. This profile could serve as a benchmark for nations that propose fostering innovation as a strategic country goal. The present study tries to build upon and go beyond the existing research on the relationship between cultural profiles and country innovation performance while understanding the governance context in which these cultural dimensions are embedded.

The study begins with the literature review related to the research questions that allow proposing the hypothesis, followed by the data and methodology, analysis and results, discussion and conclusion and limitation sections.

2. Literature review

The purpose of the present research consists in simultaneously studying the effect on innovation of good governance practices and country cultural dimensions while analyzing the drivers that can promote synergies among the variables of cultural dimensions, the variables of good governance and their potential interactions with innovation. The research focuses on European Union countries, for which they are available all the cultural dimension indexes, as well as the governance indicators and innovation indexes. The following sections outline the theoretical framework based on the literature review to support the proposed hypothesis, define the reasons to select each of the datasets for cultural dimensions, good governance indicators, and innovation outlines the methodology and results and discusses the findings and their potential implications for policy development to foster innovation at country level.

In terms of governance and innovation, a recent study by [Veiga et al. \(2020\)](#) endorses the positive relationship between the perception of citizens on their public institutions and country innovation indexes. [Jameel et al. \(2019\)](#) confirmed the relation between individuals trust in public institutions and good governance indicators. [Barasa et al. \(2019\)](#) and previously [Roach et al. \(2016\)](#) identified a positive relationship between innovation and country good governance indicators. [Sayamov \(2017\)](#) stresses the critical role good governance excerpts on innovation and the growing relevance this line of research is attaining. The present study relies on these findings to advance the relationship between good governance and innovation.

The number of indicators to measure good public sector governance has grown extensively over the last decade. Private rating agencies, especially those related to country debt ratings and political stability, started in the 1980s. Their goal was to assess a country's potential risks to investors and creditors. Among the rankings' items, corruption was one of the most relevant ones. Based on these preliminary governance rankings, scholars started to go beyond economic data to assess country stability and its relationship with economic growth. [Mauro \(1995\)](#) relied on the Economist Intelligence Unit (EIU) data to study the relation between country growth and country public institutions. [Mauro \(1995\)](#) built upon the existing corruption indicators and included several others such as the country juridical system and political stability. In 1996, the World Bank Group developed the Worldwide Governance Indicators (WGI), building along the previous indexes used for country public institutions. This index is composed of 6 indicators. According to [Stanig et al. \(2013\)](#), its main assets are its methodology, rigor, and transparency. [Stanig et al. \(2013\)](#) specify in their article that the two main limitations of this indicators reside in their lack of supranational context and interregional environment. Despite these limitations, researchers started to use the WGI shortly after they were first published, and one of the research goals pursued through them consists in analyzing the potential relations between WGI and innovation, as the works of [Becker-Blease \(2011\)](#), [Unceta et al. \(2017\)](#), [Morisson and](#)

Douissenau (2019), and Kondratenko et al. (2020) reveal.

The relationship between governance indicators and Gross Domestic Product (GDP), attracted scholars as soon as there was sufficient data to test the hypothesis of a potential positive relation between the two variables. Kaufmann et al. (2005), validated this positive relation and reported on the changes the index undergoes over time. Jankauskas and Seputine (2007), corroborated this positive relation for European Union countries, while Han et al. (2014), achieved the same results with a sample of Asian countries, as well as Mira and Hammadache (2017), for African and the Middle East Countries. GDP represents a control variable within the present research.

As per the relation of GDP and Hofstede's (2001) cultural dimensions, there exists ample literature on the subject with a consensus on the positive relation between individualism and GDP, as well as a negative relation between power distance and GDP. Gorodnichenko and Roland (2011), noted that other cultural dimensions with a positive relation with GDP are strongly correlated with individualism. These findings were aligned with Cox et al. (2011) results. According to Yeh and Lawrence (1995), "...culture is not a sufficient condition to explain economic growth and is related to other important factors that play a role in determining economic growth". Based on these findings, the present research goal consists in providing a comprehensive framework that goes beyond the limited direct effect of culture on innovation by integrating the governance dimension within a broader perspective.

In terms of the relation between the items that compose good governance and cultural dimensions, the consensus reflects the positive relation between long term orientation, indulgence, and individualism with good governance indicators, and the negative relation between good governance indicators and power distance as the results of Noorderhaven and Tidjani (2001), Gaygısız (2013), and more recently Holý and Evan (2021), research reveal. The present research analyzes the interactions among all the variables that compose GG and CD.

Finally, there exists a consensus in the literature on the positive relation between the cultural dimensions of individualism, low power distance, uncertainty tolerance, indulgence, and a long-term orientation, as reported by Sun (2009), Cox et al. (2011), Khan and Cox (2017), and more recently Boubakri et al. (2021). In terms of individualism vs. collectivism, Černe et al. (2013) research decoupled the concept of collectivism and its relation to innovation and stated that family-related collectivism has a positive relation with innovation rather than friend and organization related collectivism.

Cultural dimensions represent an exogenous antecedent for country innovation performance. Nevertheless, the literature review reveals these dimensions have been treated as individual items, while the present research focuses on their potential synergies among them to foster country innovation. Furthermore, as Yeh and

Lawrence (1995) research findings suggest, culture by itself is not the main driver for innovation and should be studied within the country-specific context. This is the reason the present research includes good governance indicators within the model to study the interactions and potential synergies among CD and GG indicators, to foster innovation and develop a comprehensive cultural and governance profile in which countries can benchmark and act upon, especially in the efficient and effective allocation of resources.

Based on the literature review and the purposes of the present research, these are the main research questions (RQs) addressed along with the study:

- RQ1. What is the profile of innovative countries based on GG indicators and cultural dimensions?
- RQ2. What are the potential synergies among GG indicators and cultural dimensions to foster innovation?
- RQ3. What are the potential relations between country cultural dimensions and Innovation for E.U. countries?
- RQ4. What is the potential relation between country GG indicators and Innovation in E.U. countries?

To address the research questions, the present study proposes the following hypothesis:

- H1: There exists a positive correlation between innovation and individualism.
- H2: There exists a positive correlation between innovation and long-term orientation.
- H3: There exists a negative correlation between innovation and power distance.
- H4: There exists a negative correlation between innovation and uncertainty avoidance.
- H5: There exists a negative correlation between power distance and control of corruption.
- H6: There exists a negative correlation between uncertainty avoidance and government effectiveness.
- H7: There exists a positive correlation between long-term orientation and voice and accountability.
- H8: There exists a positive correlation between long-term orientation and regulatory quality.
- H9: There exists a positive correlation between government effectiveness and rule of law.
- H10: There exists a positive correlation between government effectiveness and control of corruption.

Furthermore, the potential correlations among all the GG indicators, as well as the Cultural Dimensions will be explored. Finally, to fully address the research questions, the potential correlations between all the GG indicators and the Cultural Dimensions

are addressed. The profile of innovative countries, based on their cultural dimensions and GG indicators, will be outlined along the discussion.

3. Data and methodology

The study applies to the European Union members as of January 2022 plus the United Kingdom. Data is retrieved from 1996 to 2021 for Good Governance indicators, as well as GDP, and Innovation country index. Hofstede's cultural dimension indicators represent a one-time measurement.

Good Governance indicators are retrieved from the World Governance Indicators project (WGI) led by the World Bank Group (2022), based on Kaufmann et al., (2011) methodology. The WGI collects annual data for 200 countries and territories based on six governance indicators: Voice and Accountability (VA), Political Stability and Absence of Violence (PS), Government Effectiveness (GE), Regulatory Quality, RQ), Rule of Law (RL) and Control of Corruption (CC). The most recent data available is for the year 2021. The main critics of the World Government Indicators reside in its difficulty to be calculated and its potential inadequacy to be compared within different time periods. Despite these limitations, Hamilton and Hammer (2018) established in their study that these indicators represent an effective way of measuring the effectiveness of governments.

Country cross-cultural dimensions indexes Power Distance (PD), Individualism (ID), Masculinity (MS), Uncertainty Avoidance (AV), Long-term Orientation (LO), and Indulgence (IG), were retrieved from Hofstede's cultural dataset available at Data. World (2022). Hofstede's dimensions represent the most widely used cultural model, based on the literature review, when developing cross-cultural research, despite criticism from authors such as McSweeney (2002), who specifies potential problems with Hofstede's methodology, as well as the potential biased in the relation between the concept of nations and culture. Hofstede and Minkov (2010) revised Hofstede's methodology and clarified that the data for each country could be processed on the aggregated level, but never on an individual basis. The cultural dimensions cannot define the person; the sum of the persons could define the cultural dimensions. Taush (2017), in a crossed analysis of Hofstede's cultural dimensions, confirmed Hofstede's model results for four of the dimensions, PD, ID, LO and IG. Studies by Shane (1992, 1993a), Kaasa (2017), as well as more recent ones such as Tekic and Tekic (2021), based their research on Hofstede original indicators (1980, 2001).

Innovation data represents an elusive concept that has been widely investigated in the literature. There exists a consensus to base innovation research on the patent count. Griliches (1990) supports the use of patents count as an approximation to the concept of innovation. This is further supported by Griffith et al. (2006); Acharya and Subramanian, (2009); Hsu et al. (2014), and Gao et al. (2017), among other

authors. As Boldrin et al. (2011) specify, not every innovation becomes a patent, and not all patents represent innovations. Due to this fact, the present study focuses on patents granted, rather than patent applications to partially account for this specific constrain. Data is collected for all the European Union countries as of 2021, plus the United Kingdom since the UK left the EU at the end of January 2020. The data cover the years from 1996 to 2020 for all EU countries except Malta, Cyprus, and Latvia since there are several years for these three countries where data is not available. The research retrieved the data from the World Intellectual Property Office (WIPO, 2022) because all the necessary information is available for all E.U. countries except the previously mentioned ones. One of the main reasons for selecting data on innovation provided by (WIPO) is its widely use in the literature since WIPO was created in 1967 by the United Nations. Researchers such as Dutta and Lanvin (2016), Boix et al. (2016), Veugelers et al. (2010), and Crosby (2000), among others, based their studies on this official patent source.

Gross Domestic Product (GDP) per capita represents a control variable providing context on the country economic situation. To eliminate the trend in time but maintain the differences among countries, GDP per capita is defined as the difference between the logarithm in U.S. dollars at current prices and the logarithm of the mean GDP for each year. GDP data is collected from the International Monetary Fund (2022).

The descriptive statistics listed in table 1. present the highest standard deviation of all variables belonging to Innovation. This might be due to the different endowments each country counts on, as well as the differences in their financial systems and population density, among other factors described in the literature, such as Lopez-Claros and Mata (2011), and Hsu et al. (2014) suggest. As well, as is the focus of the present study, the quality of each country's institutions, based on their GG indicators and country cultural dimensions, will be explored to understand the high standard deviation on Innovation.

GG indicators show low standard deviations, ranging from 0.10, Regulatory Quality, to 0.26 Control of Corruption, while their means are within a 0.14 range from each other. The present study analyzes the potential interrelation among GG indicators, as they might be supporting each other.

As per the Cultural Dimension standard deviations, they are within the expected range, while the mean is near fifty for all CD, except Uncertainty Avoidance, which might imply that E.U. countries taken as a whole, tends towards avoiding uncertainty, which in turn, might have an effect on Innovation development that will be explored along with the research.

Table 1. Descriptive statistics.

	Minimum	Maximum	Mean	SD
Innovation	3	21034	2417.3	3996.6
Voice and accountability	0.313	0.963	0.747	0.129
Political Stability	0.300	1.000	0.799	0.126
Gov. Effectiveness	0.000	1.000	0.654	0.238
Regulatory Quality	0.400	1.000	0.772	0.106
Rule of Law	0.250	1.000	0.787	0.154
Control of Corruption	0.000	1.000	0.655	0.268
GDP PC Constant USD	3756.7	111968.4	31983.2	21138.1
PDI	11	100	51.56	21.6
IDV	27	89	58.16	18.4
MAS	5	100	47.44	24.4
UAI	23	112	70.56	23.3
LTO	24.4	82.9	57.53	16.9
IVR	15.6	77.7	43.74	18.9

4. Analysis and results

Along with the current study, quantitative data is used to determine if there are any patterns or trends among the variables under study. The study relies upon correlational research since the goal is to identify if there is correlation between the variables under consideration, but the purpose is not to find a causal relationship between them. Correlational research provides additional support for theories about causal relationships among variables tested in different contexts and indicates the potential causality on the current context under study. Furthermore, it allows examining the potential relations among newly introduced variables into the model, as is the case of the study, while no manipulation or intervention is performed upon them.

The research relies on open-source secondary data collected from the previously indicated sources. Even though there is very little control over extraneous variables in correlational research, the study introduces the control variable country GDP, as since stated in the literature review, it is a variable that is highly correlated to Innovation. P-values were tested at 0.05, 0.01 and 0.001. Tables one to three summarize the results of the analysis.

Table 2. Innovation, Cultural Dimensions, GDP per capita.

	GDP	INN	PD	ID	MS	UA	LO	IG
INN	0,49**	100%						
PD	-0,11*	-0,54**	100%					
ID	0,71***	0,43**	-0,55**	100%				
MS	-0,17	-0,1	0,18	0,16	100%			
UA	0,11	-0,44*	0,57**	-0,59**	0,14	100%		
LTO	0,21**	0,39**	0,14	0,16	0,13	0,04	100%	
IG	0,08	0,32	-0,58**	0,47*	-0,18	-0,51**	-0,37	100%

*P <0.05, **P <0.01, ***P <0.001

GDP shows a positive and significant correlation with Innovation, Individualism and Long-term Orientation. Innovation is significant and positively correlated with LTO and Individualism, and significant and negatively correlated with Power Distance and Uncertainty Avoidance. These results confirm hypotheses one to four. Further analysis of the data allows observing the interaction among cultural dimensions themselves. The cultural dimensions significant and positively correlated are Power Distance with Uncertainty Avoidance as well as Individualism with Indulgence. Power distance is negatively correlated and significant with Individualism and Indulgence, while Individualism is negatively correlated with Uncertainty Avoidance. Finally, Uncertainty Avoidance is negatively correlated with Indulgence.

Table 3. Innovation, Good Governance, GDP per capita.

	GDP	INN	VA	PS	GE	RQ	RL	CC
INN	0,49**	100%						
VA	0,71**	0,11**	100%					
PS	0,72***	0,16**	0,61**	100%				
GE	0,85**	0,26**	0,60**	0,68**	100%			
RQ	0,8***	0,14*	0,70**	0,47**	0,55**	100%		
RL	0,81**	0,21**	0,76**	0,72**	0,86**	0,64**	100%	
CC	0,83**	0,19**	0,74**	0,71**	0,81**	0,54**	0,89**	100%

*P <0.05, **P <0.01, ***P <0.001

GDP per capita and innovation are significant and positively related to all the variables within GG. In the case of GG and GDP per capita, all correlations are above 0,7, while in the case of Innovation and GG, the values range from 0.11 to 0,22.

Within the relations among the GG variables, the following ones stand out due to their high degree of correlations: Government Effectiveness and Rule of Law, Government effectiveness and Control of Corruption, as well as Rule of Law and Control of Corruption. All these correlations are above 80 percent. These results are aligned with the proposed hypothesis.

Table 4. Good Governance, Cultural Dimensions.

	PD	ID	MS	UA	LO	IG
VA	-0,27***	0,21**	-0,19	0,41**	0,71**	0,67**
PS	-0,17	0,16	-0,41**	-0,39**	0,63**	0,25
GE	-0,31**	0,24**	-0,19	-0,61**	0,78***	0,38**
RQ	-0,23**	0,07	-23	-0,27*	0,68**	0,43
RL	-0,31**	0,47**	-0,43*	-0,39**	0,73**	0,21
CC	-36**	0,15	-0,63***	-0,61**	0,76***	0,46**

P <0.05, *P <0.01, ****P <0.001

In terms of the stated hypothesis, the results confirm the negative correlation between Control of Corruption and Power Distance as well as Government Effectiveness and uncertainty avoidance. The positive correlations between long-term orientation and regulatory quality, as well as voice and accountability are also confirmed.

The study allows to further explore relations between Good Government Indicators and Cultural dimensions. The results reflect the positive relation between Masculinity and Control of Corruption, while Political Stability is negatively correlated with Masculinity. Uncertainty avoidance is negatively correlated with control of corruption, while long-term orientation is positively correlated with all Good Governance indicators.

5. Discussion

Understanding the relations between Innovation and GG, as well as Innovation and cultural dimensions, allows governments to allocate scarce resources in the areas that might have a greater positive effect promoting innovation. Changing the cultural dimension indexes of any given country, might be a challenging and even discouraging endeavor, even though cultural dimension indexes change along long periods of time. On the other hand, -makers might be aware of their country's cultural profile and tailor their innovation policies, based on these characteristics, along with their current GG country indicators.

While changing country cultural dimensions to foster innovation might be as controversial as futile, acting upon the GG indicators is within reach of governments

to support innovation. Based on the present research, all GG indicators are positively related to innovation. Therefore, countries might be able to prioritize which GG indicators they can act upon, based on their resources, and their social, political, and economic context. Since Government Effectiveness, Rule of Law and Control of Corruption are the three items more highly correlated with Innovation, these could become the priorities of countries to act upon, to foster innovation.

In terms of the research questions one and two, the profile of a highly innovative country, based on the results of the study, corresponds to nations with high GG indicators on all its six items, along low Power Distance, high level of Individualism, high Uncertainty Tolerance, as well as a Long-Term Orientation. These combinations of GG indicators and Cultural Dimensions provide the highest degree of synergies within a country, to foster innovation. Furthermore, this profile further addresses research question two regarding the potential synergies among GG indicators and Cultural Dimensions. Countries with low Power Distance, high level of Individualism, high Uncertainty Tolerance, as well as a Long-Term Orientation might benefit even further from every additional unit of improvement on their GG indicators to foster innovation.

The present study could not replicate previous results based on the literature review on the positive relation between Indulgence and Innovation, nor low Masculinity and Innovation. While the sign of the correlations was following previous analysis, the results were not significant. This calls upon further assessment and replication, using new methodologies as well as different cultural dimensions frameworks such as The GLOBE Project (House, 2004). However, the GLOBE Project might not address an exact parallel for each of Hofstede's (2001) cultural dimensions, such as Indulgence, and represents the most wide source in the literature for cultural studies.

The present research results are aligned with previous studies that addressed the correlation between cultural dimensions. These results answer research question three. The more a society becomes individualistic, the lower power distance rate it shows, which in terms, provides a favorable ground for Innovation to thrive. Furthermore, individualistic societies embrace uncertainty more than collective societies. As the European Innovation Scoreboard (2021) reports, the three most innovative European countries are Sweden, Finland, and Denmark in this order, which according to Hofstede's (2001), the three of them report above sixty in the scale of Individualism and report High Uncertainty Tolerance scores.

To address research question four, the research analyses the potential relations between GG Indicators and Innovation. The negative relation between Power Distance and GG indicators and the positive relation between Long-term orientation and GG indicators, is aligned with the recent study by Holý and Evan (2021). Countries with low Power Distance experience a high degree of good governance, which in turn, fosters innovation. This might be due to the nature of the good governance indicators, as citizens from countries whose leaders are held accountable for their actions (voice

and accountability), might be able to do so, due to a low degree of Power Distance. Furthermore, Innovation's positive correlation with GG indicators and Long-term orientation might be based on the advantage that GG indicators might offer, via Political Stability, Government Effectiveness, Regulatory Quality and Rule of Law, providing a stable and secure environment for innovation policy development and implementation.

In terms of GDP and Cultural Dimensions, the negative but relatively low (-0,11) and significant relation between GDP per capita and Power Distance is aligned with the literature review and can be further explained by the results of Cox et al. (2011), that indicate PD first increases as GDP grows, and then decreases as GDP continues to grow. Furthermore, the present research is aligned with the literature research on the positive correlation between GDP, Individualism and Long-term orientation. Nevertheless, Hofstede's (2001) cultural dimensions framework was developed when Asian countries such as China, Japan, South Korea, and India, among others, did not have the economic relevance they have nowadays. These countries, especially the first three, exhibit well about eighty percent scores on the Long-term orientation cultural dimension, which is positively correlated to innovation. One of the critics of Hofstede's model is its emphasis on Western countries, neglecting at the time of the study many of the Asian countries. This introduces a bias when studying Innovation in different contexts than the present study does (European countries). This might be addressed by combining more comprehensive cultural frameworks, such as The GLOBE Project (House, 2004), and the Lewis model (2006), which was developed to consider equally all regions of the world.

Finally, as for the positive relation between Good Governance and GDP growth, as Easterly (2005) reports, countries with high quality governance generally tend to prioritize economic growth. Nevertheless, the causality direction is not always clear and might require a country-by-country examination, as well as the consistent use of economic indicators that are beyond the scope of the present research.

6. Conclusion

Studies on culture and innovation might view cultural dimensions interacting with innovation as separate entities, overlooking the potential relations among the cultural dimensions themselves and their possible synergies and interactions with innovation. Governance indicators might also be treated as independent entities and might lack further country background, such as the cultural context in which these governance variables interact. Furthermore, national cultural dimensions interact with country governance contexts, which might directly affect the components of country good governance indicators and cultural dimensions on innovation. The present research builds a comprehensive framework on the interactions among Innovation, GG, and Cultural Dimensions. The most innovative countries share positive Good Government measurements along with all its indicators, as well as a cultural profile based on a high

level of Individualism, low Power Distance, high Uncertainty Tolerance, and Long-Term Orientation. Countries with cultural dimension indicators not prone towards innovation might take advantage of the present findings since the results provide an additional path, related to Good Governance that might serve as their foundation to build upon Innovation and economic growth.

One of the main limitations while using cultural dimensions resides in collecting migration effects. This growing phenomenon might substantially affect the evolution of country cultural dimensions. Future lines of research might be able to capture this effect and incorporate it within the model. Furthermore, in terms of culture and governance, the increased number of international companies operating within a country might promote cultural and governance index changes that might have a direct effect on country innovation over time. These two combined effects call upon future research proposals.

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