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Main non-conformities verified in health inspections in family farming and rural production in Minas Gerais

Principais não conformidades verificadas nas inspeções sanitárias na agricultura familiar e na produção rural de Minas Gerais

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ABSTRACT

Introduction: The need to strengthen the initiatives of the productive model of family farming and rural producers in harmony with the procedures for the formalization and production of safe food requires that Health Surveillance departments better assess the risk related to these activities. **Objective:** To analyze the panorama of inadequacies to good manufacturing practices detected in the health inspections of rural producers or family farmers in the State of Minas Gerais. **Method:** Cross-sectional study based on the information obtained in the spreadsheet of risk notifications and risk situations (*Planilha de notificações de riscos e situações de riscos*) from the Health Department of Minas Gerais (Brazil). This spreadsheet collect data from all health inspections in food producing establishments of rural producers and family farmers, was carried out from January of 2017 to December of 2019, at 853 municipalities in the State. **Results:** 3,442 health inspection risk notifications were analyzed, showing that the highest percentages of non-compliance with hygienic-sanitary requirements were the absence of formal training for handlers, in 26.00% of inspections; the use of non-potable water detected in 16.50% and non-compliance with good practices by handlers, mentioned in 14.20%. On the contrary, the inadequacies of time and temperature in transportation (4.70%), the use of feedstock without registration (5.10%), and the inadequate exposure (6.20%) of the final products represented the non-conformities less referred to in the reports. **Conclusions:** The main non-conformities observed in inspections of small rural enterprises in Minas Gerais indicate that structural issues are a higher priority regarding health requirements to the detriment of educational and basic sanitation processes. These constraints on compliance with regulations expose the main vulnerabilities that hinder productive inclusion. These findings may serve as a reference for the sector's development initiatives.

KEYWORDS: Public Health; Sanitary Inspection; Food Production; Public Policy

RESUMO

Introdução: A necessidade do fortalecimento das iniciativas do modelo produtivo de agricultura familiar e do produtor rural em harmonia com os procedimentos de formalização e da produção de alimentos seguros requer da Vigilância Sanitária melhor apreciação do risco relacionado à essas atividades. **Objetivo:** Analisar o panorama das inadequações às boas práticas de fabricação detectadas nas inspeções sanitárias de produtores rurais ou de agricultores familiares, do estado de Minas Gerais. **Método:** Estudo transversal elaborado a partir das informações obtidas na "Planilha de notificações de riscos e situações de riscos", da Superintendência de Vigilância Sanitária de Minas Gerais, resultado de todas as inspeções realizadas entre 2017 e 2019 nos estabelecimentos produtores de alimentos dos produtores rurais e agricultores familiares, dos 853 municípios do estado de Minas Gerais. **Resultados:** Foram analisadas 3.442 notificações de risco de inspeções sanitárias, sendo possível verificar que os maiores percentuais de não atendimento aos requisitos

higiênico-sanitários foram a ausência da capacitação formal dos manipuladores, em 26,00% das inspeções; o uso de água não potável, detectada em 16,50% e a não obediência às boas práticas, pelos manipuladores, citada em 14,20%. Ao contrário, as inadequações de tempo e temperatura no transporte (4,70%), o uso de matérias-primas sem registros (5,10%) e a exposição inadequada (6,20%) dos produtos finais representaram as não conformidades menos referidas nos laudos. **Conclusões:** As principais não conformidades verificadas nas inspeções da produção de alimentos pelos pequenos empreendimentos rurais de Minas Gerais demonstraram uma polarização no atendimento às exigências sanitárias, com a priorização de adequações à estruturação física, em detrimento aos processos educativos e de saneamento básico. Tais limitações no cumprimento das determinações normativas ressaltaram as fragilidades basilares que dificultam a inclusão produtiva, devendo servir de referência para as iniciativas de desenvolvimento do setor.

PALAVRAS-CHAVE: Saúde Pública; Inspeção Sanitária; Produção de Alimentos; Política Pública

INTRODUCTION

In recent years, the importance of family farming and smallholders for food production in Brazil has been increasingly recognized. New social and economic considerations have come into play as the country implemented policies and regulations to expand opportunities and strengthen the sector.[1]

Historically considered as a subsistence activity to ensure the livelihood of farmers, their families and communities, family farming is today a significant link in the supply chain. It is estimated that family farming accounts for about 70% of the produce consumed by Brazilian households.[2] However, from the farmers' point of view, despite some incentive laws and an increase in local initiatives, this production model still faces major obstacles to the marketing of its products. Most of these enterprises are poorly capitalized and usually resort to low-tech methods, which prevents them from supporting complex, structural or process changes and limits their access to formal markets.[3] In order to formalize their procedures and improve food safety, while safeguarding traditional customs and knowledge in line with good practices, the role of health surveillance becomes even more relevant.

The prestige resulting from incentive programs and the emergence of new producers has increased the need to assess the risks of these activities. In the Brazilian state of Minas Gerais there is a digital tool called "Risk and risk situation reporting spreadsheet" in FormSUS, to be filled out on a routine and remote basis, according to the Health Surveillance Monitoring Program established by the Bipartite Commission of the State of Minas Gerais (CIB-SUS/MG) n. 2.418, in November 17, 2016.[4] This spreadsheet aims to identify hazards, their differences, assess the level of exposure and characterize the risk found in all health inspections, regardless of the nature of the enterprise. In the state of Minas Gerais, it is mandatory to fill out the spreadsheets that will set the parameters for subsequent inspections. It is expected that all inspections (100%) done by health inspectors in any type of enterprise subject to state or municipal inspection generate reports of risk factors so that the resulting database is as comprehensive as possible.[4]

Concerns of this nature reinforce the need for studies that assess the conditions in which these enterprises work, so that, in case of any non-compliance, they can receive suggestions and interventions to improve food safety and quality. This is because, in addition to the inspection routine, based on the measurement of risks and the identification of associated factors, Health Surveillance is supposed to guide the prevention of diseases and the promotion of good health practices, especially among the groups that most need intellectual and instrumental support.[5]

The objective of the present study was to analyze the inadequacies in good manufacturing practices found during regularization initiatives in family farms or smallholdings (as stated in the "Risk and risk situation reporting spreadsheet" at FormSUS[4]) in the state of Minas Gerais, from 2017 to 2019.

METHOD

To enable a fact-based analysis of the sanitary conditions of family farms and rural food production enterprises, we conducted a cross-sectional study using secondary data from health surveillance inspections carried out by health inspectors in the 853 municipalities of the state of Minas Gerais between January 2017 and December 2019.

In a census diagnosis, we considered the spreadsheet records related to inspections of food enterprises. For the sake of this research project, we considered only those categorized as family producers and/or family farmers. The data in the "Risk and risk situation reporting spreadsheet", compulsorily filled in by the inspectors, enabled the identification of hazardous materials/situations that stood out as the main health risks of these enterprises.

To identify inadequacies and assess the level of good practices, we considered the answers to the direct questions listed in the report (Table). We quantified the frequency of negative answers ("NO") in the group of risk and risk situation reports derived from the various factors that triggered the inspections during the study period in Minas Gerais. For the same reason, "YES" and "DOES NOT APPLY" answers were not included in the calculation of occurrences in the studied population.

Since the same inspection can find more than one area of sanitary non-compliance, these areas were quantified according to the requirements, with no proportional distribution regarding the total reports made in the period.

RESULTS AND DISCUSSION

The analysis of the database revealed 482,781 reports of risks and risk situations from the inspections of all enterprises subject to health inspection between 2017 and 2019. Of these, family farms and/or rural production enterprises accounted for 3,442 inspections (0.71%).

For state institutions, the mandatory nature of the spreadsheet enables its use as a tool to protect the quality and enforce compliance with health requirements in the production of food marketed in the municipalities of Minas Gerais, regardless of the nature of the enterprise. It is at this point that health surveillance initiatives are important for this study. The differences between products and enterprises were excluded from the scope of the study precisely because we want to consider them as a sum of practices and, consequently, generalize their potential for the whole sector of family farming and rural food production in Minas Gerais.

It is worth mentioning that the representativeness of this research is limited, since the total number of family farmers and rural food producers in Minas Gerais is unknown. However, the number of such enterprises is probably higher than official records say. Dorigon[6] found shortcomings in health control when evaluating craft products from smallholdings in the state of Santa Catarina. He warns that almost all family farmers that were duly registered at the time of his research had started their activities in an informal manner. Fischer et al.[7] corroborated the expectation and ensured that the informal market is an alternative for many family farmers.

As for the inspections in Minas Gerais, several factors triggered 3,442 inspections during the study period (Figure). A significant percentage of the inspections was for the renewal of health permits (40.06%), which indicates a large number of licensed enterprises that remained active in the previous year and expected to continue with their activities. Similarly, 33.06% of the inspections were done in enterprises seeking their first licenses, which demonstrates a substantial increase in the number of players in this sector and reinforces the role of family farming and rural production in the promotion of productive inclusion.[8]

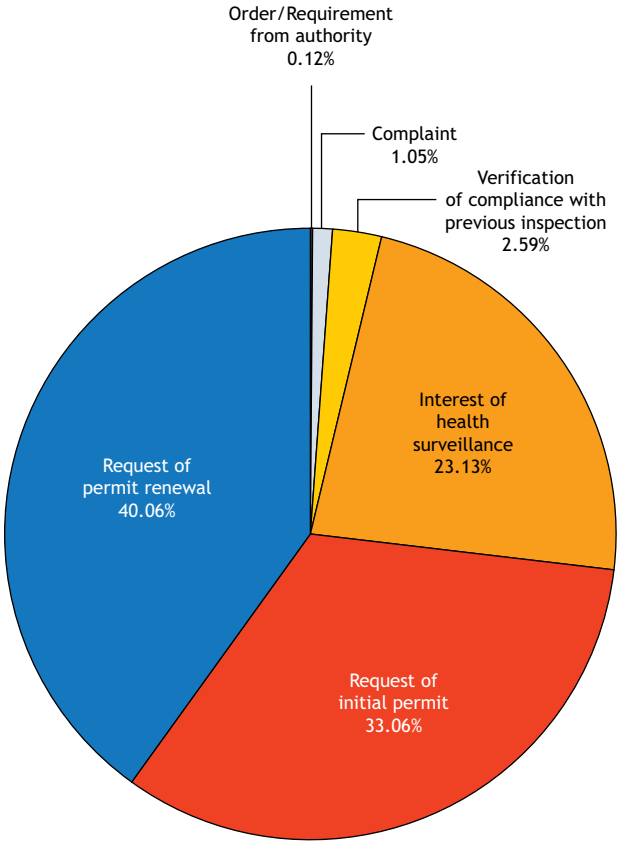
In contrast, very few health surveillance inspections were driven by requests from authorities (0.12%). This may signal a quality precept, since these demands usually resulted from requests made by the Minas Gerais State Program of Consumer Protection and Defense (Procon-MG), an agency of the Public Prosecution Office of the state of Minas Gerais (MPMG), or requests from the Brazilian Ministry of Agriculture, Livestock and Supply, which, suspecting the existence of a risk, required health surveillance verification.[9] In addition, the low percentage of inspections triggered by complaints stands out (1.05%). This is a very important activity and, unlike what has been observed by other studies, in which the lack of technicians and vehicles limited the inspections to those based on the complaints of the population[10,11]—since all complaints must investigated—this issue did not impact the frequency of activities. And, even though infrastructure challenges and insufficient resources plague the whole country, we cannot overlook the fact that the low representativeness of this demand may be influenced by new standards of producer-consumer relationships based on a perception of reliability and compliance.[12]

The enterprises of interest to this research received 1,008 inspections in 2017, 1,199 in 2018 and 1,235 in 2019. The average for the three-year period (□ = 1147.3) revealed an increase of more

Chart. Questions for the assessment of risk situations in the health inspections of food enterprises of family farmers and rural producers in the "Risk and risk situation reporting spreadsheet"/FormSUS.

Question #	Question for the assessment of the risk situation
141	Is the water used potable?
142	In the reception/storage steps, are the temperature and preservation of raw materials/ingredients that require special conditions verified?
143	Is the storage area in good sanitary conditions?
144	Are raw materials, ingredients, and packaging stored in clean and tidy places to guarantee protection against contaminants?
145	Are the raw materials with mandatory registration duly registered in the competent body?
146	Are the facilities, equipment, furniture, and utensils in proper sanitary conditions?
147	Is the handling team trained in good practices (clothing, behavior, hygiene, and health)?
148	Does the handling team follow good practices?
149	Is the food/product transported in time and temperature conditions that preserve its sanitary quality?
150	Are the final products exposed in an appropriate way to prevent contamination and/or proliferation of microorganisms (time/temperature control, material, and hygiene of utensils and furniture, packaging integrity)?
151	Are the buildings, facilities, equipment, furniture, and utensils free of vectors and urban pests or any evidence of their presence such as feces, nests, and others?

Source: Prepared by the authors with data provided by the Vigi-Risco Project of the Minas Gerais Health Surveillance Superintendence, 2020.



Source: Prepared by the authors with data provided by the Vigi-Risco Project of the Minas Gerais Health Surveillance Superintendence, 2020.

Figure. Distribution of the reason for the inspections of food enterprises of family farmers and rural producers in Minas Gerais, from 2017 to 2019.

than two times the inspections done in previous years, like the 514 inspections recorded in 2016. This increase can be attributed to the mandatory nature of the spreadsheet, effective from 2017.[4] But the actions of the Productive Inclusion with Health Safety Project, an initiative of the Brazilian Health Surveillance Agency (Anvisa), in partnership with the Brazilian Service of Support to Micro and Small Enterprises (Sebrae) and the National Front of Mayors, must also be considered. The project improved the support of the National Health Surveillance System (SNVS) to enterprises that struggled to formalize their economic activities.[5]

Although some progress has already been made, we believe that the reality of this sector is far bigger than what is already covered by health surveillance services. According to the Sistema Safra Agroindústria report, Minas Gerais had 5,728 family agribusinesses whose activities were subject to health surveillance inspection in 2018.[13] There was, therefore, a deficit average of almost five times in this type inspection. Furthermore, not all rural food production enterprises are classified as agribusinesses. This classification depends on their size and taxpaying category[4,14] and the results are underestimated numbers under the scope of the inspection service. This is because for the purposes of filling out the spreadsheet, the categorization of an enterprise as a family producer and/or family farmer is subject to the assessment of the inspector, with no specific guidance in the spreadsheet. The categorization depends, therefore, on the inspector's knowledge of Law n. 19.476, of January 11, 2011,[15] of Decree n. 46.712, of January 29, 2015,[16] and of the Resolution of the Minas Gerais State Health Department (SES/MG) n. 6.362, of August 8, 2018,[17] and may be influenced by the inspector's personal impressions and feelings on the topic.

On the other hand, even though the enterprises may be categorically distinct, any non-compliance can disrupt the general health principles that are common to good manufacturing/handling practices. Conceptual particularities do not affect the assessment of health requirements for the purpose of risk and risk situation reporting. For this reason, the results presented here should be highlighted because of their objective representativeness in the food production landscape and because of the potential they entail.[18]

With this research, we observed that the lack of training of handlers in terms of dressing, behavior, hygiene, and health conditions was the most frequent inadequacy, found in 869 (25.25%) of the 3,442 inspections carried out in the period. This and other areas of non-compliance stand out as reasons for food service inadequacy in view of the current health legislation (Table 1).

The lack of staff training revealed the low compliance of these enterprises with the legislation, especially with Joint Board Resolution (RDC) n. 275, of October 21, 2002[19] and SES/MG Resolution n. 6.362/2018.[17] Other authors also describe it as a frequent shortcoming.[20] Oftentimes, enterprises say they attend training courses only because the health surveillance so requires,[21] but they seem to be unaware of the real benefits of this requirement. In general, family farming in Brazil has always been low-tech, which prevents investment in sanitary improvements. This reinforces the need to raise awareness among workers in the area (and also consumers) about the importance of good practices for food safety, considering that the lack of training increases health risks and contributes to the inadequacy of food for consumption.[22]

The second most frequent non-compliance was the use of non-potable water, found in 550 (15.98%) of inspections. This finding is of paramount importance, since it directly impacts the quality of food, whether due to the possibility of microbiological or chemical contamination or due to changes in aesthetic characteristics like color, smell, turbidity, precipitation, crystallization, among others, always posing risks to the health safety of the product.[23] This situation, however, reflects an overarching problem that affects not only this type of production environment. Recognized as a fundamental human right by the United Nations (UN) in 2010,[24] potable water is not yet available to everyone in Brazil. Data from the National Household Sample Survey (PNAD) of the Brazilian Institute of Geography and Statistics (IBGE) indicate that 9.1% of the population living in rural Brazil does not have access to potable water.[25] This is the same percentage found in the state of Minas Gerais, where the characterization of

Table 1. Distribution of non-compliant items according to health requirements in food enterprises of family farmers and/or rural producers in Minas Gerais, from 2017 to 2019.

Sanitary requirements	Non-compliant items*	
	N.	%
The handling team is not trained in good practices (clothing, behavior, hygiene, and health)?	869	25.25
Use of non-potable water	550	15,98
The handling team does not follow good practices	476	13.83
The buildings, facilities, equipment, furniture, and utensils are not free of vectors and urban pests or any evidence of their presence such as feces, nests, and others	448	13.02
The facilities, equipment, furniture, and utensils are not in proper sanitary conditions	365	10.60
The storage area is not in good sanitary conditions	311	9.04
In the reception/storage steps, the temperature and preservation of raw materials/ingredients that require special conditions are not verified	268	7.79
The raw materials, ingredients, and packaging are not stored in clean and tidy places to guarantee protection against contaminants	263	7.64
The final products are not displayed in an appropriate way to prevent contamination and/or proliferation of microorganisms (time/temperature control, material, and hygiene of utensils and furniture, packaging integrity)	212	6.16
The raw materials with mandatory registration are not duly registered in the competent body	176	5.11
The food/product is not transported in time and temperature conditions that preserve its sanitary quality	161	4,68

* In the same inspection, more than one non-compliant requirement can be verified, with no proportionality ratio between the findings and the total number of inspections (n = 3,442) in the period.
Source: Prepared by the authors with data provided by the Vigi-Risco Project of the Minas Gerais Health Surveillance Superintendence, 2020.

the forms of supply and the monitoring of the quality of water for human consumption have shown that about 10% of the state population still uses alternative solutions of water supply—which does not always receive proper treatment.[26,27]

The lack of access to potable water is a major obstacle to rural enterprises. It is also associated with foodborne diseases (FBD), which are estimated as an integrated cause of the death of more than 2 million people every year because of the ingestion of contaminated food or water.[28] Despite the need for each enterprise to ensure the quality of the water it uses in its processes, we must also recognize that, since water is a common good, it is essential to implement public policies that improve the sanitary quality and the sustainability of these initiatives.[29]

Another concern is the non-compliance of the handling staff with good practices, identified in 476 (13.83%) of the 3,442 inspections. Surprisingly, however, this item did not top our list of inadequacies, although it is the main finding of several publications that suggest that family farmers and rural producers are completely unaware of the requirements of good manufacturing practices. Many also complain about the inflexibility of the legislation, given their small scale of production and the impossibility of substantial investment.[30,31]

Several aspects may be involved in the less frequent occurrence of this inadequacy. Decentralization initiatives and municipal inspections may have contributed to overcoming some territory-specific obstacles, and risk factors, social relationships, and policies have received targeted actions in some inspection services.[32] The enforcement of public food and nutrition policies that moved from authoritarian to participatory planning in the last decades,[33] the improvement in the population's level of education, including health education, and its effects on family farming[34,35] have also changed the profile and frequency of episodes, and health surveillance must be attentive to that.

Although our results are not the only possible interpretation of this phenomenon, they signal the smallholders' willingness to adapt and implement good practices, with the adoption of methodologies to adjust their strategies and solve some problems that appear in the absence of a rigorous production process.[36] The findings reinforce, therefore, that the health surveillance assessment should be constantly updated to avoid pointless approaches to the mitigation of contemporary occurrences. They also demonstrate that the food production chain in the state is changing, as the domestic and international contexts evolve. Therefore, as highlighted by Prezotto,[37] we need continuous research to subsidize surveillance and policy innovation.

As for the other items we evaluated, when considering safe food[38] as that which does not cause disease or harm to the consumers and is free of chemical, physical or biological contamination, the inadequacy of buildings, facilities, equipment, furniture, and utensils—either because of the presence of vectors/pests or because of poor sanitary conditions—is a significant finding.[39] Inadequate hygiene in the production environment can contaminate food through direct or indirect contact.[36] Insects, rodents, and birds must be controlled in the internal and external areas of the production site to prevent them from serving as vectors of pathogens and pests that affect the sanitary conditions and the quality of processed products[39]. These animals were found in 448 (13.02%) of the inspections and pose high risks because they are sources of chemical, physical, and microbiological hazards, which, in turn, are the main forms of food contamination. Likewise, poor sanitary conditions in equipment, furniture, and utensils, found in 365 (10.60%) of them, should be better evaluated in the inspections of these enterprises.

Conversely, the research also highlights the non-compliant items with the lowest percentages mentioned in the reports analyzed in the period (Table 2).

Table 2. Distribution of less frequent non-compliant items according to sanitary requirements in food enterprises of family farmers and/or rural producers in Minas Gerais, from 2017 to 2019.

Sanitary requirements	Non-compliant items*	
	N.	%
Inadequate time and temperature conditions when transporting the food/product	212	6.16
Use of raw materials without due registration	176	5.11
Inadequate display of final products	161	4.68

* In the same inspection, more than one non-compliant requirement can be verified, with no proportionality ratio between the findings and the total number of inspections (n = 3,442) in the period.
Source: Prepared by the authors with data provided by the Vigi-Risco Project of the Minas Gerais Health Surveillance Superintendence, 2020.

These findings are strongly related to preservation methods and food technology.[40] They can be explained by the fact that much of the production in these rural enterprises does not require special temperatures for preservation, which facilitates compliance,[41] not to mention the high costs of this type of process. In terms of display, the intention to protect and improve the acceptance of the manufactured product[42] seems to enable the understanding that the necessary investment will be eventually offset, thus favoring compliance.

We should remember, however, that any inadequacy is a potential threat to the sanitary quality of the food. However, when assessing risk in food, there is no weighting in the scope of inspections. General provisions on health safety suggest the adoption of risk-related education in the inspection of food produced by smallholders to inform the decisions made by the health surveillance body. Establishing a hierarchy of non-compliant items will enable inspectors to list correction priorities according to their level of risk and help them choose the interventions to enable the compliance of the smallholder. It is about establishing a hierarchy of risks and mitigating strategies based on principles like precaution, political responsibility for collective risks, and shared responsibility for individual risks.[43]

What is proposed is the logic of acceptable risks, in which the guidelines for inferences in the evaluation process are monitored by an expert system of technical excellence, aimed at ordering the social and material spheres of life, including health surveillance.[44] Although provided for by the Health Code of the State of Minas Gerais,[45] the use of this methodology is restricted to the evaluation of some companies in the area of medicines and drugs. The proposal, however, will benefit both inspectors and food producers, ensuring better risk management in food-related activities.

Finally, it should be noted that the present study has some limitations imposed by the research instrument. Although the "Risk and risk situation reporting spreadsheet" has questions about good practices for different types of enterprises—which enables it to be used for a wide range of activities—the characterization of the enterprises is merely a generic classification of rural producers and/or family farmers, without further detail about the population in question. Furthermore, this generic approach and the cross-sector use of the spreadsheet prevent some relevant items from being adequately parameterized according to the variety of manufactured products, making more specific assessments impossible. This study made an early investigation of the performance of the spreadsheet in this specific category of production, and its findings reveal the limited reach of public policies on basic sanitation and health education. We hope this study can encourage further studies on productive inclusion in a strategic and articulated manner in rural Minas Gerais.

CONCLUSIONS

The frequency of non-compliance with regulatory standards indicates the priority of questions of physical structure to the detriment of education and basic sanitation processes, identified in the health inspections in the production of food by rural enterprises in Minas Gerais. This hierarchy highlights the main weaknesses that prevent compliance with normative rulings and hinder productive inclusion, and should serve as a guide to foster the sector. This study also reinforces the notion that generic health regulations must be accompanied by instruments that consider the particularities of different types of food production and control to enable the proper enforcement of health surveillance standards.

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Authors' Contribution

Cesar DF - Conception, planning (study design), data acquisition, analysis, and interpretation, writing of the manuscript. Moreira SM - Planning (study design), data analysis and interpretation, writing of the manuscript. All authors approved the final draft of the manuscript.

Conflict of Interest

Authors have no potential conflict of interest to declare, related to this study's political or financial peers and institutions.