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Electronic System for Business Safety Inspections in Peru

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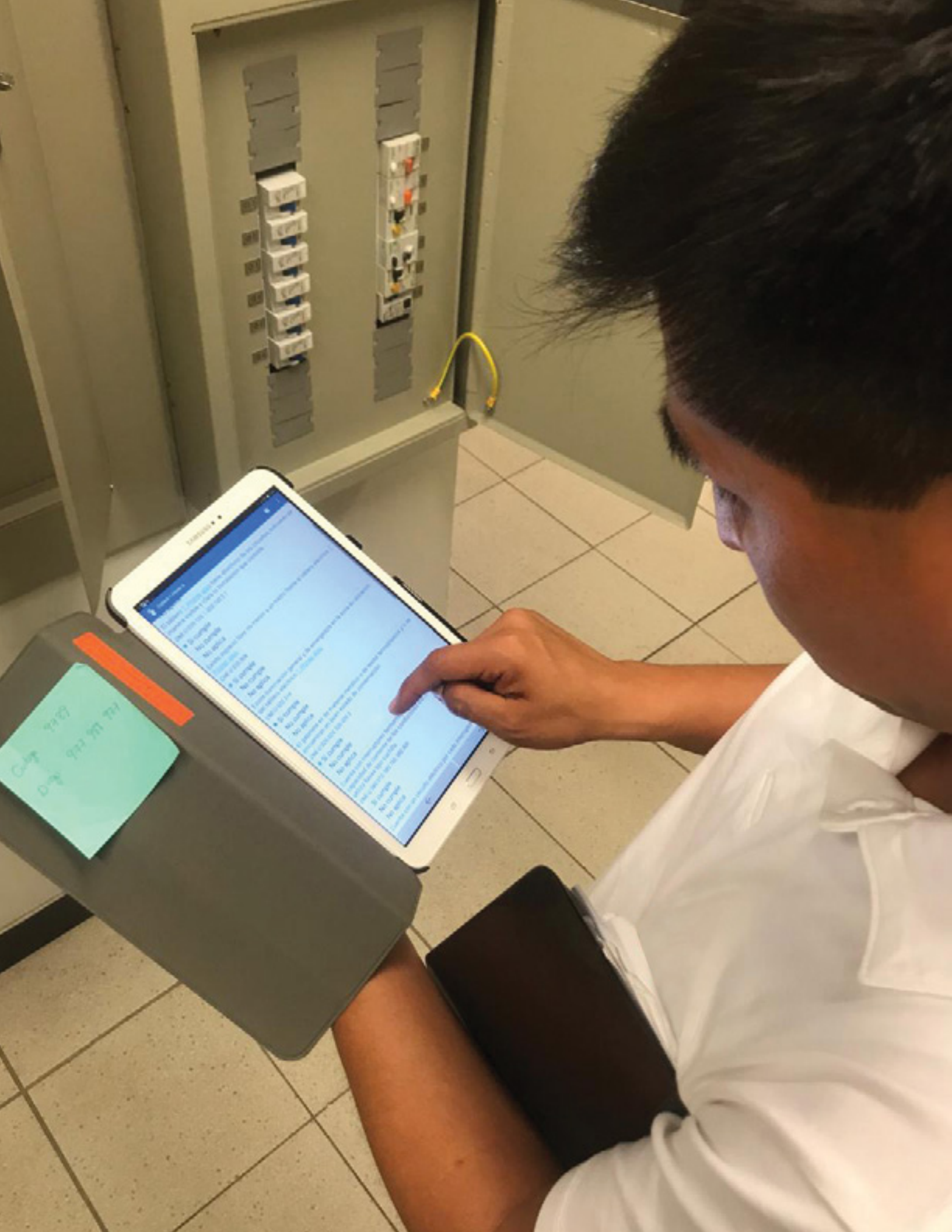


Background

Business safety inspections are commonly cited as one of the most important bureaucratic barriers to doing business around the developing world (World Bank 2019, 2020). In Peru, the business safety inspection system is characterized by low compliance with established norms, misaligned incentives and high transaction costs. These inefficiencies affect micro, small, and medium enterprises (MSMEs) disproportionally, as they do not have the resources or know-how to navigate the inspection procedures. MSMEs constitute 99.5 percent of firms, employ up to 89 percent of the population, and contribute up to 31 percent of gross domestic product (GDP) in the country (Ministry of Production 2017). Thus, the inefficiencies in the inspection system hamper the business environment, adversely affecting shared prosperity and economic growth.

The World Bank Group is conducting a rigorous impact evaluation study in collaboration with the Ministry of Housing of Peru.[1] Specifically, it will assess how the deployment of an electronic system for inspections—in combination with the improved monitoring of inspector performance and optimized firm auditing—can be used to address key constraints in the inspection system. This work will shed light on whether these mechanisms can reduce the compliance burden on firms by improving regulatory efficiency while also ensuring safety. In addition, it will provide evidence about how such systems could operate when implemented at scale.

This note provides an overview of the policy problem that Peru faces, and describes the solutions to be tested. It then focuses on lessons from developing and implementing the electronic system to solve the policy problem, with an emphasis on those lessons related to the constraints and inputs to improving regulatory efficiency and accountability.

The Policy Problem and Possible Solutions to be Tested

In 2018, the Peruvian government implemented a reform of the regulatory framework for business-safety inspections. Accordingly, it introduced a risk-based model to classify firms, as well as an expedited procedure for low-risk businesses to obtain their operating licenses. However, the inspection process continues to face important constraints. Based on data obtained by the research team in one pilot municipality in 2020, only 46 percent of firms complied with all requirements. These firms passed the inspection, albeit in some cases, after two or more visits—illustrating the high cost to firms and the government. The constraints identified in this system include a high degree of discretion in the application of the regulation, and low capacity in enforcing the regulation by the municipalities in charge of implementation. As a result, most firms require multiple visits to obtain the safety certificates

[1] This impact evaluation study is supported by the World Bank Competitiveness Policy Evaluation Lab, with contributions from the United States Agency for International Development (USAID) and the United Kingdom's Prosperity Fund.

necessary to start their operations, thereby creating inefficiencies, opportunities for rent-seeking, and the perpetuation of safety risks.

Various factors may be contributing to the regulation's lack of standardization, and the low capacity of municipalities to enforce it. The inspection regulation is vague, and the list of items subject to inspection is not clearly defined. Although inspectors use a checklist tool covering areas such as risk of fire and collapse, its application is highly discretionary. For instance, various elements of one object (constituent components of a gas cylinder) or various objects (gas cylinders, fire extinguishers, and so on) are often combined in a single checklist item. There is no standardized process to determine compliance when multiple objects are evaluated, or to identify the specific element that is causing the safety hazard.

Low capacity at the municipal level stems from a lack of resources. The current regulation requires municipalities to conduct supervisory visits or audits to verify that firms maintain the appropriate safety standards over time (that is, after they have obtained their initial safety certificate). However, most municipalities do not conduct these audits because they are expensive and are not paid for by the firms. In this context, these audits sometimes require up to three inspectors and multiple visits. Thus, these and other constraints reduce business incentives to maintain safety standards over time. Likewise, they reduce inspector incentives to perform accurate assessments, leaving room for discretion and rent-seeking behavior.

Accountability Mechanisms to be Evaluated

The main objective of the impact evaluation study is to assess the role that stronger accountability can play in improving safety standards and reducing leakages—without imposing excessive burdens on firms. Accountability is a condition that reduces bureaucratic discretion through clear rules, monitoring and enforcement (Light 1993). The study will evaluate the use of a combination of mechanisms to increase the accountability of inspectors and firms, assessing their impact on compliance, safety, leakages, and the efficiency of the inspections.

The first accountability mechanism to test (Phase 1) is the adoption of an electronic system for inspections (hereafter, the e-system) that contributes to the standardization of the application of regulations. It provides municipalities with a tool to monitor inspections and obtain data and analytics in real time. During 2018 and 2019, the e-system was designed, tested, and fine-tuned in collaboration with five district municipalities, namely: Comas, La Victoria, Los Olivos, San Isidro, and Trujillo. More recently, the e-system was launched and adopted in one municipality. It has provided useful data, as well as an opportunity to see how well the e-system functions. At least two other municipalities are expected to adopt the system in 2020.

The second accountability mechanism to test (Phase 2) entails a monitoring scheme of inspectors and random quality checks. It is expected to increase accountability through the standardization of their assessments. Currently, the work of inspectors is only lightly monitored. Furthermore, the regulation lacks effective procedures to correct or modify inspectors' assessments if errors are somehow identified. Thus, the scheme will introduce a dedicated group of qualified third-party evaluators, who will verify some inspections shortly after they are conducted.

The third accountability mechanism to test (Phase 3) targets the notion of accountability from the firms' point of view. It consists of conducting audits in a certain share of firms to incentivize them to maintain safety standards over time (after they have passed the inspection). These audits consist of follow-up inspections that firms undergo following the same safety standards as those required at the time of applying for the safety certificate. Currently, the municipalities do not have resources to conduct these audits, despite being mandated to do so by the regulation. However, most firms are never audited. Given the resource constraints that municipalities face, the study aims to analyze the effects and cost-effectiveness of different auditing probabilities.

Improving Standardization and Accountability Through an Electronic System

The impact evaluation study first evaluates the adoption of the e-system to conduct inspections. The e-system is expected to help standardize the application of the inspection regulation and reduce discretion when assessing business safety. The e-system does not change the technical aspects of the inspection. For example, the objects inspected are the same as those listed on paper. Likewise, the inspection checklist and official reports generated by the e-system are the same as the paper checklists and reports. However, the e-system records more granular data and introduces significant changes in procedures to promote greater standardization, efficiency and accountability. The next section will examine how the e-system can help solve the problem of the lack of standardization in the application of the regulation.

Eliminating Paper Forms and Introducing Real-time Administrative Data and Information

The e-system's most significant change involves the elimination of paper forms, and the introduction of a computerized system. The new e-system is expected to result in gains in efficiency, institutional memory, and easy access to reports and analysis by all concerned stakeholders. With paper forms, inspectors are obliged to carry multiple forms in duplicate (including three possible paper forms to be completed, with some up to 13 pages long).

With the e-system, the checklist has been programmed into an application developed to conduct inspections utilizing tablets or smart phones (hereafter, the "app"). When an inspection is finished, the app determines which reports are generated based on the inspection outcome. As such, inspectors do not have to worry about which specific forms to complete, which to hand over to the business, and which to keep with them for later updating. The app automatically determines the forms to be generated and their recipients, thereby freeing the mental and physical resources of the inspectors.

The app allows inspectors to record granular observations of objects while they complete the inspection checklist, take photographs, note comments, and sign the inspection form directly on their device (either a tablet or phone). Devices are equipped with a subscriber identity module (SIM) card that allows inspectors to send the inspection report by email to the business representative as soon as the inspection is concluded. In addition, basic data such as the address and business name need to be entered only once or can be pre-loaded. This represents an improvement from having to write this information by hand in each of the various forms.

- Reduces paper and time spent by inspectors on administrative tasks.
- Provides access to forms, aggregate reports and inspection data in real time.

Streamlining the Inspection Procedure

The e-system contributed to the streamlining of the inspection procedure, making it more efficient and accurate. Two key features of the app include its ability to tailor the inspection checklist to the type of business and group questions in a more efficient manner.

The paper inspection checklist includes questions for the various types of businesses (for example, hospitals, schools, offices, and so on), as well as questions that only apply to businesses with specific characteristics (for example, buildings with more than two floors). Inspectors are required to indicate manually which questions do not apply to the current type of firm. As such, they sometimes inadvertently miss questions in the process. However, the app automatically filters out the questions that do not apply based on the type of business and the characteristics of the building. As a result, inspectors do not need to think about which questions may apply because non-relevant questions are automatically skipped. In addition, they do not have to worry about omitting certain questions because the app's main menu uses colors

to indicate which questions have been answered and which are pending.

The app also organizes the checklist questions in a more efficient way. The paper checklist tool organizes questions by type of risk, for example, risk of fire, collapse, and so on. In practice, however, inspectors usually evaluate objects or equipment that involve different types of risk. An air-conditioning unit, for example, might be poorly affixed to the wall (with a risk of collapse) and missing a ground connection (with a risk of fire and electrocution). The fact that these questions are not grouped by object on a paper checklist means that inspectors usually take notes about the object. They then complete the paper form at the end, thereby leading to inaccuracies. However, the app groups relevant questions by object, allowing inspectors to answer all questions pertaining to specific equipment or collective objects. The fact that inspectors can extract all questions for a specific object at once and in front of the object itself makes it a more practical tool. As such, they can more easily answer the questions while they conduct the inspection, thereby contributing to greater accuracy.

The app has changed the procedure for recording observations. However, the information collected is then aggregated to electronically generate the official forms according to the regulation (that is, grouping again by the type of risk).

- Automatic filtering optimizes the questions that need to be answered.
- Organizing questions by object contributes to more accurate and comprehensive inspections.

Standardizing Assessments

One of the main problems with the regulation is that it provides few parameters or rules to standardize the assessments conducted by inspectors. One example involves checklist items that refer to multiple objects (for example, several fire extinguishers or electrical outlets), but require the inspector to condense their evaluation into a single yes/no answer. In these cases, the regulation does not specify whether inspectors must evaluate all objects on the premises or evaluate a subset. In practice, inspectors usually evaluate a subset of objects and then record aggregate compliance for the group. This practice can cause a lot of valuable data to be lost. However, with the app, the assessment of each object is standardized. Inspectors can record compliance for individual objects (that is, for each fire extinguisher, electrical outlet, or escape route), with the system then calculating aggregate compliance automatically. During the study period, the inspectors using the app will record data for individual objects, but only for select checklist items (given that this may also be time consuming). The research team will then analyze whether this standardization process contributes to making the inspections more accurate.

The app also standardizes the inspection procedure by activating follow-up actions automatically. These follow-up actions are specific instructions provided to the firm when an item is non-compliant. For example, a non-compliant fire extinguisher can trigger seven different follow-up actions (recharge the extinguisher, change its location, and so on). On paper, inspectors must manually check the relevant follow-up actions after they have marked the item as non-compliant. To further complicate things, these actions are sometimes not on the paper inspection checklist, but on a separate form. Thus, the app has been designed so that the relevant actions are automatically activated, and the corresponding electronic forms generated. This may reduce the chances of human error and save inspectors' time.

- Option to evaluate compliance on an item-by-item basis generates richer data and may reduce inspector discretion.
- Automatic activation of follow-up actions may increase accuracy and save time.

Developing and Implementing the Inspection e-system in a Participatory and Adaptive Manner

The e-system was developed to operate and manage inspections at scale and in real time. Currently, inspections are conducted on paper and no data are available to track the results or monitor business safety issues, which limits policymaking and learning opportunities.

The e-system is comprised of two main components:

- The app: a low-cost application for tablets or phones to conduct the inspection. It is based on the regulatory checklist, but it allows for the collection of more granular information in a systematic manner and incorporates workflow management.
- A web-based platform: a site where inspectors can access official inspection reports and generate photographic panels tagged to each establishment. Municipalities can also access monitoring and performance data on a dashboard.

This customized solution produces timely and actionable information to identify challenges in the implementation of inspections—and enhance accountability by making mid-course corrections. Moreover, it does so without the intensive use of resources, expertise or equipment that are commonly absent in resource-constrained contexts.

The development of the e-system was a participatory and adaptive process, involving continuous field testing, inspector feedback, timely adaptations, and the training of inspectors. The key steps and components of the e-system are outlined below, highlighting the importance of user experience, adaptability, flexibility, and pertinence as crucial contributors to its success.

Field Testing and Joint Development of the app with Inspectors: Key Factors in Building a Flexible System and Generating Ownership

The initial step in developing the e-system involved the design and testing of the app, including the corresponding electronic forms. Based on the granular information entered in the app, the official inspection forms that are consistent with the regulation are generated electronically and then accessed through the web-based platform.

The app consists of a section to enter key information about the establishment before the inspection begins. The inspectors then use the main menu to see and access all objects that need to be inspected and track their progress. Once they select an object (such as electric panels, fire extinguishers, alarm systems, and so on), the app displays all questions or assessments pertaining the object. Indeed, the main menu is an important feature because it allows inspectors to make assessments in whichever order they wish; for example, grouping questions by object allows them to have all the relevant questions for a specific object in the same place.

Field testing, which was conducted in six municipalities over a period of approximately one year, was crucial at an early stage to build a flexible system to incorporate and standardize inspection practices. For example, with paper forms, inspectors typically walked through an establishment observing objects and taking notes, completing the checklist only after the walk-through was completed. By contrast, the app encourages them to record their assessments on the spot and with a high degree of standardization.

The app also incorporated many unwritten procedures that were not specified in the paper forms or the regulation manual, but were useful to the inspection process. In this way, field testing helped highlight instances that required clarification or further instructions to ensure standard recording. For example, some municipalities require inspectors to photograph the façade of a building (to provide evidence of the inspector's presence on the site and to serve as a record of the firm's location). This procedure is now incorporated as part of the app's inspection workflow sequence.

Finally, collaborative field testing ultimately allowed inspectors to develop ownership of the app. Several of the existing features were incorporated at the request of inspectors as ways to improve the system or to save time. For example, developers initially

separated a question about escalators, elevators, forklifts and other electrical equipment into four separate questions in order to capture more detailed data about each type of equipment. Inspectors recommended keeping it as a single question, and instead incorporating a multiple-choice field to identify the item under inspection as an escalator, elevator, forklift or other. This was the format that was ultimately adopted, as it saved inspectors time while providing the same level of data detail as the previous alternative.

Web-based Platform: Facilitating the Generation of Official Reports and Monitoring of Inspectors and Firms

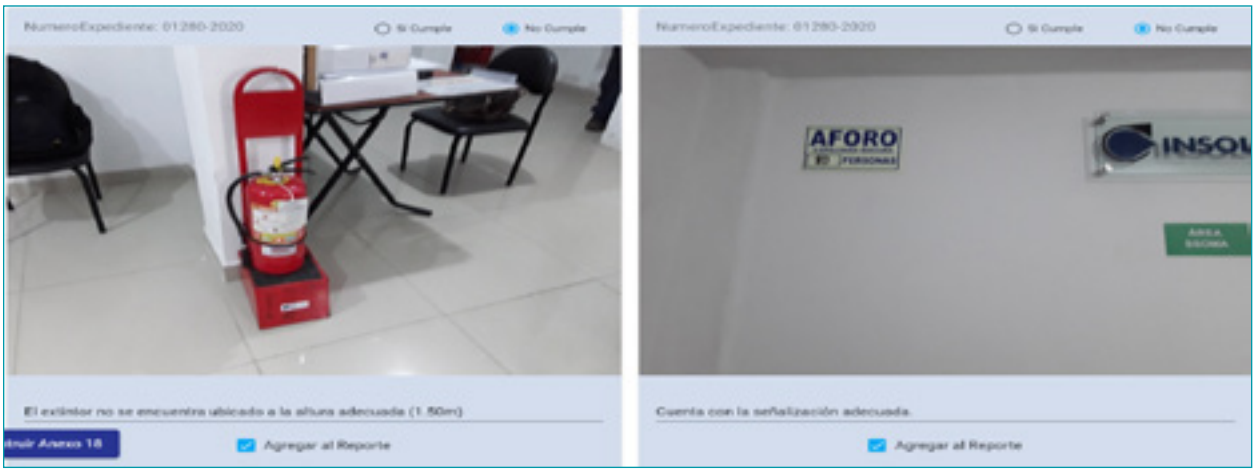
Once the app and corresponding digital inspection forms were finished and thoroughly field tested, the next step involved designing a report platform. The web-based platform allows inspectors and managers to access inspection reports, create photographic panels, and retrieve statistics and key indicators through a report dashboard. The platform has separate interfaces for inspectors and municipal managers. Inspectors can access reports, photographic panels and statistics regarding inspections that they have conducted. Managers have access to information regarding all inspections in their municipality.

The report component is straightforward. Users can search for records of specific inspections and access and download inspection reports in a PDF format. These can also be emailed to firms directly from the platform, which can be useful in cases where the firm did not provide an email during registration. An advantage of this setup is that municipal managers have access to inspection results in real time. When using the paper-based system, managers usually have to wait until the next day to receive the paper forms with the results from the inspectors.

The web-based platform also automates the creation of photographic panels. These are reports where inspectors must provide evidence, with pictures, of the compliance or non-compliance of the safety conditions observed. The platform automatically uploads all photographs taken by the inspector with the app; inspectors can then select which ones to include in the panel and write their comments. The end product is a PDF report, as mandated by the regulation.

There are two main advantages to the automation of the photographic panels: (i) it saves inspectors' time, as they do not have to download photos from cameras and paste them in a document; and (ii) it provides an additional layer of accountability, as municipal managers can view all photographs taken by inspectors (as opposed to only those that are included in the final photographic report) and do so in real time. Image 1 shows the photographic panel interface.

Image 1. Photographic Panel Interface



Source: Diego Garcia-Montúfar, World Bank.

Finally, the dashboard displays key indicators that municipal managers can use to monitor inspector and firm performance across their districts. For example, they can monitor compliance in a detailed manner (by type of firm, location, dates, and so on), and analyze safety risks with detailed information about the main violations. The dashboard generates tables and graphs with the following information:

- Inspection progress (for example, are inspections taking place? Where? When? In what type of business?).
- Inspection results at the firm and aggregate levels (for example, how are firms performing?).
- Safety risks (for example, which items from the checklist present the highest rates of safety violations across inspections? What are the most frequent violations in common elements such as electric panels or fire extinguishers?).
- Inspection quality (for example, what is the level of adherence to protocols?).

Learning-by-doing: An Effective Means of Improving e-system Skills

Once the e-system was developed, inspectors from three municipalities participated in classroom trainings, where they were introduced to the app, and field-trainings, where they conducted a mock inspection on the premises of a business (Image 2). Upon completion of both trainings, inspectors were able to use the app for real inspections on their own. Alternatively, they could request field support for one day. All municipalities participating in the study are expected to undergo these trainings and fully adopt the e-system.

The trainings revealed that inspectors of all ages and backgrounds were able to adopt the e-system with relative ease. Most inspectors are ready to start using the system on their own after attending the classroom and field training. Those that have difficulty using technology sometimes require additional one-on-one support for a full morning. However, even in such cases, inspectors are ready to use the system on their own after an additional session. Inspectors can also consult the e-system instruction manual if they experience problems. Overall, the implementation of the e-system thus far has demonstrated that the system's user-friendly interface translates into a short learning curve and quick adoption by inspectors.

Evaluating the Impact of the e-system

Once the e-system is functional in at least four municipalities, the first phase of the impact evaluation study (expected in 2020) will assess the impacts of introducing the e-system on the following:

Image 2. Classroom Training with a Team of Inspectors

Source: Diego Garcia-Montúfar, World Bank.

- Inspector performance (number of inspections per day) and learning curve (time taken for the average inspection duration to stabilize after implementation of the system).
- Process efficiency (time required for paperwork from application to obtaining the safety certificate).
- Compliance of safety conditions (percentage of firms that pass the inspection, and number of violations).

This phase of the study will leverage the administrative data generated by the e-system. To assess the effects attributed to the e-system, inspectors in all pilot municipalities will be randomly assigned to either paper or app inspection during a six-week period. After this period is completed, paper reports will be digitized. The impact evaluation will then compare the outcomes of the inspections conducted with the app with those conducted on paper.

So far, preliminary data are available for 176 inspections conducted between February and March 2020 in one municipality (96 with the app and 80 on paper). It is important to note that at this early stage, these data cannot be used to draw conclusions regarding the effectiveness of the e-system. However, the preliminary data provide insights into how the e-system can be used to inform policy and make improvements.

Table 1 highlights an interesting occurrence. It shows that suspended inspections seem to be disappearing between the initial and final inspection visit using paper (from 26 to 0 percent), but not for inspections conducted with the app (15 to 4 percent). This could be an example of how the app is serving to enforce the inspection protocol, resulting in greater thoroughness.

Comparing compliance with safety standards by inspector can also be useful for quality purposes, as well as for identifying possible leakages, broadly defined as corruption or insufficient effort. For instance, from Figure 3, it would be important for the municipality to assess why two inspectors have 100 percent compliance rates, when on average it is known that most enterprises do not pass the inspection.

The non-compliance rate for specific elements also has important policy implications, as it informs municipalities and regulators about the key security conditions that need to be targeted. Table 2 suggests that differential switches in electric panels, circuit directories in electric panels, and electrical equipment without plugs with earth pins, seem to be the items that are most frequently inspected (in 169, 172, and 152 firms, respectively). However, among the items assessed, the lack of fire alarms and ground connections of metal structures in roofs present the largest rate of violation (with non-compliance rates of 48 and 45 percent, respectively). This type of information was previously unavailable and difficult to obtain. For example, in order to present the figures for the paper inspection, the research team had to digitize inspection reports and enter all the data manually.

Table 1. Inspection Results (percentage of total inspections)

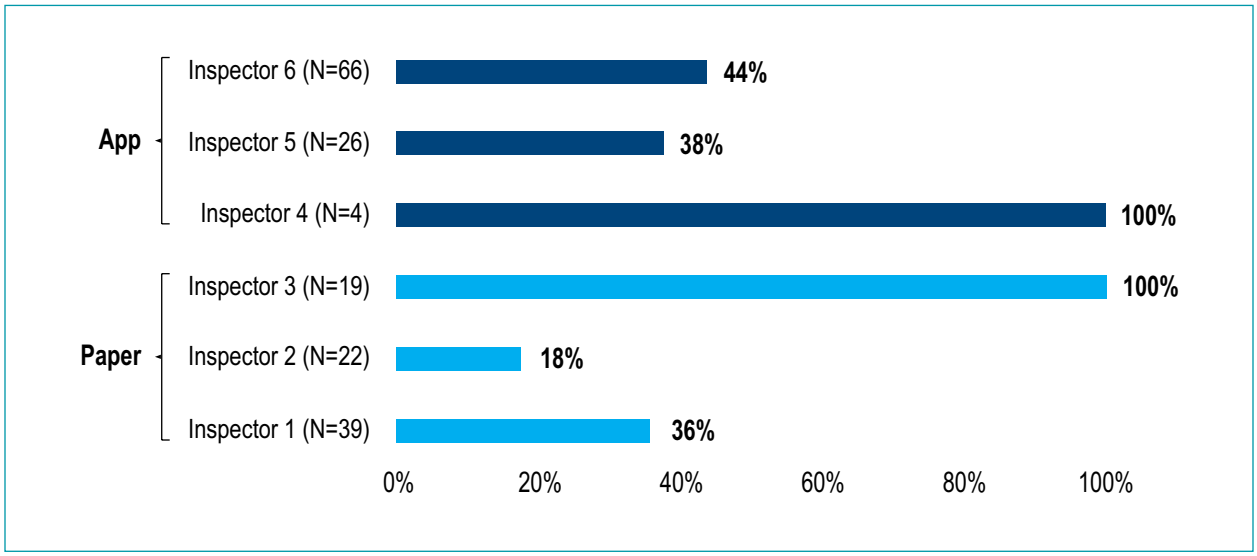
	First Visit			Last Visit		
	App	Paper	All	App	Paper	All
Complies	27%	40%	33%	45%	46%	46%
Does not comply	47%	31%	40%	51%	54%	52%
Pending corrections	11%	3%	7%	-	-	-
Suspended	15%	26%	20%	4%	0%	2%
Total inspections	96	80	176	96	80	176

Source: Research team calculations.

Note: For 73 percent of firms, the inspection is completed in the first visit. For these firms, the results of the first and final visits are the same. For the other 27 percent, more than one visit was needed to complete the inspection.

Another insight from Table 2 is the discrepancy in the ranking for non-compliance between the paper and the app inspections. For instance, the lack of fire alarms is the item with the highest non-compliance rating among paper inspections, whereas deficient hoses of gas cylinders has the highest non-compliance rating among app inspections. Rusted steel structures are identified prominently in the app inspections, but not in the paper inspections. Further analysis is required to identify the reasons for these discrepancies when more data become available.

Figure 1. Percentage of Inspections Recorded by Inspector that Comply with Safety Standards



Source: Research team calculations.

Table 2. Rank and Non-compliance Rates (by element)

	All			App	Paper
Checklist Item	N	NC (%)	Rank	Rank	Rank
Facility has a fire alarm system installed	33	48	1	10	1
Metal structures in rooftops have ground connection	21	48	2	9	2
Hoses of type 10 gas cylinders are in good condition	22	45	3	1	4
Facility has a security plan	18	44	4	3	8
Steel structures are free of rust	16	44	5	2	51
Electrical equipment plugs have an earth pin	152	42	6	8	3
Electric motor casings have a ground connection	28	39	7	4	14
Electric panels have a differential switch	169	39	8	6	5
Electric panels have a circuit directory	172	34	9	7	10
Outdoor fire extinguishers are stored inside a cabinet	15	33	10	4	19

Source: Research team calculations.

Note: NC is the percentage of non-compliant firms of the total number of firms for which the item was assessed (N). A total of 172 firms were inspected in this sample, excluding suspended inspections.

Lessons: How the e-system is Providing Inputs for Regulators

Highlighting Accountability Features Affecting Inspection Quality and Reliability—But Missing in Regulation

The development and implementation of the e-system has revealed important accountability features that are missing in the regulation and implementation guidelines, including a lack of standardization. The regulation leaves many aspects of the inspection procedure undefined, such as the process to determine which items on the checklist are applicable to the establishment at hand. For example, should inspectors ask the business representatives if the establishment is equipped with air-conditioning, electric motors or gas tanks, or should they determine this themselves during the inspection? Leaving such procedural issues unspecified can lead to discretionary judgments and low standardization.

In practice, inspectors using paper forms usually observe the establishment first and then mark their assessments. In the paper checklist, they are required to mark not applicable for any item or equipment not encountered during the inspection. Thus, items that were hidden, located on rooftops or in basements, or outside their route are sometimes omitted. With the app, this procedure can be standardized: inspectors must ask several questions before starting the inspection in order to determine whether certain questions apply. Questions that the app automatically marks as N/A can still be retrieved later if the inspector finds the equipment in question while conducting the inspection. This and other examples illustrate how the e-system can contribute to standardization and completeness, reducing the room for discretion and errors.

Identifying New Administrative Procedures to Enhance Efficiency and Accountability

Electronic inspection processes should follow the regulation for business safety inspections, as well as the general administrative law of Peru. In this context a challenge surfaced during the implementation of the e-system, specifically while ensuring that its features and processes were compliant with general administrative directives. This challenge became an opportunity in understanding how the e-system can enhance the efficiency and accountability of the inspection system for all stakeholders.

The major procedural challenge involved the legal notification to firms about the inspection. When using the paper inspection, firms sign and receive a copy of the inspection forms, which serves as a legal notification. However, the legal requirements for electronic notifications are different and involve two components. First, they must be authorized by the firm or applicant. Second, the government must produce evidence that the notification was received. The first requirement was addressed at the municipal level. In this regard, partner municipalities incorporated a short form whereby applicants could authorize electronic notifications at the time of requesting the inspection. For the second requirement, email receipt notifications were incorporated into the e-system. With these elements in place, municipal employees can track which firms have received their notifications and can follow up with those that have not received them.

Another illustrative challenge concerns the difficulty in addressing mistakes made by inspectors. Currently, once an inspection is finalized (that is, the inspection form has been duly signed by all inspectors and the applicant), the result cannot be easily reversed—even if a genuine mistake is identified (for example, if the report has the incorrect firm identification number). The procedure to amend this entails an audit of the establishment, requiring additional financial resources (as businesses do not pay for audits), as well as a lengthy administrative process (as the previous business-safety certificate must be annulled through a municipal resolution).

Overall, this costly and lengthy process reduces the incentives for quality controls. One way to address this is through the implementation of a brief grace period (for example, one day) in which managers or supervisors can identify and correct mistakes (perhaps only of a specific kind) made by inspectors.

The e-system could facilitate the incorporation of this procedure by sending the electronic notification (with any corrections) to the firm by email after the inspection form has been revised or approved by the manager. Thus, this would eliminate the need for additional visits.

Appropriate and low-cost features that allow for the tracking of actions (or lack of actions), such as the brief grace period or flags and alerts, can enhance transparency and accountability and help avoid leakages. These innovations provide the e-system with the flexibility to adapt to changes in the regulation. At the same time, they allow multiple actors to save time and allocate their resources into monitoring inspection outcomes in a more efficient way.

Revealing Potential Mechanisms to Increase Quality Inspections and Reduce Leakages

The lack of resources and capacity in the municipalities has led to some implementation challenges. Two problems that most municipalities face are a high volume of inspections and a lack of resources to hire enough inspectors. The result is that available inspectors are spread too thinly. In addition, low-pay results in some inspectors having to work multiple jobs in different municipalities. Therefore, inspectors have limited time to dedicate to individual inspections, which can affect the thoroughness and overall quality of inspections. In the face of these constraints, the e-system provides valuable tools to ensure inspections are conducted more quickly and with greater rigor and thoroughness.

The implementation of the e-system has also generated some ideas and strategies to improve accountability. However, they have not yet been implemented. For example, the use of Global Positioning System (GPS) tracking can help to ensure that inspectors visit the premises of firms during an inspection. It can also be used to track the duration of inspections, contributing to improvements in planning and logistics.

Concluding Remarks

The ongoing collaboration and use of the e-system through an adaptive and participatory approach have produced important insights and lessons:

- **Participatory approach.** A participatory approach utilizing local expertise and involving key stakeholders is critical to selecting the right design variations of a system to operate and monitor inspections with timely and actionable information.
- **Information and Communications Technologies (ICT)-based monitoring and evaluation (M&E) systems.** It is possible to develop ICT-based, low-cost, and fully functional M&E systems in capacity-constrained settings. Such systems can increase transparency and improve accountability through the reporting of information in real time to government agencies. They can also improve standardization, efficiency and quality. Challenges for developing such systems include the detailed and extensive thinking around its design, as well as the governing principles and protocols of the monitoring function.
- **Extensive testing** is essential to ensure that the system is functional, flexible, user friendly — and not overly dependent on single users. In this regard, ICT solutions can help through automatizing most steps to minimize the risk of bottlenecks due to inaction by some parties.
- **Capacity building.** An important lesson stems from the limited technical capacity of government agencies to develop and adopt these systems. Therefore, special attention should be given to building capacity to take advantage of technology.
- **Multi-disciplinary team.** Building adequate management and information systems has the potential to improve delivery capacity and accountability. Such systems can also serve as a critical tool for data-driven and evidence-based policymaking in the future. This requires that the systems be built by a multi-disciplinary team. This team would work on defining what should be measured and how. It would also guarantee the quality and reliability of the measures, and heed user experience (UX) and user interface design (UI). Finally, it should allow for the integration with other existing systems.


TABLERO DE
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