Columbia Global Centers | Rio de Janeiro

Essays on Efficiency, Transparency, and Innovation in the Brazilian Public Sector

Comunitas

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Preface

A diverse group of students from the Global Executive Master of Public Administration Program, at Columbia University, in a meeting a few years after graduation, talked about their experiences, the knowledge and tools they had acquired during their studies. Among other topics, they acknowledged how fortunate they were for having had the opportunity of studying in one of the most respected universities in The United States of America. And what started as a vague thought grew into brainstorming around feasible ways to contribute to discussions about improvements in public administration. The discussion evolved into the challenge of writing a book. Its theme would frame public sector management and would deal with efficiency, transparency, and innovation.

Effective management in the public sector demands specialized knowledge, soft skills, and a good understanding of the political context in which a manager is inserted. Significant changes and achievements are usually linked to great leaders and renowned names. However, there are several outstanding projects, programs, and strategies taking place, seeking to deliver better public services, led by mid-level public managers. Notwithstanding their ultimate outcomes, few of these endeavors have been publicized so far.

Mid-level administration frequently deals with good initiatives that add real value and practical results to the citizens' routine. More than that, it succeeds in developing good products, despite a sometimes unfavorable political environment. This mission has grown increasingly difficult, as the political scenario has become even more volatile lately. Most of the time, turbulent environments are not presented as fertile terrains; even worse, they harm motivation and productivity. On the other hand, as they must be, crises provide minimal conditions for innovative solutions, and huge improvements usually come to surface.

Aware of these circumstances, this group of authors felt the need to bring high quality practices and initiatives to light. Many of the essays deal with Brazil. Even before the COVID-19 pandemic, public administration in Brazil was already in crisis. Brazilian citizens now demand a more effective and efficient State, with fewer expenditures and a more balanced budget. More than ever, high levels of taxes have been questioned and challenged by the new digital commerce methods. Constantly threatened by an economic crisis, and haunted by the prospect of a fiscal one, Brazil must upgrade the traditional primary sources of State revenues and the way in which governments spend their money.

As this volume of essays by experienced managers in the Brazilian public sector is published, the Covid-19 pandemic has spiked again, adding a new layer of complexity. It is the public manager's responsibility to puzzle through all the complexities and respond to the challenges satisfactorily.

The first Chapter of this book (written by Antonio Barros) explores transparency from a different point of view. Public administration rules need to be understood by the ordinary citizen. Financial and tax education provide the fundamental knowledge to accomplish that. The Brazilian tax system is one of the most complex in its operation, maybe the most complex of all governments. Three levels of public administration (one federal government, 27 states, and more than 5 thousand municipalities) collect their taxes under differing rules and regulations.

However, legislation and regulation literacy have not been enough to provide individuals with a sharp critical sense, so they can exert their citizenship rights fully. Education is the key to control and diminish both tax evasion and fraud. Moreover, along with a good financial culture, these tools can help the entire country to collect revenues and save, which ultimately contributes to excellence in public service.

Social welfare expenditures are directly dependent upon tax collections and the quality of government expenditures. Specifically, financing all Brazilian social security programs (again, one federal government, 27 states, and more than 5 thousand municipalities)

is an enormous challenge for public administrators. Furthermore, beyond all adjustments on balance sheets, the constant increase in life expectancy exerts tremendous pressure on public budgets and demands high levels of management efficiency.

Social security is fully analyzed in Chapter Two of the volume.

The Brazilian social security dilemma of today has its origins in the long process of rural to urban migration in the country. Legislation affecting social security and pension payments has been modified through eight federal constitutions; the most recent social security regime was subject to more than 100 amendments. In 2020, the Brazilian social security system underwent yet another reform. The Chapter authors, Celina Melo and Paulo Tafner, delve into this subject, explaining the reform very thoroughly.

After discussing Brazilian revenues and social expenditures, Luciano Lanz, the author of Chapter 3, introduces aspects of a Brazilian public policy initiative to improve credit access, specifically for small- and medium-sized enterprises. These enterprises, which account for most of the job offered in the country, have been suffering a considerable impact as a result of the COVID-19 pandemic. The author explains how the new Brazilian credit guarantee program – PEAC/FGI – has ameliorated the credit access crunch during this time. Lanz also discusses challenges and opportunities to turn some innovative ideas into a permanent initiative.

Shifting focus to a world context, Kristin Franklin, in Chapter 4, employs a framework of analysis which combines trust in government with respect for ecological systems. The author sustains that both are equally necessary to drive economic growth. Introducing the Sustainable Development Goals and its relation to trust, the author points the way towards a sustainable management development analysis at local level.

Climate change, climate action plans, and the cases of New York, Rio de Janeiro, and San Francisco are the core of Rafaela Romero's analysis in Chapter 5 as she explores of sustainable management's fundamental aspects at local government level. Romero discovers a correlation between good performance in managing sustainable programs in municipalities and resulting opportunities for profitable businesses. She suggests that cities must improve this competitive advantage to guarantee a better economic and health future for citizens.

The financial market is on the spot in Chapter six (Palak Parekh). Sustainable investments can be helpful to equalize social issues. Managers, investment firms, investors, people are looking beyond financial statements to find out how companies create value in the long term. Is our society finally dictating the rules as a real stakeholder?

Aline MacCord in Chapters 7 and and Juliana Cardoso in Chapter 8 present initiatives carried out, respectively, within the Brazilian Department of Plant and Animal Health Protection in the federal government sphere and in the State of São Paulo's Department of Agriculture. Both of these two successful initiatives have generated value by engaging and connecting people. They were developed and implemented through different times and different federal and state administrations. The main point for having these texts here, in this particular sequence, is to focus on similarities and differences, when dealing with distinct, and sometimes contrasting, spheres of Brazilian public administration. Both departments deal with a similar subject matter. However, they operate within entirely different poles of power.

Glailson Lima and Alexandre Lobão in Chapter 9 discuss a common issue faced by Brazilian public administrators: development of new management procedures at zero cost. The main point is the trade-off between quality and price. The authors base their analysis on their own day-to-day experience in the Department of Enforcement Support of the Brazilian National Telecommunications Agency. Successful development of systems demands specific knowledge of the peculiarities that characterize such an activity. Consequently, several potential problems may affect both solutions and final results. However, there are some alternative approaches, as shown in the article.

Lucia Rodrigues in Chapter 10 explores artificial intelligence and the potential change it can generate. Climate change, social progress, health, accessibility, urban environment, and ethical issues related to artificial intelligence are considered in this text.

Eduardo Mota and Andrey Prison in the final Chapter take us through innovations in public management during the COVID-19 pandemic. It investigates how public managers in Brazil were constrained to accelerate some management processes, respond more quickly, and provide better services after this massive crisis started. The authors discuss a list of concrete innovations and solutions while taking into account the complex Brazilian political context. They point to some factors that influence leaders and public managers in their efforts to design and implement practical and useful innovations.

This book's ultimate goal is to provide support and encouragement to Brazilian citizens and public managers

looking to their government for hope and inspiration. The effort aimed to present innovations suggested by public managers who had participated in Columbia University's Global Executive Master's in Public Administration. We present this volume to our readers with a message: "Improving public management from within is possible. If we can do this, you certainly can as well.

Eduardo Almeida Mota

Foreword_

It is truly with great pride that I recommend to the reader this remarkable collection of essays all inspired by the shared ambition of the authors to improve the performance of government agencies in Brazil and around the world. The ten chapters in this collection, ably assembled by the editors, were written by thirteen authors and co-authors. Through presenting a staggering range of detailed case studies, the authors tackle the hard issues of improving government performance in an age in which it is dishearteningly fashionable to disparage the core function of government which is to provide efficient services to the citizens.

The volume is remarkable in a number of ways, besides its chief focus on the poorly understood workings of the Brazilian public sector.

First, it presents us with challenges to innovation is a wide variety of institutional settings, ranging from tax justice and efficient systems of social security to partnerships with the private sector in dealing with pandemics and the catastrophe of climate change to incorporating artificial intelligence and combating rural poverty. We have a chance to look at government in operation from a variety of fascinating viewpoints, including federal, state, and local governments.

Second, the authors are all highly trained and experienced practitioners who have dedicated their careers to the public service and are now operating at mid- to senior-levels of public management. They present their research results to us with the objectivity of an academic and with the confidence that only comes with experience in the inner workings of government. While not all chapters are dedicated to Brazilian cases, readers from around the world will come away from this volume with a keen sense of the trials, tribulations, and, also, the possibilities of government in Brazil.

Third, the authors do not shrink from the reality of public service hindered by many factors, including inappropriate political interference which prevents the implementation of many worthwhile ideas and can cause immense frustration. At the same time, they are optimistic that the government, by itself or in partnership with the private sector and civil society, is capable of doing much more than it does at present through achieving a clearer focus on efficiency and innovation. The world can really be a better place if government does its job properly and if public managers, and the citizens they try to serve, do not surrender to cynicism and complacency.

Finally, I would be remiss in not pointing out a common bond between these authors, one that helps explain why they have come together from so many different places to provide this volume to us. Almost all were at one time students in a highly-innovative Master's degree program in public administration assembled and delivered by Columbia University's School of International and Public Affairs under the direction of Professor William Eimicke. This Master's program delivered a top international public management training in a pioneering hybrid fashion perfect for the schedule of busy professionals who continued to work full-time while pursuing their Master's degree ambitions.

Dedicated to the simple proposition that efficient and innovative public service can improve the lives of all, the authors resolved to reflect on their practical experiences to ask themselves, and their readers, what could be done to improve service delivery. As such, the book is a clarion call for all of us not to lose heart and to become more aware of the problems, yes, that hinder government, but also of the possibilities for improved performance in the future. The book is being produced in the English language to assure a wide circulation outside of Brazil. It is a prime example of former students "giving back" in gratitude for the education they have received at Columbia and elsewhere and for the opportunities that have befallen them to work in senior positions in government.

To the readers of this volume, I recommend a most careful read and express

my hope that they will be inspired, as the authors themselves have been, to do their part to make governments in the future work better for all of us.

I extend my sincere congratulations to each of the authors, with special mention to Eduardo Mota and Luciano Lanz who did so much to bring this project to fruition.

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AN INNOVATIVE APPROACH TO TAX AND FINANCIAL EDUCATION FOR BRAZIL'S BASIC EDUCATION SYSTEM

ANTONIO BARROS

AN INNOVATIVE APPROACH TO TAX AND FINANCIAL EDUCATION FOR BRAZIL'S BASIC EDUCATION SYSTEM

Antonio Barros

Abstract

The interdependence between government actions and people's behavior concerning finance, the effects of tax and financial literacy on state fiscal sustainability and household financial health, respectively, and the preconceived advantages of simultaneous implementation of educational programs for citizenship indi potential for the integration of educational initiatives to mutually leverage the sustainability of public accounts and the financial health of families and, by extension, national development. The complementary of the impact between financial education and tax education is undergoing tests to be applied to the Brazilian basic educational system.

Introduction

This article intends to provide evidence of the correlation between the national economy cross-over effects of private financial decisions and the use – or not – of fiscal policy, as well as the potential of benefic mutual influence, when these decision-making processes are well-informed and appropriate, taking into account the influence observed, in terms of positive overall impacts for the economic system.

It then presents financial and tax education, conceptually, as well as some initiatives approaching the matter, including their results around the world, comparing the situation of tax and financial literacy, as results of efforts from a number of countries and those obtained from the Brazilian programs.

Thereafter, this paper formulates the assumption that there are expressive benefits rising from the simultaneous implementation of these subject matters for citizenship in schools. Finally, an on-going project pilot testing this hypothesis in Brazil is also presented, in order to display its scaling potential .

Private and public finance crossover effects and the Brazilian case

The dynamics between a country's public and private sphere, in general, has straight mutual influence. Each person's life, in turn, considered altogether, significantly impacts the social environment and, by extension, governmental actions The same applies to finance. Public expenditure is influenced by personal financial choices, just as fiscal policies affect people's financial lives.

In developing countries, fiscal policy would strongly tend to be procyclical (Alesina, 2008), exerting political influence, either to expand public spending in times of abundance of public revenues or proceeding otherwise in times of crisis. General Keynesian models, or their contrary, tax-smoothing models, imply, respectively, countercyclical or neutral approaches (Talvi, 2005). These views express the concerns of economists around the world, over the mutual influence of the business cycle, tax rates, and government spending.

Even in countries such as Brazil, where public expenses have grown in different rhythms over the last thirty years, no matter the general conditions of the economy or, specifically, when public budgets are constrained (World Bank Group, 2017), a deep fiscal crisis is closely correlated to an ongoing economic crisis. Despite the widely different recipes aiming at economic recovery, this influence has been a consensus among economists in Brazil, as seen in the recent debate on the spending cap of Brazilian federal public expense ("teto de gastos")[1].

A fiscal consolidation program, for instance, can both induce individuals and companies to save and reduce private expenses, through decrease in public spending, or, on the other hand, raise consumption among families – and, therefore, foster production – by an expectation of future tax rates reduction (Jönsson, 2004). This also points to a close correlation between private and public financial decisions, and how they may affect each other in specific areas, such as savings, expenditure, and investment.

A systemic macroeconomic example can be observed during a business crisis, when the generation of wealth produced by companies diminishes: overall income decreases, and citizens, in general, along with their families, become impoverished. The lower the economic activity level, the lesser taxes are paid. Thus, considering that the biggest portion of public administration resources comes from tax payment, governments end up with a shortage of money to implement services and policies. Consequently, the government has to deal with a compromised budget, which results in a considerable increase in demand for public action. As families lose income, for instance, they might stop paying their health insurance plans and start to rely on the public health system. Another example concerns those who opt for private education: they often need to take their children out from private schools and send them to public ones. In short, when the government has less money, even more action is needed, and this may eventually aggravate fiscal crisis[2]. Regardless of the

issue on the public sector efficiency, in substantive terms, economic crises tend to generate proportional fiscal crises in developing countries.

A more generous scenario of economic recovery, on the other hand, has opposite outputs: the same crisis exemplified before, when coming to an end, begins to present a rise in economic activity, a new cycle of prosperity. People start consuming more, companies hire and invest again, unemployment rate falls, and individual, as well as family incomes are boosted. The government receives more resources through taxes and it does not need to do as much as in the previous case. The result is that it will be able to spend with those most in need, people who depend on the state to access policies and services, and, in most cases, cannot save for difficult times.

As previously seen, the behavior of the elements that compound economic phenomena cannot be perceived separately. Such influence is systemic and continuous. Generally, economists and researchers isolate these elements in aggregates to investigate and understand how they work. In the real world, outside the labs, everything happens at the same time and it is almost impossible to distinguish lone effects. Personal and public finances are always deeply influencing each other.

Financial education and private financial decision-making

For the International Network on Financial Education (OECD, INFE), financial literacy is a "combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing" (2018, p. 4).

More specifically, Lusardi and Mitchell define financial literacy as the "ability to process economic information and make informed decisions about financial planning, wealth accumulation, debt, and pensions" (2014, p. 6). However, the authors state that financial literacy is seen by economists as a standard level of individuals' decision-making process, as they would always have experience, knowledge, or technical conditions – even in a very complex and mutable world – to make optimal choices, maximizing the utility of their resources.

Most of these microeconomic models do not take into consideration that ordinary people, even when dealing with important financial decisions, are not experts, and they rarely escape from behavioral aspects that affect such processes (Willis, 2008), which includes private consumption decisions and the impacts of advertisement.

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1   Por que o governo deve cortar gastos para o Brasil crescer? ("Why must government cut expenses for Brazil to grow?") https://www1.folha.uol.com.br/mercado/2019/09/por-que-o-governo-deve-cortar--gastos-para-o-brasil-crescer.shtml (08 September 2019) and Por que o crescimento do gasto público não explica a crise fiscal? ("Why doesn't increase in public expense explain the fiscal crisis?") https://www1.folha.uol.com.br/mercado/2019/10/por-que-o-crescimento-do-gasto-pu-blico-nao-explica-a-crise-fiscal.shtml (09 October 2019).

2   This article started to be written in the beginning of 2020, when the effects of the sanitarian crisis caused by COVID-19 couldn't be largely felt in Brazil yet. The situation of the fiscal crisis described above was exactly what happened in the following days. The recrudescence of an existing economic crisis that took place as a result of the business lockdown, has increased the Brazilian federal public deficit in hundreds of billions of "reais" in a few months. Proof of such bad condition of the Brazilian public accounts is that a trigger was activated and the National Monetary Council (Conselho Monetário Nacional) allowed, as an exception to the rule, the Central Bank to fund the National Treasury by

R$ 325 billion (around USD 60 billion). https://g1.globo.com/economia/noticia/2020/08/27/conselho-moneta-rio-autoriza-banco-central-a-repassar-r-325-bilhoes-para-o-tesouro-nacio-nal.ghtml (27 August 2020).

Budgeting and any other private financial issues as those related to savings, credit taking, debt management, and investments are daily concerns of families, mainly nowadays, when the complexity and variety of financial products require qualified information for choices to be made. If there is a close correlation between private and public financial decisions, poor private financial decision-making should be targeted by governments. This trend has been observed in recent decades and has become a general concern worldwide. OECD, for instance, started to firmly address this lack of public action as part of such a complex problem, and began to recommend that "financial education should start at school, for people to be educated as early as possible" (2006, p. 3).

Kappler et al. (2015) in the Financial Literacy around the World: Insights from the Standard & Poor's Ratings Services Global Financial Literacy Survey report summarize the problems due to the lack of financial literacy:

Financial ignorance carries significant costs. Consumers who fail to understand the concept of interest compounding spend more on transaction fees, run up bigger debts, and incur higher interest rates on loans (Lusardi and Tufano, 2015; Lusardi and de Bassa Scheresberg, 2013). They also end up borrowing more and saving less money (Stango and Zinman, 2009). Meanwhile, the potential benefits of financial literacy are manifold. People with strong financial skills do a better job planning and saving for retirement (Behrman et al., 2012; Lusardi and Mitchell, 2014). Financially savvy investors are more likely to diversify risk by spreading funds across several ventures (Abreu and Mendes, 2010). (p. 4)

Moreover, the worldwide financial crisis has led many governments to implement programs to provide financial education in schools, in order to influence people's behavior in the future, towards their independence and autonomy from public policies. The general assumption is that financial literacy implies better individuals' decisions (OECD, 2005). The results can be perceived in several studies informing that the premise is real and verifiable.

Bernhein et al. (1997), in the conclusion of their survey, point that it is highly probable that financial education, applied to high school students in the United States, can reduce the relative occurrence of poor financial decisions in their future. There is a noteworthy preliminary consideration, brought as a simple analogy to explain the effects of early financial education: it can increase familiarity with proper financial decision-making, the same way computer literacy acquisition by children appears to have a long-term effect in increasing comfort to deal with computers[3]. The study shows that high school mandates correlate with changes in behavior on adult financial decision-making, specifically in adequacy of saving.

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3   The intention of the analogy is simply to illustrate a common-sense hypothesis. As it is stated. "long-run effects of targeted educational initiatives have been difficult to detect in other contexts." (Bernhein et al., 1997, p.1).

FIGURE 1: WIDE VARIATION IN FINANCIAL LITERACY AROUND THE WORLD
(% OF ADULTS WHO ARE FINANCIALLY LITERATE)

Major advanced economies: Canada, France, Germany, Italy, Japan, United Kingdom, United States

Major emerging economies: Brazil, China, India, Russian Federation, South Africa
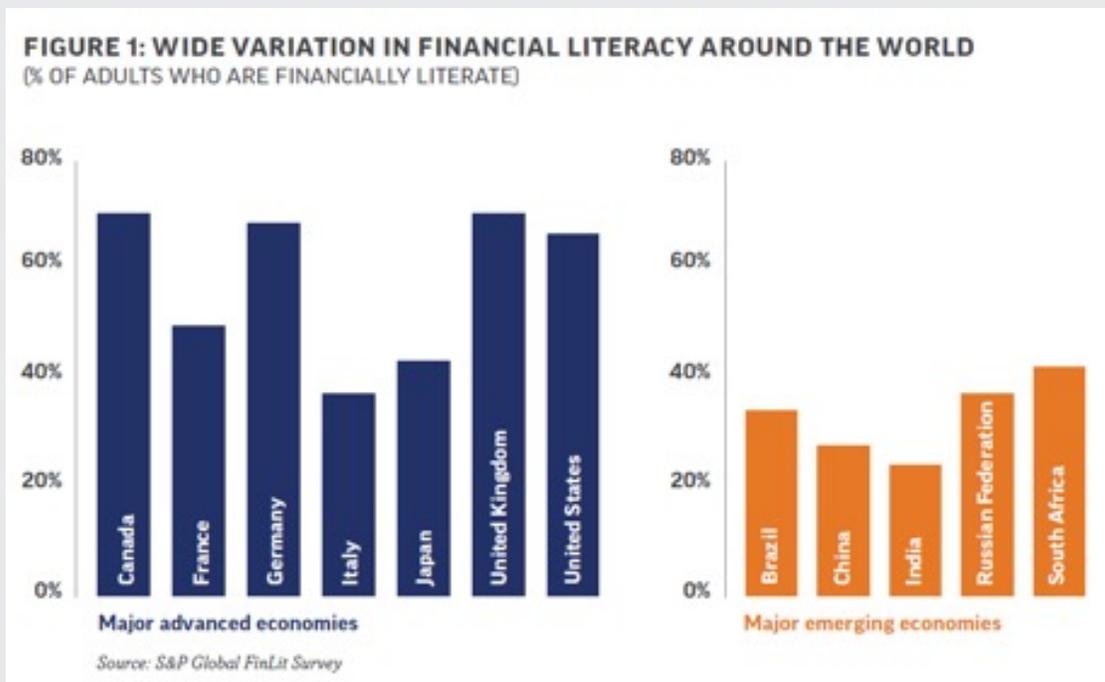
Source: S&P Global FinLit Survey

Figure 1. Chart of Financial Literacy around the World. Reprinted from Klapper et al., 2015. Financial Literacy around the World: Insights from the Standard & Poor's Ratings Services Global Financial Literacy Survey, World Bank Development Research Group and The George Washington University School of Business, p. 9.

Other studies show that financial literacy leads to more quality of financial decisions and, by extension, to a larger financial "comfort", with fewer material concerns. The participation of families in the stock market, for example, is obstructed by the lack of financial knowledge (Rooij et al., 2007). If private financial skills are more likely to be required from individuals to deal with complex aspects of their financial lives – and this seems to be more and more necessary in these changing times, when states suffer from fiscal deprivation – the lack of financial literacy must correspond to a government's general concern, and might be dealt with through public policies, especially designed to mitigate this issue.

In an international comparison, country-level financial literacy ranges from 13 to 71 percent (Kappler et al., 2015, p.6). Based on this research, results indicate that 35 percent of the adult population in Brazil have financial literacy. Taking most emerging countries into account, the Brazilian score is 4.79% higher than the average results, but if compared with advanced economies (55.71%), its number is 37.18% lower on average.

An international survey on financial literacy competencies (OECD, 2016), coordinated by the OECD's International Network on Financial Education, interviewed 51,650 adults aged 18 to 79, from 30 different countries, including 17 from OECD. The study focuses on aspects of financial understanding and practice: knowledge, behavior, and attitudes. Based on this investigation, Brazil was ranked in the 26th position, with a general score of 12.1 (out of 21) which is 8.33% lower than the average among all the countries (13.2) and 11.67 % lower than OECD countries' average (13.7). Despite the small difference, the overall results of the research were said to be relatively low, confirming room for improvement and the need for action. Furthermore, Brazil has presented the issue of over-confidence: the average results from people who said they had high or very high levels of
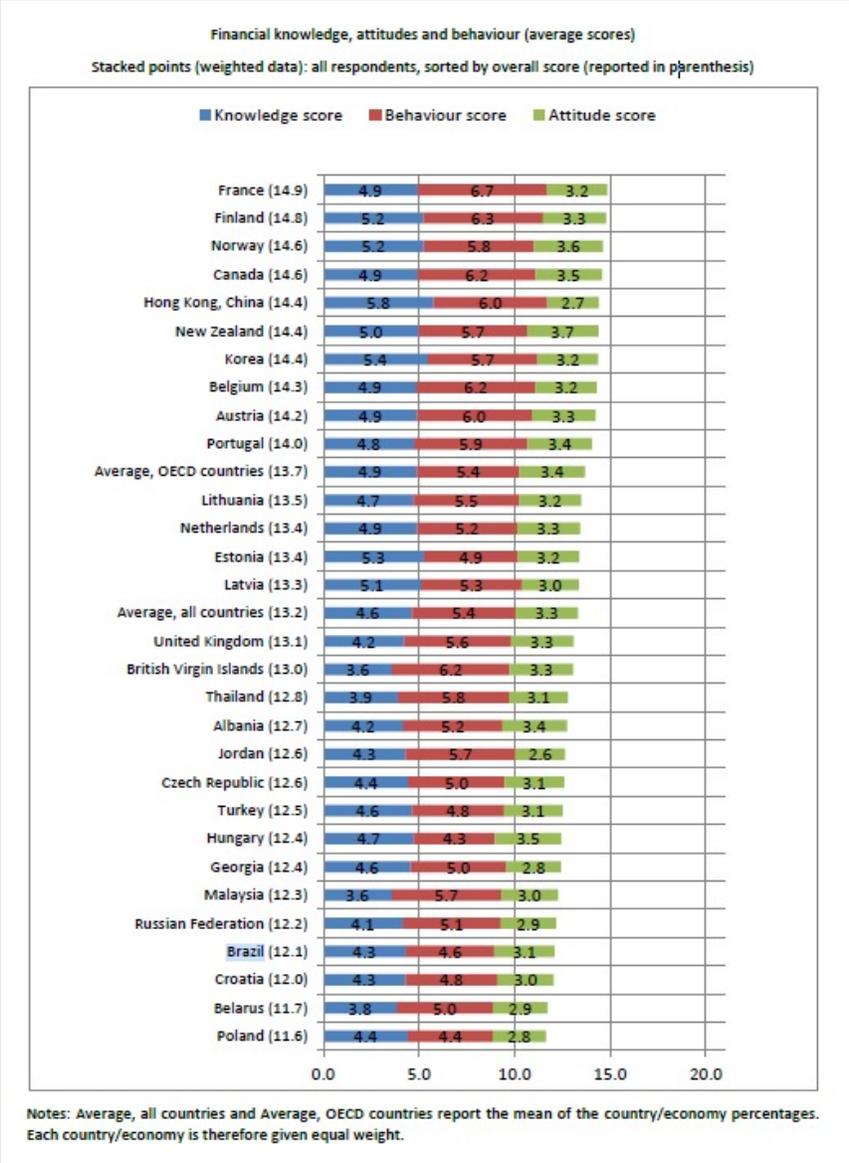

Figure 2. Chart of Overall score of financial knowledge, attitudes and behavior (average). Reprinted from OECD, 2016. OECD/INFE International Survey of Adult Financial Literacy Competencies, Paris: OECD, p. 8.

financial knowledge, actually were the same of those who considered themselves with quite the same understanding of most people.[4]

Besides, The Global Findex Database, a study based on about 150,000 interviews with adults aged 15 and above, in more than 140 countries (Demirguc-Kunt et al., 2014), points that Brazil, among developing countries, has, by far, the highest rate of people receiving money transfers from the government, directly into an account: 88% of the total number of recipients. Bolsa Família, the major social welfare program in Brazil, delivers the credits straight through a card or bank account to 99% of its beneficiaries.

These numbers combined may partially explain the Brazilian high rates of individual and family indebtedness levels. Low financial literacy and broad access to basic bank and credit services[5] for the poorest leads to an increasing number of individuals and families who are unable to pay their debts when they are due, which compromises their payment capacity. The increasing levels of default on direct loans and credit for the consumption of goods (a major characteristic of Brazilian commerce culture) also affect the risk for money lenders, what makes interest rates even higher and eventually increases the problem of general indebtedness[6].

In order to fight this situation, since 2010, Brazil formally counts on a governmental program to foster financial education: the National Strategy for Financial Education ("Estratégia Nacional de Educação Financeira - ENEF"). It began within the international movement made by a number of countries to provide financial literacy to their populations. The goal of the program is to provide and support actions that help the population to make more autonomous and conscious financial decisions.

Over the implementation period, it focused on young people and children. Retirees and women assisted by social programs[7] were also included, according to their degree of vulnerability. In 2019, in the 6th edition of the national financial education week, there were 14,835 reported initiatives and a total audience of 70.7 million people, which made it the record holder in number of initiatives and audience (AeF-Brasil, 2020).

Despite this major effort and its relevant numbers, the ENEF program has not yet fully engaged in assessing the overall impact of its supported actions. The Consumer Indebtedness and Default Survey (CNC, 2020), produced by the National Trade Confederation, shows that in the same last 10 years, Brazil has faced an expressive growth in the household indebtedness index, reaching 67.4% (July 2020), compared to 57.7% (July 2010). Despite the efforts made, it seems that much remains to be done.

Tax education and public fiscal decision-making

Conceptually, tax literacy consists of three main branches: general knowledge about the tax system (coercion by legal obligation, and mitigation of complexity), the understanding of the importance of tax payment, the use of public resources for common good (self-interest and social solidarity), and the control of the allocation and spending of public resources (active participation) by the population. Each of these features operates simultaneously and reinforces the general tax and fiscal literacy, leading to the acceptance of taxation, and contributes to the development of social cohesion and citizenship. Therefore, tax literacy encompasses, at least, three dimensions: personal knowledge, the understanding of social impact, and a collective practice of overseeing.

Most of the world's experience in tax education has played a complementary role in traditional enforcement-based techniques. Public programs generally focus on the complexity of the tax systems, which means that providing tax literacy would reduce non-compliant behavior, by being effective in explaining it to taxpayers – or promoting tax reforms that reduce the complexity of the system. The main reason for this seems to be the fact that tax default is mainly caused by citizens' ignorance. This reduced view would care, roughly speaking, only about knowledge as the source of tax payment levels (exclusively related to tax literacy), without taking into account the question of how much the services provided by the state can affect the population's quality of life[8], or how each citizen sees their personal role in the entire system towards other taxpayers

and the society. However, the second and third dimensions have become more frequent lately, with governments "enhancing accountability between citizens and the state" (OECD & FIIAPP, 2015, p.3). The publication reveals a large set of initiatives within developing countries that aim at taxpayer education, in order to foster self-motivated tax compliance. In general, governments have noticed the importance of addressing low-levels of tax and fiscal literacy. Thus, tax and fiscal education are also prevailing in developed countries[9].

Even before the event of the COVID-19 pandemic, the global fiscal crisis led states to reinforce tax compliance culture worldwide, as a way to increase internal revenue, to face such a critical moment and fund national development. Despite this main goal, which brings resources directly, tax and fiscal education also concern the impact of citizens' control on the quality of public expenditure.

Although tax education is being spread all over the world, there are observable differences related to the objectives among different national programs. Developing countries have, at the same time, higher levels of domestic savings and, when needed, a countercyclical use of the fiscal policy. Developing countries, on the other hand, usually have lower levels of savings and use procyclical fiscal policy tools quite often. Beyond some evidence brought earlier in the article about national governments' behavior facing business cycles, and the effects of financial education over savings rates, fiscal literacy can also be a result of cultural aspects and the social perception of the outcomes from the use of public resources.

A number of studies show the verifiable influence of culture in savings behavior. Guin (2017) and Fuchs-Schündeln et al. (2017), for instance, analyzed the Germans and their cultural trend to save more than their neighbors. Regarding social perception, "beyond enforcement and the probability of being caught, people's attitudes towards taxation are shaped by (…) perceptions regarding institutions, the use of tax revenues such as the quality of public services, and the strength of democracy" (Daude et al., 2013, p. 31-32). The rationale underpinning this premise is the fact that in developed economies, where the population counts on efficient public services, mainly those within a consolidated democracy, people will more readily comply with taxation.

In addition, , the Germanic culture, as well as those in the majority of developed economies, expresses this trait in terms of political preferences. It may explain

the general support for the maintenance of fiscal balance through primary surpluses, even in times when the fiscal policy can address economic problems with minor or no damage to the sustainability of public accounts[10]. The same hypothesis can be applied to developing countries, especially those with large lower-middle classes, which are not pleased with the public outputs and usually behave politically in the exact opposite way, allowing (or demanding) some economic populism, being Latin America such a good example. A broader fiscal education allows societies to demand better quality of fiscal decision-making from governments.

These supposed causes may help to understand why some nations have already developed a familiar sense of financial literacy, handed down from generation to generation. A non-technical explanation can count on previous periods of scarcity, such as famines and wars, but also on the longevity of these cultures. Therefore, the various national programs of tax and fiscal education may be classified in a range from those which are more concerned to provide young people with useful tools to understand adult life and its constant relation with the world of taxation[11] – especially by the time they start their professional lives and begin to have some money available – up to those in which the main goal is to spread ideas yet not assimilated and conveyed by families. Thus, the first educational approach should be at childhood, starting in the very early years.

In Brazil, according to its base document, the National Fiscal Education Programme ("Programa Nacional de Educação Fiscal – PNEF"), which has existed since 1999, the objectives of fiscal education are considered as follows:

> Fiscal Education aims at building awareness towards the exercise of citizenship, aiming at and enabling citizen participation in the functioning and improvement of the State's social and fiscal control instruments. Other important themes for Fiscal Education are: taxes and their social function as an instrument that can and should be used to promote changes and reduce social inequalities; the quality of public expenditure management; public budget; combating tax evasion, smuggling, embezzlement, and piracy; participation and social control, among other topics (PNEF, 2015).

Other documents from PNEF also confirm this integrated vision of the citizen's role through tax and fiscal matters, which includes paying taxes, receiving services, demonstrating social solidarity, overseeing expenditure, and cooperating with the system consolidation. Fiscal education, in this sense, should not be understood only as the disclosure of the fiscal technique or legal and accounting specificities of taxation.

9   The European Union has developed a pilot project to spread tax education throughout the continent. https://europa.eu/taxedu/ (26 September 2020).

10   The example is described in an article published months before the pandemic of COVID-19. https://bpr.berkeley.edu/2020/01/05/fiscal-education-the-case-for-increased-german-spending/ (05 January 2020)
11   As in Fiscal Education for the Young (IOTA, 2008)

However, the most successful outputs of fiscal education in Brazil are strictly related to tax literacy, with focus on payment compliance (OECD & FIIAPP, 2015). The major example would be the centers for tax and accounting support ("Núcleos de Apoio Contábil e Fiscal – NAFs"), which work as a cooperation between the tax authority and universities, to annually provide consulting in how to pay federal taxes – mainly the IRS ("imposto de renda") – by the time it has to be informed by the taxpayers, in order to be collected within a couple of months by the Brazilian government.

At last, raising public awareness about the tax and fiscal system in Brazil has frequently diverted society, aside from the issue of public spending, and its required monitoring, in order to fight poverty and inequality. The balance between revenues and expenses over time, which guarantees the sustainability of the state funding, was never seriously considered as a subject. The tax system in Brazil is based on indirect taxation, labor and consumption-based taxes, thus regressive – which implies that the poor pay relatively more, on average. The lack of implementation of fiscal balance in financial education may contribute to maintaining the everlasting cycle of injustice in taxation and poverty.

This is even more devastating in times of crisis such as the COVID-19 pandemic, when taxpayers will probably feel forced to evade tax filing and payment obligations to alleviate financial pressure (OECD, 2020, p. 29). Besides, the sudden increase of public spending with no correspondent revenue will threaten the state's financial sustainability conditions.

The combined effect of the costs of fiscal packages, the increase in public spending to mitigate health and economic damages, as well as the loss in tax revenues resulting from the crisis will lead to a significant increase in government borrowing, translating into quickly deteriorating budget balances and public debt levels (OECD, 2020). (p. 39)

Tax and financial education implemented together

As stated in the previous sections, when it comes to tax and fiscal education, the general reference is to some kind of financial education aimed at providing an understanding of what taxes are. This knowledge is supposed to develop a certain "protection" of the individual before the state so that each citizen pays what is due, in order to preserve the ability to contribute over time. Although some governments seem to care more about the sustainability of tax payments than about an immediate gain, it is also true that some of them may be formally admitting that each person's contribution to the tax burden may eventually compromise one's personal financial life.

Such correlation is frequently observed in studies that describe tax literacy primarily as a way to deal properly with financial decisions related to tax payment, returns, and ancillary obligations. If, on one hand, it is quite common to find this kind of association, there is no consolidated literature, on the other hand, on the complementary application of financial and tax education through an integrative method that improves both personal and collective aspects of finance. Despite the proof of the impacts of each of these specialized branches of education on citizenship, studies that correlate results between these efforts are still in the theoretical field and have been poor in pointing practical results.

This article brings some premises that might work as a new drive for a joint implementation of tax and financial education, seeking to be implemented together, for better future outcomes. There are also some technical and operational aspects of such implementation that would be facilitated by an integrative effort. Education for citizenship normally counts on context-oriented constructs, applied in a transversal way along with regular school subjects. The same occurs with financial and tax education[12]. Moreover, the use of students' personal experience for broader contextualization of the subjects, and the application of the analogies between private and public finances would create a more adequate learning environment for the appropriation and particular reframing of the educational content, which might enable positive changes in attitudes and behaviors.

Both tax and financial literacies have their effects on people's lives described in terms of time and space, or in its comprehensiveness and wholeness. Time dimension can be observed over the lasting results produced by an oriented decision-making process. Financial planning – of government and citizens – is the best example for this, in terms of permanent effectiveness brought by financial and fiscal literacy. In general terms, it gives sustainability to financial behavior over time.

Regarding spatial dimension, which refers to the global effect of local action, and not taking other factors into account, good financial education helps families to better plan their future and begin saving for moments of emergency, for instance. A more predictable private financial behavior increases the level of domestic savings. In the medium to long term, the volume of resources available for credit increases, offsetting the demand for financing, if the economy is growing. In such a situation, interest rates tend to fall, and public debt starts to consume fewer public resources, proportionally. If this happens, governments will have more money for

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12   The new Brazilian BNCC ("Base Nacional Comum Curricular"), the common curricular national base for basic education, includes both financial and tax education in the national curriculum, to be applied transversally.

investment in educational or infrastructure policies, for instance, which is a relevant fiscal and social gain.

On the other hand, quality tax education makes citizens demand for more efficient public spending and helps to reduce government failures. Furthermore, it is a civil right to directly influence the government's decisions on where and how public money is spent in Brazil (Barros, 2019). This accountability and responsiveness, even if occurring only at election times – with people choosing the best candidates and removing the worst ones – already reduces waste and misuse of public resources greatly. If this happens, fiscal pressure will decrease, even if governments do not do less, which will preserve rights and guarantee access to policies.

In this case, the government will then have the option to charge fewer taxes and continue to do what it already does, or to maintain the tax burden and carry out more and better services and policies, or even a combination of those. As a result, household spare money will increase, either by having the amount of taxes they need to pay to governments decreased (now they can hire more services directly), or due to the fact that they will now be able to save, precisely because public services are now better and more available, and they will not need to buy them from the market. In both situations, there is a direct financial gain. Good fiscal health results in the improvement of the financial health of individuals and families.

The association of tax and financial education is quite promising. Citizens become aware of the importance of their contribution to the whole financial system, of their active contribution towards the country's fiscal health, and of the consequent improvement of government and citizens' financial health. Therefore, the impacts of tax and financial education combined go beyond mere economic effects. Among the many outcomes of such kind of education are the increased demand for accountability, the strengthening of public governance, and ultimately, democratic consolidation.

A project to test the hypothesis

Given the opportunity to enhance public effort to promote tax and financial education, testing the thesis becomes essential. The "Em Busca do Tesouro" project [In Search of the Treasure] is an initiative of the Brazilian National Treasury, which seeks to provide the society with didactic information on how the state performs the administration of public resources and how good management of personal finances can bring benefits to the whole society (STN, 2020).

Furthermore, it aims at strengthening citizen awareness in future generations, highlighting the fact that it is the society that pays taxes to receive the services provided by the state. Therefore, the state itself must choose, by democratic means, in which policies and programs these resources should be used, in what ways, with what quality level they should be applied, and if the results obtained are satisfactory.

It is essential to promote fiscal and financial education, as well as citizen monitoring of public policies, since the early years of basic education, developing notions of social and personal responsibility and encouraging new behaviors. By promoting the diffusion of this knowledge and practices among children and young people, changes in attitude are likely to influence society's choices in the future, making private behavior and public actions more effective, more representative, and legitimate, enhancing a collaborative effort to improve life quality for the Brazilian population.

The content of the project is mainly presented in two comic books: the nationwide famous "Mônica and Friends" ("Turma da Mônica"), but also encompasses further materials, approaching common situations regarding the use of money by individuals and governments. In order to facilitate the learning process, both magazines were designed to be used sequentially. They can be presented separately, although the project foresees a conductive line for the construction of the narrative.

The project targets an audience of children in 4th and 5th grades of Elementary School, that is, girls and boys with ages ranging from 9 to 11 years old. At these ages, the degree of abstract reasoning attributed to children is already considered sufficient for them to understand the concepts to be proposed. Another relevant factor is that, at this stage, students begin to be prepared for a new educational cycle at school, generally interacting with more than one teacher, which allows different possibilities for exploring new contexts.

The content presented is designed to be worked transversally, with use suggestions of some teaching resources, such as the contextualization of themes within subjects' content ¬¬contemplating the curricular components – activities in the classroom or learning spaces, besides a small guiding text referring to each story, with a glossary attached.

The activities proposed aim at developing cognitive development and autonomy, mainly through children interaction. It is also very important to pay attention to the development of socio-emotional skills, as the content is approached. The learning process must take advantage of the children's previous knowledge, just as it happens with the girls and boys that are characters in the stories. Whenever the experience of the other characters

is enough to contextualize certain contents, there is no need for further interventions.

The assessment of the impact of the project will be based on statistically relevant parameters so that measurement and analysis are consistent. The plan is to produce rigorous evidence about the effectiveness of the project in carrying out the intended transformation. This more complete assessment of a formative and multidimensional nature should be randomized, made in specific incursions, eventually measuring the process of behavioral change. After this first phase, the overall impact shall be compared to those from studies of financial and tax education projects' lone effects.

Conclusions

This work argues that the multiplicity of factors affecting general finance require the implementation of tax (fiscal) and financial education to provide general literacy in these fields of knowledge. The present paper shows that some difficulties found in these specialized branches of education for citizenship can be mitigated, when considered together. Nevertheless, the integrative approach presents some advantages still to be studied and explored. Thus, a project that applies this general concept is also presented here. It will be implemented as a pilot experiment in Brazilian schools, in order to have its results and impacts measured.

However, further studies should address the lone effects of tax and financial literacy initiatives, from qualitative and quantitative perspectives. The same shall be applied to verify the impacts of the integrative implementation of the project named "Em Busca do Tesouro". This will identify the differences between the impact of each educational branch when offered together, and those obtained in isolated public policies, implemented by tax and financial education.

References

Abreu, M., & Mendes, V., 2010. Financial Literacy and Portfolio Diversification, Quantitative Finance, Vol. 10(5), pp. 515-528.

AeF-Brasil, 2020. Vida e Dinheiro [Life and Money], https://www.vidaedinheiro.gov.br.

Alesina, A., & Tabellini, G., 2008. Why is fiscal policy often procyclical?, Journal of the European Economic Association, vol. 6(5), pp. 1006-1036.

BCB, 2020. Relatório de Economia Bancária [Banking Economics Report], 2019. Brasília: Banco Central do Brasil, Brasil.

Barros, A., 2019. Avanços e desafios para o acompanhamento cidadão da gestão pública segundo o marco constitucional: a experiência dos Observatórios Sociais [Advances and challenges for citizen monitoring of public management according to the constitutional framework: the experience of the Social Observatories], In: Hirose, R., Carreiras Típicas de Estado: desafios e avanços na prevenção e no combate à corrupção. Belo Horizonte: Fórum, pp. 55-69.

Behrman, J. R., Mitchell, O. S., Soo, C. K., & Bravo, D., 2012. The Effects of Financial Education and Financial Literacy: How Financial Literacy Affects Household Wealth Accumulation, American Economic Review: Papers & Proceedings, Vol. 102(3), pp. 300-304.

Bernhein, B. D., Garrett, D., & Maki, D., 1997. Education and saving: The long-term effects of high school financial curriculum mandates, The National Bureau of Economic Research, NBER Working Paper 6085, July 1997.

Brackin, T., 2007. Overcoming tax complexity through tax literacy - an analysis of financial literary research in the context of the taxation system, Australasian Taxation Teachers Association Conference, 22-24 Jan 2007, Brisbane, Australia.

CNC, 2020. Pesquisa CNC de Endividamento e Inadimplência do Consumidor (Peic) [CNC Consumer Debt and Default Survey], Confederação Nacional do Comércio, July 2020, http://cnc.org.br/editorias/economia/pesquisas/pesquisa-de-endividamento-e-inadimplencia-do-consumidor-peic-julho-0.

Daude, C., Gutiérrez, H. & Melguizo, Á., 2013. What Drives Tax Morale? A Focus on Emerging Economies, Review of Public Economics, 207-(4/2013), Instituto de Estudios Fiscales, Hacienda Pública Española, pp. 9-40.

Demirguc-Kunt, A., Singer, D., & van Oudheusden, P., 2014. Global Findex Database 2014: Measuring Financial Inclusion around the World, World Bank Development Research Group.

European Union, 2020, TAXEDU web-portal, September 2020, https://europa.eu/taxedu.

Fuchs-Schündeln, N., Masella, P. & Paule-Paludkiewicz, H, 2017. Cultural Determinants of Household Saving Behavior, 2017 Meeting Papers 1052, Society for Economic Dynamics.

Guin, B., 2017. Culture and Household Saving, Working Paper Series, nº 2069, Frankfurt: European Central Bank.

IOTA, 2008. Fiscal Education for the Young, IOTA Report for Tax Administrations, Intra-European Organisation of Tax Administrations.

Jönsson, K., 2007. Fiscal Policy Regimes and Household Consumption, Cambridge Journal of Public Policy, vol. 27, issue 2, pp. 183-214.

Klapper, L, Lusardi, A, & van Oudheusden, P., 2015. Financial Literacy around the World: Insights from the Standard & Poor's Ratings Services Global Financial Literacy Survey, World Bank Development Research Group and The George Washington University School of Business.

Lusardi, A., & Tufano, P., 2015. Debt Literacy, Financial Experiences, and Over Indebtedness, Journal of Pension Economics and Finance, Vol. 14, Special Issue 4, pp. 332-328.

Lusardi, A. & Mitchell, O. S., 2014. The economic importance of financial literacy: Theory and evidence. Journal of Economic Literature, American Economic Association, Vol. 52(1), pp. 5-44.

Lusardi, A., & Scheresberg, C. de B., 2013. Financial Literacy and High-Cost Borrowing in the United States, NBER Working Paper 18969.

OECD, 2020. Tax and Fiscal Policy in Response to the Coronavirus Crisis: Strengthening Confidence and Resilience, In: Tackling Coronavirus (COVID-19): Contributing to a Global Effort, updated 19 May 2020, http://www.oecd.org/coronavirus/en/.

OECD, 2018. OECD/INFE Toolkit for Measuring Financial Literacy and Financial Inclusion, Paris: OECD.

OECD, 2016. OECD/INFE International Survey of Adult Financial Literacy Competencies, Paris: OECD.

OECD, 2006. The Importance of Financial Education, Policy Brief, July 2006, http://www.oecd.org/finance/financial-education/37087833.pdf.

OECD, 2005. Improving Financial Literacy: Analysis of Issues and Policies, Paris and Washington: OECD Publishing.

OECD & International and Ibero-American Foundation for Administration and Public Policies (FIIAPP), 2015. Building Tax Culture, Compliance and Citizenship: A Global Source Book on Taxpayer Education, Paris: OECD Publishing.

PNEF, 2015. Documento Base do Programa Nacional de Educação Fiscal [Base Document of the National Fiscal Education Program], Grupo Educação Fiscal – GEF, Brasília: PNEF.

Russia's G20 Presidency & OECD, 2013. Advancing National Strategies for Financial Education: A Joint Publication by Russia's G20 Presidency and the OECD.

Stango, V., & Zinman, J., 2009. Exponential Growth Bias and Household Finance, The Journal of Finance, Vol. 64(6), pp. 2807-2849.

STN, 2020. Em Busca do Tesouro [In the Search of the Treasure], Secretaria do Tesouro Nacional, Ministério da Economia, Brasil, https://embuscadotesouro.tesouro.gov.br/principal.

Talvi, E., & Vegh, C., 2005. Tax base variability and procyclical fiscal policy in developing countries, Journal of Economic Development, vol. 78(1), pp. 156-190.

Torgler, B., 2005, Tax Morale in Latin America, Public Choice, 122 (1/2): 133-157.

Willis, E. L., 2008. Evidence and Ideology in Assessing the Effectiveness of Financial Literacy Education, Faculty Scholarship, University of Pennsylvania Law School, Paper 197.

World Bank Group, 2017. Um Ajuste Justo: Análise da eficiência e equidade do gasto público no Brasil [A Fair Adjustment: Analysis of the efficiency and equity of public spending in Brazil], (Brasil: Revisão das Despesas Públicas, vol. I: Síntese).

2

CAN WE TALK ABOUT SOCIAL SECURITY SUSTAINABILITY IN BRAZIL?

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CAN WE TALK ABOUT SOCIAL SECURITY SUSTAINABILITY IN BRAZIL?

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Abstract

This chapter presents an analysis of social security (in)sustainability in the Federative Republic of Brazil and identifies some aspects that Constitutional Amendment - CA 103/2019 brings, as well as adjustments that still need to be made. Its scope encompasses formal and public data provided by institutions and related literature available for a more detailed analysis. It is also within the aim of this work, to discuss social security issues of subnational Governments (states and municipalities), considering that, for the first time in the history of Brazilian social security, they were not incorporated in a constitutional reform. A discussion on certain polemical points – not included in the reform approved – is presented here. Under this heading there are, among others: age equality between men and women; the so-called demographic "trigger", a mechanism foreseen in the original body of the Amendment, ensuring automatic readjustment for retirement age, based on life expectancy increase; the deindexation of retirement benefits from minimum wage; the Benefit of Continued Provision – BPC (Benefício de Prestação Continuada) and rural pensions. The dilemma whereby the current pay-as-you-go pension system must also rely on capitalization – a topic avoided during the social security reform debates – is also examined in this chapter, which finally points to the fact that a great number of measures, clearly perceived as relevant to improve the Brazilian social security system, still need to be addressed. Some rules in the pension system, for example, can be adjusted to give the population a better stimulus to contribute towards their own social security fund, optimizing the social security system, and making it more sustainable and fairer for the society as a whole.

Introduction

Historically speaking, social security is something relatively new. It appeared a little over a century ago when, with the growth of capitalism, societies became urbanized. Traditional community ties slowly disappeared, and it became increasingly necessary to create risk-sharing mechanisms. This was a long process, as the rural-urban transition came about quite slowly. Even in developed countries, more complex cities were rare up to the beginning of the 20th Century. In the U.S., for example, it was only in the 1920s that the urban population overtook the rural. In Brazil, even as late as the 1950s, nearly two-thirds of the population lived in rural areas.

Social Security is an outcome of this process. It is an ingenious institutional construct, built to protect members of modern society from the risks of disease, work impairment and aging. Ever since its formal origin, in Germany, at the end of the 19th century, up to the present, each society has been shaping its own institutional apparatus.

Some preserved the idea of insurance; others structured mechanisms to guarantee income, though disassociating from contribution. There were also those who created mechanisms in which the value of the benefit was defined a priori; while, for others, this value is the result of investments and returns obtained over time. There are still those who combined social security and welfare, as is the case of Brazil; others, like England, engendered a welfare program parallel to the social security structure, stipulating a basic benefit value destined for extremely poor individuals at lower than the minimum ongoing social security rate. Irrespective of the various nuances and modalities, the fact remains that Social Security prevails worldwide.

In Brazil, Social Security (and generical Welfare) were progressively expanded. Various professional categories, individual workers, micro entrepreneurs and those in the rural sector were incorporated. The coverage of the system was greatly extended. In addition, even those that never contributed were protected, upon reaching a certain age. It became extensive and complex, but due to lack of criteria and various misalignments, it has also become a costly deficit-balance system, riddled with privileges and injustice.

Brazil spends more than 14% of its GDP on social security, with a deficit of another 5% of its GDP. Transfers are made to some groups of government employees, totaling net amounts of over 5 million BRLs per capita. Certain categories retire at less than 50 years of age, while less skilled, poorer workers, more vulnerable to the difficulties of the labor market, retire at over 65 years of age, if men, and over 60, if women. Due to legal inaccuracies, there is a great deal of fraud and enormous interference on the part of the Justice system, conceding benefits with no legal standing whatsoever. It has been clear that a social security reform is needed.

In February 2019, after many frustrated attempts, the government proposed a Constitutional Amendment (PEC), whose approval and enactment took only 9 months. This approval brought a measure of relief and some claimed that the social security issue had been dealt with in Brazil. What we attempt to show in this article is that the real situation is not exactly so. Some progress has certainly been made, but we still have a very unbalanced system that requires a substantial amount of general tax revenues, which could and should be directed at other areas and at other investments.

The chapter is structured in 5 sections, aside from this introduction. In section 2, a brief summary of Constitutional Amendment – CA 103/2019 is presented, underscoring the main changes and alterations to the Brazilian social security system. In section 3, there is a discussion on the subnational Governments (states and municipalities) social security issue, bearing in mind that, for the first time in Brazilian social security history, a constitutional reform did not incorporate subnational Governments. In section 4, a discussion on certain polemical points – not included in the reform approved, for reasons of political order – is presented. Under this heading there are, among others: age equality between men and women; the so-called demographic "trigger", a mechanism foreseen in the original body of the Amendment ensuring retirement age would automatically be readjusted, based on an increase in life expectancy; the deindexation of retirement benefits from minimum wage; the Benefit of Continued Provision – BPC (Benefício de Prestação Continuada) and rural pensions. In section 5, we deal with a polemic theme, avoided during reform debates: capitalization. In section 6, we present our main considerations and conclusions.

2 - Social Security Reform: Constitutional Amendment - CA 103/2019

Many things happened to the social security reform proposal, from the time of its entry to its exit in the Legislative Branch. There were some enhancements, as, for example, the improvement in the rules of transition. However, there was, above all, a great deal of fiscal dehydration. Let us see: (1) the withdrawal of states and municipalities (BRL 350 billion); (2) exclusion of rural contributions (BRL 80 billion); (3) alteration of BPC and of salary bonuses (BRL 160 billion); (4) adjustments in special retirement benefits and others (BRL 70 billion); (5) adjustments in the rules applicable to government employees (BRL 30 billion).

The reduction in expenditures with states and municipalities were not present in the initial accounts presented by the government, which means that, out of the foreseen BRL 1 trillion, there remained approximately BRL 750 billion. In sum, Congress subtracted BRL 700 billion from potential taxation, being BRL 350 billion from the Union and BRL 350 billion from states and municipalities. Society will have to foot the bill in the traditional manner: by means of taxes.

Nevertheless, having undergone so many polemical discussions, what is the Reform after all? Essentially, it is a parametric adjustment of the operational rules of the system. The reform extinguishes retirement based on contribution time. It establishes a minimum age for all workers – 65 for men and 62 for women – except for teachers – 60 for men and 47 for women. For civil police officers, the minimum age is 55 for men and women. It has made the calculation rule for the value of the benefit actuarially fairer, redefined and restricted the value of survivors' benefits, thus limiting the accumulation of benefits.

Various transition rules were created to smooth over the effects of the reform for those who are in the labor market. The point system used is the sum of age and contribution time, beginning with 96/86 (men/women), undergoing an increase of 1 point per year until they reach 105/100. This will occur for men in 2028 and for women in 2033. The minimum age requirement for retirement as of CA 103/2019 begins at 61/56 (men/women) and increases each year by half a year, until the person reaches 65/62 (men/women), provided the contribution requirement of 35 years for men and 30 for women is met. This transition will take 8 years for men and 12 for women, overall. For those who are close to retiring, there will be a toll (a transition modality) equivalent to 100% of the time remaining until retirement, at which point they should comply with minimum age and years of contribution requirements. For private sector workers and government employees there will be a minimum age requirement of 60/57 (men/women), for teachers 55/52 (men/women) and for civil police officers 53/52 (men/women). Lastly, in the case of old-age pension for urban dwellers, the minimum age for women will be increased per annum, by half a year, until it reaches 62 years of age (currently, the figure is 60 years). Each worker is free to choose the most favorable transition rule that applies to their specific case.

In addition, the reform foresees the unification of contribution rates between workers of the private and public sectors, and the implementation of progressive rates in relation to the salaries they beget. In December 2019, rates were fixed at 8% (for those earning up to BRL 1,751.81), 9% (for those earning between BRL 1,751.82 and BRL 2,919.72) and 11% for those earning more than the latter amount. With the reform, there will be many other pay scale levels, as well as a change in the collection system, that will be aligned with the Income Tax model, i.e., marginal rates.

Those earning more than the INSS ceiling (BRL 5,839.45 in December 2019 and BRL 6,101.06, as of January 2020) will have an increase in contribution. For those earning less than this amount, the impact will be differentiated: there will be a reduction for the majority and an increase for the minority. The financial result for the General Social Security Regime – RGPS (Regime Geral de Previdência Social) will be a slight reduction in contribution. Graph 1 presents the results of the alteration.

The reform dealt with the social security issue related to the public sector with great diligence. It curtailed the creation of special welfare systems for subnational governments that currently have none. It established that all entities in deficit standing should be required to

**Graph 1: RGPS's Effective contribution rate before and after CA 103/19**
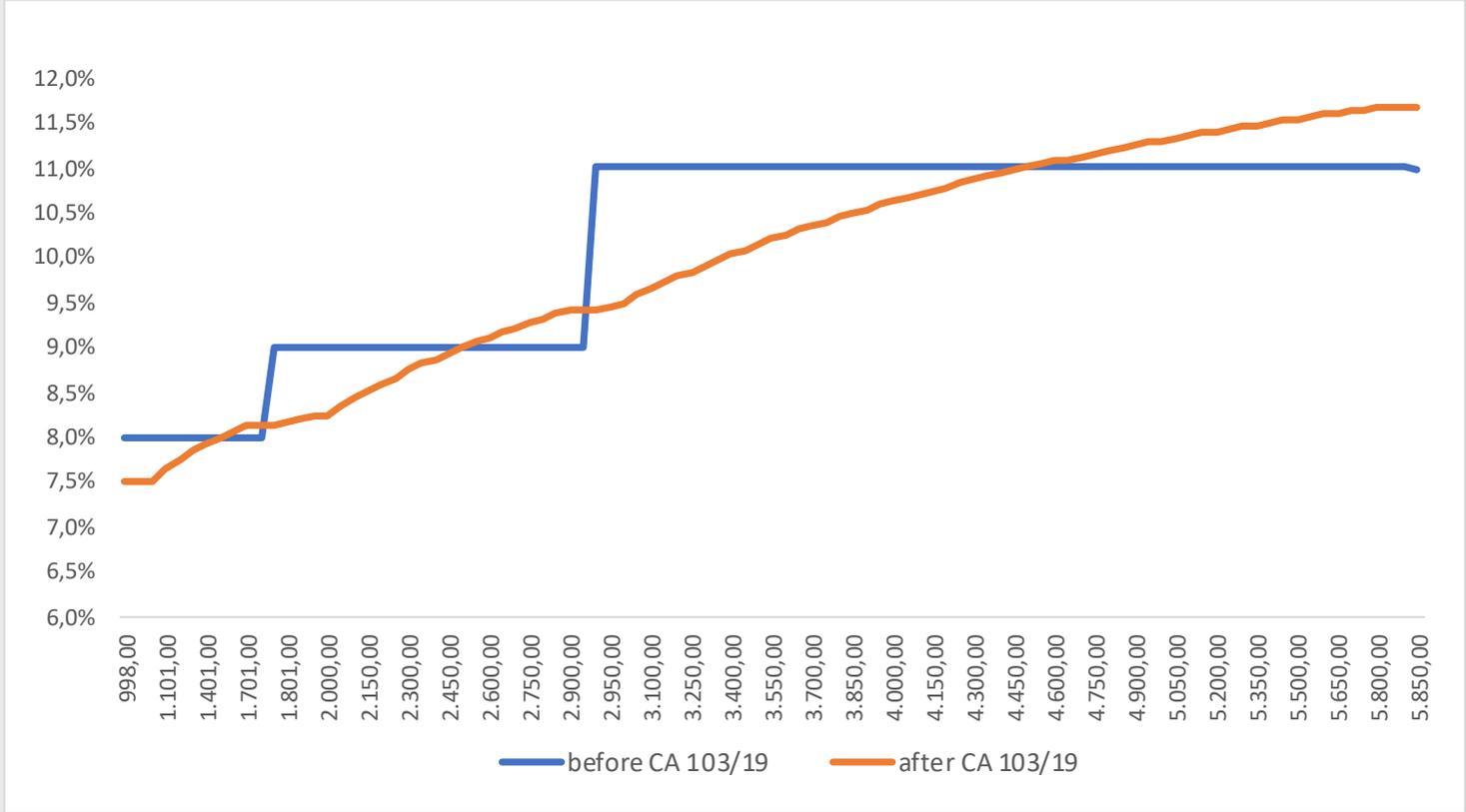
Source: authors' database.

increase the rate of contribution to 14% and thus settle their welfare indebtedness based on a rebalancing plan approved by the General Office of Social Welfare. It allowed that, once faced with actuarial deficit, retirees and pensioners should contribute estimated on the full amount of the benefit that exceeds the minimum salary. Currently, public sector retirees and pensioners contribute only with that portion that exceeds the social security ceiling. Were the deficit to persist, a temporary extra contribution might be exacted to aid in balancing the debt. Graph 2 shows the impact Constitutional Amendment CA 103/19 has had on actual contribution rates of active government employees, retirees, and pensioners.

Graph 2: RPPS's Effective contribution rate before and after CA 103/19
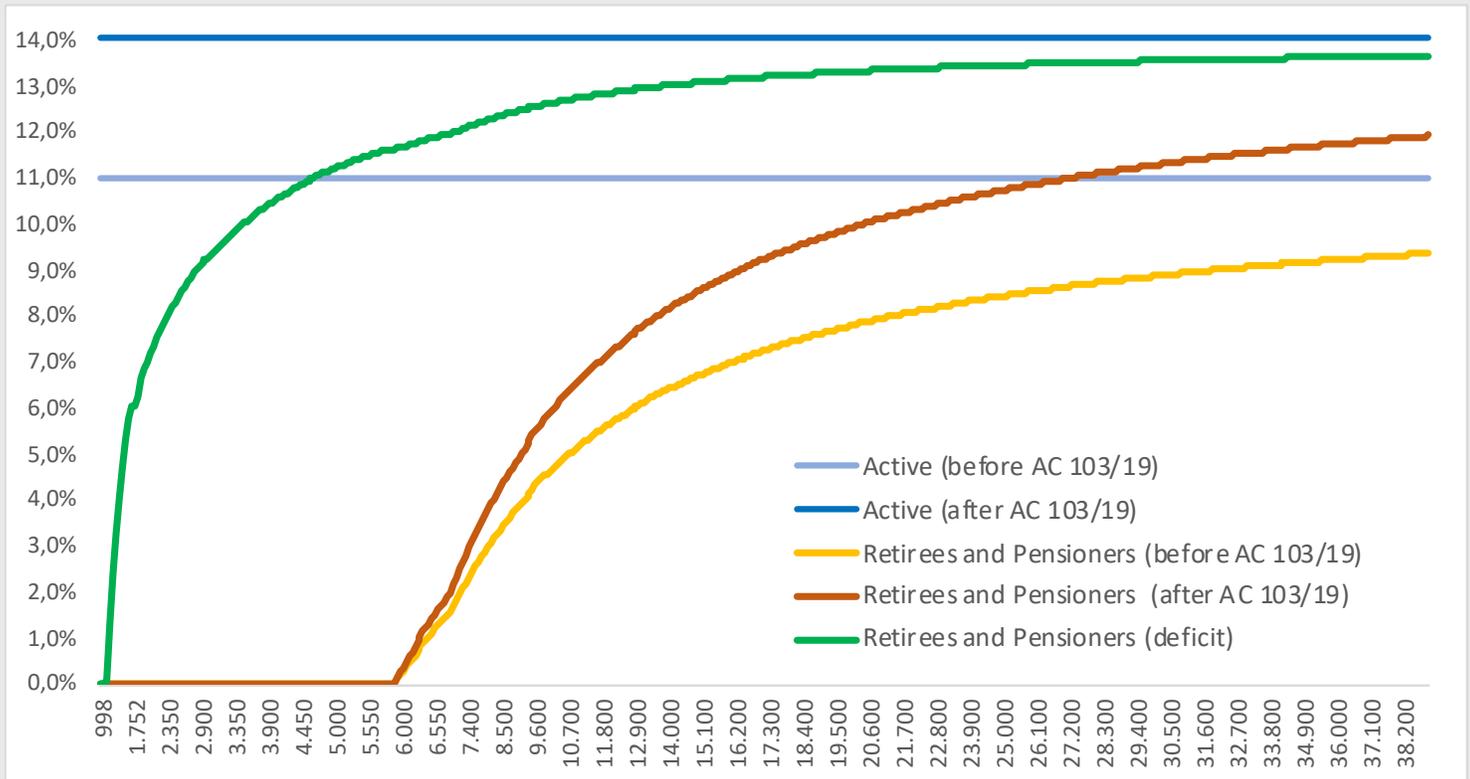
Source: author's database.

The increase in contribution rate for active government employees, retirees, and pensioners can be seen in Graph 2. It has great collection potential – and consequently poses less need of shifting tributes for debt coverage. However, the expansion of the social security contribution base for retirees and pensioners, in case the deficit[1] persists, extraordinarily increases the collection of this contingency, demonstrating an enormous collection potential for the Civil Servers Social Security Regimes – RPPS (Regime Próprio de Previdência Social), be they Federal, State or Municipal.

For the reasons presented above, the Reform is certainly the most ambitious undertaking of its kind, ever presented to Congress. It deals with practically all types of benefits, adjusts parameters, and confers survival time to our social security system. Between the sending of the proposal and its approval, however, it underwent "dehydration" and consequent loss of its tax potential.

Table 1 presents the fiscal impact estimated by the government and the Senate's IFI (Independent Fiscal Institution), at different times, during the appraisal of the constitutional amendment. It also includes an estimate made by one of the authors of this chapter at the time of the approval given by the House of Representatives. As easily perceived, the loss of fiscal power was high. Even much higher than that resulting from the approval of CA 287 (proposed during the Michel Temer government and defended by several scholars and former members of the Temer government team)[2].

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1   It is noteworthy that the General Social Welfare Police, as well as those of Capital Cities, present enormous actuary deficits, and could be largely incremented with this type of collection upon instituting the new incidence base. Large municipalities also have actuary liability. For greater detail, see section 3.

2   The CA 287 proposal was bold and quite broad. The initial estimate of its fiscal impact was around BRL 800 billion, in 10 years. After the House of Representatives Committee studies, the impact was reduced to BRL 500 billion. At the time, the work was suspended, due to the complaint filed as to the imbalance of the former Attorney General. Later, when the negotiation process was resumed, other points were lost, and the estimated savings reached BRL 420 billion, in ten years. At

The IFI's[3] estimate was systematically lower than the government's, both in the original version and in the

the beginning of the current government, members of the Michel Temer government and several analysts defended the thesis that it was better to continue with that proposal - thus saving time - rather than start a new procedure. The result is that, in nine months, the impact obtained was twice what it would have been, had CA 287 Proposal been approved.

3 IFI is an Independent Agency for Fiscal Issues. It is associated to the Federal Senate.

version approved by the Chamber's CCJ. In both cases the IFI's estimate is around 20% lower than the government's estimate, and also lower than Tafner's estimate (in this case, 16% lower).

The government and Tafner's estimates for the text approved in 2nd round in the House of Representatives (and for the Senate CCJ) are similar (BRL 9.3 trillion estimated by the government and BRL 906.4 billion by

Table 1: Savings estimates during a 10-year period with CA 06/2019 at different moments along the Legislative process – in 2019 BRL billion

Breakdown	Government Estimate - Original Proposal	IFI Estimate - Original Proposal	Government Estimate - 2nd Round House of Representatives	Tafner's Estimate - 2nd Round House of Representatives (*)	Government Estimate - CCJ Senate	Tafner's Estimate - CCJ Senate (*)	IFI Estimate - CCJ Senate	Government Estimate - 2nd Round Senate
RGPS (Total) (I)	806.7	644.6	654.7	643.2	621.3	608.4	541.1	621.3
Retirement Age	194.4	143.4	110.7	107.8	110.7	107.8	91.7	110.7
Retirement by Time of Contribution	432.9	352.2	384.8	380.6	378.5	371.6	300.4	378.5
Retirement by Disability	79.4	75.1	78.6	75.0	78.6	75.0	75.1	78.6
Survivor Benefit	137.8	100.2	128.1	125.1	101.1	99.4	100.2	101.1
Others	-8.2	0.0	-18.0	-18.0	-18.0	-18.0	0.0	-18.0
New Contribution rates	-28.4	-23.1	-28.4	-26.3	-28.4	-26.3	-23.1	-28.4
Income Tax RGPS	-1.2	-3.2	-1.2	-1.2	-1.2	-1.1	-3.2	-1.2
RPPS Union (Total) (II)	220.0	171.1	159.8	149.1	159.8	149.1	103.0	159.8
Retirement	139.1		103.2	98.6	103.2	98.6		103.2
Survivor Benefit	16.2		11.2	10.0	11.2	10.0		11.2
Revenue from retirement postponement	41.4		23.5	18.4	23.5	18.4		23.5
New Contribution rates	27.7	25.5	25.7	25.7	25.7	25.7	25.5	25.7
Income Tax RPPS	-4.4	-7.1	-3.8	-3.6	-3.8	-3.6	-7.1	-3.8
Targeting the salary bonus (III)	169.4	150.2	76.4	74.9	76.4	74.9	70.2	0.0
BPC (IV)	68.1	28.7	23.4	20.0	0.0	0.0	0.0	0.0
Subtotal (I a IV)	1,264.2	994.6	914.3	887.2	857.5	832.4	714.3	781.1
CSLL (5% additional for Banks) (1)	0.0	0.0	19.2	19.2	19.2	19.2	30.0	19.2
Sum Total	1,264.2	994.6	933.5	906.4	876.7	851.6	744.3	800.3
Sum Total excluding CSLL	1,264.2	994.6	914.3	887.2	857.5	832.4	714.3	781.1

Source: authors' database.

Note (*): The estimates made by Tafner refer to the proposal approved in second round by the House of Representatives and the text approved by the Senate CCJ (Comissão de Constituição, Justiça e Cidadania – Constitution, Justice and Citizenry Committee). No estimates were made for the original proposal submitted by the Executive Branch.
Note (1): CSLL – Contribuição Social Sobre o Lucro Líquido is a Federal social contribution tax, based on the Net Profit of firms.

Tafner, a difference of BRL 27 billion, or 2.1% and BRL 876.6 billion and BRL 851.6 billion, respectively). In IFI's estimates, this loss would be 25%.

The initial proposal contemplated a fiscal impact of BRL 1.26 trillion in ten years. In the parliamentary process, changes in the BPC and in rural benefits were very quickly discarded, in addition to other doctrinal changes, such as the exclusion of states and municipalities, the unconstitutionalities of the system's operational rules, the possibility of a capitalized system and the automatic increase of the minimum ages, due to increased longevity. The result was a "dehydration" of BRL 330 billion at federal level, and another BRL 350 billion, when states and municipalities were excluded.

It was a meeting with the past, but the opportunity for a prosperous future was lost. A new round must take place, in the not-too-distant future.

In 2015, Tafner, Botelho and Erbisti organized a book entitled "Pension Reform: the old lady's visit", in which they showed that, as much as our political elites sought to distance themselves from the topic, the fact remained that the encounter was inexorable. In the end, the past was taken care of, but the future was neglected. We had a flirtatious meeting in 2019, but the old "lady" will certainly visit again.

One thing, however, is undeniable: the country is better off today than it was before the reform.

3 - Fiscal crisis and those that were left out: the problem of the states

In this section, the focus is on the states. In good measure, however, everything that will be dealt with here can be generally extended to the Capital Cities and to the large municipalities of the country. Small municipalities

and, above all, those that created their own social security systems after Constitutional Amendments CA 20/1998 and, especially after CA 41/2003, live a reality of greater balance and sustainability of their social security systems. This is not the case of the states, capital cities and large municipalities. That being said, let us proceed to the text. The Union, the states, the Federal District and practically all large municipalities are in a delicate fiscal situation. At least 5 states of the federation find themselves in a precarious fiscal situation: Rio de Janeiro, Rio Grande do Sul, Rio Grande do Norte, Minas Gerais and Goiás.

For an entire decade, state governments expanded their current spending at a much faster rate than their revenue growth. In this period, on average, the growth of current expenditure was over 5% in real terms. Even when state governors acted in a parsimonious and fiscally responsible manner, fiscal degradation was still notorious.

Let us look at some consolidated data from the set of federative units: between 2008 and 2017, the aggregate gross revenue of all federal units leapt from BRL 388,934 billion to BRL 814,282 billion, which represents an increase of 109% – 8.5% per year. Current revenue increased from BRL 385,366 billion to 804,475 billion, though performing the exact same function as that of gross revenue. One should note that current revenue represents, on average, 98.6% of gross revenue. This means that states basically live off their current revenue.

The share of one's own current revenue in the total – that which expresses the collection effort of the federative units – increased, on average, from 75.7% to 79.1%, with a 3.4 percentage point increase in a decade. Despite this growth in revenue, it was not enough to cover expenses. Total expenditure for the same period increased from BRL 360,268 billion to BRL 805,808 billion, at a growth rate of 124%, or annual average of 9.4%. Current expenditure grew even more: it leapt from BRL 327,920 billion to BRL 765,807 billion, that is, it increased 134% within the period, at an annual average of 9.9%. Capital expenditures grew only 24% in the entire period. And Personnel expenses and obligations increased from BRL 139,658 billion to BRL 467,495 billion within the same period, that is, it grew 234.74%, at an annual average of 14.37%, consuming increasingly larger portions of the current expenditure (and of total expenditure).

What does this set of information reveal? It shows that it was not due to insufficient revenue that states began to face a severe fiscal crisis, even though in the last 4 years the revenue suffered from the growth of the crisis that has been plaguing the country. The relevant fact is that expenditures grew at a rate much higher than that of collection capacity. In addition, the increase in spending was mainly focused on personnel. Considering active, inactive and pensioners, the increase in expenses between 2008 and 2017 was 234.7%, with an average annual increase of 14.4%, much higher than that of the

Graph 3: Percentage breakdown of Current Expenditures into its main components: 2008-18
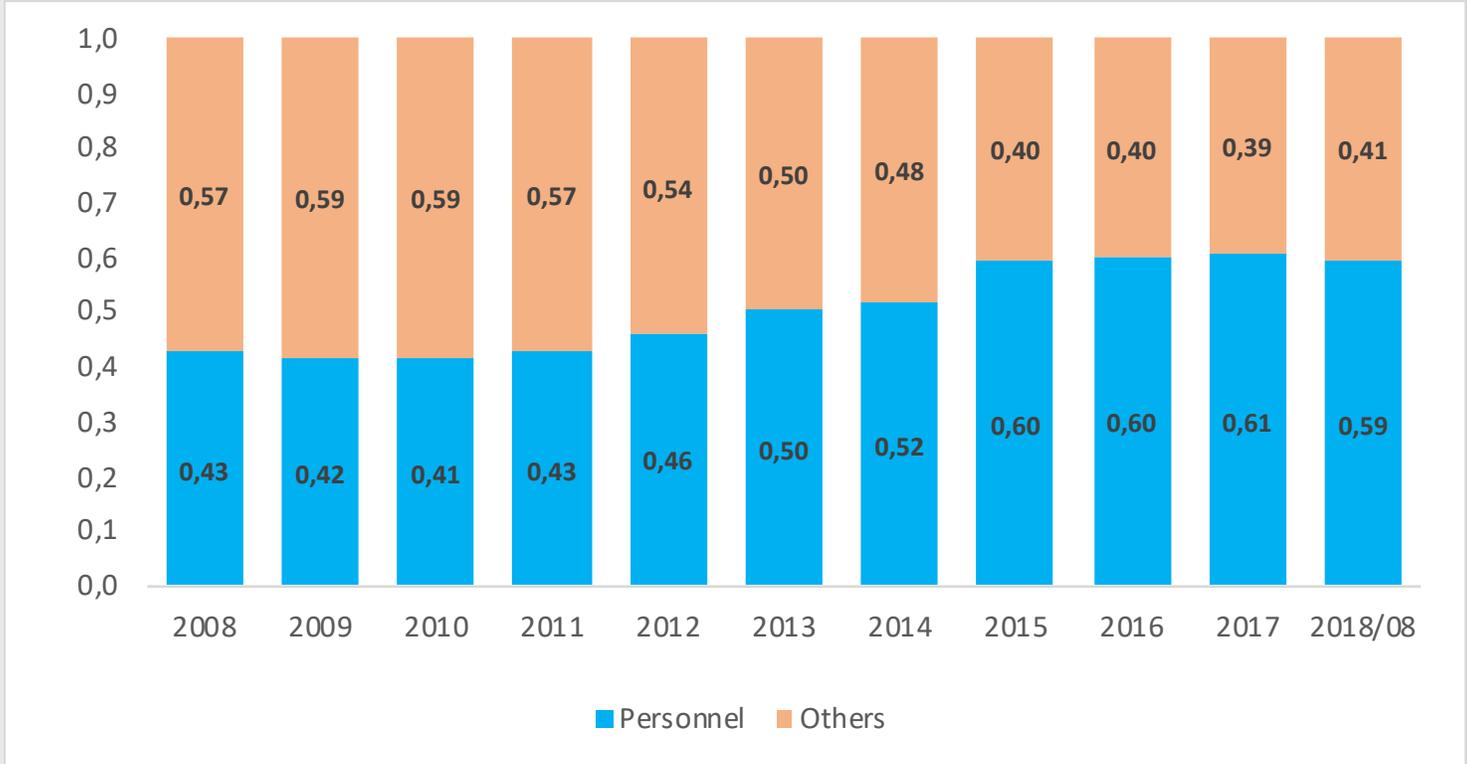
Source: SICONF. Extracted from Tafner and Barros, 2019.

revenue. Moreover, the gigantic growth of such an expense produced the fiscal collapse of the state governments. In sum, the expense with maintaining active, inactive and pensioners consumed the governments' revenue.

Evidence indicates that several federal units and large cities are approaching fiscal insolvency. There is unmistakable existence of a common base that is progressively deteriorating state finances: personnel expenses. The situation varies from state to state, but, on average, more than 65% of the growth of expenses with personnel was due to retirements and pensions. On the other hand, investment spending fell from 6.63 of total expenditure in 2008 to 4.01% in 2017, a drop of 40%. Graph 3 presents an outline of this information.

Successive social security financial deficits[4] have demanded special attention from local governments, which have been reducing their investments and/or reducing other essential expenses, such as education, health, security, etc. In the case of state governments,

the growth of the social security deficit stifles their fiscal capacity and jeopardizes their ability to carry out essential duties, particularly those related to secondary education, public security, and secondary health care.

These financial deficits, though severe, do not express the true gravity of the fiscal situation. It is necessary to analyze the actuarial liabilities[5] of the Private Pension Schemes of the federated states. The fact is that, in 2015, the actuarial deficit of the states was estimated at BRL 2.7 trillion (almost 40% of GDP)[6] . It is a debt contracted with civil servants and it represents, without a doubt, the biggest fiscal challenge over the coming two decades.

4   Financial deficit represents the difference between revenues from employers 'and employees' social security contributions, and expenses with benefit payments.

5   The actuarial liability is the (negative) result of the difference between the sum of expected earnings from a social security system and the sum of expected expenses with payment of benefits over time, bringing the amounts obtained to present value through a neutral interest rate. If the result is positive, there is an actuarial surplus. Otherwise, there is an actuarial deficit. If both magnitudes are equal, the system is in equilibrium. It is, therefore, a debt of the Entity with its active employees, retirees, and pensioners.
6   And that of municipalities is more than BRL 500 billion (almost 10% of GDP).

Graph 4: Actuarial deficit of state and federal RPPS expressed in multiplex of RCL - 2017
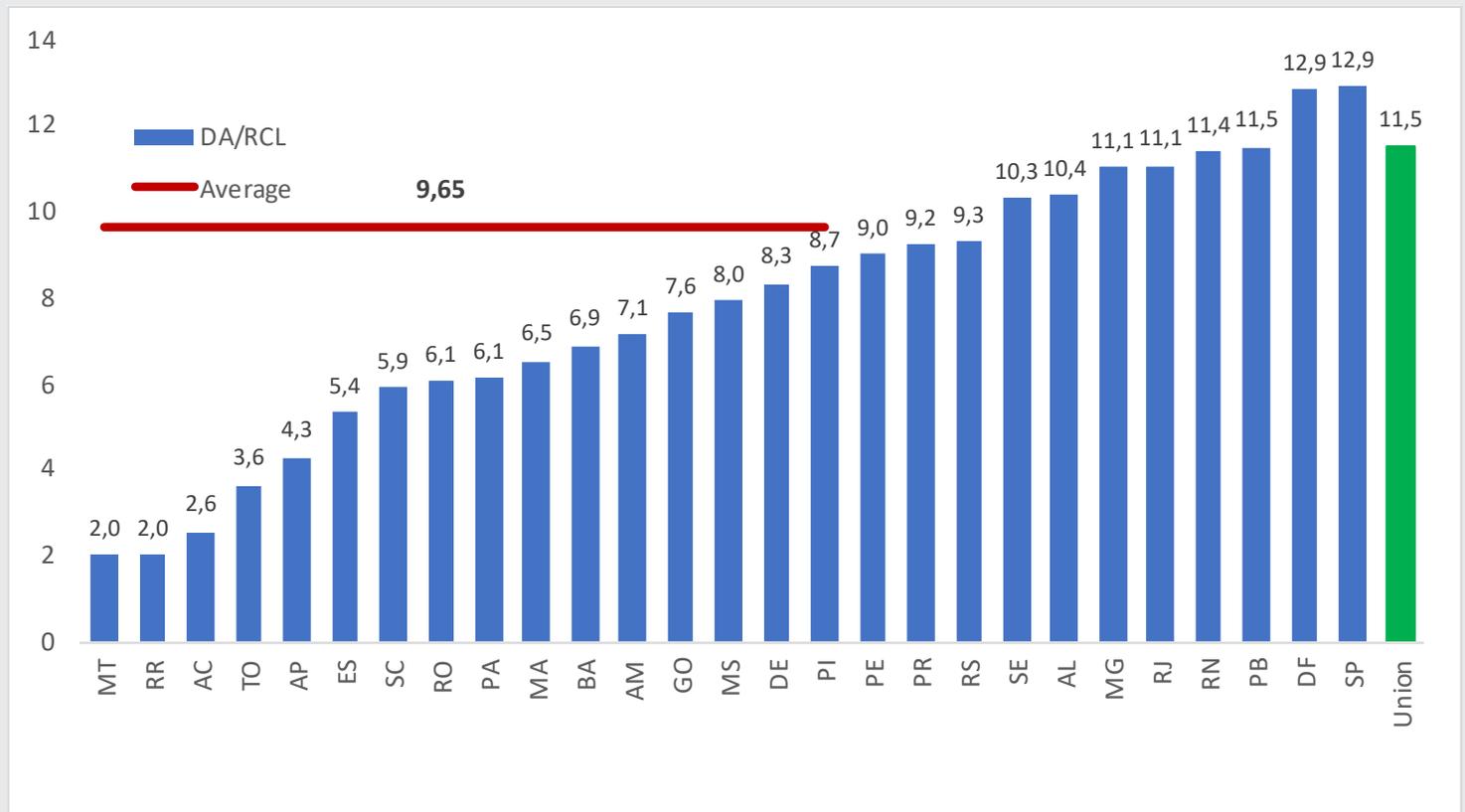
DA = Actuarial Deficit
RCL = Current Net Revenue
Source: Actuarial Valuation Reports / Social Security Secretariat and National Treasury Secretariat (STN). Made by the authors.

Graph 4 presents data referring to the pension liabilities (actuarial deficit) estimated for the year 2017, for the RPPS of all federative units and the Union.

Only 5 states have social security debts below five times their Current Net Revenue (RCL). These are the 3 former territories, Roraima, Acre and Amapá, whose pension liabilities were assumed by the Union, and two other states, Mato Grosso and Tocantins, which came about as the result of the division of 2 other states, where, at least in part, the Union made commitments to maintain part of the benefits, when the division took place. All other 22 states have higher debts, and for 15 of them the debt is more than 7.5 times the RCL. About these states, we can say that, at each ten-year interval and for the next 75 years, they will have wasted resources equivalent to one time their Current Net Revenue, or, quite simply, every ten years they will have to do without one annual budget.

3.1 – State pension systems and the demographic effect

The states created their own regimes right after CF-88. For this reason, nowadays they have a high number of civil servers already retired and active at a late age, now close to retirement. Police officers and teachers, who represent more than 60% of the state government's workforce, have had special retirement rules that guarantee their right to retire at particularly early ages. Taking data from the subnational Finance Bulletin, it is possible to verify that, in some states, the participation of categories that have special rules reaches almost 90% of spending on inactive individuals. Graph 5 shows 14 Federative Units and their share of social security spending on teachers and military personnel within the total spending on inactive people for the year 2017.

Graph 5: Share of social security expenditures with teachers and military personnel of the States in total expenditures with inactive workers (2017)
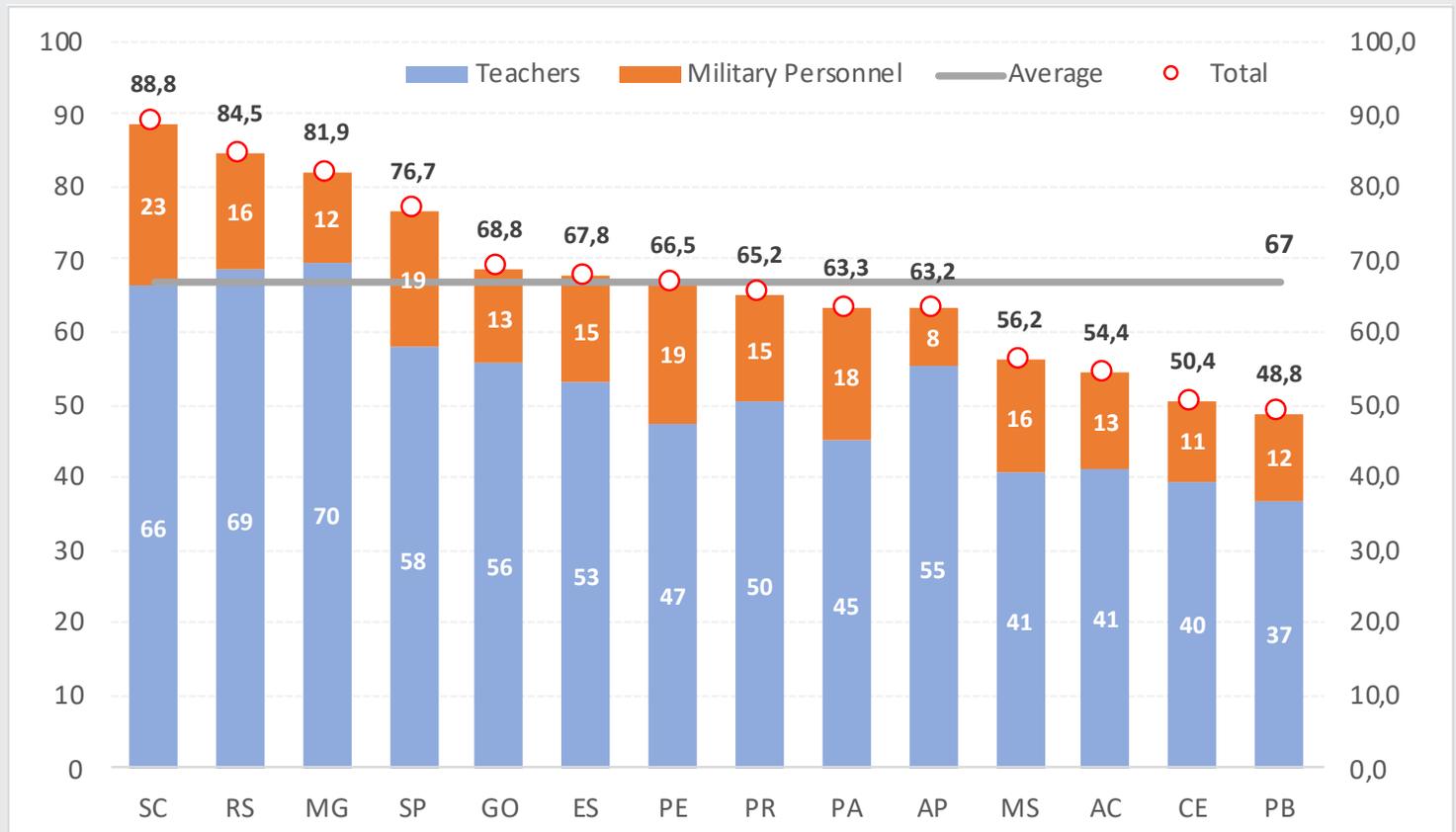
Source: STN. Made by the authors.

In 13 of the 14 Federal Unities, the share of spending on these two categories exceeds 50% of the total of inactive spending; in 10, this percentage is over 60%; and in 4 (29%), expenses exceed 70% of the total. The scenario is pretty much the same in almost all states in the country, and the tendency for every state, sooner or later, is to reach levels similar to those in the most extreme conditions.

It should also be noted that in almost all states, approximately 50% of the active workforce will be able to retire in between 6 and 10 years from 2020 on. In a nutshell, the state's social security expenditure will inexorably tend to grow, and at a faster pace than revenue growth. The result will be the fiscal collapse of the Brazilian states.

In addition, all government employees hired up to 2003 enjoy the right to retire with a benefit equal to

Graph 6: Relationship between Demography and State Pension Deficit (2017)
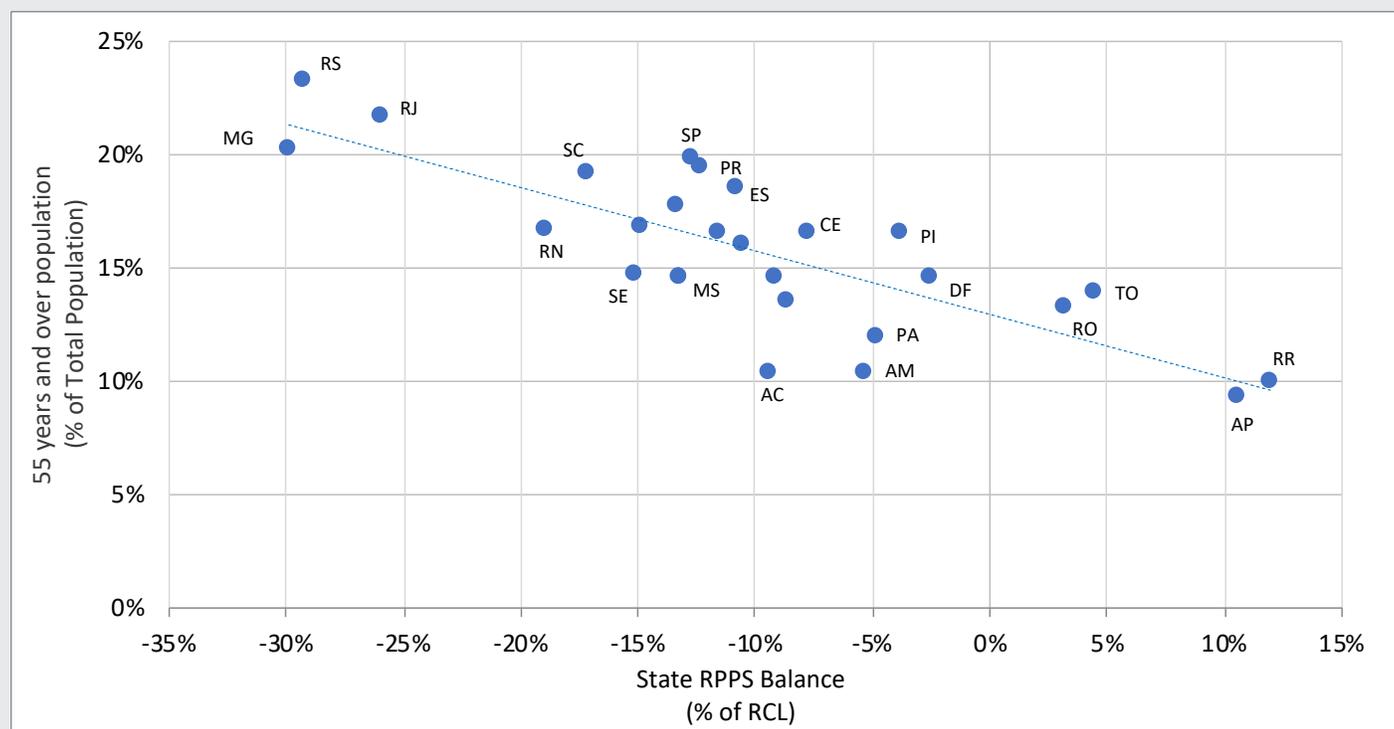
Source: STN – States' Fiscal Indicators. Made by the authors.

the last salary received when active (integrality) and their benefits are readjusted on the same dates and indices as those granted to active workers (parity).

The association between aging workers and an increase in the social security deficit is unequivocal. Considering all Federative units, the following results are expressed in Graph 6.

Graph 6 very clearly shows that the states with the highest proportion of people aged 55 and over are precisely those who have the worst results with their public pension systems. While only the 4 youngest states in the country showed a surplus in the RPPS in 2017, older states, such as RJ, RS and MG committed 25% to 30% of their RCL.

The most effective response to the reduced average retirement age and benevolent criteria for access, such as the right to integrality and parity, will be the approval of state pension reforms similar to Constitutional Amendment 103/2019, which are progressively being undertaken by the states.

3.2 – The absence of the states and ongoing state reforms

Constitutional Amendment Proposal (PEC) 006/2019 contained several changes suggested for the Brazilian social security system. For States and Municipalities, there were provisions particularly relevant

to ensure the control of social security expenditure. Among these mechanisms, the following stand out: (i) raising retirement age for men and women (65 for men and 62 for women); (ii) setting a minimum age of 60 for teachers of both genders; (iii) progressive rates that may reach 22% for high remuneration (above BRL 39 thousand) and fixing the minimum retirement age for police and firefighters at 55, for both genders. The criteria for granting survivor benefits and the rules for the accumulation of benefits are also changed, becoming more restrictive.

During discussions in the House of Representatives, the states and municipalities were removed from the proposal that was approved in plenary.[7] The impact of the reform on state finances can be measured by comparing its estimated effect (in case CA 106/2019 had included states and municipalities) on social security expenditure in ten years (BRL 328 billion) on expenses with Personnel and Obligations (BRL 467.5 billion) and on the Current Expenditure of 2017 (BRL 765 billion).

The estimated 10-year pension expense reduction would be equivalent to more than 70% of expenses with personnel and obligations, and more than 42% of all current expenditures, for a year. As, on average, expenditures with retirement and survivor benefits represent approximately

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7   States and municipalities were not only removed from the approved text. The draft was approved with the solely inclusion of specific legal provisions (in some cases, State Constitutional Amendments), so subnational entities can count on these and other provisions to combat their local social security deficit

Table 2: Estimates of States' Reduction of Social Expenditure by Region (BRL million)

REGION	Impact in 4 years			Impact in 10 years		
	CIVILIAN	MILITARY	TOTAL	CIVILIAN	MILITARY	TOTAL
North	7,446.94	1,363.12	8,810.07	30,932.85	4,019.52	34,952.36
Northeast	14,860.41	2,662.95	17,523.36	65,829.99	9,039.66	74,869.65
Southeast	23,444.46	7,678.07	31,122.53	106,017.65	28,157.96	134,175.61
South	10,699.05	2,035.79	12,734.83	47,953.99	6,523.53	54,477.52
West-Center	5,704.54	641.59	6,346.13	26,675.21	2,859.29	29,534.50
Brazil (Federative Units)	**62,155.39**	**14,381.53**	**76,536.92**	**277,409.69**	**50,599.96**	**328,009.64**

Source:Office of Supplemental Pension Plans .Made by the authors.

50% of Expenses with Personnel and Obligations, the impact of the Reform would be equivalent to "zeroing" more than one year of expenditures with retirees and pensioners over a 10-year period. Estimates for the reduction of social security expenses are shown in Table 2.

It is possible to determine the impact of the reform for each of the Federative Units, had the CA 103/2019 been extended to the states. Graph 7 presents the estimates of reduction in expenses for the next 10 years, divided between civilian and military personnel.

• **State reforms**

By the time this chapter was written, 18 states had made changes to their own regimes[8] and only one

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8   The states that have managed to approve some changes

Graph 7: Estimated Reduction of Social Security Expenditure per State (BRL million, in 10 years)
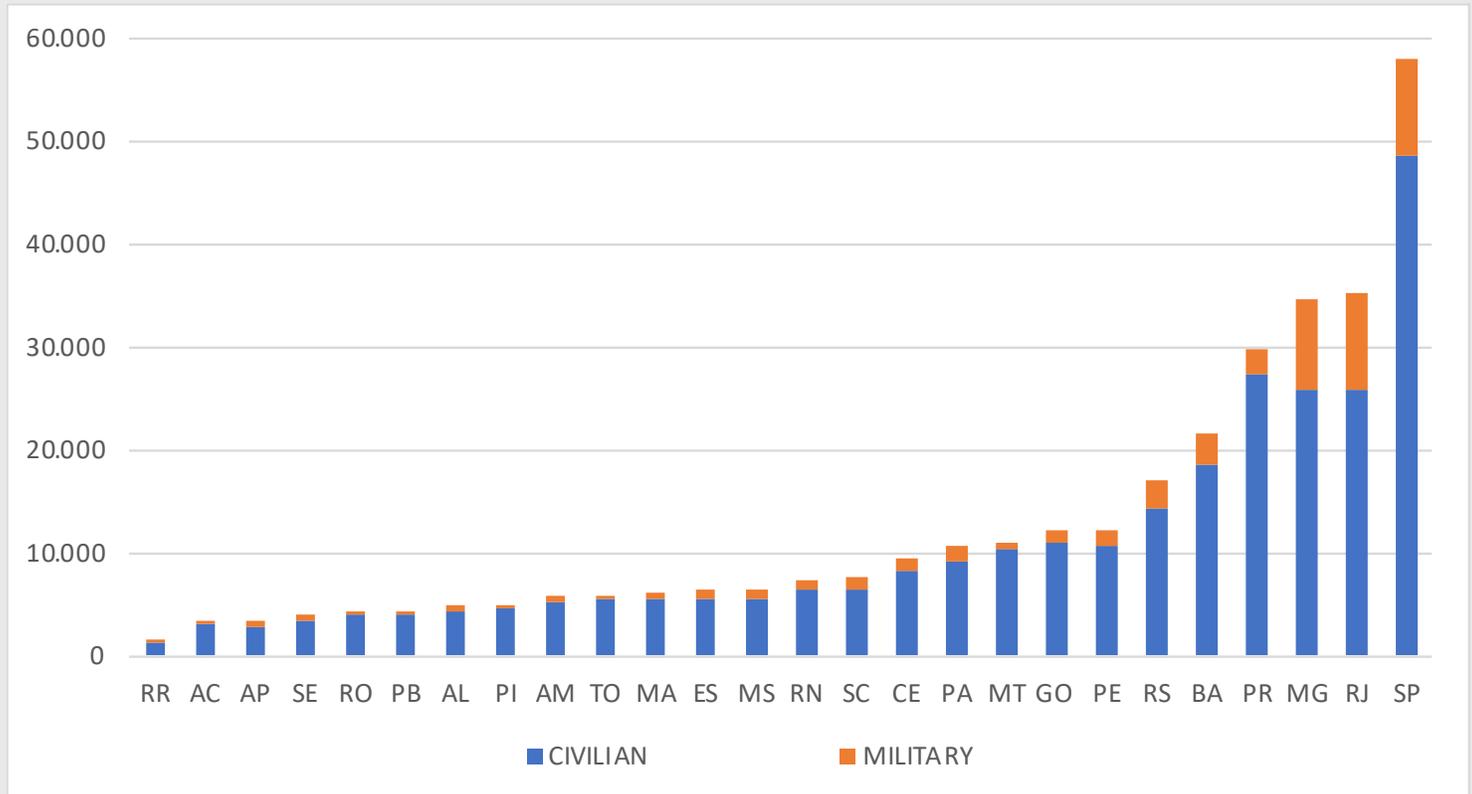
Source: Office of Supplemental Pension Plans . Made by the authors.

of them was still in the process of doing so. Some made more profound changes, bringing the rules and provisions provided for, in CA 103/2019, to state level (Acre, Ceará, Espírito Santo, Goiás, Mato Grosso do Sul, Pará, Paraná, Piauí, Rio Grande do Sul, Santa Catarina, São Paulo, Sergipe). Others (Alagoas, Amazonas, Maranhão, Mato Grosso, Paraíba, Pernambuco) were more superficial, focusing primarily on changing the contribution rate.

The most daring proposal for a legal change was undertaken by the government of Mato Grosso do Sul, which, in addition to adopting all the rules in CA 103/2019, foresaw, in its State Constitutional Amendment, the possibility of adopting an extraordinary rate and the binding of its rules federal ones. Goiás, Espírito Santo, Paraíba, São Paulo, Santa Catarina and Rio Grande do Sul, to a greater or lesser degree, also made changes similar to the CA 103/2019 rules.

Mostly relevant to the scenario depicted above is the fact that, for the first time in Brazilian social security history, we will have differentiated rules governing the national territory. Apparently, that does not mean much. But this is not quite right. Aside from the fact that we have civil servers with much softer rules than their counterparts in the private sector, there will beenormous difficulty in adjusting social security compensation (Comprev)[9].

Since resources from social security compensation are circumscribed, they can only be used for the payment of social security benefits, or to cover current and capital expenses necessary for the organization and operation of the RPPS Management Unit. These resources must be managed by the management unit of the RPPS, though the part of the compensation begotten by benefits paid for by the Treasury of the federative entity can be allocated to said Treasury, with the specific purpose of paying the social security benefits under its responsibility.

A problematic issue that has a close relationship with financial compensation between social security systems, concerns the reciprocal counting of rural time. The 1988 Federal Constitution ensured reciprocal

counting of contribution time in public administration and in the private sector, both rural and urban. However, it was only with the passage of Laws no. 8212 and no. 8213, both on July 24, 1991, that all rural workers became mandatory contributors to the RGPS. This issue can be particularly sensitive in states with a recent history of great participation of the rural population, which can now be aggravated, due to different rules resulting from different "reforms" of federal entities.

This is a matter to be analyzed by the Social Security Secretariat and will give rise to a huge legal discussion that could have been avoided, had all come under the same rules.

4 - In the name of politics, forever postponing the obvious

In this section, we present notes on some points that were left out of CA 103/2019, despite being included in its original proposal. For each of the items – age equality between men and women; the demographic "trigger"; the deindexation of social security benefit from the minimum wage; the benefit of continued service (BPC) and rural retirement – we will seek to bring only the most significant elements for a little more in-depth reflection, aware that each topic would be worth a specific chapter. We understand that these items, as well as capitalization – to be analyzed in section 5 – should be part of a new round of modernization of our social security system to be carried out in the not-too-distant future.

4.1 – Age equality in men and women's retirement

The difference in treatment, in terms of retirement age between men and women, is not exclusive to Brazil. For a long time, most countries maintained a lower retirement age for women in their pensions systems. There is no record of the reason for this different treatment. Three hypotheses are usually cited, the first two being more widely accepted: (1) women who worked in the past had an exaggerated workload, as they were almost exclusively responsible for domestic care; (2) macho societies tended to over-protect women. Thus, the difference in treatment would be a manifestation of this predominant chauvinism. A third hypothesis is that women, until the end of the 19th century, had a life expectancy equal to, or even lower than that of men, and this was due to their extremely high mortality rate at childbirth. None of these theories have been conclusively proven. But the fact remains that in most countries, women's retirement age was lower than that of men. Since the end of the 1980s, when system reforms began to take place worldwide, the retirement age gap for men and women has progressively narrowed and, in many cases, has simply disappeared.

Table 3: Retirement ages in selected countries, by gender (2017)

Country	Male	Female	Gender equality	Country	Male	Female	Gender equality
Germany	65	65	yes	Greece	65	60	
Argentine	65	60		Netherland	65	65	yes
Australia	65	60		Hungary	62	62	yes
Austria	65	65	yes	Iceland	67	67	yes
Chile	65	60		Italy	65	60	
South Korea [a]	65	65	yes	Mexico	65	65	yes
Costa Rica	62	60		Norway	67	67	yes
Denmark	67	67	yes	Peru	65	65	yes
El Salvador	60	55		Poland	65	60	
Spain	65	65	yes	Portugal	65	65	yes
USA [b]	67	67	yes	UK [c]	65	65	yes
Finland	65	65	yes	Switzerland	65	65	yes

Source: Cechin & Cechin (2007) with updates made by the authors. Notes: (a) Expected for 2033. (b) Expected for 2027. (c) Expected for 2020.

In Brazil, until the recent reform, the age difference between genders was 5 years. After the approval of CA 103/2019, this difference will be reduced to 3 years, past the transition period.

Table 3 presents a sample of 24 countries with the legal retirement age for men and women.

Considering the retirement ages of this sample, men retire at 64.9 and women at 64, that is, the difference is less than one year. In two thirds of the countries, retirement age is the same for both men and women. And the global trend is progressive equality. This was not the case with the reform made in Brazil last year.

Table 4 presents demographic data produced by IBGE (Brazilian Geography and Statistics Institute). The statistics are compiled from the Demographic Census' data. The results are spectacular. Between 1980 and 2010 (thirty years only) life expectancy at birth for a Brazilian citizen increased by 13.3 years (4.4 years per decade). In 1980, at birth, their life expectancy was 62 years; in 2010, 75.3 years. If they survived until the age of 60, a Brazilian, in 1980, was expected to live another 15.8 years; this same Brazilian, in 2010 was expected to live for another 21.9 years (an increase of 2 years per decade).

The data in the table also reveal that women's life expectancy is systematically higher than men's, and that it has been so, since the 1980s. At birth, their life expectancy is 7.2 years higher than men's, and at 60, it is 3.5 years higher (2010). It is also important to consider that the argument of the domestic work overload resulting from offspring care is substantially smaller today, than it was in the past. In 1980, on average, each woman had 4 children. In the 2000s, only 2. Currently, the fertility rate is approximately 1.75 children per woman. Although a certain female predominance in domestic chores prevails, the difference is decreasing over time. Approximately 40% of women at reproductive age have no children. Out of those who do, 50% have only one child. If it is not possible to immediately match retirement age between men and women, this should be considered soon. It is part of an agenda for a new reform.

4.2 – The Demographic trigger

In the Constitutional Amendment Proposal sent to Congress, there was a provision that made retirement ages flexible, given increased life expectancy in population. The idea was that, whenever there was an increase in average life expectancy, retirement age would increase as well. This is an interesting tool because it makes the whole society a "partner" to collective social gain. Increases in life expectancy reflect many factors, some of which are associated with individual behavior – healthier eating habits, reduced smoking and alcohol intake, regular exercise, regular medical examinations, etc. Others are derived from public action, such as investments in sanitation and public health, regular and extensive vaccination campaigns, etc. Others still stem from advances in the pharmaceutical industry and

medical technology. Thus, an individual's "earning" of one more year of life is the result of personal and collective investments.

Associating the retirement age to this improvement makes a social share of the gain possible. Part of it can be attributed to the individual, part to society. It is always difficult to determine how much of the gain is due to individual action and how much is due to public action and other factors[10]. In the Constitutional Amendment presented, there was no such division, but the possibility was authorized and referred for definition by infra constitutional law.

The well-known "Armínio-Tafner" proposal presented the same mechanism and went further: it would allow that the event of a 6 months gain in life expectancy implied an increase of 4 months in retirement age. Thus, if, for example, men's life expectancy increased by six months and the retirement age was initially set at 65 years, it would be converted to 65 years and 4 months. The individual gain would be 1/3 and the collective gain would be 2/3 of the life expectancy gain.

It is worth noting that this would have avoided prolonged and exhausting legislative debates and should have been implemented immediately, without delay. Furthermore, as the increase in life expectancy does not occur by leaps and bounds, the changes would be smooth and distributed over time, without major misfortunes or shocks for individuals. This is also part of the agenda for a new reform.

4.3 – The deindexation of Social Security from Minimum Wage

This is certainly an overly sensitive topic in our culture. For this very reason, a certain detailing of arguments is required, which is what we do next.

For centuries, we lived and prospered without the existence of the minimum wage (MW). Nowadays, it would be considered sacrilege to speak of its non-existence. The MW is the lowest remuneration allowed by law (in the formal market). It is geared towards less qualified workers and guarantees curbing any movements in the labor market that might lead to wages below the productivity level of that work. It is, in fact, state intervention in the labor market.

For countries in which there is a high level of informality, such as Brazil, the MW, in addition to serving as a formal pay threshold, fulfills a "beacon effect". It serves as a kind of signal for the informal sector.

In Brazil, the MW was created during the Getúlio Vargas Government, by Law no. 185 of January 14, 1936. In article 2, it states that: "The minimum wage is the lowest remuneration afforded adult workers for a normal workday. For minor apprentices or for those who perform specialized services, a reduction of the minimum wage by down to half is allowed, and for workers engaged in hazardous work, an increase in the same proportion is allowed."

It was regulated by Decree Law no. 399/1938. Note that, contrary to popular belief, it was not a necessary value to satisfy the needs of a family, but of every adult worker. That same precept is set out in this Decree. In Article 2, it states that: "The minimum wage is the lowest remuneration due to all adult workers, regardless of gender, for a normal day of work and it is one that is able to satisfy, in a certain time frame and region of the country, the workers' normal need for food, housing, clothing, hygiene and transportation".

The text of the above-mentioned decree's summary is as follows: "It approves the regulation to execute Law no. 185 of January 14, 1936, instituting Minimum Wage Commissions". Two years later, minimum wages were fixed. On May 1, 1940, Decree-Law No. 2162 set the values that began to take effect on July 8 of the same year. At the time, there were 14 different minimum wages. In Rio de Janeiro, then the country's capital, the minimum wage amounted to almost three times that of the Northeast. Note that if the minimum wage is the minimum earning due to a worker "in a certain region of the country" and at a "certain time", it must reflect the cost of replacing the labor force. Put another way, it represents the average marginal productivity of a worker in a given region, considering the characteristics of manpower and the local productive structure.

The number of regional minimum wages varied widely over time. In 1963, there were 38 minimum wages. They were being unified, so that, in 1974, there were only 5 different ones, one for each region. The unification took place in May 1984 and was later consolidated in the 1988 Federal Constitution – CF/88 (Constituição Federal). But CF/88 went further: it established that it would become the basic wage for both Social Security and for the Benefit of Continued Provision for the elderly and disabled (BPC). At that time, the MW started indexing Social Security and BPC benefits. This small change in the role of the MW has become an increasing problem in the sustainability of Social Security in Brazil.

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10   The increase in life expectancy can be attributed to several factors: improvement of medicines and drugs in general, of medical and surgical methods, the advance of sanitation, the universalization of vaccination and others. All of these factors are not directly associated with each individual. They are, therefore, social achievements. On the other hand, better individual habits, such as playing sports, healthy eating, consulting doctors, etc. are factors that are intrinsically associated with the individual. That is why life expectancy gains must be shared between individuals and society, as presented in the Constitutional Amendment Proposal.

Graph 8: Real Average Minimum Wage Index: 1995-2020 (base: January, 1995=100)
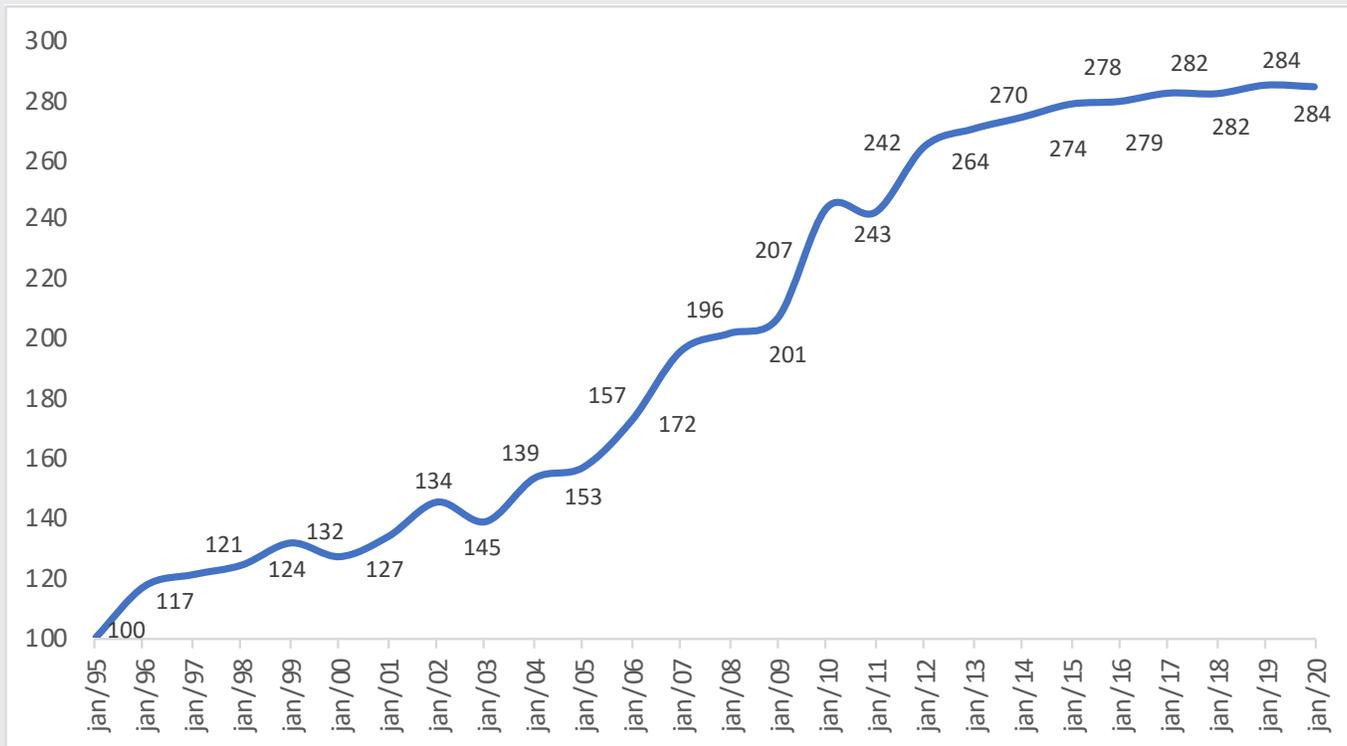
Source: Ipea data. Nominal Value deflated by INPC. Made by the authors.

• **The evolution of the minimum wage value.**

After having had its value deeply eroded by inflation, right after the Real Plan, the minimum wage started to revalue, significantly. In the late 1990s, it reached 100 dollars in value and is currently equivalent to approximately 250 dollars.

Considering the average annual real value between 1995 and 2020 (January), the minimum wage multiplied 2.84 times. It underwent a huge appreciation, as shown in the graph below.

Given that only the social security basic wage and the BPC are indexed to the MW, real increases in the MW, in addition to putting pressure on social security expenditure, gradually provide all beneficiaries with benefits approaching the MW level, introducing a strong feeling of injustice among Social Security beneficiaries. The expression "I used to earn the equivalent to 8 MW, but today I only earn 4", translates the "feeling". There was no loss of purchasing power because their benefit was adjusted according to the inflation. It was the MW that grew, and compared to it, any retired person felt wronged.

• **Does it make sense to index the basic wage to the MW?**

In Brazil, social security benefits with values equivalent to the basic wage (and the BPC) are readjusted on an equal footing with the variation of the minimum wage. Until 2019, this was, in turn, equivalent to the sum of the previous year's inflation and the GDP variation of two years earlier. For the other benefits, only the inflation of the previous year was given.

In most countries, there is no indexation, but the readjustment of social security benefits takes inflation into account, as in Mexico, the US, Canada, France, and Italy. In Germany, readjustments are associated with wages, but not with the minimum wage, and this is not defined based on GDP performance. Sweden has a mixed regime, using wages and inflation. This reveals that there is a concern about maintaining the purchasing power of retirees and pensioners.

Maintaining the purchasing power of retirees and pensioners seems to be the rule, but there does not seem to be any parallel to giving an actual increase. In Brazil, we have done the worst: the actual increase is given only to a part of the retirees and pensioners. This means that those benefits close to the minimum wage are gradually incorporated into it. Depending on GDP growth, this process can be fast. With GDP running at 2%, benefits that are 10% higher than the minimum wage will be incorporated into the MW in just 5 years. If they are 20% higher than the MW, this process will take a decade[11].

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11   Note that the faster the economy grows, the faster the process described takes place. Thus, if the GDP grows 4% per year in less than 5 years, those who receive 20% over MW will eventually receive only the MW. (Essa é a fonte?)

Does it make any sense to have actual pay raises for some and not for others? Does it make sense for a policy to establish that everyone will inexorably earn a minimum wage? This causes a permanent feeling of "loss" on the part of those who have contributed higher values than the MW, in addition to producing a feeling of subversion of both the remuneration and the social structure.

• **What is the impact of the social security MW?**

In 2000, benefits of up to 1 minimum wage represented 63% of the total benefits issued and consumed 33% of social security expenses. In 2017 its numerical incidence was practically the same, but its expenditure already consumed 47% of the total expenses. Nearly half of social security expenditure is allocated to one minimum wage benefits. This means that, for every 1% of actual increase in MW, social security expenses will increase by 0.5% in real terms.

The recovery of the minimum wage took place quite quickly and sharply. Today, it is above its highest level since the 1970s, and its effect on poverty has been overwhelming. Maintaining indexation will only increase pension expenditures, put pressure on public accounts, increase the size of the state and jeopardize public policies, as well as investment resources. We need to forget the past and think about the future.

4.4 – The BPC

The Constitution determined that the lowest value for retirement pensions, survivor and welfare benefits for the elderly and disabled was the minimum wages. Thus, those who contribute based on the social security basic wage, as well as those who do not contribute, can receive the same benefit value. However, legal principle draws attention to the fact that for social security purposes, different contributions imply retirement pensions (and survivor benefit pensions) of different values. But this is not so for all welfare benefits.

Tafner (2005) showed that there is basically no socioeconomic distinction between workers who earn retirement from 1 MW and BPC beneficiaries. He identified that individuals over 50 years of age who do not contribute to social security, live at poverty line, have low level of schooling and reduced chances in the job market. These are the same characteristics of those who, with work income of up to 1.2 MW, and at the same age, contribute to Social Security. In fact, in this group, 56% contribute and 44% do not. That proportion grows as they get older (the non-contribution rate increases systematically as of the age of 50).

The Organic Law on Social Assistance (LOAS) classifies assistance aid in two types: the impaired (55% of benefits issued[12]) and the elderly (45%). The value is a minimum wage for both types. The benefit is granted to elderly people aged 65 and over whose monthly per capita family income is less than ¼ of the minimum wage. It is also granted to families at this level of per capita income with an impaired member. Unlike the social security benefit, the assistance received by a family member is not considered for the purpose of calculating monthly family income.

The number of assistance benefits for the elderly grew from approximately 501 thousand benefits issued in 1996 to 2,022 million benefits in 2017. This is equivalent to an average rate of expansion of almost 7% per year. Growth was so accelerated that, in the same period, it more than doubled its reach among the population aged 65 and over, assisting about 11% of this contingent.

As informed, the value of this benefit is the minimum wage's, and this has undergone significant increases. Combining the expansion of the number of benefits with the real increase in the minimum wage, the result is that the expenditures undertaken between 1996 and 2017 were multiplied by more than 33 times, the equivalent to an annual rate of more than 18%. In real terms (INPC), the average annual real growth was over 12%.

Transferring income to poor individuals via social assistance is a noble mission. It is fair and necessary. However, transferring the same amount to those who contributed and those who did not contribute, or amounts above what would be necessary to lift them out of poverty is unfair and inefficient. Each BRL 1.00 transferred above the necessary count, means one less BRL for other areas.

The BPC, in fact, removes millions of people from exclusion, but by continually increasing the real value of the concession, and by maintaining the concession at the same age level as that of workers who contributed to the social security system, this policy only produces an increase in expenditures and discourages contributions.

After payment of the benefit, less than 10% of the elderly remain "poor" and less than 1% remain "extremely poor". As the number of individual beneficiaries is small, compared to the total population, BPC has a reduced effect on the total incidence of poverty and extreme poverty (these are strongly concentrated in children and young people). However, among recipients, this transfer has an important value. This reveals that the benefit, despite the small impact it has had on the population as a whole, has also had a huge impact on the levels of poverty

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12   December 2017 data collected from the Social Security Statistics Directory. (Fonte?)

and deprivation of the beneficiary public, which indicates good targeting.

Given this evidence and information, how should BPC be dealt with? Should their design be kept as it is? Experience shows that many countries have transfer programs for poor elderly people. In general, the rules are: (a) access to the same retirement age, but at a lower value (between 20% to 70% of the social security basic wage); (b) at the same value as the social security basic wage, but with access at older ages (between 3 and 5 years older); (c) a third group has the benefit at reduced value and at an older age than that of normal access to retirement. Brazil is an atypical case: the same value and the same age. And more: the amount received from BPC does not enter the family income calculation and yet the same value, if a retirement, does enter this calculation. What is the result? The spouse of those who receive BPC (but who did not contribute to INSS) can receive another BPC, while the spouse of those who receive retirement benefits (having contributed to the INSS) cannot.

Despite the loud debate on the issue, it is still necessary to calibrate this welfare benefit. In the proposal sent to the Legislative, there was a mechanism that sought to rectify the error, at least partially. It was immediately attacked and removed from the reform. But what was said about it?

We can call the proposed mechanism a "phasic benefit". The BPC beneficiary would start receiving a certain amount at the age of 60 (5 years before retirement age). That value would increase with time, and would reach the value of 1 MW at 70 years of age (5 years after retirement age). The initial value of the proposal was BRL 400 - a value in keeping with the income needed in this age group to get out of poverty. The reactions were severe, and the phasic benefit was discarded.

Notwithstanding, it is necessary to redesign the benefit, due to its injustices and misguided incentives. BPC is well focused. It removes 90% of the elderly group from poverty. It targets individuals with little schooling, predominantly women living alone or with a partner, with basically no children at home. We know that from the age of 50 onwards, the potentially eligible future public for the benefit are getting by in informality or are unemployed, which dramatically reduces contributions to the system. For the former group, there is no alternative but to wait until they are 65 years old to receive the BPC. Could we think about improving targeting for this group? It is not just the fact that we could, but that we should. Well, that was what the Government tendered in its proposal. Anticipating payment in reduced amounts would virtually eliminate poverty in the 60-65 age group and would be very well focused. Increasing the age at which they

receive the value of 1 MW would have a positive effect on contribution levels, which would be healthy and desirable.

If, at times, the design proposed does not prove adequate, it should not hinder the debate and prevent the possibility of finding a suitable format for the BPC.

Let us consider some data regarding contribution alone: at 65 years of age a woman expects to live 20.1 years more and a man, another 16.9 years. They will reach the age of 85.1 years and 81.9 years, respectively. On average, life expectancy at 65 means another 18.7 years, thus reaching 83.7 years (IBGE 2017). Under the current rules, a man will receive BRL 202 thousand, a woman BRL 241 thousand and, on average, elderly individuals will receive BRL 224 thousand via BPC. Redesigning this benefit is possible, in order to alleviate poverty before the current 65 years of age, since it is known that these individuals are structurally vulnerable. Why wait for 65 and condemn these individuals to live in poverty until that age, when we do know it is how they will be living?

This will certainly constitute part of the agenda for a new reform.

4.5 – Rural retirement

The incorporation of rural workers into the social security system happened in 1963 through FUNRURAL (Law no. 4214 passed in the 1960s). In 1971, Prorural was instituted. This granted retirement benefits due to old age, impairment, survivor's benefits, and other aids. Even in an incipient way, it brought the rural world into the domain of the social security system. It was with the advent of CF/88 that the right to retirement for rural workers was clearly consigned (art. 195, § 8). It is similar to old-age pension in the urban scenario, with different contributory and age requirements.

To obtain retirement benefits, the rural worker needs to prove his age (60 years for men and 55 for women, 5 years less than that for urban workers) and effectively prove the exercise of rural activity, which can be done through: (a) work contract or working papers; (b) land lease contract, partnership or rural renting; (c) reasoned statement from the union representing the rural worker (or fishermen's union or colony), (d) Registration with INCRA; (e) the rural producer's notebook; (f) invoices of goods received issued by the acquiring company; (g) tax documents related to the delivery of rural production to the agricultural cooperative, fish warehouse and others, indicating the insured as the seller; (h) proof of payment of social security contribution resulting from the sale of their production; (i) copy of the income tax return stating revenue from agricultural sales; or (j) occupation license or permission granted by INCRA[13].

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13   INCRA is the National Institute for Settlement and Agrarian

Graph 9: Statistical Information on Rural Welfare
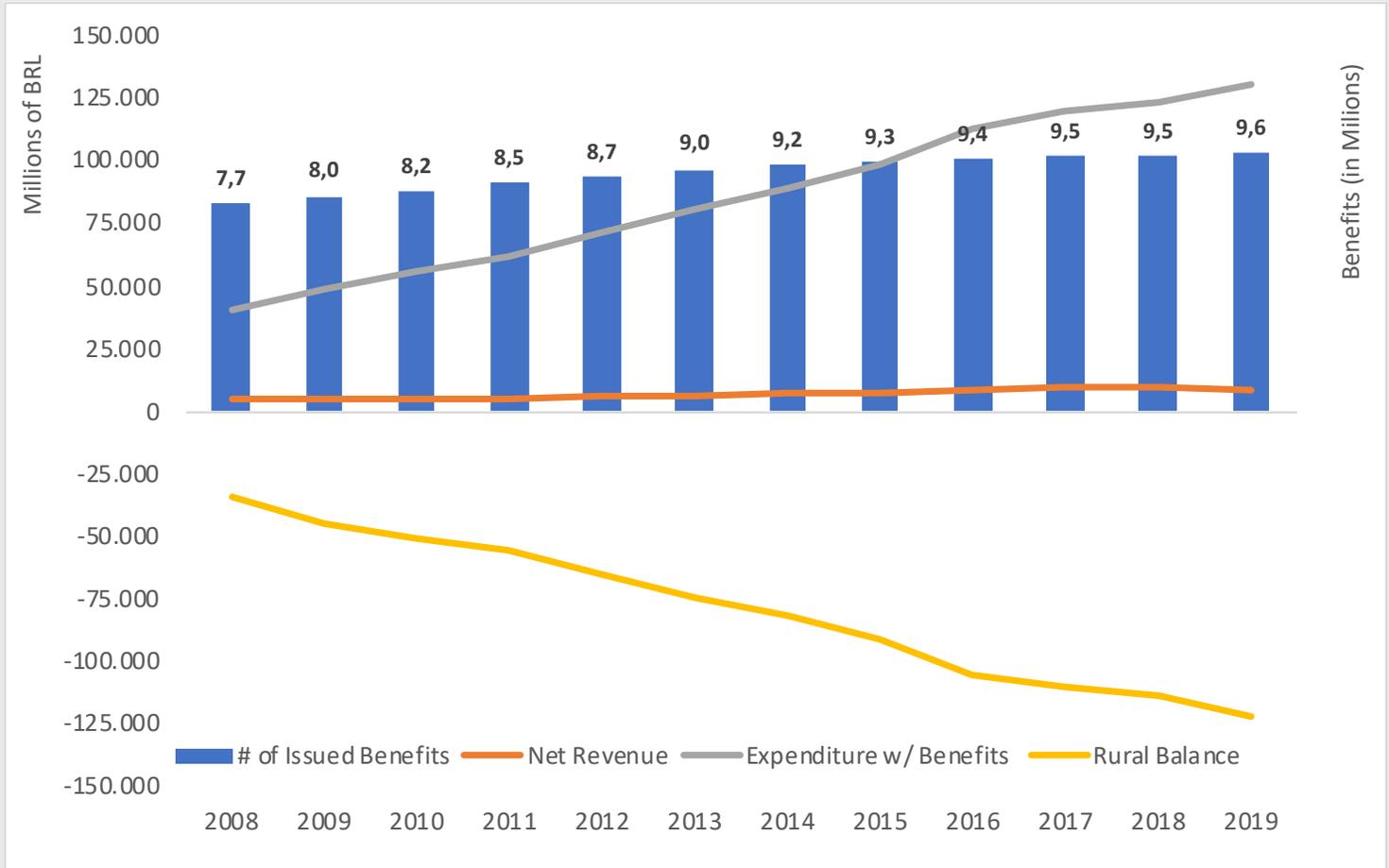
Source: Social Security Statistical Yearbook (AEPS) and Social Security Statistical Bulletin (BEPS).

From the above, it appears that the rural benefit is not directly associated with the contribution, but with the condition of being a rural worker. This means that rural social security has characteristics of a social welfare benefit. It does not require and is not directly associated with the contribution. The data in Graph 9 reveals this characteristic.

Rural collection covers but an insignificant fraction of expenditures with rural benefits. Moreover, it is decreasing, when it comes to percentage. In 2008, the collection corresponded to 12.5% of the expenditure; in 2012, 8.1%, and in 2018 only 6.4%. In other words, more than 90% of the rural benefit expenditure is paid for by general taxes. A curious fact is that the percentage of rural benefits is greater than the percentage of rural population in all Brazilian states. Graph 10 presents these figures for 2010, the date of the last demographic census.

Evidently, this information portrays different moments in time. While the percentage of rural population depicts the demographics and local economic conditions for 2010, the percentage of rural social security benefits

depicts the demographics and local economic conditions of a few decades back. Even so, it draws attention to the difference found. In the Federal District, for example, while the rural population represents only 3% of the total population, 17% of all its social security benefits are rural. There are several cases in which the relative incidence of rural benefit is more than twice the incidence of the local population.

It is reasonable to assume that the percentage of rural benefits is slightly higher than that of the rural population, so, in all likelihood, it is the very lenient rules for granting rural benefits that encourage fraud, thus increasing the occurrence of such benefits.

The proposed Constitutional Amendment, as well as Provisional Measure (MP) No. 871[14] of January 17, 2019, sought to establish rules for rural benefits that would more closely resemble those applicable to urban social security benefits. However, the topic was discarded during the proceedings in the House of Representatives.

Reform.

14   MP no. 871, known as the "MP to combat fraud", defined rules that restrict the possibility of fraud occurring in a number of social security benefits. Specifically, in the case of rural benefits, the participation of rural unions issuing supporting documents to prove rural activity for their members would no longer be accepted.

Graph 10: Percentage of rural population and rural benefits by State, 2010

State	(%) Rural Population	(%) Rural benefits
DF	0,03	0,17
GO	0,10	0,33
MT	0,18	0,41
MS	0,14	0,32
RS	0,15	0,27
SC	0,16	0,27
PR	0,15	0,36
SP	0,04	0,08
RJ	0,03	0,03
ES	0,17	0,32
MG	0,15	0,29
BA	0,28	0,51
SE	0,26	0,45
AL	0,26	0,37
PE	0,20	0,42
PB	0,25	0,55
RN	0,22	0,52
CE	0,25	0,56
PI	0,34	0,66
MA	0,37	0,67
TO	0,21	0,60
AP	0,10	0,34
PA	0,32	0,50
RR	0,23	0,50
AM	0,21	0,36
AC	0,27	0,46
RO	0,26	0,59

■ (%) Rural Population   ■ (%) Rural benefits
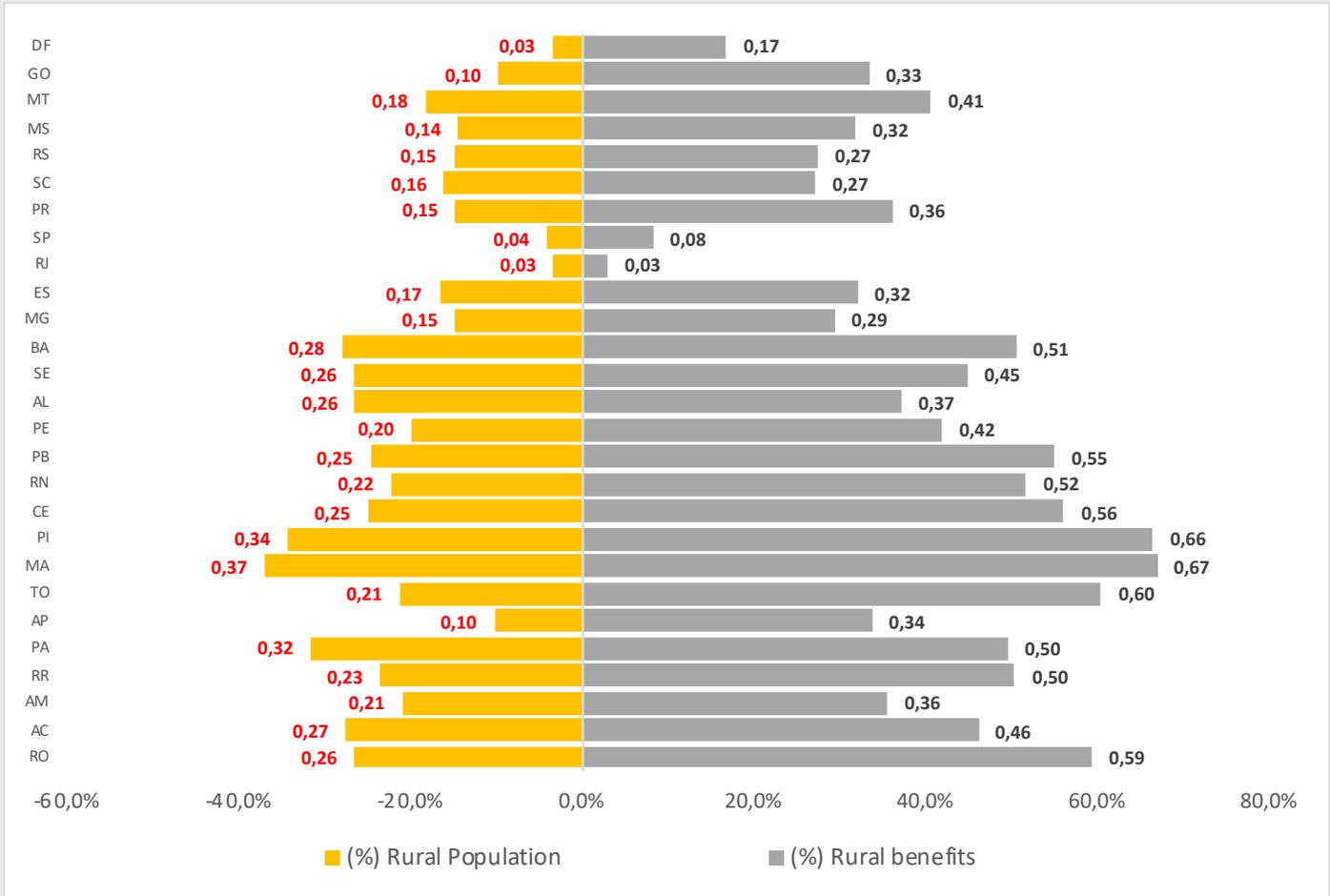
Source: Demographic Censuses (2010), IBGE and AEPS.

And what did the Constitutional Amendment propose? It proposed that a minimum annual contribution obligation of BRL 600 per family group be established, as well as a minimum contribution time equal to that of urban workers (this would only apply for new rural workers, once approved). In addition, it proposed that the retirement age for women be raised to 60 years (abiding by a transition rule). Currently, rural workers can retire five years in advance as compared to their urban counterparts, that is, men at age 60 and women at 55.

The whole rural issue is controversial and delicate. It is possible – and eventually desirable – for rural workers to have slightly different rules from those applicable to urban workers. However, there is no evidence that the current difference is justified. The rural world has been intensely changing and the old stereotype of the rural worker who works with a hoe and rake does not correspond to a significant part of the Brazilian rural scenario.

This is certainly a topic that will demand more evidence, so that the rules of rural social security can be adjusted to the reality of the Brazilian countryside. No passions or preconceived concepts. Just a lot of evidence and common sense. It will certainly be the subject of a new round of reforms.

5. Dealing with the inexorable: capitalization

Our pension system - like so many others set up over the 20th century - is a pay-as-you-go system in which the current active generation collects contributions to pay benefits for those who are already retired or are pensioners. This system can be balanced when demography is favorable, that is, when the population grows at vigorous rates, so there is a large number of active workers and a small number of beneficiaries. Otherwise, the system collapses. And how is Brazilian demography? The fertility rate, which, in the 1960s was 6.3 children per woman, in 2010 had dropped to 1.75 children per woman. Life expectancy at birth, which, in the 1970s, was 55 for men and 60 for women, is now 73 and 80, respectively. The projection for 2060 is 78 and 84 years for men and women. Furthermore, if an individual in the 1970s reached the age of 60, they hoped to live another 12.0 or 14.4 years if man or woman, respectively, and today they already survive 20.1/23.6 years. IBGE's projections indicate that they will survive 23/27 years in 2060. It is a spectacular advance.

In 1980, Brazil had 66 million individuals of working age and only 7.2 million elderly people. There were, therefore, 9.2 active workers to finance each inactive one. We currently have 138.5 million active workers and 29.3 million elderly people. The ratio dropped to 4.7 active for each inactive member. In the future (2060), the working age population is projected to number 116.3 million and the elderly population, 73.6 million. We will then have a maximum of 1.6 active workers to finance each inactive one. Our pension system is doomed to fail.

Estimates indicate that pension expenditure will exceed 20% of GDP. How will the country be economically and socially sustainable, if our annual expenditure on a single item will consume more than 1/5 of all the wealth generated? Demanding such a sacrifice on future generations is cruel, irrational and for them, unacceptable. What we do now is to send them away, saying: leave the country, otherwise your future and dreams will be stolen. Analysts have long warned that our demographics conspire against social security, our rules are out of order, our spending is growing out of control and our actuarial liabilities are higher than two GDPs.

Even with the changes introduced by Constitutional Amendment CA 103/2019, the system will not be in balance. Its effect will only be an expenditure pace reduction and deficit growth. Well aware of this, also knowing that, in just over ten years' time the country's population will start to decline, as well as the Working Age Population, but that the elderly numbers will continue to grow until they represent more than 30% of the total population, why do we not start preparing a balanced and fiscally sustainable new model for the next generations? By refusing to debate the issue, the Legislative helped to condemn the forthcoming generations.

Undoubtedly, there is no ideal capitalization model. There are several possibilities, and we must study them carefully, in order to format a pension adjusted to the Brazilian social, economic, and cultural characteristics . A structure that combines some virtues of the pay-as-you-go system with others of capitalization. A system that guarantees minimum income for the elderly but is fiscally balanced and sustainable. One that has the right incentives for the formation of long-term savings for individuals and families.

This is certainly the most delicate topic of a serious and responsible agenda for a new round of reforms.

6. A few considerations and conclusions

As shown in the introduction, social security is an ingenious institutional construct built to protect members of a modern society against the risks of disease, labor-related impairment, and ageing. In Brazil, we are compromising our future generations to favor the elderly, but when social security restructuring was being undertaken, the future generations were not even consulted (some were not old enough to vote, while others had yet to be born). Hence, we have engendered a world in which poverty and squalor converge in the younger layers of society.

Lengthy analytical work and proposals to alter the social security system have been developed by specialists, and in 2019, with the advent of CA 103/19, certain milestones were reached. It was, basically, a parametric readjustment of its operational rules. In other words, the reform extinguishes retirement by time of contribution; establishes a minimum age for all workers; makes the rule for calculating the benefit amount actuarially fairer; redefines and restricts the amount of death pension, and limits the accumulation of benefits. However, some important changes were left out of CA 103/19, the main ones being those concerning states and municipalities.

In the states, expenditures grew at a much higher rate than the states' collection capacity. Increase in spending was mainly concentrated on personnel, producing the fiscal collapse of state governments. In other words, when a governor takes office, they are saddled with a large payroll, money that could have otherwise been destined for investments in other areas, but which, in several states, is used to cover hefty personnel costs. As they are not in CA 103/19, the states ended up implementing pension reforms of their own. For the first time in the history of social security in the country, there will be different rules within the national territory, which will give rise to a huge legal discussion that could have been avoided, had everyone come under the same ruling.

There is still a long road ahead, before we can even begin to talk about sustainability in social security in Brazil. We would initially have to resume abiding by homogeneous rules throughout the national territory and bridge the gap between public and private initiative workers, so that the latter would not feel short-changed. Furthermore, as is already the case in several more advanced social security systems that have chosen to adopt age equality in the retirement of men and women, we could do likewise, or choose the demographic "trigger". In addition, it would be necessary to deindex the minimum wage from the social security benefit and adjust the rules of the BPC and rural retirement.

A veritable breakthrough would have ensued, had governors proposed a universal benefit for all elderly individuals whose value would have been enough to lift the person above poverty line, and for those who contributed somehow, there would be a higher amount of earnings, proportional to the contribution, limited to a ceiling. If the

person chose to receive above the ceiling, it would also be possible, through capitalization. Thus, everyone in society would be under the same rules and would not see treatments as different as those we currently face in the Brazilian social security system.

Brazil needs to prioritize this agenda, if we want to survive the deluge of progressively escalating social security expenditures, contracted under unfair and discriminatory rules. Even worse, the country, as it stands, ends up exporting its qualified labor and not prioritizing that which is more important: the future. The old lady will still be visiting us.

References

AEPS – Anuário Estatístico da Previdência Social – Available at: https://ces.ibge.gov.br/base-de-dados/metadados/mps/anuario-estatistico-da-previdencia-social-aeps (accessed in October 2020)

Banco Central do Brasil website – Available at: http://www.bcb.gov.br (accessed in September 2020)
BEPS – Boletim Estatístico da Previdência Social – Available at: https://ces.ibge.gov.br/base-de-dados/metadados/mps/boletim-estatistico-da-previdencia-social-beps.html (accessed in October 2020)

Boletim de Finanças dos Entes Subnacionais, 2019. Secretaria do Tesouro Nacional, Ministério da Economia – Available at: https://sisweb.tesouro.gov.br/apex/cosis/thot/transparencia/arquivo/30407:981194:inline:9731352684720 (accessed in September 2020)

Cechin, J. e Cechin, A. (2007); "Desequilíbrios: causas e soluções". In: Tafner, Paulo; Giambiagi, Fabio (org.). Previdência no Brasil – Debates, dilemas e escolhas. Rio de Janeiro: Ipea, 2007.

Censo Demográfico, IBGE – Instituto Brasileiro de Geografia e Estatística – Available at: https://www.ibge.gov.br/estatisticas/sociais/populacao/9662-censo-demografico-2010.html?edicao=9673&t=resultados (accessed in October 2020)

IBGE – Instituto Brasileiro de Geografia e Estatística – Available at: https://www.ibge.gov.br/ (accessed in October 2020)

INCRA – Instituto Nacional de Colonização e Reforma Agrária – Available at: http://www.incra.gov.br/pt/ (accessed in October 2020)

Ipeadata, Ipea – Instituto de Pesquisa Econômica Aplicada – Available at: http://www.ipeadata.gov.br/Default.aspx (accessed in October 2020)

Secretaria de Previdência – Available at: https://www.gov.br/previdencia/pt-br (accessed in September 2020)

SICONFI – Sistema de Informações Contábeis e Fiscais do Setor Público Brasileiro – Available at: https://siconfi.tesouro.gov.br/siconfi/index.jsf (accessed in July 2020)

STN – Secretaria do Tesouro Nacional – Available at: https://www.gov.br/tesouronacional/pt-br (accessed in September 2020)

TAFNER, Paulo., BARROS, Gabriel (2019). Análise fiscal do Estado do Rio de Janeiro: há uma boa perspectiva? Relatório de pesquisa realizado para o IETS. Jul/2019.

TAFNER, Paulo., BOTELHO, Carolina., ERBISTI, Rafael (Orgs.). Reforma da Previdência – A Visita da Velha Senhora. 1. ed. Brasília: Gestão Pública, 2015.

TAFNER, Paulo (2007). Simulando o desempenho do sistema previdenciário: seus efeitos sobre a pobreza sob a mudanças nas regras de pensão e aposentadoria. In: Previdência no Brasil: debates, dilemas e escolhas. Paulo Tafner e Fabio Giambiagi, editores. Rio de Janeiro: IPEA, 2007.

Related Legislation

CRFB/88 – Constitution of the Federative Republic of Brazil dated October 5 1988
EC 103/2019 - Constitutional Amendment no. 103 dated November 12 2019
LOAS – Lei Orgânica da Assistência Social: Federal Law no. 8,742 dated December 7 1993
RGPS - Regime Geral de Previdência Social: Federal Law no. 8,213 dated July 24 1991
RPPS - Regime Próprio de Previdência Social: Federal Law no. 9,717 dated November 27 1998
PEC 287/2016 - Constitutional Amendment Proposal no. 287 dated December 05 2016
PEC 06/2019 - Constitutional Amendment Proposal no. 06 dated February 20 2019
EC 20/1998 - Constitutional Amendment no. 20 dated December 15 1998
EC 41/2003 - Constitutional Amendment no. 41 dated December 19 2003
Federal Law no. 4214 dated March 2 1963
Federal Law no. 185 dated January 14 1936
Decree Law no. 399 dated April 30 1938
Decree Law no. 2162 dated May 1 1940
MP – Medida Provisória no. 871 dated January 18 2019

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COVID-19 AND SME CREDIT GUARANTEE SCHEMES IN BRAZIL

LUCIANO QUINTO LANZ

COVID-19 AND SME CREDIT GUARANTEE SCHEMES IN BRAZIL[A]

Luciano Quinto Lanz[B]

Abstract[1]

Small and medium-sized enterprises (SMEs) struggle to survive in many countries. Difficult access to credit, especially due to lack of guarantees, is a major contributor to this. Guarantee Schemes are able to solve the problem, and this article analyzes their increased relevance in improving credit access in Brazil, during the COVID-19 pandemic. It is a case study over the Fundo Garantidor para Investimentos (Investment Guarantee Fund - FGI), using secondary data from previous research, and analyzing the initial effects of the new government emergency guarantee program (PEAC FGI) to keep SMEs credit access during the pandemic, managed by BNDES. The methodology uses a qualitative approach and descriptive statistics, using data from public documents and operational reports. The analysis considered the role of national development banks and effectiveness of guarantee schemes. The results demonstrate the increased relevance of FGI during the COVID-19 pandemic. From 2010 to 2020, 28 banks contracted more than 38,000 operations worth more than 2.8 billion dollars[2]. The new FGI PEAC achieved more than 18 billion dollars[3] in 6 months. However, additional studies are necessary to evaluate this new guarantee schemes along with social and economic development in the country.

Introduction

In 2020, the Brazilian economy, as well as those in other countries, suffered a huge impact, due to the COVID-19 pandemic. Many businesses had to be temporarily closed because of social distance requirements imposed by the government. This stop in economic activity was accompanied by a credit crunch. The government launched a series of measures to support employment and businesses, such as labor contract temporary suspensions, emergency aids to workers, credit lines to support enterprises' payrolls, credit lines to sectors affected by the pandemics, etc.

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1   This article is an update and follow up of part of the research for the fulfilment of the requirements of Columbia University – School of International and Public Affairs for the degree of Master of Public Administration: The potential role of SMEs' Credit Guarantee Schemes to promote financial inclusion in Brazil.

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2   Considering weighted BRL x USD Exchange rate from 2010 to 2020.

3   Considering BRL X USD Exchange (PTAX) from 17/12/2020 – R$ 5,0606.

Among these measures, the federal government created a new guarantee scheme through an executive law proposal, Provisional Measure[4] number 975, enacted on June, 1st, 2020) the Emergency Credit Access Program – Programa Emergencial de Acesso ao Crédito – PEAC[5]. PEAC-FGI is a program that provides credit guarantees, mainly for Small and Medium-sized enterprises (SMEs). The program is operated by the BNDES (Brazilian Development Bank) that already operates the Fundo Garantidor para Investimentos (Investment Guarantee Fund - FGI).

Since 2009, FGI provided guarantee for more than 38,000 operations, in a total of BRL 8,1 billion, through 28 financial agents. The new program, PEAC FGI, in less than 6 months, since July 1st, 2020, provided guarantees for more than 134,000 operations, in a total of BRL 92,1 billion, through 40 financial agents.

The purpose of this article is to analyze what explains this huge performance difference between the two initiatives, considering that both are guarantee schemes managed by the same institution – BNDES, and even by the same team. Using previous research on FGI governance and performance compared to PEAC FGI, as well as international literature on National Development Banks (NDBs) and guarantee schemes, this article intends to identify the key features of both initiatives and propose an improved model.

Some limitations of this research include its scope, that covers only public data form PEAC FGI, and analyzes its performance considering habilitation and initial guarantee concession to operations. Since operations have a grace period from 6 to 12 months, there are no guarantee claims so far . There are no detailed operational data available to evaluate additionality from the new program. Other limitations are the lack of studies, considering the effects and interaction between these credit initiatives on credit market, since there are other guarantee programs, such as FGO Pronampe and credit lines like PESE and PEAC Maquininhas.

2. Literature Review

This section presents a literature review on the role of the National Development Banks (NDBs) in the credit guarantee system; credit guarantee schemes ownership (public or private) and governance structure, key features, motivation and performance indicators (Lanz, 2017).

This review was conducted in order to understand the Brazilian environment, compared to the international benchmark and how it affects guarantee schemes governance and performance.

2.1. National Development Banks and Guarantees

National development banks (NDBs) play an essential role in the developing financing regime. There are more than 250 national development banks holding $5 trillion in assets. Much emphasis is given to multilateral development banks (MDBs). However, National development banks have an important role in implementing infrastructure, sustainable projects, supporting SMEs, providing guarantee and as "market makers", focusing on market failures, bringing the private sector to long-term financing and investment (Studart & Gallagher, 2016).

Torres and Zeidan (2016) identified a typical four phase life cycle for the existence of development banks: establishment, development, engine for growth and developed financial markets. Each phase has typical instruments for earmarking credit, divided in two categories: direct, the NDB autonomously originate debt or equity; and indirect origination, NDBs create incentives to stimulate other financial intermediaries to originate loans related to government targeted investment projects, companies or industrial sectors. These incentives can be divided into provision of long-term funds; guarantees; equalization; and penalties.

NDBs can provide guarantees for long term funds in either category: direct or indirect. The provision of guarantee to indirect operations or long-term operations using resources from the financial agents is common. Sometimes banks operate these instruments directly, sometimes through funds or related companies (Lanz, 2017).

Guarantee support is consistent with Studart and Gallagher's (2016) view of the five points underlying NDBs support to sustainable projects; guarantee can help in project development and scaling up, leveraging finance, reduce the cost of capital to the borrower, crowding-in private capital, and improving governance and inclusiveness.

According to Lanz (2017), the way a NDB provides support to long-term investment depends on each bank's life-cycle stage, as well as financial and equity markets development of the specific country. The goal of the NDBs is usually leveraging private financing; aiming to crowd in private capital, and use indirect origination, especially through guarantee schemes and provision of long-term

Table 1: A Comparison Between National Development Banks

Item	KfW	ICO/ENISA/CERSA	BNDES	BPI France
Country	Germany	Spain	Brazil	France
Technical support	Entrepreneurship education	Training, Guarantee Associations	Training, support to Agents	Advisory (CMS)
Loans	Working capital, investments, innovation	Working capital, investment, innovation	Working capital, investments innovation	Working capital, investments innovation
Guarantees	-	Up to 80%	FGI – up to 80%	Up to 80% Quasi-capital
Equity	Venture capital, seed funds, indirect capital	Direct and indirect equity	Start-up funds, venture capital	Start-ups, venture capital
Other	Start-up monitor	Securitization	Revolving Credit	Crowdfunding platforms

funds. NDBs managed guarantee schemes in many countries.

Guarantee schemes supported by NDBs have coverages up to 80% of the value of the credit. The actual coverage may vary according to the type of loan (working capital, investment or innovation). Table 1 shows some NDBs support to SMEs in selected countries. NDBs usually support SMEs using diverse instruments besides guarantees, such as technical support, loans, equity and new innovative ways, like revolving credit, crowdfunding platforms, rankings and monitoring, among other initiatives.

In Brazil, when the new guarantee funds were created in the late 2000's, the law specified that only public financial institutions could be appointed as administrators. NDBs can provide guarantees for funds in either category: direct or indirect. FGI initially operated only with indirect transactions using resources from BNDES that were lent through financial agents to the MSMEs beneficiaries. In 2015, provision of operation guarantee, using resources from financial agents or other sources (such as FINEP), was started. (Lanz, 2017).

FGI guarantee support is consistent with Studart and Gallagher (2016), view of NDBs support to sustainable projects, especially for leveraging finance, reducing the cost of capital to the borrower, crowding-in private capital, and improving governance and inclusiveness (Lanz, 2017).

2.2. Guarantee Schemes for SMEs

Financial institutions are reluctant to provide financing to SMEs, due to the high costs of transactions and the intrinsic high-risk of each operation (Beck and de la Torre, 2007). Many countries have created partial credit guarantee schemes to minimize these difficulties (Beck, Klapper, Mendoza, 2010). Banks consider credit guarantee schemes as the most common and effective program of government support for loans to SMEs, ahead of directed credit and the use of interest rates of regulatory subsidies (Beck, Demirgüç-Kunt & Maria, 2008).

According to Honohan (2010), it is common for governments to become involved in guarantee systems, in order to compensate for market flaws and attain social well-being, by attempting to minimize the effect of the adverse selection and moral hazard on the rates charged from SMEs. Governments also attempt to correct the uneven distribution of credit allocation, which, under normal circumstances, does not reach poorer areas. They also seek to explore the externalities of the dynamism of entrepreneurs who lack resources, increase loans to SMEs and avoid or minimize credit crunches. One of the arguments used is that banks do not provide loans directly to SMEs because they lack guarantees and are not certain of the risk that they run. Guarantee systems break this vicious circle. In addition to the issue of well-being, other issues encourage governments to use credit systems: (i) their similarity to private risk sharing systems; (ii) optimistic pricing and separate accounting

Table 2 - Main characteristics of each guarantee scheme

Type	Nature	Resources	Operation	Liquidity
Guarantee funds	Public, private or mixed	Public and private resources, seeking to be self-sustaining	The operational activities of analysis, concession and recovery are delegated to financial agents	High (resources available in the fund)
Guarantee programs	Public (managed by development agency or bank)	Resources limited by the public budget	Own or delegated operational activities (with subrogation)	Low (subject to supervision and contingency of resources)
Mutual guarantee associations	Private	Private resources from associates	Own operational activities for analysis, concession and recovery	Average (limited by regional scope)

Source: Adapted by the author from Lanz and Perufo (2013); Pombo and Herrero (2003), Zica and Martins (2008) and OECD (2010).

from the public budget, which minimizes fiscal costs; and (iii) little need for the allocation of capital, as the systems have leverage.

According to Beck et al. (2010), credit systems can be classified in accordance with their ownership (public or private) and governance structure: credit guarantee companies, national public programs and private corporate associations.

According to Lanz and Perufo (2013), partial credit guarantee schemes can be classified into three types: guarantee funds (GF), guarantee programs (GP) and mutual guarantee associations (MGA). Table 2 shows the characteristics of each guarantee scheme.

Based on Lanz and Tomei (2014), it is possible to identify some benefits of guarantee funds over the other models:

The Guarantee Fund can combine state and private resources. Mutual Guarantee Associations usually have only private funds (with the exception of possible contribution of non-reimbursable public funds) and Guarantee Programs only use public budget resources in its capital.

A Guarantee Fund have greater liquidity resources, because, after its constitution, the fund does not depend on the public budget (as Guarantee Programs) or funding from its members (as Mutual Guarantee Association). A Guarantee Fund usually seeks to be self-sustaining.

A Guarantee Fund, being private, have greater freedom to delegate operational activities than a Guarantee Program, which has public character, and greater interconnectivity than Mutual Guarantee Association, usually made with regional characteristics or linked to local production clusters.

A guarantee operation involves four phases in a guarantee scheme (Lanz, Cotovio, 2018):

• Habilitation – financial institutions establish agreements with the guarantee scheme to accept such guarantees on their operations. this could involve the value of the guarantee fee, participation on the scheme capital and governance, characteristics of operations accepted and other operational conditions.

• Guarantee contracting – can be individual, by portfolio or tranche, can be either conditional (subject to approval by the guarantee scheme), or delegated, under certain conditions. There are usually coverage limits, as well as information flow and advanced payment of the guarantee fee.

• Guarantee Claim – can be on first demand or final loss, and involves analysis of the claim preconditions (default, coverage, operation data), approval of the claim payment.

• Credit Recovery – most funds delegate credit recovery to financial agents and subject them to some audit (usually randomized and comprising a sample of operations). Final loss claim is usually simpler than on first demand claim. However, it is not adequate to volatile

institutional environments, such as Brazil, subject to inflation, exchange and excessive interest rate fluctuation.

According to Beck, Klapper & Mendoza (2010), on emerging markets, credit recovery faces some challenges, such as an inadequate institutional environment to enforce contracts, especially during crisis, bankruptcy laws that do not favor credit recovery, unreliable guarantee registers, instable judicial and extrajudicial execution systems.

2.2.1. Guarantee Schemes Effectiveness

In order to evaluate the effectiveness of guarantee schemes, the most common measurement relates to additionality, which can be financial and economic. Financial additionality indicates whether the SME would have access to credit in the absence of the guarantee, and the conditions of this operation. Economic additionality refers to the economic and social benefits, positive externalities, such as the creation of jobs and expanded production (Jonsson, 2009).

A guarantee scheme, according to Green (2003), from the viewpoint of the guarantor, seeks to ensure maximum additionality in the long run. The guarantee scheme should establish indicators to evaluate cost-effectiveness and how sustainable the scheme is.

Sustainability, according to Jonsson (2009), is measured by the capacity of the guarantor to cover its costs, either through charges, direct subsidy, donations, or income from the investment of resources in the fund. The percentage of financing for SMEs with guarantees in the country is an indicator of the global impact of the system. The degree of leverage is considered an indicator of the successful exploitation of the stabilizing resources of guarantees. Another important indicator is the default rate.

From the borrower's viewpoint, the effectiveness of the system can be translated by indicators, such as the number of loans and improved conditions, increased values and deadline, lower tax rates, reduced collateral and faster processing of loan applications (Jonsson, 2009; Green, 2003).

For the lender, the performance indicators are linked to behavior in relation to SMEs and the rate of coverage requests. Lanz and Tomei (2013) identified further indicators, such as the period of time between the application and payment of coverage, and the rate of rejected coverage requests linked to the conformity of operations with the rules of the guarantee system, which should seek simplicity and clarity.

Table 3 – NDBs support to SMEs during COVID-19 pandemic

Item	KfW	ICO/ENISA/CERSA	BNDES	BPI France
Country	Germany	Spain	Brazil	France
Technical support	Entrepreneurship education	Training, Guarantee Associations	Training, support to Agents	Advisory (CMS)
Loans	Instant loan (up to 800,000 EUR), Entrepreneur Loan and Start-up (up to 100 million Euro). Syndicate Finance	Working capital, investment, innovation	Working capital, investments innovation (Suspension of payments)	Working capital, investments innovation (Suspension for payments)
Guarantees	Instant loan (up 100%), Entrepreneur Loan and Start-up Loan (up to 80% large companies and 90% SMEs)	140 billion Euro More than 500,000 enterprises Up to 80% SME's and self employed	FGI – up to 80%	Up to 90%
Equity	Venture capital, seed funds, indirect capital, ERP Capital for Start-ups (subordinated loan, up 7 years grace and 15 repayment)	Offered liquidity to companies in the portfolio	Start-up funds, venture capital	Start-ups, venture capital
Other	Start-up monitor	Securitization	Revolving Credit	Crowdfunding platforms

Source: KfW (2020), ICO (2020), BPI (2020), made by the author.

According to Lanz and Tomei (2014), the main benefits of this type of fund for the bank are the shared credit risk, the application of a favorable risk weighting factor to determine the regulatory capital required by the Central Bank, and the liquidity of collateral, which has no restraints on its trigger and depends solely on the beneficiary's default , similar to a bank guarantee.

3. Results

3.1. National Development Bank response to the COVID-19 pandemic

The way NDBs responded to the pandemic depended on different bank life-cycle stages, and how financial and equity markets were affected in each country. However, it is easy to identify concentrated efforts to provide liquidity through loans and expansion of guarantee coverage.

Under such circumstance, guarantee schemes supported by NDBs reached coverages up to 100% of the value of the credit. The actual coverage may vary according to the type of loan (working capital, investment or innovation). Table 3 shows some NDBs support to SMEs during the COVID-19 event in different countries, including new and existing initiatives.

A novelty was the suspension of payments and a significant increase in government subsidies. There is a clear and rapid response that can be attributed to experience acquired during 2008 subprime crisis.

3.2. FGI versus PEAC FGI

As a private fund, FGI, tried to correct the deficiencies identified in its antecessor, FGPC , structured as a public program, subject to budgetary constraints and rigid credit recovery rules (Lanz, 2017). However,

Table 4 – Characteristics of FGPC x FGI x PEAC FGI

Scope	FGPC	FGI	FGI PEAC	Comments / Theoretical Reference
Type of entity	Public	Private	Private (segregate Public funds)	FGPC is a typical Guarantee Program, FGI a typical Guarantee fund and FGI PEAC is mixed, combining characteristics of both. (Lanz & Perufo, 2013)
Resources	Public budget. Subject to budget constraints.	ABGF, BNDES, financial agents. Segregated in fund.	Public budget	FGI PEAC is not subject to budget constraint, which is an innovation to a Guarantee Program in Brazil. (Beck et al., 2010; Lanz & Tomei. 2014)
Equity Structure	Federal Government as *shareholder*	Public (ABGF and BNDES) and private shareholders (banks)	Federal government (Class C shares)	FGI PEAC is part of FGI, with a special class of shares. (Beck et al., 2010)
Management fee (BNDES)	N/A	0.15% PY on managed funds + 1% PY on the total assets (contracting services directly paid by the FGI)	1% PY on the total assets (contracting services directly paid by the FGI)	PEAC FGI simplifies the Fee to BNDES, (Honohan, 2010).
Guarantee fee	Fixed factor (0,15% multiplied by the term of operation)	Variable factor according to the Loss Given Default considering operations term/duration.	No fee (after August 19th, 2020)	PEAC FGI is not sustainable, and carries a high risk of adverse selection. (Honohan, 2010).

Governance Structure	Administrator and Audits	Shareholders' Assembly, Federal participation Council, Administrator and Audit, actuarial Consulting.	Federal participation Council, Administrator and Audit, actuarial Consulting	The new fund keeps the improved governance structure. (Lanz & Tomei, 2014)
Resource Management / application	Annual Federal budget	Active with fixed and variable income, having as benchmark 92,5% IRF-M and Ibovespa	Active with fixed income, having as benchmark 95% SELIC	Resource allocations is conservative, mainly fixed income government bonds (Lanz & Tomei, 2014)
Scope of coverage	Operations with BNDES resources	Operations with BNDES capital and credit from financial institutions' own resources	Operations with BNDES capital and credit from financial institutions' own resources	The new fund amplifies the scope of operations funded, which are mainly from financial institutions' own funding. (Beck, Demirgüç-Kunt & Maria, 2008)
Purpose of guarantee operations	Investment, working capital and exports	Investment, innovation and working capital	Investment, innovation and working capital	No significant change (Lanz & Tomei, 2014).
Beneficiaries	Micro and Small Enterprises, besides the Medium Exporting Companies or the Export Chain	Micro, Small and Medium Enterprises; Self-employed Freight Carrier; Individual Microentrepreneur	Small and Medium Enterprises; Large Enterprises from specific sectors (limited to 10% of guarantee portfolio)	PEAC FGI is focused on SME enterprises (Beck and de la Torre, 2007).
Type of guarantee	By operation/loan	Per transaction (linked to the stop loss rule in the Agent's portfolio); By portfolio; Indirect guarantee as a second floor to Credit Guarantee Companies and FIDCs.	Per transaction (linked to the stop loss rule in the Agent's portfolio);	Even with higher stop loss the funds are only effective from a portfolio point of view (Lanz & Cotovio, 2018)
Guarantee Coverage / Limits by Beneficiary	Up to 80%	20 to 80% of the loan. Guarantee limited to R$ 10 million	80% of the loan (without interest). Guarantee limited to R$ 10 million	PEAC has a fixed guarantee coverage for simplified operation (Lanz & Cotovio, 2018)
Stop loss mechanism	N/A	7% each 5 years' period	30% (Small Enterprises), 20% (Medium and Large Enterprises)	Much higher stop loss on PEAC FGI, compatible with Guarantee Programs. Not sustainable (Lanz, 2017)
Leverage limit	8 times the capital	12 times the capital	3 to 4 times the capital (based on portfolio competition between Small enterprises and Medium/Large enterprises	Lower leverage to keep solvency and allow higher portfolio coverage / stop loss (Honohan, 2010)

Claims payment	Subject to Government budget fiscal constraints. Default rate methodology based on debit balance	On first demand. Default rate methodology based on the net loss of the portfolio (Honored - Recovered Value) / Guaranteed)	On first demand. Default rate methodology based on the net loss of the portfolio ((Honored - Recovered Value) / Guaranteed)	PEAC FGI has the most simplified claim rules (Lanz & Cotovio, 2018).
Credit recovery responsible	Restricted to rules or approval by the Board in each agreement.	Pre-approved policy with recovery delegated to the Agent and subject to audit.	Financial agents using their own rules (applied to other operations)	Simplified process, but kept interest alignment and compliance (Lanz, 2017).
Financial agents' habilitation / qualification	Qualification linked only to the possibility of operating with BNDES.	Contract with FGI subject to quota contributions and approval of the Credit Recovery Policy.	Simplified contract (authorization as a financial institution by the Central Bank, Credit Operations portfolio equal or larger than R$ 50 million, rating BBB-)	Simplify and expedite process. This is consistent with the objective to expand credit access, deconcentrate the financial system, and target market failures (Studart and Gallagher, 2016).

FGI performance never achieved the intended volumes, neither in terms of SMEs supported or financial volume. PEAC FGI, in a few months, achieved an exceptional performance.

Table 4 presents a comparison between the structure of these three credit guarantee schemes, considering the characteristics identified in other initiatives around the world and relating them with the guarantee schemes' theory. The table is based on the analysis of the guarantee schemes' by-laws, regulations and manuals.

There are some factors that seem to explain PEAC FGI performance:
(i)   Simplified habilitation process with no Financial Agent capitalization Financial Agents;
(ii) No guarantee fee (after August 19th, 2020);
(iii) Portfolio approach, a narrow window to contract operations (until December 2020);
(iv) High stop loss (30% to Small Enterprises and 20% to medium and large enterprises);
(v) Claim payment without proof of extrajudicial or judicial execution;
(vi) Simplified credit recovery rules that allow the Financial Agents to use their own ones, including permission to sale non-performing loans after 18 months, through an auction process.

Most of these characteristics being acceptable (and even desirable) on an emergency credit guarantee program, many of them seem to be difficult to replicate to a sustainable guarantee fund. However, the evolution of this guarantee schemes from FGPC to PEAC FGI, combined with the international benchmark and previous research, seems to indicate a path to be pursued in the future, in order to improve SMEs credit access.

The main items that could be modified to propose new guarantee schemes, with more impact and more similar to traditional FGI operations (already proved to be sustainable over time), based on PEAC FGI experience are:

(i)   Allow habilitation of Financial Institutions that do not operate as BNDES financial agents, simplifying the capital and credit rating requirements, keeping a 0,5% capitalization guarantee intended by the Financial Agent (200 times leverage);
(ii) Adjust the guarantee fee pricing, based on the actual portfolio loss (or adjusted projected portfolio loss, seeking breakeven or accepted loss to the fund);
(iii) Use a portfolio approach, with narrow tranches, which mitigates credit cyclical effects;
(iv) Increase stop loss from 7% (14 times) to up to 12% (8 times leverage). The actual percentage should be adjusted considering the impact on the guarantee fee. The actual stop loss can be negotiated with each financial agent, considering the risk and the guarantee fee that it is willing to accept;
(v) Allow claim payment with no proof of judicial execution (and even extrajudicial execution). However, keeping the obligation that Financial Agent should prevent credit prescription, and some form of sample audit;

(vi) Simplify credit recovery rules, which allows the Financial Agent to use their own ones, including permission to sale non-performing loans after a predetermined period, through an auction process.

These are complementary remarks, based on these recent developments. However, that are other alternatives, such as the use of portfolio guarantees, change claim payment to final or middle loss payments (Lanz, Cotovio, 2018; Lanz; Perufo; Mantese, 2014).

4. Conclusions and Recommendations for Further Research

The new guarantee program, PEAC FGI, has been successful in keeping credit access during the crisis so far. However, there are many challenges on the horizon, especially those concerning operationalization of guarantee claims, credit recovery, evaluations of additionality and effectiveness over time.

The need to create a new credit guarantee scheme in a very short time created opportunities to simplify the process, develop new innovative solutions, keeping adequate levels of risk and compliance.

Some of these innovations and simplifications can be incorporated to new guarantee schemes, or even used to reformulate existing ones. The main challenge is finding a balance between financial sustainability, additionality and outreach (SMEs served).

Some opportunities for future research include comparison with other initiatives to improve credit access during the COVID-19 pandemic, such as FGO Pronampe guarantee program and credit lines, such as PESE and PEAC Maquininhas. Other possible opportunities include cross country studies of credit guarantee solutions used during pandemic crisis, as well as quantitative and qualitive evaluations on additionality.

References

Beck, Thorsten & De La Torre, Augusto. (2007). "The basic analytics of access to financial services." Financial markets, institutions & instruments, 16 (2), 79-117.

Beck, Thorsten; Demirgüc-Kunt, Asli & Peria, Maria Soledad Martinez. (2008). Bank financing for SMEs around the world: Drivers, obstacles, business models, and lending practices. World Bank Mimeo.

Beck, T.; Klapper, L. F. & Mendoza, J. C. (2010). The typology of partial credit guarantee funds around the world. Journal of Financial Stability, 6, 10-25.

BNDES. (2017). FGI - Fundo Garantidor para Investimentos. BNDES. Rio de Janeiro. Retrieved from http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Apoio_Financeiro/Programas_e_Fundos/FGI/index.html.

BNDES. (2016). FGPC – Fundo de Aval. Rio de Janeiro. BNDES. Retrieved from http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Instituicao_Financeira_Credenciada/FGPC/index.html.

BPI. (2020). Covid 19: Bpifrance emergency plan. BPI France. Retrieved from https://www.bpifrance.com/News-Insights/Covid-19-Bpifrance-emergency-plan.

BPI. (2020). Covid-19 : Mesures exceptionnelles, BPI France. Retrieved from https://bpifrance-creation.fr/encyclopedie/covid-19-mesures-exceptionnelles.

CMN. (1999). Resolução 2.682. Dispõe sobre critérios de classificação das operações de crédito e regras para constituição de provisão para créditos de liquidação duvidosa.

Green, A. (2003). Credit Guarantee Schemes for Small Enterprises: An Effective instrument to promote private sector-led growth, SME Technical Working Paper Series, UNIDO.

Honohan, P. (2010). Partial credit guarantees: Principles and practice. Journal of Financial Stability. 6, 1-9.

ICO. (2020). Líneas de Avales COVID-19, ICO.. Retrieved from https://www.ico.es/web/ico/linea-avales-covid-19 Jonsson, M. (2009). Performance of credit guarantee schemes (CGS). HD Graduate Diploma in Finance. Copenhagen Business Scholl. Paper, (24).

KfW (2020). COVID-19 in Europe – How Italy, Spain and Germany respond to the crisis. 2020. Retrieved from https://www.kfw.de/stories/society/social-cohesion/corona-europe-promotional-bank-de/

KfW. (2020). KfW coronavirus aid: loans for companies, KFW. Retrieved from https://www.kfw.de/inlandsfoerderung/Companies/KfW-Corona-Hilfe/

Lanz, L. Q. (2014). Confiança e Controles em Relacionamentos Interorganizacionais: Um modelo de suas interações e de seus reflexos no desempenho, Doctoral Thesis, PUC-Rio. 2014.

Lanz, L. Q. (2017). The potential role of SMEs' Credit Guarantee Schemes to promote financial inclusion in Brazil. Master Thesis. SIPA. Columbia University, NY.

Lanz, L. Q. & Cotovio, A. C. P. (2018). Garantia por carteira: proposta de modelo adaptado para os fundos garantidores no Brasil. Revista do BNDES. BNDES. Rio de Janeiro. 50, Dec., 401-440.

Lanz, L. Q. & Tomei, P. A. (2013). Aprendizagem Organizacional, Mudança Estratégica e Cultural: O caso do Fundo Garantidor para investimentos (FGI). Gestão & Conhecimento, 7(2), jul./dec., 153-180.

Lanz, L. Q. & Tomei, P. A. (2015). Greater Access to Credit for Small and Micro Enterprises: Building trust in a Guarantee Fund. In: Congreso do Consejo Latinoamericano de Escuelas de Administración - CLADEA, Viña del Mar, Retrieved from http://faceauv.cl/cladea2015/images/stories/track5/CLADEA_2015_submission_121__2_.pdf

Lanz, L. Q. & Tomei, P. A. (2014). Confiança versus controle: análise da governança do Fundo Garantidor para Investimentos. Revista de Eletrônica de Estratégia e Negócios. 7 (1), jan./apr., 105-136.

Lanz, L. Q. & Perufo, J. V. (2013). Risco de crédito e estimativa de alavancagem de um fundo de aval. Revista do BNDES. BNDES. Rio de Janeiro. 40, Dec., 194-230.

Lopes, S.; Lagoa, J. C. S, Jr; Cardoso, M. P. & Piccinini, M. S. (2007). "Fundos de garantia e acesso ao crédito das micro, pequenas e médias empresas. A experiência do FGPC: sucesso ou fracasso?" BNDES Setorial, Rio de Janeiro, 26, 4-23.

Pombo, P. G. (2006). Aportes Conceptuales y características para una clasificación internacional de los sistemas/esquemas de garantía. Doctoral Thesis. Universidad de Córdoba.
Pombo, Pablo G. & Herrero, Alfredo. (2003).Los sistemas de garantía para micro y la pyme em una economía globalizada. DP Editorial. Sevilla.

SEBRAE. (2016). Serviço Brasileiro de Apoio à Micro e Pequena Empresa. Sobrevivência das Empresas no Brasil. Coleção Estudos e Pesquisas. Brasília: Sebrae.

SEBRAE. (2017). Pequenos Negócios no Brasil. Boletim Estudos e Pesquisas; 57, April. Brasília; Sebrae.

SEBRAE; Fundação Universitária de Brasília - FUBRA. (2004). Fatores condicionantes e taxa de mortalidade de empresas no Brasil. Brasília: Sebrae e Fundação Universitária de Brasília.

Studart, Rogerio & Gallagher, Kevin P. (2016). Infrastructure for Sustainable Development: The Role of National Development Banks Global Economic Governance Initiative. GEGI Policy Brief, 007, 10.

orres, Ernani & Zeidan, Rodrigo. (2016) The life-cycle of national development banks: The experience of Brazil's BNDES. The Quarterly Review of Economics and Finance, 62, 97-104.

4

RECOGNIZING TRUST – BUILDING THE FOUNDATION FOR RESILIENCE AND GROWTH

KRISTIN FRANKLIN

RECOGNIZING TRUST – BUILDING THE FOUNDATION FOR RESILIENCE AND GROWTH

Kristin Franklin

Abstract

As economies grow and advance, systems change to support growth. A critical aspect to sustain continued and longer-lasting growth is to take into account social cohesion and market resilience, such as trust and accountability across societies, alongside economic inputs, and market interventions. These dialogues have been advancing the conversation around innovative approaches to economic growth, as well as the global conversation on global investment impact and efficiency. The idea of who the actors are in international development and global research are evolving. Capturing this movement, finding new ways within both the formal and informal sectors to engage new partners and redefining previous roles for traditional partners are all leading to an interesting point in the evolution of global goods and inclusive growth.

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Systems can either adapt or break, under pressure. Globally, cultures and economics, though facing many similar challenges, need to chart their own unique recovery plan to emerge from stress. Many of the pain points need to be addressed through an inclusive approach, locally adapted, and targeted to the key components of the system. These pain points are critical factors within the broader system for economic growth and community resilience. If there is a light in the global scenario, it is that the understanding around economic development and systemic change is evolving as well. An example of this evolution is the Busan Partnership, a historic manifestation of collective action policy.

In 2011, the Busan Partnership was signed, elevating private sector engagement, and establishing a set of shared principles among development actors for cooperation and aligned agendas. This put, at a global scale, development practitioners are on notice that aligned agendas and mutual accountability are aspirations of not just development donors, but countries and private sector actors. And countries are reflecting on their progress towards these principles – country ownership, results-driven policies, collaboration across a diverse group of actors, transparency and shared responsibility . Globally, many of our most pressing challenges require unified action. Zero Hunger remains a high-level target, under the Sustainable Development Goals (SDGs) calling for system-wide change across the food and agriculture sectors. With hunger on the rise, and only expected to increase, due to conflict, climate change and economic downturns, this challenge requires action across the entire system . Engaging the full breadth and depth of the food and agriculture system will require an understanding of characteristics, from regulation and governance to food preferences and cultural

norms, which are system institutions introduced through the application of an adapted ecological model.

This chapter considered two areas of thought as critical pieces for supporting sustained economic growth and building resilience into communities, countries, and economies – trust, as an underpinning characteristic of economic growth, and the adapted ecological model for systems framing.

This discussion intends to argue that attention to items, such as levels of trust and understanding your partner system actors can support sustainable economic growth; considering private and public partnerships and recognizing each other's strengths and unique values can support both parties in achieving their goals; transparency and open systems can remove limitations from growth and that, even in the best of times, trust is critical, but in the most pressing of economic and societal challenges, trust is the factor from which all other actions react; finally, that trust is a key factor for the way farmers choose and act, in order to prepare their next crop, when countries face severe droughts that wipe out their entire cropping seasons. At the end of this chapter, a discussion on the use of an adapted ecological model to understand the dynamics of an economy is presented.

Throughout this content, I will frequently refer to institutions, both formal and informal. Within this chapter, the term "institutions" is used in its broadest sense, to define social contracts, organizations, rules of law, etc, that establish a framework or guideline for individuals to engage in the economy. Informal institutions are relationship-based systems or organizations which are not formally registered. Formal, on the other hand, are regulated and verified.

Trust – An Often Hidden Foundation

The concept of trust and its role in organizational strength is becoming increasingly more recognized. That includes conversations within our institutions around what is missing and where we are falling short, or between the system partners around who is at fault and how we have gotten so. The challenge with these concepts is understanding and agreeing to the metrics being measured, and what baselines have been established. I argue that trust is the gap in these conversations. It is the grounding point we can begin to have these conversations around. When trust erodes, we leave people behind because building trust requires collective action. Thus, how we react matters, either as individuals or organizations. When looking to address systemic concerns around stability and resilience, even in our most stable economies, finding the starting point is the common ground of understanding or trust that supports us.

In this time of unprecedented global challenges - climate change, food insecurity or instability led by unrest and poverty – individuals are looking for systems and organizations in which they trust. Globally, some sectors are poised for this work, whereas others are not. We need to break down the concept of trust. What trust is, who and why we trust, and what trust can do to bring stability and drive growth. These questions are important, and there is no way to argue against that. The public sector, NGOs and private leaders are in a unique place to address this. The world and how we work together is changing. The connections across sectors within supply chains and between communities are evolving, and we must respond to these changes.

What is next and how we navigate this space is going to be an overarching public policy discussion going forward. We will need alignment across organizations to unite resources, expertise, and our own perspective. The Millennium Development Goals (MDGs), then Sustainable Development Goals (SDGs) and now multi-stakeholder partnerships like Busan are leading the way. They are showing us the 'what', in the question about trust. They are pointing towards the end goal. Strong systems and networks of trust are required for sustained long-term growth. How institutions can flourish. And how unique partners find their niches.

Trust has been a factor of business and economics for decades, initially starting out as a management or marketing tool. Trust was originally concentrated around ethics - is a business able to keep their employees and draw customers to the organization. Some considered sales to be the first and foremost priority. These businesses were willing to sacrifice customer safety for revenue. When Heinz Ketchup first came on the market, its founder and inventor, Henry Heinz, challenged the industry standard by using clear bottles to signal cleanliness . He was making his product free of preservatives and taking sanitary precautions. In an industry where most bottles were dark, which prevented the consumer from fully seeing the product, the Heinz clear bottle was a promise and an outreach of trust to their consumers. From there, he challenged the industry to adopt certain food standards, stressing that individuals had the right to know their food was safe.

Regulating organizations such as the Better Business Bureau and the USG oversight bodies support the sharing of unbiased information with customers and holding corporations accountable. The need for trust has also led to innovations in labeling, safety seals and expiration dates.

Another evolution of trust as a management tool came with group dynamics, collaboration, and process

efficiency. Covey (2006) points that low-trust relationships slow down processes, as they breed suspicion based on distrust, whereas high-trust relationships drive openness and collaboration. Team leaders realized that distrustful working environments led to unnecessary friction and decreases in their team's motivation. This opened-up a broader 'leadership' conversation among corporate executives, and eventually became a question for businesses and industries as a whole, seeking to identify where their organizations were showing leadership to advance social causes.

Customers began to place trust in organizations that were good stewards of the environment, supported empowerment of disadvantaged groups and/or other social causes. These signals of trust emerged from fair trade organizations. Verified products support the faith consumers place in organizations that are supportive participants in society.

Corporate social responsibility opened the opportunity for organizations to think about themselves as actors within a broader system. This system thinking, along with the openness and strength created in high-trust relationships, extend beyond standard corporations, as described in Franklin & Oehmke (2017). The coffee sector in Rwanda benefited immensely by the high-trust relationships across the value chain. This recognition of a trusted network of collaborators and partners, as a way to create greater value, has evolved into a new approach to business and economic growth: the idea that high trust multi sectoral partnerships are critical to advancing a shared agenda.

Kania & Kramer (2011) first identified the evolution from profit motivation to corporate social responsibility and now to shared value. This reorientation of private sector priorities has produced powerful social impacts in areas of health, food security and sanitation. The need for systemic change is bigger than that of one single actor or institution. It requires addressing how the entire system functions (Franklin, 2017; Kramer & Pfitzer, 2016).

The history and expectations for trust in the private sector have seen multiple iterations, while NGOs and public organizations have long maintained structures based on high trust, as they have been traditionally providing services for the people. This does not mean that their transition with trust has been any smoother. Organizations and governments are often looking at measuring and understanding trust. Trust is showing the depth of its integration in society and its role as not simply a 'feeling' but an actual outcome, a physical indicator. Trust requires people, organizations, policies, and institutions to not only do what they say but to also show integrity that what they said accomplished what it needed to. In society now, there

are all these big ideas, grand proposals, etc. but a factor from Covey's trust which in a time of information overload, is to be the organization with integrity and expertise. Does your organization have the critical knowledge and skills and are you able to execute the work properly. Trust builds from honesty. It comes out of transparency, as it needs to be earned. Earning trust is a multi-stage process, and knowing the structure of the system can show gaps in trust.

Take, for instance, SDG 2 - Zero hunger. First, food security and the network of businesses, industries, policies that make up the broad network are very personal, specific to individual towns, communities, cultures, and social norms. Food choice is personal. How we choose to buy food for our families, where we choose to purchase from are all decisions built very much on trust. We trust the owner of the shop to sell safe and healthy foods for our families. We trust them to follow health and food safety guidelines on storage and sourcing. We trust the farmer who raises the cattle to feed the animals properly, to care for the animal's health. The farmer trusts the vet to provide medicines, maintain their license and practice good judgements when healing the animals. This chain of relationship and business transitions is all built and/or impacted, in one way or another, by trust. Even the lack of trust can play a role in the chain. For instance, should the vet not be trustworthy, farmers may be reluctant to utilize their service. Thus, deciding on whether or not trusting the vet will certainly incur in value addition.

These decisions can get even direr when individuals have more limited resources. If you are a low resource farmer, choosing to buy seeds from multiple sellers, you are going to consider trust in the equation, which looks more like a risk analysis based on knowledge of seeds, availability of funds and sellers' reputations. These decisions cross through these systems. The trust of the vegetable seller is connected to the individual who sells the seeds. Trust crosses outside direct engagements, thus requiring the understanding of the macro-system where governance and social contracts can serve as the underpinnings of trust. Think about labels and verified products which signal that a product has met certain criteria: we may not know much about the product, but the social norms, governance and our trust of the macro-system allow us to feel confident, accept the risk and purchase the product.

Food is a personal choice which, in communities where agriculture is the main source of livelihoods, drives decisions and supports, or deters, some farmers in, or from, taking risks. And these opportunities, where risk or changes from standard practice are the moments that can allow people to advance out of poverty. These are the opportunities where new seeds, improved techniques or

more reliable buyers can provide the bridge for individuals to move out of poverty. How are these bridges identified and sustained - trust. Not just a tool for growth these are also the moments that stabilize stressed economies, creating resilience and strong institutions. Supporting the necessary social interventions to ensure security in times of crisis, while promoting the pillars of trust through results, integrity, intent, and capabilities (Covey 2016). We offer the ecological model as a model for diagnosing and identifying opportunities (bridges) within the system. Adapted Ecological Model.

Recognizing trust is not as simple as flipping a switch to establish high-trust relationships. Understanding the system within which trust needs to be built is a critical step to addressing challenges and finding opportunities. Systems change is going to require changes in policy, which are sensitive areas, as they often involve the definition and commitment to ownership of certain roles. Governments have long led the policy process. As the economy becomes more integrated, there is the need for trust to ensure ownership, roles, and responsibilities in moving growth forward. This requires technical understanding of network systems to guarantee proper engagement and systemic involvement of actors, to not only provide that commitments are based in good policies, but also that they are able to be upheld by the individuals engaged in the conversations.

The ecological model allows the understanding of a market system or supply chain to be framed in a more fluid dynamic forum, linking immediate systems with social and political ones, of a community or culture.

The adapted ecological model provides a framing for engaging the system. It defines five layered systems – microsystem, mesosystem, exosystem, macrosystem, and chronosystem – which interact within and across each other. The ecological model approach challenges traditional development. It moves the linear value chain into the broader social context. The societal characteristics of the macrosystem and chronosystem can slow, or even improve, the functioning of value chains through regulations, trade, regional/local norms, etc. When overlooked, these areas can create major roadblocks in the development of an area.

Context is changing and the standard actors are not necessarily assumed as best placed to approach a challenge within the system. When addressing roles, Bowles (2000) suggests "Communities can sometimes do what governments and markets fail to do because their members, but not outsiders, have crucial information about other members' behaviors, capacities, and needs." The concept of trust and system change becomes even more interlinked with the addition of the societal systems

(macro and chrono). These systems highlight the deeper and ingrained feelings towards trust of governments, transparency of norms or local organizations, access rights across groups, etc. These issues challenge our most vulnerable populations around the world. They are also the ones most likely to struggle from recurrent crisis and insecurity.

This high-level action on aligning agendas can be seen in the recent signing of the Joint Framework for Action for the Ghanaian cocoa sector. This framework created an aligned agenda under which the principles of collaboration were defined. It called for clear and actionable points of accountability, while outlining the shared agenda of the actors in the collective sector . The Framework, though developed jointly, is overseen by the Government of Ghana, with undersigned private sector partners submitting their plans for advancing the shared agenda for both Government review and public awareness. Written to drive impacts, the framework lays out specific milestones and deliverables for the actors, making the objectives of the collective parties clear and ensuring mutual accountability.

As a development community, when we deal with individuals who live far removed from the standard 'type' of farmers we reach, how do we extend our networks, how do we share our best practices and how do we support them in mostly needed moments? Extension and capacity building are the challenges development professionals face every day. How are public dollars and public efforts best focused to drive broad impact? Trust is a gap missing in various systems, in how we understand, build it and capture its strengths to support the most vulnerable around the globe.

The past decades have brought many innovations in collective action. Innovations that improved trust and transparency. Initiatives, such as the SDGs and multisectoral partnerships create opportunities for tackling the largest global challenges. While aligning agendas at this large scale is critical, moving forward, we need to better understand the end users – multi-stakeholder dialogues to support the breaking down of these silos and promoting communication to advance aligned agendas. Understanding these users also involves understanding the systems within which they function. Continued research and application of system change approaches are necessary, when dealing with complex relationships, besides awareness on the metrics to diagnosis strengths and weaknesses. Resources, such as the OECD Trust Index, are setting the stage for this body of work.

References

Bowles, Samuel & Gintis, Herbert (2000). Social Capital and Community Governance. Department of Economics. University of Massachusetts Amherst, Massachusetts, 01003 December 22, 2000.

Institute for Economics & Peace (2020). COVID-19 and Peace, Sydney, June 2020. Available from: http://visionofhumanity.org/reports (17 June 2020).

Covey, S.M.R. (2006), The Speed of Trust, New York, Free Press.

Kramer, M.R. & Pfitzer M.W. (2016), "The Ecosystem of Shared Value", Harvard Business Review.

Dunn, E.G. (2012), "Facilitating Systemic Change in Value Chains: Lessons Learned for Strengthening Country Systems".

Franklin, K. and Oehmke, J. (2019), "Building African Agribusiness through Trust and Accountability", Journal of Agribusiness in Developing and Emerging Economies, Vol. 9 No. 1, pp. 22-43.

Porter, M.E. & Kramer, M.R. (2011), "Creating Shared Value", Harvard Business Review.

Franklin, K. (2017), Trust as a Catalyst for Development: Infusing Sustainable Change into the Global Food System. M. Pub. Admin., Columbia University.

Bowles, Samuel & Gintis, Herbert. (2002). Social Capital And Community Governance*. The Economic Journal. 112. F419 - F436. 10.1111/1468-0297.00077.

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CITY HALLS' ROLE IN FIGHTING CLIMATE CHANGE: THE CASE OF RIO DE JANEIRO

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Rafaela Romero

Abstract[1]

This paper aims to analyze local level roles, in terms of sustainability management, taking city halls, not only as regulators of citywide emissions, but also as corporations that generate their own emissions through their operations, buildings, fleet, etc. Based on a literature review, and making use of comparative analysis of New York, San Francisco, and Rio de Janeiro's climate action plans, the main objective here is to highlight strategies for Rio de Janeiro's city hall, in order to improve its corporate's sustainability management. The document begins presenting the climate change issue as a public good, as well as its challenges, especially regarding countries' cooperation. Then, it examines sustainability management at local level, discusses the three cities as case studies, and makes use of comparative analysis, in order to present strategies for Rio's sustainability management improvements. Finally, it addresses gaps and benefits of strategies proposed.

Challenges dealing with climate change

"Climate change is now a scientifically established fact."[2] In 1990, the total amount of emissions was 36 gigatons of carbon dioxide equivalent. In 2005, they rose to 46 gigatons. By 2050, in order to have a 50% probability of staying below a two centigrade increase in temperature, the world needs to get down to 18 gigatons, which is half of what was emitted in 1990, and less than half of what was already emitted in 2005.[3]

There is no doubt that climate change requires extremely serious and sustained global attention. The basic structure of the problem is well known: "humans emit greenhouse gases (GHGs), particularly carbon dioxide (CO_2), but also methane, nitrous oxide, and hydrofluorocarbons (HFCs), through consumption and production. These flows of emissions accumulate into stocks of GHGs in the atmosphere. The rate of accumulation depends upon Earth's 'carbon cycle', whereby CO_2 is reabsorbed into the oceans and land. Over time, the accumulated GHGs trap heat and the result is global warming. As the planet warms, climate changes, which affects human and animal life through rising sea-levels and events, such as storms, floods, and droughts."[4] It is not just a distant-future problem. Many of its impacts will be felt by people currently alive.

On the other hand, formulating appropriate policies is highly challenging, due to, not only scientific complexity, but also an ambivalent general public and a major international prisoner's dilemma[5]. For instance, one country could incur the cost of doing research on renewables and pay

a higher cost now. At the same time, other countries could incur less costs doing nothing, while also receiving benefits from what the first country has done. There is a free-riding issue here. Countries may wait for others to incur the cost, while they continue the old way.

The economics of climate change is still relatively young and GHG emissions are classified as a global public bad, "possibly the most significant yet in human history." There is no way to prevent someone from receiving the same effects from the public good, while it is not possible to subtract what a person consumes from what somebody else consumes (it is a non-rivalrous and non-excludable good). Moreover, nobody consumes less or more climate, once you reach a certain degree of average temperature.[6]

However, that does not mean that everybody is affected the same way. Although carbon concentration is a global public good, this concentration will affect various parts of the world differently. It will lead to major changes in human geography, and affect all countries, but the most vulnerable, the poorest countries and populations, will suffer earlier and more, even having contributed less to the causes of climate change.[7]

Moreover, many middle-income countries are also becoming significant emitters, even though they do not have the carbon debt that rich countries have accumulated over the decades and are still low emitters in per capita terms.[8]

The point is that adaptation to fight against climate change is an essential issue. It means taking steps towards building resilience and minimizing costs, while also finding ethical and political acceptable paths, in order to circumvent natural disagreements.[9]

In a more positive approach, this will also create significant business opportunities, as new markets are created in low-carbon energy technologies and other low-carbon goods and services. "The world does not need to choose between averting climate change and promoting growth and development."[10] However, again, this could be easier for economically advanced countries, since they are able to develop the cutting-edge technology required for such ventures.

In addition, because new climate change policies will likely be developed and implemented in the next few years, they will also mean challenging efforts for democratic governance.[11] Political systems will agree to

pay the early costs, in order to obtain the long-term gains and "leadership will require looking beyond electoral cycles."[12]

Sustainability management at local level

"Cities are part of the climate change problem, but they are also a key part of the solution".[13] While targets at international levels are not binding and they are not linked to specific policies, initiatives at the municipal level have established more concrete provisions, producing some impressive results.[14] Local level can measure, follow-up and be close to local authorities to make things done.[15]

Cities are not only engines of economic growth, but also crucial to climate action. Urban areas are home to half the world's population and generate around 80% of global economic output, as well as around 70% of global energy use and energy-related GHG emissions. Over the next decades, nearly all of the world's net population growth is expected to occur in urban areas and, by 2050, the urban population will increase by, at least, 2.5 billion, reaching two-thirds of global population.[16]

Therefore, municipalities have a comprehensive role in climate change. They must prevent resilience in their communities, by reducing vulnerabilities. That means tracking and controlling citywide emissions by making GHG Inventories, designing Climatic Action Plans and implementing public strategies and policies. Finally, they should track and control their own corporate emissions, also through Inventories and Action Plans, playing a major Leading by Example role.[17]

Corroborating that, Drucker quotes: "you can't manage something if you can't measure it[18] Thus, this paper assumes that corporate carbon management in municipal administration should measure and control the activities that cause emissions. This should also be seen as an opportunity to optimize its operations, the use of resources and achieve more efficiency. Moreover, cities could take this as a competitive advantage, while leading changes and impacting positively in several value chains.[19]

In addition, as shown in Table 1, City Halls are gradually adopting three approaches, when fighting climate change, while taking emission inventories as a starting point to sustainability management.[20]

6   Dervis (2015)
7   Stern e Nicholas (2006)
8   UNDP (2007)
9   Stern & Nicholas (2006)
10   Ibid
11   Brainard & Sorkin (2009)

12   UNDP (2007)
13   " Kamal-Chaoui, Lamia and Alexis Robert (2009)
14   UNDP (2007)
15   Romero (2015)
16   New Climate Economy (2014)
17   United States Environmental Protection Agency (2016)
18   Drucker (2016)
19   Kamal-Chaoui, Lamia and Alexis Robert (2009)
20   Romero (2015)

Table 1. Three local level approaches for emission inventories

Community-Scale GHG Inventory	Covers citywide emissions and allows the City to promote mitigation strategies for the entire community.
Local Government Operations (LGO) Inventory	Covers emissions from the responsibility of the Municipality, enabling it to control its emissions through general energy efficiency strategies and sustainable consumption. Local government emissions are typically a subset of the community-scale ones, reaching 3-7% of citywide total emissions.
Corporate GHG Inventory	Addresses the emissions of an organization. It allows any Department or Agency to control its emissions and apply direct reduction strategies. In Brazil, Programa Brasileiro GHG Protocol provides the necessary guidelines to private and Public Sector organizations, and a specific protocol was designed for public agencies in the United States: GHG Protocol for the US Public Sector.

Source: Romero (2015)

It is urgent that cities should be prepared for sustainability management. Since it is a practice of economic production and consumption that minimizes environmental impact and maximizes resource conservation and reuse, "all competent managers will be sustainability managers."[21]

GHG Inventories in the United States of America

Municipalities that implement corporate programs in order to reduce emissions in their facilities, operations, and fleet, not only build capacity and save resources at local level, but also achieve community's awareness of the benefits of green technologies (leading by example) and consequently improve the city's competitiveness.[22] Experiences in San Francisco and New York City include those strategies.

San Francisco experience: DepCAPs

San Francisco City and County's commitment to environmental goals dates back to the 1990s, and it is linked to the California State's commitments that establish renewable energy consumption and GHG reduction targets. The first Climate Action Plan of San Francisco was launched in 2004 considering transportation, energy efficiency, renewable energy, and solid waste concerns[23]. San Francisco has joined with over 500 cities around the world to participate in the Cities for Climate Protection (CCP) campaign, sponsored by the International Council for Local Environmental Initiatives (ICLEI).

Table 2. Common structure of DepCAPs Action Plans

Department profile	Mission, activities, responsibilities, budget, facilities, fleet
Department's carbon footprint	City and Department targets, annual emissions, energy use, energy efficiency measures, renewable energy use, green building, water reducing and fleet fuel measures, employees' transportation raising
Other sustainable practices	Regulatory compliance: Zero Waste, Green Procurement, Carbon Sequestration, and Urban Planting

Source: San Francisco Department of the Environment (2013)

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21   Cohen (2011)
22   United States Environmental Protection Agency (2016) and Schwab (2016)

23   San Francisco Department of the Environment (2004)

In 2005, San Francisco committed to supporting Kyoto Protocol emission reduction targets, which were reached in 2008. Since then, the City has coordinated a corporate climate change program through the SF Environment Department, annually tracking and publishing GHG emissions from 60 Departments through the Departmental Climate Action Plans – DepCAPs.[24]

DepCAPs were regulated by Law in 2008. Each Department started to account for their emissions and to track the following items: equipment and fleet fuel consumption, energy and water use in buildings, waste generation, employee's transportation, and purchasing procedures. The process, which allows Departments to identify possible improvements in their operations and reduce their carbon footprint, is assisted by Climatic Liaisons represented by employees in each Department. Local Government Operations (LGO)'s emissions accounted for 4.03% of citywide emissions in 2010.[25]

There were 46 DepCAPs Action Plans published in 2013.[26] Table 2 shows a common structure of these plans. Related impacts in the Community are reported and the Environmental Goals of the Department are also declared.

New York City experience: PlaNYC and OneNYC

New York City has elaborated GHG inventories since 2007, reporting both citywide emissions and LGO emissions. Since 2008, they have been annually updated, in order to register the progress towards targets and to fit legal requirements. LGO emissions accounted for 7.10% of citywide emissions in 2009.[28]

PlaNYC 2030 is a plan to responsibly meet the city's growing population and infrastructure needs while focusing on sustainability and resilience as the main theme in citywide planning. It was released in 2007 and it has become a model for other large global cities. More than 25 City Agencies and external partners in Academy, Private Sector, and Society contributed to set goals, initiatives, and milestones.[29]

The Mayor's Office of Long-Term Planning and Sustainability (OLTPS) and The Mayor's Office of Recovery and Resiliency (ORR) oversee PlaNYC progress, updating it every four years and providing annual progress reports. OLTPS coordinates its development transversely with other municipal agencies. Among the 132 initiatives

Table 3. OneNYC four principles and its initiatives

Growth	Population growth, real estate development, job creation, and the strength of industry sectors
Equity	Fairness and equal access to assets, services, resources, and opportunities, so that all New Yorkers can reach their full potential
Sustainability	Improving the lives of our residents and future generations by cutting greenhouse gas emissions, reducing waste, protecting air and water quality and conditions, cleaning brownfields, and enhancing public open spaces
Resiliency	The capacity of the city to withstand disruptive events, whether physical, economic, or social

Source: The City of New York (2016)

In addition, the Green Procurement Program is highlighted by the US Environmental Protection Agency (EPA) as a reference in Leading by Example, for assisting San Francisco Municipal Departments to implement City procurement policies.[27]

presented by PlanNYC update, in 2011, about ten initiatives addressed Local Government Operations in Energy, Air Quality, Solid Waste, and Climate Change areas.

Since the first PlaNYC, in 2007, the City has made considerable progress on reaching goals, by reducing GHG emissions in 19 percent, investing billions of dollars to protect the water supply, planting millions of trees, installing 300 miles of bike lanes, developing programs

24   Ibid
25   ICF International (2012)
26   San Francisco Department of the Environment (2013)
27   United States Environmental Protection Agency (2014)

28   Dickinson and Desai (2010)
29   NYC Mayor's Office of Sustainability (2016)

to phase out polluting heating oils and working to make buildings and neighborhoods more resilient.[30]

As a continuity of the previous plan, though within a different political mandate, OneNYC 2050 was launched in 2014, as a new approach for the city sustainability management. As shown in Table 3, there are four principles that inform OneNYC's goals and initiatives. Thus, this plan introduces a new focus on equity and reducing poverty for the initial plan.[31]

The plan also mentions that "the strength of the city is essential for the strength of the region, and strong communities around the city make it more competitive nationally and globally." It puts nearly all City agencies together in cross-cutting working groups to examine underlying trends and data, in order to develop new initiatives. However, a clear roadmap enabling progress assessment will be needed. OneNYC is abundant in terms of goals, but not in terms of how those goals will be met. For example, the goal set to lift 800,000 people out of poverty is not under the exclusive city's control.

Rio de Janeiro's Climate Change Policy

In 2011, the Municipal Policy on Climate Change and Sustainable Development was established in Rio de Janeiro, setting citywide emissions reduction targets: 8% in 2012, 16% in 2016, and 20% in 2020, related to emissions in 2005[32]. Works, programs, activities, and projects from municipalities should consider the reduction targets and estimate their emission impacts; and procurement and contracts should consider environmental products purchasing and social sustainability.

This means that Rio de Janeiro already has sustainability guidelines citywide: improvements in bicycle paths lengths, CO2 emissions reduction plans for buses and implementation of BRS (Bus Rapid Service) and BRTs (Bus Rapid Transit)[33]. However, it does not have such guidelines for its own operations and building stocks, as a corporate. Emission accounting and tracking, as well as other sustainable measures resulting from Local Government Operations, though under Law, are still waiting for specific rules for their implementation.

Rio's Climate Action Plan considers two inventories as baseline: the first Community Emission Inventory, published in 2000, related to 1998, and another one, published in 2011, related to 2005[34]. It has also established alternative scenarios, based on, not only city level projects, but also regional and national government initiatives.

Citywide emissions were updated in the 2012 Inventory and Action Plan. It was also estimated that emissions would approach the established reduction target by 2016, considering, among other factors, initiatives in the City of Rio de Janeiro Strategic Plans[35], regarding urbanization projects, urban mobility, reforestation, and urban afforestation.[36]

It is also relevant mentioning that the city has two voluntary initiatives of corporate GHG emission tracking: The Municipal Urban Cleaning Company (COMLURB), which tracks the annual emissions of fleet and landfills under its control; and the Planetarium Foundation, which annually discloses its Inventories in Programa Brasileiro GHG Protocol since 2013, as part of its low-carbon policy. In addition, there are also initiatives in management, governance, and business areas that would provide many opportunities for carbon reduction measures:
  • The efficient procurement initiative (Governo de Alto Desempenho program) would have a potential impact in reducing waste generation;
  • The regulations to implement municipal projects and policies facing climate change and disclosure of sustainability actions by publishing Global Reporting Initiatives (GRI) - Sustainability Reporting (Rio Capital Sustentável program) would respectively allow a clear allocation of responsibilities, targets and milestone setting;
  • The initiative that engages Energy Research Centers based in Rio (Rio Capital da Energia program) could also be used to help with performance analysis and search for energy efficiency solutions for City operations.

Comparative analysis

San Francisco and New York City are quite different from Rio in political, economic, and social contexts. However, observing these experiences may be helpful in evaluating potentials not yet explored in Rio de Janeiro's Climate Change Policy. Some key context aspects of the three Cities are compared in Table 4.

New York and San Francisco clearly tracked and disclosed their operation emissions while preparing Community GHG Inventories, differently from the experience in Rio de Janeiro. In addition, both North American cities know the municipal government activities' participation in citywide emissions (San Francisco: 4.03%; New York: 7.10%), while the South American city is not able to predict its own participation yet. Thus, it cannot set clear targets for its operations and cannot contribute to the LGO Climate Action Plan.

30   The City of New York (2016)
31   Ibid
32   Rio de Janeiro Municipal Agency of Environment (2011)
33   Romero (2015)
34   Rio de Janeiro Municipal Agency of Environment & COPPE/ UFRJ (2011)

35   Rio de Janeiro City Hall (2012)
36   Fundação Planetário (2013)

Table 4: LGO Climate Policies: San Francisco x New York City x Rio de Janeiro

	SAN FRANCISCO	NEW YORK CITY	RIO DE JANEIRO
Population	808.976	8.363.710	6,453,682
City Agencies	60 Departments	128 Agencies	54 Agencies
Municipal Building Stock	446 buildings (29 types)	4.000 (300 million square feet)	2190
Number of employees	28.861	More than 300.000	118.503
Managers of Climate Policy (LGO)	SF Environment	Mayor Office: OLTPS e ORR	No
LGO emission Inventories	Yes	Yes	No
LGO emissions/ city-wide emissions	4,03%	7,10%	No

Source: author's database, the United States Environmental Protection Agency (2014), San Francisco Department of Environment (2013), NYC Mayor's Office of Sustainability (2016), San Francisco Water Power Sewer (2013), IBGE (2014) and New York City (s.d.)

The size of the city of New York, in terms of population, number of employees, and public buildings stock is closer to that of Rio de Janeiro than to San Francisco's. The establishment of detailed regulations addressed to city hall's operations (San Francisco and New York experiences), and centralization of climate governance process in The Mayor's Office (New York experience only) seem to be the best strategy to ensure that the investments towards Public Administration will be implemented within objective criteria of environmental economic and social sustainability in Rio de Janeiro.

Conclusions

A corporate information system, in terms of sustainability issues, would be the starting point to define the basis for sustainable management decisions at Rio de Janeiro's city hall. However, this is a challenging process. In order to bring about the change, the core action would be to establish a governance plan, delegating both implementation and follow-up accountability to a specific group. This governance should not just be accountable for technical solutions, but also responsible for engaging stakeholders. It would represent a high impact at low-cost policy. It could also rely on the New York structure as an example, due to their similarities.

After setting the governance accountable to make the plan work, the next step would be to start agencies' data collection, in order to build a diagnosis of City Hall's consumption and waste of resources.

However, defining and restricting data use could also be a challenge. Since each agency has its own way of reading data, building an integrated database for all would require, not only GHG Protocol methodology analysis, in order to set scopes and most relevant sources of emissions, but also negotiation, organization, and adaptation from municipal agencies.

In fact, it is not easy to collect, aggregate, and manage agencies' consumption data. However, it could be quick, cheap and would bring relevant results in the long term. This diagnosis would enable the development of a Corporate GHG Emission Inventory and set the City Hall's corporate climate action plan. Besides, this idea is already aligned to Rio's Municipal Strategic Plan 2017-2020 and Visão Rio 500 Plan.

There are several benefits expected from this: the main one is to learn from the present scenario, while reducing the City Hall's consumption of resources such as water, fuel, gas, energy, etc. The City Hall will also actively be contributing to reduce GHG emissions and wastes, as well as fighting against climate change by optimizing consumption.

There are some additional gains in increasing Commissioners' accountability and growing transparency to taxpayers: the possibility of highlighting this policy in the media is also a benefit, which can drive Rio de Janeiro to be at the forefront of sustainable cities that also track its own emissions, a still unedited policy in Brazil. Moreover, Rio de Janeiro could share the experience with other cities in Brazil and Latin America, in order to spread sustainability policies.

The Planetarium Foundation initiatives on implementing low carbon strategies and energetic efficiency, already established in Rio, are demonstratives of high potential benefits that could be expanded through all agencies in the city.

In conclusion, Rio de Janeiro has sustainability guidelines in the urban scale, but not for its own operations as a sustainable institution. There is not a clear identification of the Municipal Government as an organization that uses sustainability indicators and emission reduction targets, oriented through action plans. Rio's City Hall misses a great opportunity, not only to save financial resources, minimize environmental impacts and GHG emissions from its own operations, and gain efficiency, but also to leading by example and pushing several local businesses through a sustainable path. By tracking and reducing its emissions, Rio would also improve its competitiveness and be at the forefront of cities that implement Corporate Sustainability Management in Brazil.

References

Brainard, Lael, & Isaac Sorkin. (2009). Climate Change, Trade and Competitiveness. Is a Collision Inevitable? Washington: Brookings Trade Forum.

Cohen, Steven A. (2011). Sustainability Management: lessons from and for New York City, America and the Planet. New York: Columbia University Press.
Dervis, Kemal. (2015). Formal Global Economic Governance – Climate Change: Towards Paris 2015. Global Executive Master in Public Administration lecture, Columbia University, NY.

Dickinson, Jonathan, e Rishi Desai. (2010). Inventory of New York City Greenhouse Gas Emissions. New York: Mayor's Office of Long-Term Planning and Sustainability. Drucker, Peter. (2016). Drucker Institute. <http://www.druckerinstitute.com/> Accessed on 24th March 2016.

Fundação Planetário. (2013). "Registro Público de Emissões." Programa Brasileiro GHG Protocol. Rio de Janeiro.

Hepburn, Cameron, e Nicholas Stern. (2008). A new global deal on climate change. Oxford: Oxford Review of Economic Policy, Volume 24, Number 2.

ICF International. (2012). Technical Review of San Francisco's 2010 Municipal GHG Inventory. Memorandum. IBGE. (2014). Estimativas da população residente nos municípios brasileiros com data de referência em 1º julho de 2013. Available in <http://www.ibge.gov.br/home/estatistica/populacao/estimativa2013/estimativa_dou.shtm>. Accessed in 28th December 2014.

Kamal-Chaoui, Lamia and Alexis Robert (eds.). (2009). Competitive Cities and Climate Change. OECD Regional Development Working Papers N° 2, 2009, OECD publishing. New Climate Economy. (2014). Better Growth, Better Climate: Synthesis Report. Washington, DC: The Global commission on the economy and climate.

NYC Mayor's Office of Sustainability. (2016). About PlaNYC. 2016. Available in <http://www.nyc.gov/html/planyc/html/about/about.shtml>. Accessed in March 2016.

Rio de Janeiro City Hall. (2012). "Plano Estratégico da Prefeitura do Rio de Janeiro 2013-2016, O Rio Mais Integrado e Competitivo." Rio de Janeiro.

Rio de Janeiro Municipal Agency of Environment. (2011). "Política Municipal de Mudanças Climáticas, Lei 5.248." Rio de Janeiro: Rio de Janeiro City Hall, 27 de January de 2011.

Rio de Janeiro Municipal Agency of Environment and COPPE/UFRJ. (2011). "Plano de Ação para a redução de emissões dos gases de efeito estufa da cidade do Rio de Janeiro." Centro Clima. Rio de Janeiro.

Romero, Rafaela Dias. (2015). Corporate sustainability information system to City Hall of Rio de Janeiro: leadership by example. Technology & Innovation in the Public Service Conference, New York: 14th July 2015.

San Francisco Department of the Environment. (2004). "Climate Action Plan for San Francisco: Local Actions to Reduce Greenhouse Gas Emissions." San Francisco.

San Francisco Department of Environment. (2016). City Department Climate Action Plans. 2013. Available in http://www.sfenvironment.org/article/city-government-climate-action/city-department-climate-action-planning. Accessed in March 2016.

San Francisco department of The Environment. (2014). Climate Milestones. Available in <http://www.sfenrivonment.org/cas/milestones>. Accessed in December 2014.

San Francisco Water Power Sewer. (2013). "2012 Energy Benchmarking Report - SF Municipal Buildings." San Francisco.

Schwab, Klaus. (2016). The Global Competitiveness Report 2015-2016. Geneva: World Economic Forum.

Stern, Nicholas, e Cameron Nicholas. (2006). The economics of climate change: the Stern Review. Cambridge: Cambridge University Press.

The City of New York. (2016). One New York: The Plan for a Strong and Just City . 2016. Available in <http://www.nyc.gov/html/onenyc/downloads/pdf/ publications/OneNYC.pdf>. Accessed in March 2016.

UNDP. (2007). Fighting climate change: human solidarity in a divided world. New York: Human Development Report 2007/2008.

United State Environmental Protection Agency. (2014). Developing an Action Plan. Available in <http://www.epa.gov/statelocalclimate/local/activities/ actionplan.html>. Accessed in December 2014.

United States Environmental Protection Agency. (2016). Leading by Example in Government Operations. Available in <https://www3.epa.gov/statelocal climate/>. Accessed on 23rd March 2016.

6

ENVIRONMENTAL SOCIAL, GOVERNANCE INVESTING – (ESG) REIMAGINE CAPITALISM FOR SOCIAL IMPACT?

PALAK PAREKH

ENVIRONMENTAL SOCIAL, GOVERNANCE INVESTING – (ESG) REIMAGINE CAPITALISM FOR SOCIAL IMPACT?[A]

Palak Parekh[B]

Keywords: ESG Investments; ESG Solutions; Money Management; Investment Management

Abstract

This chapter presents an analysis of sustainable investments and their position as a possible solution for growing societal issues.

The COVID-19 pandemic, climate changes, continuing income and economic inequality growth between the wealthy and middle-class seems to be the unsolved questions of our time. However, initiatives have been arising from managers and investment firms to incorporate non-financial performance measures into their decision-making processes. Investors are looking beyond financial statements (impact scores and metrics) to understand how companies create value in the long-term. ESG investments have been continuously linked with long-term shareholder returns. ESG refers to the principal factors in measuring the sustainability and ethical impact of an investment and offers global players an opportunity to mobilize institutional and retail asset flows that are expected to meet a social or environmental goal.

ESG Investing is an instrument to push society in caring about its stakeholders as much as its shareholders. This article will explore detailed measurement metrics to address specific ESG demands, creating positive impact without undermining returns. ESG Investing is a multifaceted approach to solving the world's most pressing issues through one of the world's largest industries: the money and investment management.

"Humankind has not woven the web of life. We are but one thread within it. Whatever we do to the web, we do to ourselves. All things are bound together. All things connect."
- Chief Seattle, 1854.

Introduction

Environmental, social and governance issues erupt in 2020 Spurs ESG Investing.

Sustainable investing is on the rise globally and hailed as the solution for growing societal issues. In 2020, unprecedented societal issues face the globe from the COVID-19 pandemic spreading across the globe claiming millions of lives, to climate change and income and economic inequality continuing to widen between the rich and middle class. Income disparities are so pronounced that America's top 10 percent now average more than nine times as much income as the bottom 90 percent, according to data analyzed by UC Berkeley economist Emmanuel Saez. In the United States, the income gap between the rich and everyone else has been growing by every major statistical measure, for more than 30 years. The economic consequence from COVID-19 continues to hit lower income Americans the hardest. A new Pew Research Center survey finds that, overall, one-in-four adults have had trouble paying their bills since the coronavirus outbreak started, a third have dipped into savings or retirement accounts to make ends meet, and about one-in-six have borrowed

money from friends or family or gotten food from a food bank.

The capital markets are not spared in this changing landscape. According to Sustainability Accounting Standards Board, (SASB), investors see it in their declining ratio of net assets to enterprise value, in their frequently short-sighted earnings guidance, and in a changing regulatory landscape. Most importantly in 1975, 17 percent of the assets in the S&P 500 were intangible; in 2015, the number was 84 percent. Many managers and investment firms are incorporating non-financial performance measures into their decision-making processes and investors are looking beyond financial statements (impact scores and metrics) to understand how companies create value in the long-term. According to a report released by the Boston Consulting Group, investors are increasingly focused on ESG areas as evidence mounts linking performance in those areas with long-term shareholder returns. ESG refers to the principal factors in measuring the sustainability and ethical impact of an investment and offers an opportunity for global players to mobilize institutional and retail asset flows that are expected to meet a social or environmental goal. BlackRock's Chairman and CEO Larry Fink as been an advocate for ESG investment. In a July 17, 2020 earnings call, he noted that demand for sustainable products continues to accelerate as clients increasingly turn to ESG, "not only for investments that reflect their values but also to enhance performance, risk management and portfolio construction." Short-termism and the lack of stakeholder innovation has increased the role that ESG will play. ESG investing is an instrument to push society in caring about its stakeholders as much as its shareholders. Detailed measurement metrics address specific ESG criteria listed below.

Sustainable investing is growing; by assets total global AUM at the end of 2019 reached $89 trillion with ESG assets at a staggering $40.5 trillion (BCG, Protect, Adapt and Innovate, Global Asset Management Report). Globally, flows into sustainable investment funds doubled to $54.6 billion in the second quarter of 2020 over the first quarter, according to Morningstar Inc. data. According to BCG, sustainable investing will rise as firms weave ESG factors into their investment decisions, aiming to create positive impact without undermining returns. Getting accurate ESG data for investments other than publicly listed equities is difficult; fixed income, private debt, real estate, and commodities all present challenges. To deal with the problem of gaps in standardized data, asset managers should develop proprietary data tools, especially ones that show investors how the managers measure sustainability and how they use that knowledge to drive investment decisions. Data will become a key expense for investment managers looking to proactively garner assets. Below outlines the data landscape and demand for ESG products. To note, the demand is driven my data and disclosure to meet the increased appetite for ESG products and services.

• The Task Force for Climate-related Financial Disclosures places pressure on investors to purge holdings of companies that don't disclose or fail aggressive enough targets.
• ESG can create alpha: In the U.S., ESG has been a particularly effective signal of alpha over the past five years ago, driven by the explosive asset growth and inflows into ESG type strategies.

This changing landscape requires investors to rethink capital deployment, how they fundamentally price assets, and lastly adding new ESG data (both structured and unstructured) into their investment process. Lastly, governance organizations are required to hold investors accountable. We see this shift in the changing regulatory landscape through frameworks and standards. There are five major ESG frameworks or standards are outlined in Table 1.

FRAMEWORK	YEAR FOUNDED
Global Reporting Initiative (GRI)	1997
Principles of Responsible Investing (UNPRI)	2006
Sustainability Account Standards (SASB)	2011
Task Force for Climate-related Financial Disclosures (TCFD)	2015
World Economic Forum & International Business Council	2020

Source:
The first aim of the report will outline the Sustainable Investing landscape with respect to key societal trends and market sizing figures. Understanding this relationship underlines the operating environment that exists in Asset Management. The second is to discuss the historical seeds of the industry and debunks the premise that ESG investing comes at a cost to financial returns and investment performance. The last section outlines recommendations for investment management professionals and a look to how ESG is an instrument for positive social change.

The Shifting Social Landscape Role in Sustainable Investing Strategies

ESG Investing shifts from Exclusion to Integration Since the early 1990s, there has been an evolution in strategy from negative screening towards impact investing. This evolution demonstrates an opportunity for global players to align institutional and retail assets with social good. There is a demand for companies to engage with its stakeholders. ESG matters in a society where shareholder capitalism and dominance has come at the expense of stakeholder capitalism.

According to Cerulli Associates, asset managers are building out their capabilities, whether integrating ESG issues into their investment process, or developing

products focused on ESG issues, as interest from investors increases (Cerulli Edge, U.S. December 2017: Edition 244). It is important to note two different solutions for investors. The institutional, and next generation investors from multi-family offices are diving demand for ESG capabilities, while impact investing represents a new growth opportunity for asset managers where investors want to target specific type of impact.

Figure 1: Strategies for Incorporating ESG

Source: Cerulli Associates

Impact Investing

The Global Impact Investing Network (GINN) defines impact investing as "the investments made into companies, organizations, and funds with the intention to generate social and environmental impact alongside a financial return.

Figure 2: Continuum of Definitions of ESG/SRI through Impact Investing

Socially Responsible Investing (SRI)	Environmental, Social, and Governance (ESG) Integration	Thematic Investments	Impact Investing
A portfolio construction process that intentionally excludes problematic investments in securities of companies, industries, or countries based on moral values or standards and norms.	ESG integration involves proactively considering environmental, social, and governance factors in conjunction with financial analysis to identify risks and opportunity when investing in companies and evaluating their business practices.	Investments focused on ESG issues to develop a sustainable strategy or dedicated to solving sustainability related challenges. Examples include renewable energy, green real estate, and clean water funds.	The Global Impact Investing Network (GIIN) defines impact investing as "the investments made into companies, organizations, and funds with the intention to generate social and environmental impact alongside a financial return."

Source: Cerulli Associates

A Historical View: The ESG Revolution

Impact was always a cornerstone of the American corporations and story

Three major causes have led to the legitimacy of the ESG revolution and its sustained momentum. The first are the effects of globalization. Globalization was the tipping point that advanced socially responsible investing beyond exclusion of sin stocks to avoidance of companies or investments that pose a liability or risk to portfolios (Cerulli Edge, December 2017, Issue #244). The second is the 2008 financial crisis – The Great Recession – as wake up call to the financial industry that regulation is a vital to the health of the financial system. In the her book, Collaborative Capitalism and the Rise of Impact Investing, Tina Castro, principal of Avivar Capital asserts, "The Great Recession enabled a conversation, but there was also this increased fear and skepticism, and a sort of recoiling, retrenching and protecting of assets" (32). How do we regain trust and have the correct financial checks and balances? The financial crisis of 2008 moved investors to protect their assets and look for investments that made a difference. The third cause is the establishment of the Sustainable Development Goals (SDGs) as a target by the United Nations, and the fourth is a cultural shift and prevalence of corporate responsibility movements. As Bugg-Levin and Goldstein assert, "the seeds for impact investing were sown in the last quarter of the twentieth century with the socially responsible investment and corporate responsibility movements" (p. 32, 2009). The BCG report on total societal impact (TSI), stresses that it is not enough for companies to pursue societal issues as a side activity, but companies must use their core business – and the scale advantage it offers – to create both positive societal impact and business benefits (13). The insight is that "Doing good does not excuse us from doing better." If this is the case, where are the barriers?

One barrier is the culture within the investment management industry. There is a perception that ESG integration means sacrificing financial returns and because of that perceived loss of financial return, fiduciary duty of fund trustees precludes ESG investment. The other perception is investors' performance expectations are too short-term to fully obtain the positive effects of ESG performance. One of the primary reasons for the performance barrier is the perception of doing good and financial returns has often been separate from a business line standpoint. However, there are industry frameworks in place that can assist companies in integrating ESG into the investment process and sustainability programs, comingling financial returns with balance sheet processes.

Academic studies also show a positive relationship between ESG factors and corporate financial performance, supporting the premise that ESG can improve financial returns for companies. (State Street, The Investing Enlightenment). In addition, the S&P Global Market Intelligence analyzed 17 exchange-traded and mutual funds with more than $250 million in assets under management that select stocks for investment based in part on ESG criteria. The analysis found that 14 of those posted higher returns than the S&P 500 in 2020 through July 31, with those outperformers rising between 1.8% and 20.1%. In comparison, the S&P 500 was up 1.2% as of July 31. An analysis of the same group of 17 ESG funds in May 2020 found that all but two had lost value in the year to date. Critics of ESG investing often question whether the strategy can deliver premium returns. But ESG fund managers have said their focus on nontraditional risks led to portfolios of companies that so far have been resilient during the COVID-19 downturn.

Total Societal Impact: Connections to ESG & Asset Management

There is a connection between ESG Investing and how companies do business on the aggregate including their sustainability programs. As the report states, "a robust TSI program requires the right management structure, governance and incentives" (BCG, 9). Important to note is that companies are under pressure to "play a more active role in addressing social and environmental issues such as global health challenges, climate change, and gender inequality" (BCG, 15). The same study has identified the ESG topics that are most important in the industries they studied by collecting intelligence from Sustainability Accounting Standards Board (SASB), which has "zeroed in in non-financial topics that it considers to be 'material' – that is, likely to be of interest to investors because they can affect financial performance" (19). Their study revealed that there is a concrete link between performance on specific ESG factors and valuation multiples and margins (19). This is a powerful finding that points stakeholders to integrate certain topics in their business lines.

Important Definitions:

In the industry, there are disparate of ESG and Impact Investing. Each investor will have to decide how to build their ESG scoring methodology based on client investment guidelines. According to MSCI, ESG aligns values, targets impact, and integrates the risks associated with an investment. Investment is defined as monies – both institutional and retail that can be invested (investible assets) into products. These values align portfolio with investors' ethical or political values, where the target impact generates measurable social or environmental benefits and lastly integrates risk, which incorporates selected factors to enhance long-term returns (MSCI, 3).

Material ESG factors are considered risks and must be addressed. As MSCI asserts, there are major social, environmental and political issues multinational companies face when doing business. There is an economic cost that companies face when these factors are ignored or not addressed from a corporate sustainability standpoint. The cost of doing business rises if these geopolitical issues are not addressed. There is a trend towards creating value, versus having values that resonates globally. This is akin to the double bottom line: a phrase that indicates that investors – both retail and institutional – are seeking values-based investing, rather than seeking the best returns.

Asset Management Industry

The Asset Management industry growth is slowing due to long-term headwinds in three areas: (1) lower market returns due to negative interest rates, (2) near zero organic growth rates and (3) fee compression due to indexing (CaseyQuirk 2016). Near zero organic growth rates are defined as less new money that asset managers will garner. The industry has an expected annualized global industry growth 2016 – 2020 of 2%. The market is segmented where certain products are projected to experience double digit high growth rate like digital and robo-advice, and lower growth like active equity (BlackRock Investor Day, 2018). Most startling is that for the first year since 2008 financial crisis, revenue pool of traditional asset managers fell worldwide, along with profits (6, The Innovators Advantage, BCG July 2017).

What this indicates is that it is tougher for asset managers to garner new assets. To take the analysis one step further, let's take a deeper dive into organic growth. Organic growth is defined as new sales an asset manager acquires. The entire asset management industry is slated to grow at an annual organic growth rate of less than 1% by 2021 (Casey Quirk, December 2016). Per the study, the annual revenue growth will fall to 2.9% from 6.0% and the median profit margins will drop to 28% from 34% signalling a need for asset managers to find yield in new product offerings. In contrast, the ESG space is projected to grow. Per Cerulli Associates, more than 50% of asset managers received institutional client requests for ESG mandates in 2014. Another key hindrance is limited data on ESG with regards to performance tracking. According to research firm Opimas, the environmental, social and governance data market could hit $1 billion in 2021 given increasing demand for ESG data and offerings from a growing number of providers. The increase assumes annual growth rates of 20% for ESG data and 35% for ESG indexes. Opimas estimates total spending on ESG data was $617 million in 2019. Per the BCG report, data on ESG performance is becoming increasingly available and reliable, putting companies' actions in those areas under greater scrutiny, thus reinforcing investors' attention to them (Total Societal Impact, BCG, page 7). This also facilitates the "impact revolution" to grow faster. Systemically, the pieces of the puzzle are converging for ESG and Impact investing to continue to grow.

Another angle frames the narrative slightly different with the approach that the cause of low worldwide economic productivity (GDP) is caused by misaligned investment schemes. Per the UBS white paper entitled Mobilization private wealth for public good, "Unchecked private-debt accumulation in many parts of the developed world, a mortgage crisis in the U.S, and a cascade of failures across interconnected financial systems led to a worldwide economic recession" (8, 2017). The world has not recovered from the recession. The IMF projects the average annual real GDP growth rate between 2007 and

2017 will be 3.5%, a low rate. Furthermore, "consumption of non-renewable resources and over-consumption of renewable resources have enabled humanity to raise its standard of living at the expense of future generations" (8, 2017). The low growth rate and overconsumption of natural resources as a trend suggests there is a challenge in the current operating environment that is not sustainable. Change is required to spur global growth, but it must be done in the right way. A part of the answer is "responsible disruption" and the opportunity for a tri-sector approach: public-private sector practices (asset managers), value-investing principles, and governments as prime players. We now turn our focus on the ESG market in detail.

ESG Market Sizing.

According to U.S. SIF Report on U.S Sustainability, the market size is United States professionally managed assets is $54.1 trillion, with $17.1 trillion representing ESG assets.

Figure 3: Sustainable Investing Assets
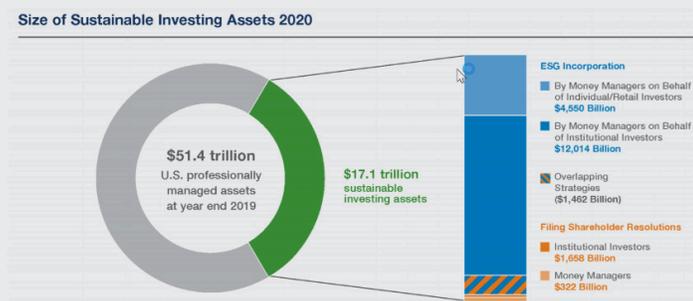
Source: According to the same study, the top specific ESG criteria for Money Managers in 2020 are climate change, anti-corruption, board issues, sustainable natio¬¬nal resources/agriculture and lastly executive pay. This trend shows the role of investors in fighting climate change where managers are seeking to invest in companies that adopt climate change policies in the long-run as a risk to society.

Figure 4: Top Specific ESG Criteria 2020

ESG News & Demographic Trends

According to research conducted by Morgan Stanley, 86% millennials—broadly defined as those born between the early 1980s and 2000—say they are interested in socially responsible investing. Millennials are also twice as likely to invest in a stock or a fund if social responsibility is part of the value- creation thesis.

Per the RI Association study, millennials are slated to inherit more than $30 trillion on the next few decades. 67% of millennials believe investments "are a way to express social, political and environmental value versus 36% of baby boomers" (U.S. Trust' Insights on Wealth & Worth, 2014). Per this study, women also represent a demographic that is interested in responsible investing. "Women are about twice as likely as men to indicate uncertainty about their views on responsible investing and more likely to believe it is important for their advisors to be knowledgeable about RI issues and trends. This indicates a clear educational opportunity for responsible investment advisors, as women investors may actually be more open to RI once they are more informed" (7). Millennials and women will be the next generation of investors who will drive the demand for ESG capabilities and impact investing. Asset managers may have to tweak their product capabilities to meet this demand. From a product perspective, many firms have created platforms, however many managers are slow to provide products to meet this emerging demand. As CEO of the Institute and Head of Morgan Stanley's Global Sustainable Finance group asserts: "The younger generation is clearly signaling that when they take over the reins to family offices and their own inheritances, they will not invest the same way. Per MSCI, there is momentum for impact investing in bellwether segments especially among high-net-worth women, millennials, Gen X with at least $10 million in investable assets (MSCI, ESG Investing Overview slide 18). The implication is that as the younger generations control more assets, the more likely they will seek impact capabilities. This trend is not only manifesting in the retail space (people as customers), but also the institutional space (family offices, pensions, endowments and foundations).

Figure 5: Women and Millennial Demand
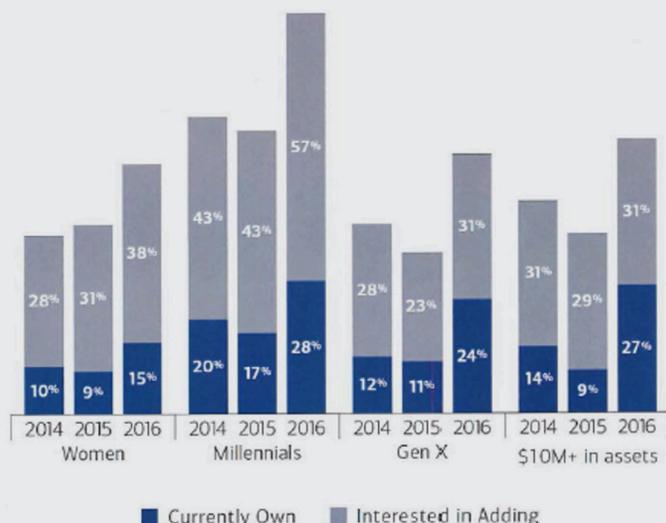
Putting it All Together: Implications

The key takeaways below address how will asset managers capture AUM and new clients in a low growth operating environment. A part of my recommendation is for asset managers to garner assets through ESG product offerings coupled with digital enablement. What does this mean? An opportunity is to cater to the next generation that utilizes cell phones, applications and technology to conduct business. Online platforms can support economic inclusion and equity (BCG, Total Societal Impact, 31). Asset Management firms must make that change to survive the low growth environment and capture the ESG and Impact Investing assets of the future. From an institutional perspective, an opportunity for asset managers is to cater to endowments, foundations and high net worth clients where we see increased demand. Impact Investing also represents a new opportunity to garner assets in-house. Per Cerulli Associates, impact investing vehicles need to deliver clear and undisputable metrics of impact and have repeatable strategies for identifying, evaluating, and underwriting investable opportunities (Edge, 12).

Asset Managers: Top-15 ESG Themes Incorporated into Investment Process, 2019

The top issue that remains at the heart of asset managers' engagement activities is climate change, with nearly all (94%) of survey participants citing climate risk as a key topic.
Source: Cerulli Associates

2Q 2019 Rank	Issue	Category	Incorporate into Investment Process
1	Climate change/carbon	Environmental	94%
2	Board issues/composition	Governance	90%
3	Bribery and corruption	Governance	82%
4	Labor standards	Social	80%
5	Gender	Social	78%
6	Energy efficiency	Environmental	76%
7	Human rights	Social	76%
8	EEO/Diversity	Social	76%
9	Executive compensation	Governance	76%
10	Employee engagement	Social	74%
11	Clean water/water scarcity	Environmental	73%
12	Sustainable natural resources/agriculture	Environmental	71%
13	Community relations	Social	70%
14	Audit committee structure	Governance	68%
15	Political contributions	Governance	68%

Asset Managers: Top-15 ESG Themes Addressed for Product Development, 2019

Source: Cerulli Associates

Rank	Issue	Category	Developing Product
1	Climate change/carbon	Environmental	31%
2	Fossil fuel divestment	Environmental	29%
3	Sustainable natural resources/agriculture	Environmental	27%
4	Gender	Social	26%
5	Clean water/water scarcity	Environmental	25%
6	Energy efficiency	Environmental	25%
7	EEO/Diversity	Social	18%
8	Pollution	Environmental	18%
9	Board issues/composition	Governance	12%
10	Opioids	Social	12%
11	Civilian Firearms	Social	12%
12	Data protection	Social	12%
13	Human rights	Social	12%
14	Audit committee structure	Governance	10%
15	Bribery and corruption	Governance	10%

Recommendations

1. Partner with data providers using AI and Machine learning for valuation and integration into fundamental securities analysis within the investment process. Spending on ESG data could hit $1B in 2021 according to research firm Opimas. Asset managers investing in ESG data sets and scoring will accelerate their portfolios integrating ESG into the investment process will have a competitive advantage.

2. From an institutional perspective, asset managers can cater to foundations, endowments and high net worth clients when developing ESG products as these segments will continue to drive demand.

3. The integration of key societal issues in the valuation investment process will assist in learning how companies are addressing societal issues leading to the proliferation of best practices. As data becomes advanced through regulatory requirements, ESG scores and impact scores will enable investors to provide ESG peer scores and ratings for selecting investment managers, company scoring will allow fund managers to integrate ESG data into investment decisions and improve corporate sustainability programs at corporations. According to Cerulli Associates research the Top-15 Themes are listed below interms of incorporating ESG themes into investment process and product development. The top issue is climate change for both. To note themes such as labor standards, gender issues, human rights, and EEO/diversity are all measurable data points and hold corporations accountable to their employees and communities where they operate. ESG metrics and new regulatory requirements driven by frameworks, will enable investors to hold companies they invest in accountable.

The world ecosystem is connected. We are all players in a system where the current state is broken. A pure capitalistic society has failed the average man from a social, governance and environmental standpoint. Economic prosperity has benefited the rich disproportionally. Issues like climate change and fossil fuel divestment are real and investors must measure the ESG risk accordingly priced into their portfolios. ESG Investing is a multifaceted approach to solving the world's most pressing issues through one of the largest industries in the world: the money and investment management. Regulation, industry frameworks, and ESG data technology firms utilizing artificial intelligence and machine learning, will accelerate this trend. Including material non-financial and financial metrics will aid investors value companies holistically. Each one of us as a part to play in uplifting society to higher standards that not only consider returns and revenue but includes improving social equity across firms. Social capitalism must exist to foster and propel society for sustained long-term growth. Realigning the right measurement and metrics (ESG scoring methodologies from global frameworks) will add transparency and eventually foster best industry practices. SASB, for example, references financial materiality with 77 industry guides outlining the material issues in any industry, while GRI requires disclosure against topics that affect a company's stakeholders and that reflect a company's "significant economic, environmental, and social impacts" or "substantially influence the assessments and decisions of stakeholders." institutional investors, multinational organizations and the private sector all play role in reimagining capitalism.

References

Boston Consulting Group (2020), Protect, Adapt and Innovate, Global Asset Management Practice, July, 1- 28.

Boston Consulting Group (2017), Total Societal Impact: A New Lens for Strategy, November, 1 - 59.

Casey Quirk (2016), Survival of the Fittest: Defining Future Leaders in Asset Management December, 1 – 16.

Clarkin, E. John, Cangioni, L. Carole (2015). Impact Investing: A Primer and Review of Literature, September 12, Entrepreneur Responsible Journal, 135 – 173.

Cerulli Associates (2017)., Allocating Assets for Public Good, ESG Issue, December, Issue #244 p. 1 – 19.

Opimas Research (2019), June 2019 Study ESG Data Projected Spending.

Pew Research Center (2020), 2020 Research.

RIA (Responsible Investing Association) (2016.) Millennials, Women and the Future of Responsible Investing, April.

Smiles, Simon., Haefele, Mark., Carter, Matthew., Donovan Paul., and Joester, Andreas.(2017), Mobilizing Private Wealth for public good, UBS White Paper for World Economic Forum Annual Meeting 2017 January, 1 – 40.

S&P (2020). S&P Global Market Intelligence 2020: Retrieved from https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/esg-funds-outperform-s-p-500-amid-covid-19-helped-by-tech-stock-boom-59850808

Sustainable Investing Foundation (SIF) U.S. Trends Report 2020.

7

STRATEGIC PERFORMANCE IN PUBLIC GOODS: THE PLANT AND ANIMAL HEALTH PROTECTION CASE IN BRAZIL

ALINE MIRILLI MAC CORD

STRATEGIC PERFORMANCE IN PUBLIC GOODS: THE PLANT AND ANIMAL HEALTH PROTECTION CASE IN BRAZIL

Aline Mirilli Mac Cord

Abstract

This article seeks to explain the concept for plant and animal care protection, its dynamics and its importance as a public good. It presents the relevance of modern management in prevention and emergency reaction processes. As a benchmark, it brings a comparative study between the initiative for the development of a performance measurement system at the Secretariat for Plant and Animal Health Protection in Brazil (SDA – Secretaria de Defesa Agropecuária), and the performance measurement system implemented at the Fire Department of New York, in 2008. It describes the scenario before the performance measurement implementation, the modernization efforts, and the lessons learned from the FDNY experience. These might be useful, when implementing a new strategic system at the SDA.

Plant and Animal Health Protection in Brazil and Strategic Performance Measurement

Brazil is one of the biggest food exporters in the world - 100 billion dollars trade in 2013, 30% of national exports. Food exportation is responsible for the country's commercial balance, and generates 24% of national jobs (CNA, 2012). The expected rise in the world's population to 9,3 billion people, in 2050, will press the demand for food worldwide. The Brazilian population will also rise to 215 million people that will need to be fed. That data signals the opportunity of growth for the Brazilian agricultural and livestock production, which is already responsible for more than 22% of the country's GDP. Along with food production, Brazilian agricultural products include fibers and biomass for renewable energy – worldly recognized as one of the most efficient energy generators, with the use of ethanol as Clean Development Mechanism (CDM), according to the Kyoto Protocol (Atkinson, 2012).

Brazil is one of the main suppliers of vegetal and animal products because of its investments in research, genetics, and nutrition. The aim is to boost accountability of technical and commercial relations worldwide, offering better quality, safer and price competitive products.

The core business of the Brazilian Secretariat for Plant and Animal Health Protection is to guarantee vegetal and animal safety, the right use of additives and ultimate safety of all products to final consumers.

The successful continuity of Brazilian agribusiness depends on the existence of a Plant and Animal Health Protection System that blocks the vulnerabilities of such a large country, with its numerous international borders, climate diversity and risks of plague entrance, causing dissemination of diseases that could compromise production and deplete markets.

A good plant and animal health protection system requires high credibility, excellence standards and thorough action efficiency.

International Commerce and Plant and Animal Health Protection

The approval of the General Agreement on Trade and Tariffs (GATT), in 1947, set rules for international commerce. Countries that signed the agreement could not raise unfair barriers to international trade, nor could they discriminate national or foreigner producers in the domestic market, or practice dumping, subsidies or other measures to unbalance commerce.

Agricultural commerce was not included in the GATT's negotiation. The international trade of agricultural and livestock products created protective barriers against foreign producers' higher tariffs, quotas, and other prohibitive measures. Several international negotiations would be required until the Agricultural Agreement and the Application of Sanitary and Phytosanitary Measures (SPS Agreement) were signed by 123 countries at the World Trade Organization (WTO), in 1994. The SPS Agreement regulates every sanitary and phytosanitary measures that might impact international trade, and guarantees the right to impose sanitary and phytosanitary measures to protect human, vegetal or livestock health.

The Secretariat for Plant and Animal Health Protection in Brazil, not only regulates sanitary and phytosanitary policies to plague and disease control, but also aims the sustainability of agricultural and livestock production for the international market.

Plant and animal health protection as a public good

Plant and animal health protection is the example, par excellence, of an authentic public good (Kaul, 2012). It is:
• Nonrivalrous: that is, the consumption, or enjoyment, of food or products under the protection provided by a country's plant and animal health protection does not detract another resident's consumption of that protection. The protection is indivisible, and its enjoyment by an additional person involves no marginal, or additional, cost.
• Non-exclusionary: no citizen can be excluded from benefiting from the plant and animal health protection system, regardless of whether they contribute directly to its budget or not. Everyone benefits from the food security provided by it.

The analyses point that, although the private sector is directly related to plant and animal health protection activities, the government provides it directly,

financing its costs through taxation and fines. National producers benefit from the system by protecting their crops and livestock from diseases and plagues that might come from abroad. The same happens with consumers – national and international – that get their provision of safe food assured.

The international market for food products is very strict, when it comes to sanitary guarantees. If the national plant and animal health protection fails, many markets will have their doors closed to national products. This grows in importance, if we consider that the Brazilian commercial balance is heavily based on the exports of food products and that many countries are dependent of Brazilian products as well (Brazilian producers provide 80% of the world's orange juice, for instance). In addition, plant and animal health protection also cares for the correct use of chemicals in the soil, which prevents environmental impacts coming from irregular crop additives.

Leverage conferred by plant and animal health protection expenditures – food security, commercial protection, healthy production, lesser environmental impact – is taken for granted. But there is a price for protecting crops and guaranteeing food to the world.

One thing about a public good is that, although people or nations may value it differently, they receive it equally. Does the benefic effect of having a good plant and animal health protection system outweigh the danger of pesticide use, genetically modified organisms (GMO) or environmental impact? How protected can people who eat that food be? How much of the environmental impact can be a result of producing enough food to supply the world?

Second, what private benefits and positive externalities do the expenditures on plant and animal health protection bring? Employment and income for food producers and related industry? Increased economic activity and income from commercialization, exporting, and other related activities? Guaranteed production and revenues for suppliers and consumers? Scientific and technological progress? International recognition of quality for Brazilian food products? Is the investment in plant and animal health protection the most efficient way of increasing economic activity and welfare? What are the alternatives and the opportunity costs? Isn't spending on other productive economic activities, long-term research or investment in other fields of activity more efficient and welfare-enhancing?

The third set of questions to ask when evaluating plant and animal health protection as a public good is: what are its negative externalities? What is potential

damage to the environment and social fabric at the massive crop and livestock production areas? Are they exposed to diseases due to continuous use of chemicals and pesticides? Are there social impacts for unequal distribution of income? Did the World Trade Organization (WTO) provoke the creation of the G-20 through the negative externality of non-tariff barriers to food products, and the need to invest in free-areas of plagues and diseases? Do commercial agreements to open markets generate negative externalities on international trade? What are the economic costs of plant and animal health protection to taxpayers? In terms of alternatives, what would be the costs for unprotected national crops and livestock? Even when, technically, there is proven safety in food production, do people feel that it is safe to consume such products?

Although not as popular a subject as plant and animal health protection, its consequent food security is also considered a public good. Unlike the broader range of plant and animal health protection, it unarguably meets the public goods criteria from a substantive (welfare) as well as a formal perspective. It is a status to which everyone aspires or wishes to maintain. Thus, it is accurate to state that food security is a universal public good. It is the best state of society for human survival and a necessary condition for the satisfaction and welfare of society's members. Without food security, one might not survive. It is a prerequisite for the pursuit of happiness and social and human development and it is fundamental to achieve peace.

How does food security meet the formal, as well as substantive criteria for being considered a public good? In terms of being non-exclusionary: if a country has food security, no resident will ever be excluded from enjoying this benefit. At international level, global food security benefits all, much like the public good of peace. Where there is food security, people are safe from hunger. Within a scenario of open international food commerce, and with enough production to supply the world demand, people will be able to enjoy its benefits, one's enjoyment not detracting from that of others.

The food security provided by international trade strengthens international peace, which is, in turn, an enabling institution of the market mechanism and an essential element of the first fundamental theorem of welfare economics.

SDA, FDNY and Domestic public goods - The inspection activity

Consider the challenge of a domestic public good, such as fire defense, and that this public good had to be supported voluntarily. How much would citizens be willing to contribute, in order to keep the city safe from uncontrolled fires?

Many would probably figure that individual contribution would make little difference to the overall fire defense system. Within a population of thousands of people, each contribution seems to be only an insignificant fraction of the total collected. Each person probably knows that, if everyone failed to contribute, their neighborhood would be more vulnerable to menacing fires, and people would be worse off, as a consequence. However, the temptation to contribute very little to their own building's safety could be stronger. Free-riding would be a tendency here, because each such person could apprehend that, if others invested in the safety of their buildings, the neighborhood would be protected enough for keeping the area safe, so each and everybody's contribution might not be really mandatory, in this case.

For this reason, the Fire Department of New York does not only work on emergencies against fires, but also inspects buildings and monitors risk areas. More people would probably condition their choice of providing better safety conditions to their own properties on the behavior of the FDNY, ensuring individual contribution, that is, each person might be inclined to contribute more, granted that others would contribute as well, and because of the fear of being fined for not taking safety measures.

Inspections, reinforced by a system of fines and compliance norms, facilitate the supply of public goods. They help to overcome the deficiencies of volunteerism.

That also happens with plant and animal health protection. Consider the challenge of supplying a local public good as simple as food, which, in many centuries past, used to be provided to entire communities through joint activities and coordinate actions. How would the maintenance of the village production have been guaranteed against contamination and disease control?

As Barrett (2007) argues, volunteerism failed, even in a village setting, as demonstrated in a case where the public good provided was a simple clock. Volunteerism then has proved to be an unreliable source, as noted by a decree from 1618:

> "Some years ago in Arzberg [Germany] they had a clock made which strikes a bell. The residents of Nichtewitz and Kaucklitz are supposed to contribute, the owners of a hide of land 1/2 Reichstaler, gardners 1 local taler, but they are unwilling to do so. Previously their excuse was that they couldn't hear the clock. Now they have admitted that they can hear it but still they don't want to pay: they are to pay their share; where they don't the authorities shall make them" (Dohrn-van Rossum, 1996).

Thus, official intervention was needed to ensure that the public good was provided. In 1618, the authorities represented a duke, prince or emperor: Today, the public authority represents the country, the state or the city.

Imagine a referendum where citizens were asked whether or not to support fire defense department's inspections on every building, to check if they were safe. The same people who would do nothing voluntarily, would probably vote in favor of the referendum, despite knowing they would have to invest money to protect their properties, in order to avoid fines. As a result, the national public good would be supplied in greater abundance, and individuals would feel they were being treated equally. The national public good, supplied in abundance, would provide better life quality to the community, and it would be in the government's power to do so.

Local and national public goods are often supplied by means such as taxation, regulation, fine application, or even physical enforcement. It does not make a difference, in this case, whether it is about fire defense or plant and animal health protection. As an example, during a sanitary health emergency, cattle suspected of being infected and endangering others, may be placed under quarantine. Even in the absence of a crisis, governments routinely require that cattle be vaccinated. This is not just to protect livestock. It is to prevent the conditions that would allow an epidemic to emerge and threaten national food production, which also represents a public good.

The modernization of Plant and Animal Health Protection in Brazil

The importance of plant and animal health protection has grown, along with the Brazilian agribusiness. The bureaucratic structure, however, has not received the same amount of investment to match such growth. There is a need for improving informational systems, technologies and equipment, as well as for updating norms that have become anachronic over time.
Modernization processes have been proved to be challenging worldwide, due to rigid government structures. The leap in technological advances urges for the modernization required to meet expectations coming from domestic and international markets, in order to deliver better and faster services to society.

A strategic proposition to modernize the plant and animal health protection services inspired a research for solutions adopted worldwide and a comparison amongst different institutions as benchmarks. This research focuses on the FDNY experience with the implementation of the automation process and intends to use it as a benchmark to build subsidies to support the automation process at the SDA (Secretaria de Defesa Agropecuária).

It is important to discuss the introduction of a more meaningful performance management system. The design of modernization measures is costly, and the collection, analysis and use of performance indicators require continuous investment in organizational resources.

Why compare SDA with FDNY?

Despite their size in range of action, both institutions work on two fields that must be accurately designed, and where we can focus our analysis: prevention and emergency reaction.

The SDA is responsible for inspecting the food produced and commercialized in Brazil, through several inspections on farms, producers, and other subjects of the chain, as well as responding to dangerous sanitary emergencies. The NYFD also works on inspecting safety in buildings and emergency calls, although dealing with different risks and response times. The agendas are different, but both institutions work in the provision of public goods of vital importance. Also, other public institutions, such as the American FDA or the Aphis, which might seem more suitable for this comparison, due to their similarity in agendas and range, have different characteristics, and the broader similarities they have with the SDA in other areas do not seem to be more useful when we focus on the proposed aspects of analysis, specifically.

The FDNY is a case of success on implementation of a performance measurement system aiming to achieve better results for the inspection activity. The FDNY management reform is an update tool to compare the modernization process of institutions that lay on old structures. A study by McKinsey and Company, (McKinsey & Company, August 2002), after the 9/11 attacks, concluded that the FDNY did not use the right indicators to measure the accomplishment of strategic goals. It was necessary to develop a meaningful strategic planning and performance measurement system in the FDNY. This strategic plan and the performance measurement system are exactly what is in course of development and implementation at the SDA. The Plant and Animal Health Protection Plan and other reports bring enough data for the comparison of both cases. This work aims to learn from this implementation at the NYFD and apply the useful lessons learned to the needs of the SDA's modernization project.

Strategic Planning. Cohen and Eimicke define strategic planning as "a regular part of organizational management where you systematically scan the environment, assess the organization's history, stakeholders, capacity and needs, and routinely modify the organization's actions in light of changing goals. Strategic planning involves tradeoffs and choices. When you decide

what an organization is going to do, you are also deciding what it is not going to do." (Cohen and Eimicke 1998).

Thus, strategic planning is a process of setting measurable goals in response to external demands, and direct internal capacities to activities that enable the organization to make progress toward those goals. A performance measurement system determines if goals have been achieved and if the right activities have taken place for that achievement. (Cohen and Eimicke 1998) Sometimes, though, it is difficult to define and measure success in the public sector, as government's objectives, such as plant and animal health protection or fire prevention, are difficult to measure.

The objective of a performance measurement system is to understand and improve organizational performance. This requires the understanding of the organization's resources, work processes and outcomes. It also requires an understanding of the organization's economic, social and political factors that influence its level of performance. The Total Quality Management (TQM) approach, pushed by Deming (Cohen and Brand 1993), indicates that managers should measure current performance levels and work to improve them cyclically.

"In the case of fire department response time, the issue of performance measurement is closely connected to the hot button issue of fire house closings. Many of New York's fire houses were built when the city's development pattern looked quite different than it does today. Some predate the invention of motorized fire trucks. But whenever the Mayor proposes closing or consolidating firehouses, he inevitably unleashes a fierce battle with community activists and the fire union. Despite the fact that fire houses were suggested to close based on lack of use (CBS 2011), Chief Cassano asserted that closing houses would negatively impact response time (NBC 2011). The concern is that the time it would take to respond to some fires would increase if fire houses were further apart than they are today. Response time measures could easily be biased by people who wish to demonstrate that fire house closings had a great impact or by those seeking to prove its impact was trivial. Other issues in measuring performance may be more mundane, but no less important, such as: When does the clock start? When does a response begin? What constitutes a completed response? Both the start and end of this process must be clearly defined, reported and measured" (Cohen and Eimicke, 2012, p.9).

Performance management systems must be sensitive to contextual issues and be analytic about reports of data.

1 - The scenario before the Performance Management Implementation

a) At the New York City Fire Department. In nearly 150 years of existence, the FDNY had more than 11,440 fire officers and fighters, 2,800 emergency medical personnel, and 1,200 civilian employees. On September 11th, 2001, 345 FDNY personnel died in service and compelled the Department to comprehensively reassess its mission, procedures, and performance (FDNY 2004).

McKinsey & Company conducted a study of the Department's response to the September 11th attacks and made specific recommendations to improve its capabilities and preparedness. It was imperative to understand what should be done to better prepare the FDNY for the 21st Century. The Report made recommendations regarding operational preparedness, communications, inter-agency/intergovernmental coordination and cooperation. It also appointed the importance to reinforce its planning and management processes by the creation of a senior management monitoring committee, the strengthening of the Management Analysis and Planning group, the development of a senior management training program and the FDNY first strategic plan (McKinsey 2002).

The Fire Officers Management Institute (FOMI) was created in 2002, as a management seminar. It trained more than 160 officers to occupy strategic positions at the FDNY between 2002 to 2012. The curriculum focused on core management tools, particularly strategic planning and performance management (NYC GlobalPartners 2010).

That first FDNY Strategic Plan covered the 2004-2006 period, focused on improving communications, expanding management training, and developing performance standards (FDNY 2004).

The 2007-2008 Strategic Plan identified "an enhanced Performance Management System for mission-critical functions" as a top priority (FDNY 2007). Bill Eimicke filled the newly created position of Deputy Fire Commissioner for Strategic Planning and Policy with the priority to implement a performance management system for the FDNY and ensure the continued success of strategic planning.

b) At the Brazilian Secretariat for Plant and Animal Health Protection (SDA). The Secretariat for Plant and Animal Health Protection (SDA) has nearly 100 years of existence and currently employs hundreds of public workers. The Brazilian Ministry of Agriculture, Livestock and Supply (MAPA)'s Strategic Plan covered the 2006-2015 period, focused on developing performance standards.

The SDA old structure separates different management lines that lack integration and causes operational inefficiency. In 2015, a new management structure for the Ministry of Agriculture and the SDA raised

the discussion on how to organize the regional Federal Agriculture Superintendencies(SFA - Superintendências Federais de Agricultura) focusing on offering better services to society. As plagues and diseases do not respect frontiers, it is necessary to invest in high-level communications to develop and implement actions, raising the transaction costs to a level that diminishes the benefits of the system.

The new Plant and Animal Health Protection Strategic Plan identifies, as well as did the FDNY Plan, an enhanced Performance Management System for mission-critical functions as a top priority, embracing the areas of communications, planning and monitoring actions, resources, and training. (SDA, 2016). The plant and animal health protection activity is based on science and knowledge. It is vital to build institutional means to support research and studies, as well as continuous training of SDA personnel.

Along with the elaboration of the plan, the new structure of the Plant and Animal Health Protection Secretariat created new transversal General-Coordination posts for Strategic Planning and Performance Management systems for the SDA.

Recent experiences lacking the necessary strategic view demonstrated that investments in technology and infrastructure are meaningless, when not followed by adequate personnel training . Also, several investments made to solve punctual problems with IT systems proved to build complex, costly and unfriendly multiple systems, instead of an integrated single IT chain.

2. The Modernization Efforts

a) The Performance Management System Task Force at FDNY. In order to build a successful performance management at the FDNY, thorough engagement from sectors such as the Emergency Medical Service, Fire and Civilian division and others is required. The FDNY established a Performance Management Task Force in July 2007, with seven members from multiple backgrounds in the institution — from Headquarters Operations to Budget and Finance. In 90 days, the Task Force submitted a final report with three major recommendations for the system: it should work with no more than six key performance indicators; it should also follow a detailed performance reporting and accountability process; and it should publicize a set of FDNY workload statistics[1] twice a year.

The Performance Management System Task Force Report provided the three sets of recommendations requested by the Chief of Department. The FDNY Vital Statistics was available on FDNY's website and in hard

copy, since 2008. The accountability process was well established in 2008 and continues today. The improving response time was the key indicator identified in the task force report and was a well-established and understood performance measure in the department. Finally, the report recommended a study to determine whether the time to answer an emergency could be reduced (Eimicke, et. al. October 2007). The time at the Fire Department Officer Management Institute (FOMI) was important because its participants and faculty could then brainstorm ways to improve performance. Response time was a frequent topic of discussion.

b) The Plant and Animal Health Protection Action Plan. The Plant and Animal Health Protection Plan is a long-term vision that should be assured for the next years. It aims to identify priority goals and to invest in the project to support its achievements. In order to obtain successful integration, again, thorough engagement is vital. After some discussion with the transversal General-Coordination representatives, the SDA has built a draft of its strategic proposal and presented it at a workshop, in February 2016. The Plant and Animal Health Protection Plan Workshop for managers had presentations of the Minister of Agriculture, Livestock and Supply – Katia Abreu, the Executive-Secretary – Maria Jaber, the Secretary of International Relations – Tatiana Palermo and the host, the Plant and Animal Health Protection Secretary – Luis Rangel. The meeting gathered more than 60 managers from different areas of expertise in plant and animal health protection, to discuss a plan and offer propositions for its implementation. The plan was conceived in six different axes: Modernization, Evaluations and Monitoring, Legal Frame, Sustainability, Intelligence and Special Projects.

One week later, a series of workshops was set to evaluate propositions and explore main ideas for each. The Plant and Animal Health Protection Plan's Axes Workshop brought 20 representatives from the main departments of plant and animal health protection together, along with the transversal general-coordination representative, and suggested a set of 28 projects that should support the six axes. Most of these projects are already in course and now will be shared with other departments and adapted through an integrated view. One of the new projects includes a performance management integrated system for the Evaluation and Monitoring axis that will work with performance indicators, set a detailed performance reporting and accountability process, and provide information for SDA workload statistics . The key indicator for the performance management is the improvement in response time for delivering the plant and animal health protection services. That concept is shared by the main departments of SDA and was mentioned several times during the workshops.

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1   COD refers to a Chief of Department Memorandum

The result of this work is the Plant and Animal Health Protection Action Plan 2016-2017, which will guide all the efforts in the next two years.

3. Results expected

a) The Decision to Focus on Response Time at FDNY. Discussions about improving response time for firefighters often center on going faster to the location of the emergency. Shorter routes or going faster were obvious options, but FDNY vehicles were already going as fast as many thought to be prudent. The Performance Management Task Force groups understood that focusing on dispatch time (the time from the moment the 911 call is received until the moment the dispatcher notifies the emergency to a fire company) was key to reduce response time. They knew that dispatch time for medical emergencies was much shorter than for fire-related emergencies , thus, most of the Task Force focused on how to reduce the fire dispatch time.

Fire dispatch protocols predated the availability of cell phones to fire officers in the early 1980s. At that time, New York City was emerging from near-bankruptcy, and arson for insurance or civil disobedience outstripped the FDNY's capacity to respond. At that time, fire dispatchers developed an elaborate protocol to triage and prioritize emergencies, using detailed information to decide where the help should go first, and which fires would wait for response.

Today, real estate in New York City is typically too valuable to be burned for insurance money. The number of fires fell sharply, but the response culture of the 1970's remains. The City's Emergency Medical Service was merged into the FDNY in the mid-1990s. Thus, medical emergencies had never needed to prioritize response due to resource scarcity. For that reason, they found that the medical emergency response was shorter than the fire-related ones. The final report of the Performance Management Implementation Task Force recommended to implement a pilot study to reduce fire dispatch protocol. The pilot program was released a week after the report was completed. The new protocol, "Expedited Dispatch", stated that fire dispatchers should consider an emergency, the event whose address and kind were confirmed. The dispatcher would gather the additional information after dispatching the fire units, and then call the company route via cell phone to provide the additional information. The expedited dispatch was piloted from February to June 2008 and response time was so reduced that FDNY implemented it citywide. As a result, FDNY's average response time to structural fires was the fastest response time in 14 years (FDNY press release, January 12th, 2009). The Performance Management Task Force determined that the response time should be directly connected to the FDNY core mission – protecting lives and property (FDNY 2011). The number of fire-related deaths and serious fires are the traditional measures of success for the department. While "correlation is not causation", in 2009 the City recorded the fewest fire deaths in 90 years and the fewest serious fires since they began keeping that statistic in 1996.

It is important to connect performance measures to an organization's strategy and to the organization's culture. Performance measures are contextual and need constant evaluation because they are embedded in the organization's structure, operations and definition of success.

b) The process of defining priorities for the SDA. The SDA has been currently discussing how to measure the performance of plant and animal health protection. It differs from the FDNY in its diversity and administrative size, so a single performance indicator cannot provide a clear dimension for performance here. A broader set of indicators could be more suitable for assessment, in this case, considering the amount of responsibility that each department holds, while a transversal general-coordination is able to direct public efforts in a more integrated way. The performance measure should thus focus on the organization of animal and vegetable production, livestock and crop health, as well as on the impacts of agricultural production on public health – fertilizers and chemical secondary effects.

As well as the Fire Department in New York, the plant and animal health protection has deeply ingrained procedures and protocols that must be assessed and modernized. Challenges are substantial and must be addressed simultaneously, according to a strategic plan. The discussion raised questions on border protection, response capacity, and risk analysis. The first change needed is a new transversal view to manage SDA's actions, aiming to better coordinate Federal, State and local agencies, as well as private institutions. The Plant and Animal Health Protection Plan also indicates that it is urgent to review norms and procedures, modernize infrastructure, equipment, and train the workforce toward decision-making that is based on scientific knowledge and intelligence analysis. All of this is necessary to face the challenges of the growing agricultural sector and the opportunities for international expansion.

It is essential, though, to have in mind that current and future demands need new approaches and tools for better knowledge, intelligence and risk management, along with the modernization of production areas. That would also foster open opportunities for public partnerships with public research institutions and universities, as well as with the private sector.

4. Lessons to learn from the FDNY experience:

a) The performance management system's implementation plan must consider organizational culture. The FDNY case demonstrates that organizational culture and standard operating procedures might resist for longer than it is useful. It took FDNY more than 25 years to realize that procedures were outdated, even though the department rarely has to prioritize its response anymore. The Firefighters' culture is also difficult to change. They are on duty together over several days, cook, eat and share many hours together. Influencing behavior in FDNY requires planned techniques. Cultural differences exist, even within organizations, nations and regions, and they must be understood before implementing performance management systems.

The SDA must consider, not only the headquarters' culture, but also the country's 27 Plant and Animal Health Protection Offices located in each State of the Federation. That is why 54 representatives coming from these regional offices have been summoned to work on propositions that also fit specific needs, to better internalize the Plant and Animal Health Protection Plan. It is a challenge that must be considered essential to the modernization process and the performance measurement of plant and animal health protection.

b) Focus on a single key indicator at a time. The emphasis on a single key indicator might work better because it is easier to understand and prevents misinterpretations. The FDNY measured response time improved dispatch and improved response time. This single indicator helped FDNY's management to update the deeply ingrained standard operating procedures. The pilot test allowed a new, innovative standard operating procedure to replace the outmoded one.

The multiplicity of SDA responsibilities makes it difficult to establish a single indicator for plant and animal health protection. Nevertheless, it is possible to assess specific indicators, in order to measure animal and vegetable production, livestock and crop health, as well as the impacts of agricultural production in public health – fertilizers and chemical effects. Despite the use of multiple indicators, each department may focus on the impacts of one or two of them, while the transversal coordination keeps the focus on integrating its policy into a broader view.

References cited and indicative bibliography:

Atkinson, B. (2012) The CDM, Kyoto protocol and the sugar, ethanol and bio-fuels industry by: Agrinergy ltd.

Barrett, Scott. Why Cooperate? The Incentive to Supply Global Public Goods. Oxford University Press Inc., New York, 2007.

CNA (2012). Análise do PIB das cadeias produtivas de algodão, cana-de-açúcar, soja, pecuária de corte e de leite no Brasil Desenvolvimento metodológico e cálculo do PIB das cadeias produtivas do algodão, cana de açúcar, soja, pecuária de corte e de leite no Brasil.

Cohen, S. and Eimicke, W. (2012) Management Innovation in Improving Response Time at New York City's Fire Department (FDNY).

Cohen, S. and Eimicke, W. Tools for Innovators: Creative Strategies for Strengthening Public Sector Organizations. San Francisco: Jossey-Bass, 1995.

Deming, W. Edwards. Out of the Crisis. Cambridge: The MIT Press, 2000. Eimicke, Bill, et. al. Report of the Performance Management Task Force.

Dohrn-van Rossum, G. (1996). History of the Hour: Clocks and Modern Temporal Orders. Chicago: University of Chicago Press.

FDNY Property Saved Indicator. Columbia University Capstone Project, 2009.

Kaul, Inge. Global public goods: international cooperation in the 21st century/ edited by Inge Kaul, Isabelle Grunberg, Marc A. Stern.

McKinsey & Company. McKinsey Report: Increasing FDNY's Preparedness. August 2002.

New York City Fire Department. Management Indicator Reporting System CB Activity Report: January-November 2007. 2007.

New York City Fire Department. Strategic Plan: 2004 - 2005. 2004. New York City Fire Department. Strategic Plan: 2007 - 2008. 2007. New York City Fire Department. Strategic Plan: 2011 - 2013. 2011.

SDA (2016). Plant and Animal Health Protection Plan 2016-2017; Secretariat of Plant and animal health protection in Brazil, Ministry of Agriculture, Livestock and Supply.

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ENHANCING LOCAL GOVERNANCE THROUGH INNOVATIVE AND EFFECTIVE MANAGEMENT: THE CASE OF THE SECRETARIAT OF AGRICULTURE IN THE STATE OF SÃO PAULO

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ENHANCING LOCAL GOVERNANCE THROUGH INNOVATIVE AND EFFECTIVE MANAGEMENT: THE CASE OF THE SECRETARIAT OF AGRICULTURE IN THE STATE OF SÃO PAULO

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Proposals, Initiatives, and Actions developed by students of the Masters' in Public Administration courses in the 2017-2018 classes at Columbia University.

Author's Note

This is a review of papers on innovative and efficient public management, from the standpoint of generating public value. The successful case that occurred in the Secretariat of Agriculture in the State of São Paulo is herein presented and considers the shared strategic planning that went on to engage and connect actors at local level. We have no conflicts of interest to disclose.
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Abstract

This article aims to address innovative and effective public management, focusing on the design of long-term policies, through leadership, strategic planning, and performance management. The management and implementation challenges are factored into the analysis, within the Brazilian federative scheme. There is a reflection about Brazilian institutions, addressing the challenges of implementing State public cooperation, especially considering the responsibilities shared between the different levels of governance. Our approach considers the role of local governance and the goals of the Secretariat of Agriculture in the State of São Paulo, providing contributions from within Public Value Creation Theory to leverage inter-initiative and promote cooperation between actors of different federative levels. Mainly, local governments have a duty to implement and promote polices that can influence people's behavior. Governments must be guided by the constant generation of public value, not by limitations imposed by their institutional infrastructure. They should direct efforts towards efficient performance, based on results and generating direct impact, aligned with their strategic purpose. This article will qualitatively address, through a literature review, the concept of innovative and efficient public management, the creation of public value, and will present a successful case of strengthened local governance for innovation within the Public Administration. The conclusion will consider the municipalities serving the public interest and their contribution to long-term state policies, with strategic planning involving the stakeholders responsible for the economic development policy in the Agricultural sector.

Innovative and Effective Public Management

Innovation is focused on creative responses to changing situations, and successful innovation is often incremental and small-scale. For Cohen & Eimicke (1996), public sector management innovation can be defined as the development of new policy designs and new standard operating

procedures by public organizations to address specific public policy problems. Their toolset to achieve innovation and make public policies more effective encompasses:

a) Strategic planning: strategic planning exercises typically involve an organization-wide initiative to reformulate goals and develop new methods of achieving those goals, by means of scanning the environment. Needs, its availability and restrictions must be discussed with staff and stakeholders to adapt the mission goals and the tasks needed. This gives the organization a chance to look at itself comprehensively, in light of new information.

b) Reengineering: government organizations must balance the constitutional requirement of due processes and consumer demands for prompt service. This calls for a mapping of processes, identifying steps and adding value. It is mandatory to include customers in the reengineering of public service delivery systems, and there is a need to remain attentive to the dangers of conflicts of interest and abuse of public trust. It refocuses the organization to its vision and purpose.

c) Total quality management: government must consider management quality, as it enables an organization to tap into knowledge about work processes, possessed only by staff, and can empower staff to think in-depth, thus boosting morale. The methodology can provide a means for bringing customer preferences into an organization, increasing the organization's ability to deliver efficiently and effectively.

d) Benchmarking: involves finding, adapting, and implementing best practices by continuously seeking to identify the best-in-class and duplicate or surpass their performance. An organization – in its endeavor to improve – can embed a strong spirit of competitiveness, pride, confidence, and energy in its culture and behavior. It enables the institutions to close the performance gaps.

e) Team management: a team can be defined as a group of people drawn from different disciplines, who work together on a permanent basis to carry out critical organizational tasks. The team focus can have a dramatic impact on the roles of managers and subordinates, as well as on the functioning of an organization, shifting it from being managed by control, to by commitment. By doing so, it can shift the institution's emphasis from individual motivation and output, to team motivation and output.

f) Leveraging the Private Sector: contracting out production or supply of specific functions allows for a changeover from a government-run enterprise to a private sector one. It not only facilitates public-private partnerships, but also works on deregulation, redesigning incentives and bringing competition and gaining on efficiency while saving on costs (Cohen, Eimicke & Heikkila, 2013).

Cohen, Eimicke & Heikkila (2013) explain that, when deciding which innovation tools to use, the effective manager must identify ways to minimize costs and accentuate benefits, motivating employees, working efficiently with resources and budgets, managing information, structuring tasks, and working with policymakers and the public. The authors highlight that only government has the legitimacy and ability to address most of the challenges facing our society. Effective public management depends both on the use of data, information, and technology, as well as relying on capable people, teams, and strong relationships. It depends heavily on structured strategic planning for systems, tasks, and responsibilities, whilst engaging stakeholders and working through budgetary and financial management with transparency and effective communications.

Creating Public Value

According to Partnership for Public Services & IDEO (2010), expectations with respect to governments are on the rise, at a time when budgets and timelines are shrinking, leaving many public servants struggling to deliver results. To satisfy these pressures, many leaders embrace innovative tools, including crowdsourcing, competitions, prizes and so on. For the author, innovation is the process of improving, adapting, or developing a product, a system, or a service to deliver better results and create value for people. Innovation in government occurs when something that is already being done is improved, or a process, service or product is disruptive in any ways, thereby deepening the impact on people's lives (e.g. simplifying a core business process, redesigning customer service systems or making information and programs more accessible to citizens through online services). It is also the case of adapting a tried and tested idea to a new context, as part of a system with breadth and scale, and developing something entirely new to achieve goals (e.g. a new service, a process, a policy or a tool).

Moore (1995; 2002) presents a bold and result-oriented conceptual framework factoring new pressures from change in citizen perception of the role of government. His main concern was in responding to the pressures brought about by the way that governments were perceived by citizens and he was able to offer public managers a new approach to effective public management. His goal was to ensure results and generate impact in the delivery of public services. To do so, he has shown the importance of working under the perspective of making better choices regarding priorities, their operational deployment and how they relate to society. Moore says

that it is fundamental to demarcate the strategic purpose of the public sector, and to identify how to implement and measure it. The author defends that the main goal of the government must be to create public value and then design an efficient allocation of resources, by prioritizing what the citizens identify as more valuable for them. It is not only about assuring positive or good results, but assuring that the results will impact people's lives and will line up with their expectations and priorities, thus tending to last longer. Legitimacy, accountability, transparency, ethos and equity are all necessary elements to establish the connection between government and society.

The use of the Public Value Theory as a tool to prioritize and evaluate the provision of public services represents a substantial innovation (Saad, 2015); it comprises the fundamental achievement of citizens' expectations and real needs, engendering effective public management, which results in the generation of positive and long-term externalities. Considering this approach and how it can be applied, Moore & Khagram (2004) determine what constitutes public value and how to produce it. Therefore, a "strategic triangle" was developed with three complex issues to be considered: 1) public value, i.e., the definition of this for the citizen. This pillar must be strategically understood and must be enabled to design and lead processes of changes and innovation, to set the needs of all stakeholders; 2) sources of legitimacy and support, i.e., coalition of key stakeholders to legitimate actions guaranteeing their sustainability; 3) operational capabilities, i.e., capability to enable the actions.

The processes, as well as their actors, must be aligned. However, this will not occur naturally and requires intervention of public managers. An effort must be made throughout the whole cycle of public policies to ensure the coordination of the aforementioned dimensions and strategic stakeholders, negotiating tradeoffs. Essentially, there are some dimensions to be considered: the one that adds value to the government and considers a systemic and long-term vision, and the one that the society considers as value, with a short or medium-term vision. In order to balance and reach both, the government must use tools that create engagement and that strengthen their relations with society, by means of continuous dialogues (e.g., municipal councils, public audiences, and others).

Public Value Theory must create an interactive environment between all stakeholders. which requires engagement and priority of theme by governments and political leaders. Auditing bodies are a supportive tool to engage these decision makers. Their work is based on recurrent monitoring of events in government and include regular projections of short and medium-term fiscal responsibility, as well as concern towards effective public policy, collecting and analyzing data, and providing recommendations.

Case: The Secretary of Agriculture in the State of São Paulo

Brazilian Federative Structure

The Proclamation of the first Brazilian Republic was on November 15, 1889. It overthrew the constitutional monarchy of the Empire of Brazil and put an end to Emperor Pedro II's reign. That is how the Federative State was established, under a free democratic and representative regime, where the provinces came to be the United States of Brazil. The federative model was created by the 1891 Constitution and maintained by the 1988 Constitution. Its 1st article establishes that the Federative Republic of Brazil is formed by the indissoluble union of States, Municipalities, and the Federal District. It also constitutes Brazil as a democratic State of law. Article 18 comprises the Union, the States, the Federal District, and the Municipalities, all autonomous, conferring more autonomy and competence to states and municipalities. It concentrated most of the tax collection in the Union and established rules for the transfer of this amount to states and municipalities. The Union and the States concentrate the tax burden, carry out investments and must provide essential services to the population. Brazil is the only country to consider the municipality as a federated entity, with local tax schemes and autonomy. The Constitution also calls for the State to develop a policy in all sectors, covering direct and indirect administration. It can edit laws that should establish the guidelines and bases of planning so, that there is an understanding as to the compatibility of national and regional plans of development. In total, Brazil has 26 States, one Federal District and 5.570 municipalities (Confederação Nacional de Municípios, 2020; Soldi, 2013).

The Secretariat of Agriculture in the State of São Paulo

The Department of Agriculture of the State of São Paulo turned 127 years of existence in 2020. It was instituted in 1891, by Law No. 15, in which the State Government budgeted the income and expenses of four State Secretariats for the following year. Among them, the Secretariat of Agriculture, Commerce and Public Works was organized by Decree No. 28 dated March 1, 1892 and regulated by Decree No. 58 dated May 2, 1892.

The creation of the Secretariat was part of the state government's strategy to implement an economic policy in the first decades of the Republic (Republica Velha – 1889 to 1930). The Secretariats of Interior, Public Instruction, Justice, Public Security, and Finance were also instated. At first, the Secretariat of Agriculture was responsible, not only for agricultural and livestock production, but also trade, industry, immigration, settlements, and the State's

land policy, concerned primarily with construction works and sanitation. Between 1892 and 1897, the initiatives focused predominantly on the construction of public buildings, bridges, roads, jails, schools, barracks, and hospitals, all of which accounted for 68% of the budget allocated to the portfolio. The Secretariat was also responsible for overseeing transport and communication services.

In 1900, six Agronomic Districts were created in the Capital, Campinas, São José do Rio Preto, São Carlos do Pinhal, Sorocaba and Iguape, each one tasked with monitoring crops, informing producers, and inspecting the experimental and display fields, among other activities. Municipal Agriculture Commissions were created, composed of farmers who assisted in the collection of estimated harvest data, organizing farmers for conferences, and requesting seedlings. Through the Secretariat, Colonial Centers were created, making it possible to manage immigrant labor for the São Paulo crops. At the time, a vast amount of European farmer immigrants was arriving, mainly Italian, Spanish, German and Austrian (Secretaria de Agricultura do Estado De São Paulo, 2020).

Relevant research and development services – provided by six worldwide recognized Institutes – enabled rural extension, as well as sanitary defense and supplies, to be given to small and medium-sized producers in 2019. Some of these institutions were founded by D. Pedro II, during the Brazilian Empire period, in fields of Agronomics, Fishing, Zoo-technology, Biology, Agroeconomics, and Food. Even with more restricted budgets and personnel structure, the focus of its deliverables was broadened to include production and better public service access for people living in rural areas.

Citizenship in focus

In July 2019, the Government of the State of São Paulo launched Decree No. 64.320/ 2019, addressing public policy guidelines called "Cidadania no Campo - 2030" that aim to guide programs, projects and actions within the scope of the Secretariat of Agriculture and Supply, with the objective of encouraging research, innovation, entrepreneurship and risk management, modernization of rural infrastructure and the sustainable use of land and natural resources, focused on adding value and competitiveness to agricultural products from São Paulo (Governo do Estado de São Paulo, 2019).

The "Cidadania no Campo - 2030" guidelines comprehend the following strategic areas:
I. Infrastructure;
II. Production, distribution, and sustainable consumption;
III. Sustainable Agronomics in São Paulo;

IV. Innovation, entrepreneurship, and promotion;
V. Health and food safety.

The 1989 São Paulo State Constitution states that the State should organize an integrated system of public agencies to promote the elaboration and execution of agricultural, agrarian and land development plans (Assembléia Legislativa do Estado de São Paulo, 1989). In order to implement the constitutionally determined objective, the State Integrated Agriculture and Supply System (SEIAA) was created, by means of Decree No. 40.103, dated May 25, 1995, and instituted a system aimed at integrating efforts between public entities and civil society, in the formulation and execution of the State Agricultural Plan (Governo do Estado de São Paulo, 1995).

The objectives of SEIAA highlight municipal participation, in providing efficient technical assistance and rural extension services, prioritizing those offered by the State to properties that fulfill a social function – especially the ones belonging to small and medium-sized rural producers in the State. SEIAA presented grounds for municipalization of services aimed at agriculture practice development and enabling partnerships (covenants) between the State and the Municipalities. The partnerships comprised both financial and economic resources: a R$ 20.000,00 transfer per year, on average, from the State to the Municipality, the availability of vehicles and state property use, and the appointment of a municipal official to provide technical support in rural areas.

SEIAA did not define specific criteria or guidelines for the transfer of resources, despite a strict audit and control of accounts rendered. The financial resources transferred were in low volume and had to be directed at current expenditures, that is, they served to cover daily expenses with little efficiency and low perception of benefits for the local rural population. In spite of SEIAA's objectives being broad and meeting the provisions of the State Constitution, we find that, at present, issues related to the rural environment involve more comprehensive and complex structures, and thus have led the Secretariat of Agriculture and Supply of the State of São Paulo to review its objectives and propose an expansion of the performance of public policies aimed at the rural population.

Considering the legal bases established by the State Constitution, in conjunction with public policy guidelines called "Cidadania no Campo - 2030", procedures for the participation of municipalities in the Integrated State System have been revised, aimed at guiding public policies within a regionalized view and integration between State and Municipalities, incorporating technical aspects to measure the performance of services provided and use of financial resources transferred to city halls, in order to

afford effective citizenship for the local population in the countryside.

Based on these precepts, as a renewal of the previous System, the "State System for Sustainable Rural Development – Cidadania no Campo" (SEDRUS) was created, by means of Decree No. 64.467 dated September 12, 2019, bringing, in its objectives, broader aspects than those of SEIAA, in order to provide efficient local rural development and promote citizenship for the rural population. Guidelines and criteria for the participation of municipalities in the System have been established, as well as mechanisms for evaluating the performance of city halls, used as a basis for priority access to state financial resources focused on fomenting agricultural development (Governo do Estado de São Paulo, 2019).

As a way of implementing the strategies of the new System, (Cidadania no Campo – Município Agro) the Agri City project has been developed, by means of Resolution SAA No. 40/2019, establishing the technical standards, procedures, criteria and mechanisms for evaluating performance and monitoring actions foreseen in the public policy guidelines "Cidadania no Campo - 2030" and in the SEIAA (Secretaria de Agricultura e Abastecimento, 2019).

Agri City

The Agri City project aims at implementing integrated actions with the Municipalities that decide to participate in the State System of Sustainable Rural Development - SEDRUS. Municipalities interested in participating in the new System adhere voluntarily to implement integrated actions established in the "Cidadania no Campo – Município Agro". The municipalities willing to participate formalize their adhesion and prove that they possess:

1. a functioning body or entity with an assignment compatible with the objectives of the system;
2. a Municipal Council for Rural Development.

For the implementation of integrated actions at regional level, the project foresees 10 Directives that guide local actions linked to agriculture and to the rural population, namely:
1. Institutional Structure
2. Rural infrastructure
3. Sustainable Production and Consumption
4. Agricultural Defense
5. Supply and Food Security
6. Social Strengthening of the Countryside
7. Soil and Water
8. Biodiversity
9. Resilience and Adaptation to Climate Change
10. Countryside-City Interaction
In each of the directives, actions are to be carried out by the municipalities in charge of sending pertinent documentation of implementation at each cycle. Such actions represent essential activities to guarantee citizenship for people who live in rural areas; 86% of these actions are related to management, whereas only 14% of the total require some investment on the part of the municipalities. The directives that guide the required actions and its related documents are:

1. Institutional Structure: Municipal actions related to improving municipal governance through instruments of inter-municipal partnerships (consortia) that forecast availability of budgets for public policies related to agriculture.

2. Rural Infrastructure: Municipal actions that improve collective physical infrastructure for the rural population, such as: improvement of rural roads, electricity, internet connectivity, sanitation, and public transportation.

3. Sustainable Production and Consumption: Municipal actions that improve public management practices related to the production and consumption of agricultural products, such as: public purchases, recognition of the agricultural product supply chain, proper disposal of waste, and appropriate use of pesticides.

4. Agricultural Defense: Actions and municipal infrastructure to inspect, accredit and guide production with the appropriate sanitary criteria.

5. Food Supply and Security: Actions that favor food and nutrition security regarding the availability of agricultural products and supply mechanisms for the population.

6. Social Strengthening of the Countryside: Actions that favor citizenship status for the population and access to public services such as: women's safety, public safety, education, employability, and incentives for young people and women to ensure rural succession, health, culture and leisure.

7. Soil and Water: Actions that favor the recovery and conservation of natural resources essential for sustainable agricultural activities, such as: conservation and recovery of soil, recovery of springs and water planning, with reference to territories with hydrographic basins.

8. Biodiversity: Biodiversity conservation actions related to sustainable agricultural activities, such as: Conservation of native forest areas, recovery and conservation of forest areas on rural property, control and prevention of invasive exotic species (fauna and flora).

9. Resilience and Adaptation to Climate Change: Prevention and planning actions to reduce the impact of activities emitting greenhouse gases, as well as the effects of climate change, such as planning the prevention and control of fires, floods, and erosion.

10. Countryside-City Interaction: Actions that favor the relationship between rural and urban areas, such as rural tourism and promotion of local production.

The municipalities that adhere to SEDRUS prove counterpart realization by sending documents prepared in accordance with the Secretariat of Agriculture's guidelines. The procedure is electronic (web system). The documents sent are subsequently analyzed by a commission of state officials trained to validate the presented counterpart realization proof.

The evaluation is carried out by a committee of 84 civil servers from the Department. For the evaluation process' isonomy, the analysis of each document is performed by subgroups composed of 3 (three) evaluators who grade it individually. The final result is calculated by the common grades of, at least, 2 (two) of the 3 (three) evaluators of the subgroup.

The final grades consented by, at least, two of the evaluators represent the municipality's performance in the project and establishes the classification of the participating municipalities. The maximum score attainable for the project is 100 points, with 10 points being attributed to each directive; the municipality that obtains 50 points is awarded certification and is given priority to receive public resources managed by the Secretariat.

The project is geared to stimulate innovation in public management practices and does so by attributing 20% of the grades for each Directive to projects that are not listed as actions, and represent any innovative public policy, service or product. The classification of municipalities is a requirement for partnerships with the State government in the implementation of public policies related to SEDRUS. The municipalities that have the best performance in the classification have priority access to financial resources managed by the State.

Project management is carried out by a multidisciplinary team from the Department with representatives, and those responsible for the themes of the 10 Directives. They are accompanied by the team of the evaluators' committee, which is composed of state government employees allocated in regional units in the area, responsible for the rural extension of the state. The project also provides technical support for the municipalities that present the poorest performances, as well as a database of projects that aims to publicize innovative and efficient projects that might serve as solutions for other municipal administrations.

Due to its continuous design improvement, with the objective of strengthening municipal institutions, a shorter pilot cycle for the validation of the methodology was operated in 2019. The same had been initially applied within the scope of the first System, SEIAA. In this stage of validation, which took place in July 2019, a self-declaration questionnaire was used, requesting information on the existence of actions related to the 10 Directives. The information collected became the reference point to establish the criteria for the transfer of financial resources that year. 250 municipalities participated, with 10 receiving amounts according to the following distribution:

I - the 1st classified would receive a transfer in the amount of R$ 500,000.00;

II - the 2nd classified would receive a transfer in the amount of R$ 250,000.00;

III - the 3rd classified would receive a transfer in the amount of R$ 125,000.00;

IV - the 4th to the 10th classified would each receive an individual transfer (each Municipality) in the amount of R$ 62,500.00.

The result was essential to understand that the project would be able to guarantee isonomy, as well as contemplate smaller municipalities with less resources available to carry out the activities, that is, ensuring that the evaluation was focused on activities related to management.

At the end of 2019, the 19/20 cycle was launched, already according to the SEDRUS legislation, whose activities and supporting documents were presented in February 2020. In this cycle, 400 municipalities with spontaneous adhesion participated, of which 316 sent some supporting documentation. The analysis of the documents will culminate in a ranking of São Paulo municipalities that will have preferential and meritocratic access to the budgetary resources and projects of the Secretariat, while those who obtained, at least, 50 points will receive the Agri City Certificate of Recognition.

The State of São Paulo has 645 municipalities, of which 427 are already participating in the System nowadays and will continue to participate in the 2020/2021 Cycle.

Advantages

"Cidadania no Campo – 2030" public policy brings a new look to the department, enabling all its areas and institutions to join in a public policy directed towards the same objectives and the same mission: that of promoting the sustainable supply of healthy and safe foods, fibers, and bioenergy, through research, innovation, entrepreneurship and risk management, modernizing the infrastructure of the countryside, the land husbandry and use of natural resources, adding value and competitiveness to products for better life quality of the population.

It is possible to expand this vision to another level of governance and local action, promoting the strengthening of municipal institutions, as well as the population engagement in the formulation of public

policies, through municipal councils. As a result, it will allow for an expansion of the scope of action from city halls to the rural territory, favoring the population that lives there. In addition to establishing the local agenda, the State is responsible for providing technical support to municipalities, so that the proposed activities are carried out. Much will be gained in research and innovation, long-term vision, continuous improvement, equitable development, and transparency, regarding the criteria for access to the policies and resources of the state government and meritocracy.

Conclusion

Considering the toolset for effective and innovative public management as presented by Cohen, Eimicke & Heikkila (2013), the "Cidadania no Campo – 2030" case illustrates mid-term strategic planning and a public policy that has been designed to redirect the focus of the department and its deliverables by placing citizens as priority. The fact that it was introduced as a Decree gives the policy even more strength. It has enabled the department to reengineer itself and the way it relates to its stakeholders; the Agri City project also engaged a new federative level committed to State public policy and its goals, focusing on improving local governance, strengthening the institutions and their relations with the citizens, as well as promoting continuous improvements, thus providing total quality management. According to the cities' ranking, it is possible to benchmark their performance and be aware of how well the projects are being deployed; the case presented involves a wide range of stakeholders, i.e., the staff in the department, the mayors and local staff, other secretariats at the state and city levels, as well as all other partners, such as rural unions, producers, councilmen and so on. It resulted in the engagement of people and teams to allow for the establishment of new partnerships with and within institutions, organizations, and the private sector.

Considering the "strategic triangle" approach, by Moore & Khagram (2004), the project allowed the department to increase perception of its stakeholders, creating public value by designing change and innovation processes that set the needs of society, whilst increasing local operational capability with technical assistance from the State. The project engagement of 460 out of 645 state municipalities, in its first full cycle, evinced the support and legitimacy being given to the public policy. It created a new relationship with municipalities and has become a learn-by-doing process, once it aimed to understand their needs and difficulties on management and governance. The main challenge here was to bring the stakeholders on board and get their commitment, especially the Mayors. This was overcome when we brought the higher-level leaders – Secretary of State – and political agents to endorse the program and the idea of meritocracy. With two successful cycles now, the program has shown its operational capability. It will still take some more cycles to verify the accomplishments and improvements made by the cities towards more strengthened local institutions, but the case unfolding in the State of São Paulo already shows important results in the realm of public policy being achieved by the "Cidadania no Campo – 2030".

References

Assembléia Legislativa do Estado de São Paulo (1989). Constituição Estadual de 5 de outubro de 1989.

Cohen, S. & Eimicke,W. (1995). Understanding and Applying Innovation Strategies in the Public Sector.

Cohen, S., Eimicke, W, & Heikkila, T. (2013). The Effective Public Manager – Achieving Success in Government Organizations – Fifth Edition.

Confederação Nacional de Municípios (2020). Federação Brasileira e o Ente Público Município. https://www2.camara.leg.br/atividade-legislativa/comissoes/comissoes-temporarias/especiais/55a-legislatura/pacto-federativo/documentos/audiencias-publicas/14-04-2015-apresentacao-do-sr-paulo-ziulkoski-presidente-da-cnm.

Governo do Estado de São Paulo (1995). Decreto nº 40.103 de 25 de maio de 1995 - Organiza o Sistema Estadual Integrado de Agricultura e Abastecimento e dá providências correlatas.

Governos do Estado de São Paulo (2019). Decreto 64.320 de 05 de julho de 2019 - Reformula o Sistema Estadual Integrado de Agricultura e Abastecimento, instituído pelo Decreto nº 40.103, de 25 de maio de 1995, e dá providências correlatas.

Governos do Estado de São Paulo (2019). Decreto nº 64.467 de 12 de setembro de 2019 - Reformula o Sistema Estadual Integrado de Agricultura e Abastecimento, instituído pelo Decreto nº 40.103, de 25 de maio de 1995, e dá providências correlatas.

Moore, M. (2002). Creating public value: Strategic management in government.

Moore, M. & Khragram, S. (2004). On creating public value. What business might learn from government about strategic management. Working Paper: Corporate Social Responsibility Initiative – Harvard University.

Oliveira, V. (2013). Planejamento estratégico e evolução do modelo de gestão da cidade do Rio de Janeiro: Um estudo investigado sob a ótica da modernização da

administração pública no Brasil, Master Dissertation, Escola Brasileira de Administração Pública e de Empresas, Rio de Janeiro.

Partnership for Public Services & IDEO (2010). Innovation in government, pg. 6.

Saad, L. (2015). Governos eficientes e serviços públicos efetivos: Contribuições a partir da teoria de valor público, Master Dissertation, Escola de Administração de Empresas de São Paulo, São Paulo.

Secretaria de Agricultura do Estado de São Paulo (2020). Secretaria de Agricultura e Abastecimento completa 127 anos: conheça um pouco de sua história. https://www.agricultura.sp.gov.br/noticias/secretaria-de-agricultura-e-abastecimento-completa-127-anos-conheca-um-pouco-de-sua-historia/

Secretaria de Agricultura e Abastecimento (2019). Resolução SAA nº 40 de 28 de setembro de 2019 - Institui as normas técnicas, procedimentos, critérios e mecanismos de avaliação de desempenho e monitoramento de ações, denominadas Cidadania no Campo - Município Agro, conforme previsto nos Decretos Estaduais 64.320/2019 e 64.647/2019 - Sistema Estadual de Desenvolvimento Rural Sustentável – Cidadania no Campo.

Soldi, R. (2013). Planejamento, Desenvolvimento Regional e o Papel Do Estado: Estudo Comparativo Entre o Estado Brasileiro e o Est

9

DEVELOPING THE ENFORCEMENT SYSTEM AT ZERO COST

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DEVELOPING THE ENFORCEMENT SYSTEM AT ZERO COST

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Abstract

In Brazil, most of the Information Technology (IT) support is provided by a third party, through contracts. The public servants' role is to supervise those contracts, in order to guarantee their correct execution. Previous enforcement systems had been developed to support all enforcement activities. This was done based on the business rules defined by each business area, but not always what was asked to be implemented in the system corresponded to what had been done. The process of correction was very complex. We will show here, that having a system developed by public servants working in the same business area, qualified with the required software development knowledge, makes it crucial to deliver a product more in line with what should be done. Our article will draw attention to the pioneering work performed by the public servants of the Department of Enforcement Support of the Brazilian National Telecommunications Agency when developing the enforcement system at zero cost.

Introduction

"If you want something done well, do it yourself!" That was once said by the great French politician leader Napoleon Bonaparte, meaning that, if you desire success, you should do it and depend upon yourself (Napoleon Bonaparte Quotes). A country's public service is meant to serve well any citizen in a community, city or state. Brazil has many public services that are usually provided by the government (public sector). These services are the main ones to be closely monitored by its population. Among them, telecommunication is the service that reaches every single person, so that, for example, if a person's network signal or internet connection is down, they will certainly feel very frustrated.

Public administration in Brazil is divided in direct and indirect. Public foundations, executive agencies, and regulators are some examples of federal autarchies – organs that are an integral part of indirect public administration (Presidency of the Republic of Brazil, n.d.). These autarchies are created by a law that permits them to execute a specific task, and each one regulates a single public service as a regulator agency. These regulatory agencies were created to monitor the delivery of public services by private companies. In addition to controlling the quality of the service delivered, they also establish rules for the sector (Presidency of the Republic of Brazil, n.d.).

The National Agency of Telecommunications (ANATEL) is the public organization responsible for organizing the operation of telecommunication services and for regulating its methods (Telecommunication Organization and Creation of Regulator

Body Act of 1995). It is administratively independent and financially autonomous, conducting enforcement activities and maintaining close contact with society through Regional Offices and Operating Units located in each of the Brazilian capitals (Brazilian National Telecommunications Agency, 2015). The organizational structure responsible for conducting the enforcement tasks is the Superintendence of Enforcement, with two subordinated departments: the Department of Enforcement and the Department of Enforcement Support.

The enforcement activities are one of the most important activities conducted by ANATEL, and to be carried out both effectively and efficiently, it is supported by a variety of enforcement instruments, officers, and systems. Enforcement systems have the potential to optimize the enforcement officer's role, if well designed. Anatel was created in the mid-90s, and the information technology (IT) systems were developed using an old development platform, compared to today. Over the years, the system that supported the enforcement activities was getting obsolete. It has been upgraded – in terms of programming language development – as the business requirements have been naturally modified.

From the mid-90s until the beginning of the 2000s, the software development process was very detailed and quite formal. The Unified Software Development Process describes, apart from the unified generic process, and the different activities in developing a software system, different models developed and evolved during the lifecycle of a system. The Unified Process is an iterative and incremental development process (Jacobson et al., 1999). It has process has four phases and in each one there are more about nine disciplines. When a system bug or a new feature needs to be addressed, the software development process can be painful, until a new functionality is delivered to the stakeholders for use. An important point of note is that, in Brazil, the software development support is provided by a third party through contracts, like software development and maintenance. The main role of the public servants is, in this case, reduced to the supervision of those contracts, in order to guarantee the perfect contractual execution, leaving the execution work to the outsourced personal.

The enforcement system was developed based on the business rules defined by the enforcement area, but not always what was asked to be added as a feature in the system was done correctly, and the correction process was very complex.

This development process lasted for 15 years (up to the mid-2010s), resulting in two enforcement systems written in an outdated programming language, where any change in the business rules or a bug fix resulted in a long process of development towards the effective delivery of the system functionality. Besides, any simple new feature on the system had to follow all the software development process.

In 2015, a question was asked: how to evolve the enforcement system, so that any new need could be made with minimal coding intervention to optimize the officers' job? After a failed attempt to develop a process-based enforcement system, the main discussion revolved around what would be the best strategy to solve the previous problems related to excessive coding and delay in product delivery. In this scenario, the Department of Enforcement Support was responsible for addressing the problem: choosing the premises for the development framework and the enforcement officers that would help to develop the system at zero cost.

We will show that having a system developed by public servants that work directly in the business area, and that retain the software development knowledge plays a crucial role in delivering a product more in line with what should be done. The key point lies in developing a system without third parties' involvement, with no risk of misunderstandings. We will now draw the attention to the innovative and pioneering work done by public servants developing the enforcement system at zero cost.

Legacy of the Enforcement System

Features of the Software Development Process

Since ANATEL's creation, up to 2015, there were two enforcement systems supporting public servants' activities during their work as enforcement officers. Both were developed through software development contracts, managed by the IT Department, responsible for the software development process. During these years, the unified software development process was widely used to develop and maintain any system at Anatel, including the enforcement system.

At that time, the software development process was based on executing as many interactions as needed, per passing disciplines in each of the four phases, as shown in Figure 1 (Kruchten, 2003).

The process was started when the business area demanded the IT Department, either to build a new system, or to evolve an existing one. Then, all phases and disciplines of the unified process were executed. In general, it took about four months to have simple functionality in the production environment. The enforcement system was very complex, so that the delivery time for each functionality would take longer than other systems. The IT Department had to manage all the development work, from requirement specification to system's deployment in the production environment.

Figure 1
The Whales Chart of the Unified Software Development Process
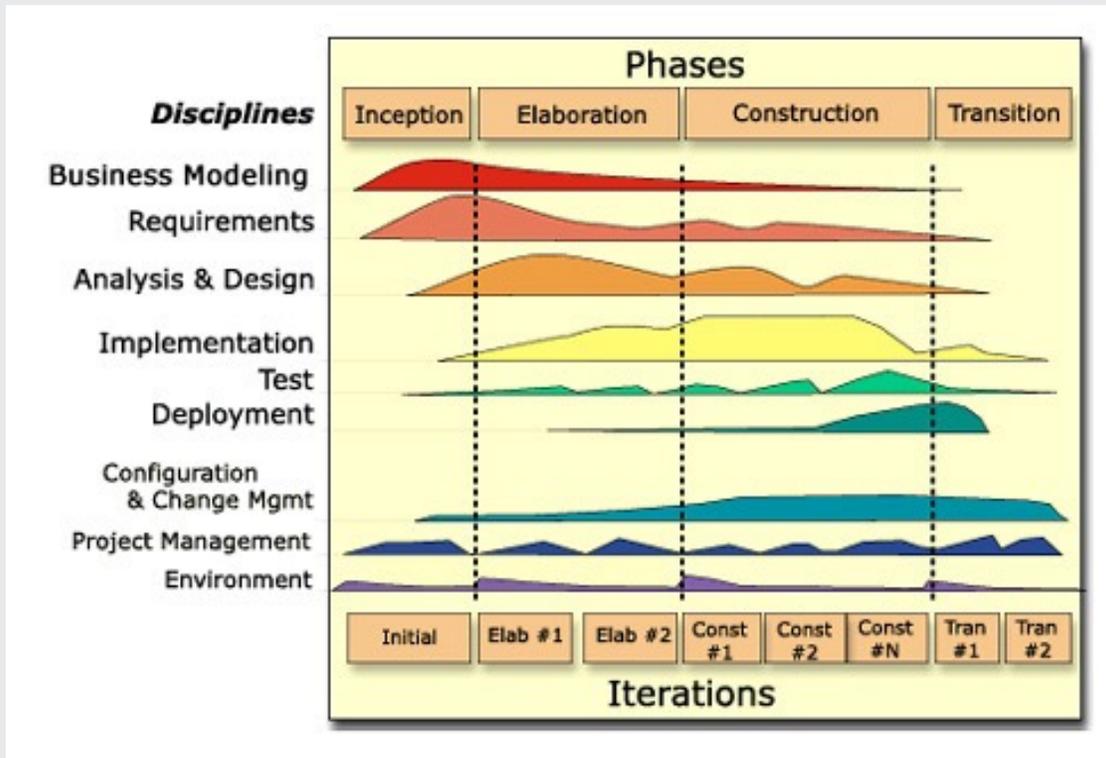
Note. This chart is known as the whales chart due to the appearance of a whale in each discipline.

The Department of Enforcement Support, like any other business area, was responsible for the business requirement definition and system approval. The basic workflow for developing a system was:

a) The business area demanded a new system or functionality;

b) The IT Department received the demand and started the requirement specification and coding;

c) Once the coding had been completed, the business area started the system approval;

d) After the approval, the system could be deployed in the production environment.

For years, a great amount of money was invested in developing the enforcement system through IT software development contracts. Sometimes, a simple form field or report change meant weeks of development at a high cost. Another common situation was when the system presented a bug issue (e.g., coding error, database inconsistency) that implied in more expenditure on development and error maintenance.

After years of working in this system development format, and knowing that the systems have a limited lifetime, due to the evolution in software development technologies, the Department of Enforcement Support started to look inside the existing system problems and redefined its business rules, in order to choose a better strategy for its use.

Problems

The enforcement system was supposed to ease the officers' job and optimize their working time. However, there was a time in which data inconsistency issues and codification errors became normal, and the system reliability was low. Even generating a report without having to manipulate data afterward was difficult.

The business processes implemented in the system no longer reflected the culture or the reality of enforcement activities, causing a gap between system and business rules. The inappropriate requirement survey and validation explain this gap, as well as the implementation of non-rationalized and documented business processes. It is also explained by the difficulty of adapting the system to changes in business rules, due its low parameterization, the non-standardized tables, and the existence of logical relationships within the application code itself, and not in its database. It is accurate to say that the system, not only failed to contribute productively, but also started to hinder the planning, execution, and accountability of enforcement activities, losing focus on enforcement actions (e.g., the complexity of entries on enforcement officers' agendas, excessive focus on enforcement hour control), no longer adding value to the dynamics of the enforcement processes.

The system did not interact well with some corporate solutions to provide simplified access to the technical databases necessary to carry out enforcement actions. The system's data integrity had been compromised by manual interventions directly to its database, simplified business rules implementation, and system errors presented during the system's use.

The enforcement system never provided support for in loco enforcement, featuring more like a pointing tool, than an instrument for guiding and facilitating enforcement actions. Despite its strong strand for management control, even to this objective, insufficient support was provided regarding quality, reliability, and completeness of the information extracted from the system.

The fact that people had to adapt to the system, and not the other way around, brought negative, technical and human effects, disturbing and burdening enforcement activities and, consequently, corporate deficit results. Traceability of information overtime was not widely disseminated in the system. This was only possible for specific aspects, such as the life cycle history of an enforcement action. The system had few histories (logs). The enforcement system was part of an outdated corporate technological context. Its development platform was based on a set of basic libraries for processing server-side scripting languages for generating dynamic web content (ASP - Active Server Pages) that had long ceased to be an industry standard and whose integration with other technologies was difficult to achieve.

Although the enforcement processes are a workflow based on business rules, the enforcement system was based on a programming methodology relying on database procedures. Carrying out adjustments, when changes in regulations occurred (Brazilian National Telecommunications Agency, 2016), was too costly.

Decision Making

Solutions

It was clear that the enforcement system had to be upgraded, whether by developing a new system from scratch, carrying out evolutionary maintenance on the current system, adopting an existing platform, or buying a closed solution.

With the system problems mapped, the Department of Enforcement Support demanded the IT Department a new enforcement system that could achieve the following goals:
1. Promote the improvement of the telecommunication service provision's performance.
2. Intensify and improve the use of IT in regulation.

In addition, the new enforcement demand intended to target the following benefits:
1. Efficiency: application of the available resources in the most rational way, expecting to increase the enforcement processes quality; the reduction of errors in repetitive and complex tasks; better integration among business processes, and the handoff reduction in administrative processes.
2. Efficacy: decrease in the time spent on Anatel's enforcement processes, especially those used by society.
3. Effectiveness and Economy: productivity increase and reduced costs in enforcement processes.

The IT Department started to elaborate a preliminary technical study (Brazilian National Telecommunications Agency, 2016) to prospect, analyze, and list possible solutions that met the enforcement system's requirements. Based on them, a function point (FP) was estimated. The measure was made to evaluate the cost and deadline for developing a new system. The count was around 1650 FP, according to the counting methods of the IFPUG counting practices manual (IFPUG, 2010). The FP cost of the existing IT development contract was around R$500,00 to develop new systems and R$730,00 to evolve and adapt existing systems. During this work, some visits to other regulatory agencies occurred, in order to learn about their enforcement systems, and if they met the business requirements.

After the ETP was concluded, there were six possible solutions for the new enforcement system:
1. Evolution of the Enforcement System in operation at other regulatory agencies.
2. Development of a new enforcement system.
3. Enforcement Workflow using Turbina (proprietary solution).
4. Enforcement Workflow at Redmine (open-source project management web application).
5. Enforcement Workflow at SEI (open-source electronic information system).
6. Evolution and adaptation of the existing enforcement system.

During a meeting, the Department of Enforcement Support team understood that the open-sourced platform Redmine, distributed by the GNU General Public License v2 (GPL) and already in use at Anatel and other public agencies, was a strong candidate solution for the enforcement system. After that, a proof of concept (POC) with Redmine platform was conducted by the Department of Enforcement Support, to test the feasibility of its adoption as the new enforcement system. Each Regional Office and Operating Unit subordinated to the Superintendence of Enforcement participated in the POC. The general evaluation was that Redmine proved to be appropriate for controlling and monitoring enforcement

activities, and that the assessment of the tool was satisfactory.

The IT Department team finished the ETP, after analyzing each of the possible solutions listed above – their characteristics, costs, advantages and disadvantages (Brazilian National Telecommunications Agency, 2016) – as follows:

1. Evolution of the enforcement system in operation at other regulatory agencies: this solution would only meet 10% of the business rules and an estimated cost of R$740.000,00 to evolve the remaining 90% of the business requirements. This solution was not recommended to be adopted.

2. Development of a new enforcement system: this would fully meet all business rules. A cost of R$825.000,00 was estimated, in order to develop a whole new system. This solution was recommended, despite its high cost.

3. Enforcement Workflow using Turbina (proprietary solution): this solution would need a specific development support contract, and it was not recommended.

4. Enforcement Workflow at Redmine (open-source project management web application): this solution would only meet 50% of the business rules and an estimated cost of R$410.000,00 to evolve the remaining 50% of the business requirements. It was recommended to be adopted with reservations.

5. Enforcement Workflow at SEI (open-source electronic information system): it was not recommended, due to the associated high cost of R$1.080.000,00 to plugin evolution.

6. Evolution and adaptation of the existing enforcement system: this solution would fully meet all business rules and an estimated cost of R$720.000,00 to evolve the remaining 50% of the business requirements. This solution was not recommended to be adopted, due to its high cost, and because the technological platform would continue to be outdated.
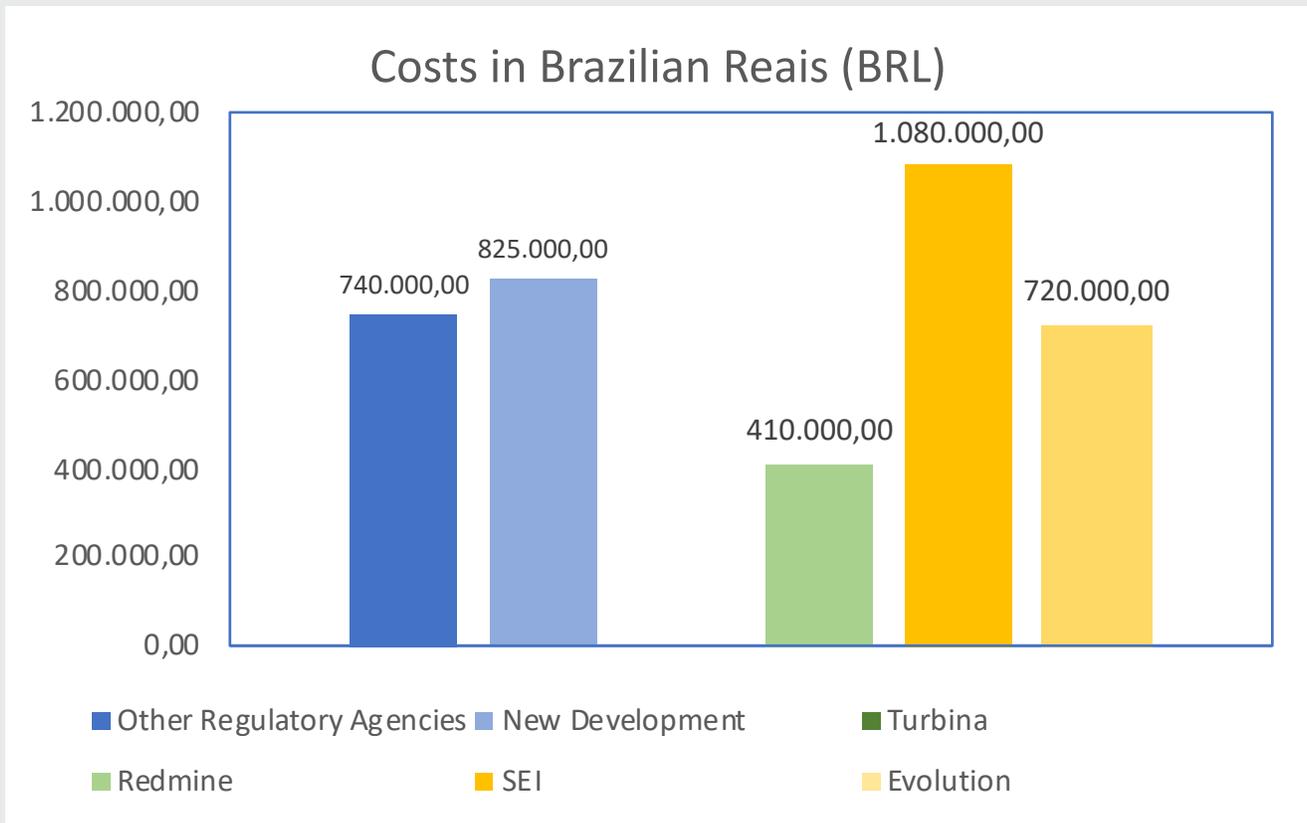
Figures 2 and 3 below show the percentage of fulfillment of business requirements and the cost for each solution.

Figure 2
Solution Business Requirements Fulfillment
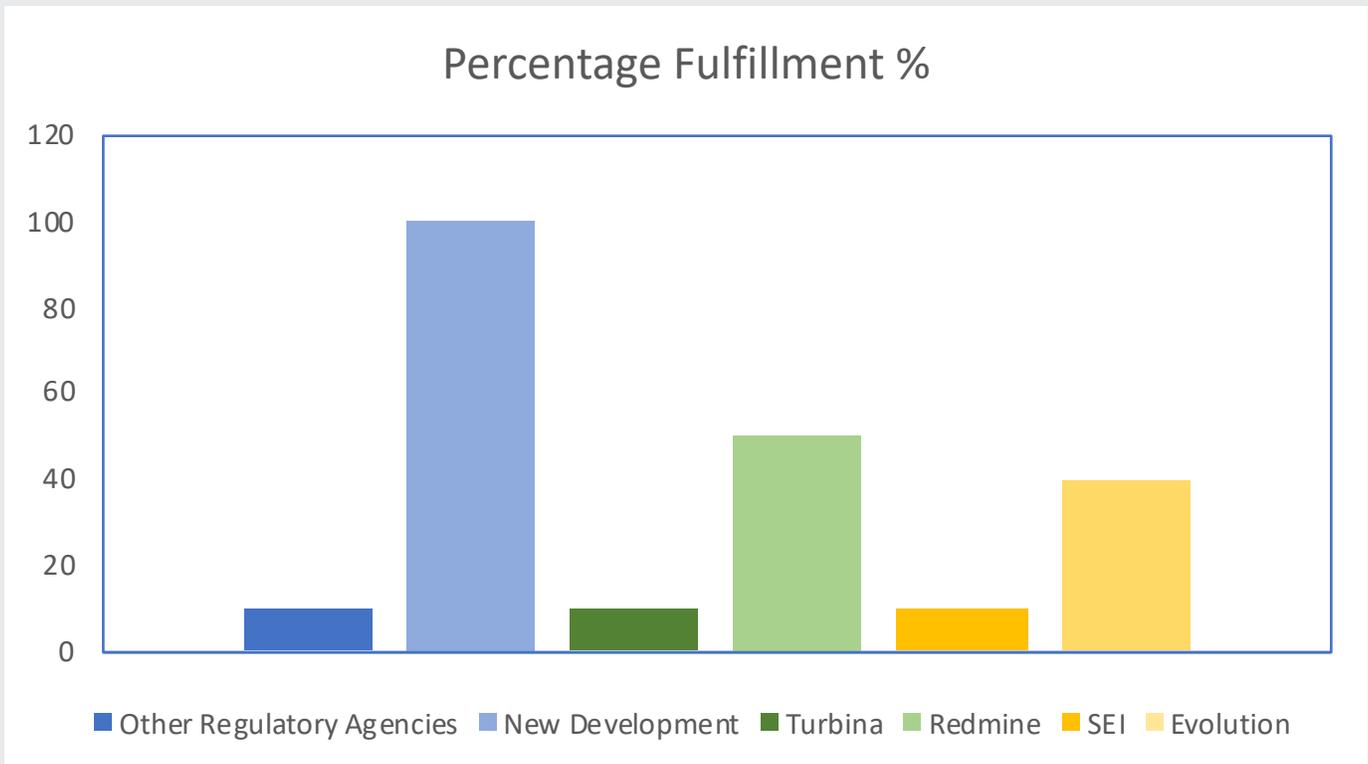
Note. Percentage of meeting business requirements.

Figure 3
Solution Business Requirements Fulfillment

Note. The Turbina solution cost was not possible to be measured.

Choosing the platform

Before making the decision of which solution was the best for the new enforcement system, some premises were defined, in order to guide the best solution choice: (a) open-sourced; (b) any customization would not involve the application core (c) model-view-controller (MVC) platform; (d) integration based on web services, instead of based on database procedures; (e) configuration of the business process without coding.; (f) form creation without coding; and (g) ensuring data consistency throughout the business process lifecycle. According to these premises, it was possible to choose the best solution.

Among all possibilities, based on Figures 2 and 3, the best solution for the new enforcement system was to develop the enforcement workflow using the Redmine platform, as it fulfilled all premises, had the lowest cost to achieve all further business requirements and could be used for the enforcement activity management in the short time. The POC conclusion, carried out with the Redmine platform, ratified the Redmine choice, as it would meet the essential business requirements, such as planning and monitoring enforcement field actions.

As previously said, the Redmine platform fulfilled 50% of the business requirements, leaving others, such as (a) georeferencing; (b) route planning; (c) offline mobile

application; and (d) integrations with other Anatel systems for further development, once the initial version of the system had been deployed in the production environment, and was already being used by the target audience. The system's name was defined as "Fiscaliza", after a survey with all the enforcement stakeholders was carried out.

Development Methodology

During a meeting with both Enforcement and IT Superintendencies , it was decided that the Department of Enforcement Support's responsibility, concerning the development of the new system, was limited to the platform resources: (a) customizations of the Fiscaliza system through the development of plugins, including those offered by the Redmine community; (b) assessment and distribution of demands registered in the Fiscaliza system; (c) supervision of the Fiscaliza system administration, including the creation of personalized queries to be available to more than one profile; management of forms, user profiles/groups, and enforcement workflow; (d) management of the test environment (TS) for carrying out various tests at Fiscaliza system in Anatel's own environment.

Redmine customization and configuration would also be in charge of the Department of Enforcement Support, backed by the IT Department, concerning: (a)

management of development (DS), homologation (HM) and production (PD) environments that required an administration profile in those environments; (b) backup of directories and databases, according to IT's policy; (c) configuration and update of the Redmine platform; (d) plugin installation and update; (e) configuration and update of the version of Ruby on Rails (RoR) and other necessary packages; (f) implementation of the necessary evolutions or development of the legacy systems to which Fiscaliza needs to be integrated in the web services; (g) managing aspects of network security, continuity and stability of the system; (h) inclusion of external users in the necessary environments, in order to allow access to Fiscaliza through LDAP authentication; and (i) support for development demands, whenever needed and requested by the Department of Enforcement Support.

Redmine is a flexible project management web application written with the Ruby on Rails (RoR) framework. It is cross-platform and cross-database. Besides, it is open source and released under the GNU General Public License v2 (GNU, 1991) terms. The remaining business requirements would be met through the development of plugins, as one of the premises was to keep the platform core unit unbroken, in order to keep its integrity. The responsibility for Redmine's customization was handed to the Department of Enforcement Support, and public servants allocated in this Department started developing the first main plugin to customize the Fiscaliza system. Three public servants were responsible for developing the plugins. The motto was to program as little as possible, to enable any system configuration using the system itself. Within a six-month period, the public servants learned the RoR programming language and developed the first plugin for the Fiscaliza system, which would be the system's core plugin. The focus of developing plugins was to give the system administrators the capability to do any configuration with minimal coding, that is, the major programming effort was put on developing the plugin. Further activities were supposed to be executed by the system itself.

After six more months of work configuring the business flows, creating the main forms, profiles and user groups, defining roles and conducting tests, the Fiscaliza system was deployed in the production environment, at the end of the year 2018. At this point, only public servants from the Department of Enforcement Support were involved in the development and configuration of the Fiscaliza system. However, the workload was too heavy to meet the remaining business requirements in the system, with only three public servants available, and it would take a long time to fulfill them. Thus, after asking all Anatel's regional offices to indicate public servants with programming language knowledge, a working group named "GT-Fiscaliza" was created, so that the requirements could be met more quickly. The working group was composed of public servants with deep knowledge of enforcement activities and systems development. GT-Fiscaliza brought a great expectation: that what would be developed for the Fiscaliza system corresponded to the enforcement officer's real needs.

Working Group

After the Fiscaliza system had been deployed, many new demands, suggestions, and questions were registered in the system, while being used. This was predictable because Fiscaliza was a new system, based on a new framework and a new visual interface. Some of these demands were really necessary or relevant for the enforcement workflow, but counting on just three public servants developing the plugins and attending other demands of the Department of Enforcement Support, made it almost impossible to implement those ideas in the short term. It is important to keep in mind that the IT Department would not be able to help at that moment, because of its existing development contract (plugins building). This was one of the duties defined for the Department of Enforcement Support, with previous agreement between the parties.

Considering this, GT-Fiscaliza was created to allow decentralized administration of the Fiscaliza system, in line with the strategic project of Regional Governance, in order to guarantee the unification of the procedures related to the control of the enforcement actions, also including an evolution proposal, new implementations, in-depth knowledge of the Redmine platform, as well as basic knowledge of the development language. GT-Fiscaliza was created to streamline the implementation of the demands arising from the various public servants of the decentralized units, mostly. This working group was composed of public servants who work directly with the enforcement process at Regional Offices. GT-Fiscaliza consists of five public servants from the regional offices and operational units, along with the three public servants that work at the Department of Enforcement Support.

After the institution of GT-Fiscaliza, the first meeting goal was to level the knowledge about the Redmine platform technology and define development priorities for the next six months. The learning curve about the Redmine framework – which included the Ruby programming language and Rails's framework itself – was low, compared to other development frameworks. This was possible, due to previous knowledge in programming logic and by the previous leveling meeting about the Redmine framework. After GT-Fiscaliza's first meeting, it was decided that the working group would be meeting on a weekly basis – every Thursday – , to monitor activities and present results.

Results

Within a six-month period working with GT-Fiscaliza, the ease of interaction between members related to the development of the Fiscaliza system and the Redmine framework was noticeable. Each member helped each other with the concepts of the Redmine framework and the enforcement activities. One of the big milestones was the recognition – by the enforcement officers – that the development and customization methodology used for the Fiscaliza system was well chosen. Besides that, during an enforcement officers' meeting, at the end of 2019, the GT-Fiscaliza members were presented in person, which favored the strengthening of the previously established bonds.

Positive results can be identified, regarding the development methodology and the creation of the GT-Fiscaliza. They are:
1. Delivery time of demands: the delivery time of development for the Fiscaliza system was reduced, compared to its previous enforcement system.
2. System Errors: the system's bugs were drastically reduced, due to minimization of programming errors. The only issues perceived were related to the system user permissions, which were not configured as a system error.
3. Database integrity: The database remained intact, due to the fact that Redmine framework uses the concept of Object Relational Mapping (ORM), which guarantees data consistency throughout the life cycle of the system process.
4. Business rules: the Fiscaliza system is being developed by public servants who work directly with enforcement activities. The implemented business rules domain remains in the business area, instead of being under the domain of third parties.
5. Integration Plugin to SEI system: the plugin development has solved a great problem of working with two systems every day. It reduced usage time between the Fiscaliza and SEI systems and simplified the enforcement officers' work.

Conclusion

Developing a Zero Cost System

Evolving the enforcement system to work with minimal coding intervention was a complex decision for solving previous problems related to mass coding and delay in product delivery. The best choice to address this problem was to choose the Redmine development framework, that fulfilled the premises for the enforcement system. Allied to this, a system development carried out by public servants, with software development knowledge, made a big difference in terms of economy, delivering a product more in line with the business rules, with zero risk of misunderstandings and system features delivered in a short time.

This methodology was an innovative and pioneer approach towards developing an enforcement system at zero cost, made by the Department of Enforcement Support through its public servants and GT-Fiscaliza.

Directions for Future Works

Considering that having public servants developing a system at zero cost in Brazil is innovative and consistent with ANATEL's philosophy, since its creation (1997), there is additional work to be done. Part of this work and improvement was discussed within GT-Fiscaliza, and some of the topics brought up were: (a) the source code versioning of the developed plugins, to maintain traceability and maintenance; (b) mapping of the development process that resulted in the new enforcement system; and (c) execution of this development methodology in other areas of Anatel or other public administration bodies.

The traditional software development process generates unnecessary costs. Moreover, the business intelligence remains with third parties, as they build the system business logic. Therefore, developing ANATEL's own enforcement system has been especially relevant, when it comes to saving an ensuring that business intelligence remains in the public agency. This methodology came to remedy unnecessary expenses and bring reliability in the use of the enforcement system effectively.

References

Napoleon Bonaparte Quotes. (n.d.). BrainyQuote.com. Retrieved June 25, 2020, from https://www.brainyquote.com/quotes/napoleon_bonaparte_108864

Telecommunication Organization and Regulator Creation Act, Brazil Pub. L. 9472 of 1995.

Brazilian National Telecommunications Agency. (2015, Jan 26). Institutional. Federal Government. Retrieved June 25, 2020, from https://www.Anatel.gov.br/institucional/en-institucional

Presidency of the Republic of Brazil. (n.d.). Local authorities. Federal Government. Retrieved June 28, 2020, from http://www.brazil.gov.br/government/how-the-government-works/local-authorities

Presidency of the Republic of Brazil. (n.d.). Regulatory Agencies. Federal Government. Retrieved June 28, 2020, from http://www.brazil.gov.br/government/how-the-government-works/regulatory-agencies

Jacobson, I., Booch, G., & Rumbaugh, J. (1999). The

Unified Software Development Process. Addison-Wesley. Kruchten, P. (2003). The Rational Unified Process: An Introduction. Third Edition, Addison-Wesley Professional: Reading, MA.

IFPUG. (2010). Counting Practices Manual. Version 4.3. GNU. (1991, Jun). GNU General Public License, version 2. GNU Operating System. Retrieved July 05, 2020, from http://www.gnu.org/licenses/old-licenses/gpl-2.0.en.html

Brazilian National Telecommunications Agency. Superintendence of Enforcement. (2016, Apr). Demand Officialization Document. Retrieved from shorturl.at/nvzCO

Brazilian National Telecommunications Agency. Superintendence of IT. (2016, Nov). Preliminary Technical Study. Retrieved from shorturl.at/aqxH5

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ARTIFICIAL INTELLIGENCE FOR PUBLIC INTEREST: APPLICATIONS FOR ENVIRONMENT, SOCIAL IMPACT, HEALTH, ACCESSIBILITY, AND URBAN ENVIRONMENT.

LUCIA DE TOLEDO RODRIGUES

ARTIFICIAL INTELLIGENCE FOR PUBLIC INTEREST: APPLICATIONS FOR ENVIRONMENT, SOCIAL IMPACT, HEALTH, ACCESSIBILITY, AND URBAN ENVIRONMENT.

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Keywords: Artificial Intelligence, Social Impact, Environment, Sustainability, Public Policy.

1. Background

Artificial Intelligence (AI) has been attracting interest from the media, government agencies, academia, private sector, nonprofit institutions, and society. But AI is not exactly new. John McCarthy was the first researcher to mention machine learning and therefore is considered its creator. Along with Alan Turing, Herbert A. Simon, Allen Newell and Marvin Minsky, in 1955 McCarthy invented the term "artificial intelligence," and in the summer of 1956, organized the well-known Dartmouth conference [1], an event that is considered the beginning of AI as a field. Its attenders would become the leaders of AI research for years.

From its early years to present days, AI has faced ups and downs in the public interest. The availability of enormous volumes of data and massive progress in computing have taken society to a singular and stimulating chapter in AI history. Today, much has been said about the power of AI to generate a positive impact on society and the environment. However, ethics and privacy aspects of machine learning have also raised concerns.

1.1 What is AI?

Artificial Intelligence is, perhaps, one of the most complex and astonishing invention of humanity so far. AI can be defined as a group of technologies and methods comprising statistical and symbolic[2] approach, with the intention to reproduce aspects of human intelligence. AI carries out a diverse range of tasks, "mostly preceding analytical, analytical mostly preceding intuitive, and intuitive mostly preceding empathetic intelligence[3]".

AI depends strongly on data since its functionality is heavily connected with statistics, mathematics, and logic. However, data alone is not enough. In order to produce relevant machine learning results, it is also necessary to clearly define goals to be achieved or questions to be answered.

One might ask the difference between AI and traditional computing, or even excel spreadsheets. The main difference relies on the ability of AI solutions to learn from data. Therefore, it is crucial to define what results you want to produce with the data available.

A   Mini-CV
1   Kaplan, Andreas; Haenlein, Michael (2019). "Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence". Business Horizons. 62: pg. 15–25

2   Hoehndorf, R.; Queralt-Rosinach, (2018) N. Data Science and symbolic AI: Synergies, challenges, and opportunities. Data Sci. 1, pg. 27–38.
3   Jayden Khakurel, Birgit Penzenstadler , Jari Porras, Antti Knutas and Wenlu Zhang (2018) The Rise of Artificial Intelligence under the Lens. Pg 2

Table 1 - Common types of artificial intelligence models

APPROACH	DESCRIPTION
Statistical learning methods and classifiers	It is the simplest application of AI. It uses classifying settings to infer actions or conclusions, commonly using a learning algorithm capable of recognizing patterns in a dataset and regulating the program action accordingly[B].
Logic	Knowledge representation and problem-solving using analysis and appraisal of arguments. Logic uses effective rules based on the acceptance of one proposition, on the basis of a set of other propositions (premises)[C].
Search and optimization	Searching for a track that starts with premises reaching to conclusions, using methods of problem-solving or self-discovery, with a practical approach that is not certain to be optimal, but enough for achieving a fast, short-term goal or approximation[D].
Artificial neural networks	Based on the structure of neurons' network in the human brain. neural nets are intended to simulate associative memory. This approach uses a network of "neurons" named N in a condition of one-one relation, where one N accepts input from other N, activating a network. When one N is activated, it "decides" whether it should activate another N, using logic and probability models to set associations between the two[E].

Source: Silhavy Radek (2018) Artificial Intelligence and Algorithms in Intelligent Systems

There are several approaches to solve the most difficult problems, some of those are described in Table 1.

Some of the contemporary most complex and well-constructed AI models combine more than one of the approaches described. Those models compare and combine different approaches to isolated problems, asking which model will take full advantage of the dataset, to achieve an expected output.

1.2 - AI for Good

Technology, like artificial intelligence united with cloud technology, can be a game changer in the most challenging social and environmental global issues. AI can help save lives, promote social progress, preserve the environment, fight climate change, tackle inequality, conserve cultural heritage, improve accessibility, and much more. It is up to AI researchers and developers to shape this new technology and drive it towards the advancements our society urgently seeks for.

Nevertheless, there is substantial attention from society in general on AI's ethical, safety, privacy, and legal concerns. Understanding and dealing with these issues is extremely important to create a positive future for AI and enable society to benefit from its enormous contribution possibilities. Researchers and policymakers have the responsibility to address AI possible negative outcomes, in order to allow societal benefits that AI is delivering and can deliver in the future. Our endeavors today will shape the future of AI.

2 - AI for Environment and Climate Change

Environmental and Climate Change AI benefits derive from the possibility to analyze large-scale interconnected databases, to develop actions towards conserving the environment. AI can positively impact biodiversity below water and above land as well as address the dreaded effects of climate change.

AI can help low-carbon energy systems integrating renewable energy and energy efficiency, which are extremely important to address climate change. Smart electricity grid meters can produce valuable data for energy management and allow cost reduction, in addition to contributions to lower carbon emissions levels. Symbiosis Institute of Technology (SIT), in Pune, India, developed incremental grouping algorithms to benefit from a set of data. According to Archana Chaudhari, JRF at the Symbiosis Institute of Technology (SIT):

"The algorithm created predicts demand and peak loads identifying regional, seasonal, and community patterns in consumption; enable utilities to align generation with anticipated demand to reduce waste; and help consumers to plan their own electricity usage for lower demand and reduced carbon emissions".[4]

B   Russell, Stuart J.; Norvig, Peter (2003), Artificial Intelligence: A Modern Approach (2nd ed.), Upper Saddle River, New Jersey: Prentice Hall.
C   "ACM Computing Classification System: Artificial intelligence." ACM. 1998. Archived from the original on October 12, 2007.
D   Battiti, Roberto; Mauro Brunato; Franco Mascia (2008). Reactive Search and Intelligent Optimization. Springer Verlag.
E   Domingos, Pedro (2015). The Master Algorithm: How the Quest for the Ultimate Learning Machine Will Remake Our World. Basic Books.
4   https://ai4edatasetspublicassets.blob.core.windows.net/grantee-

Chaudhari's initiative optimizes energy distribution and consumption from information that helps to comprehend energy usage in real-time, rationalize energy distribution, finally decrease electricity waste and carbon emissions.

On climate change, it is possible to use AI to understand its current and future impacts and improve the ecosystem's health. As an example, Imazon[5], a Brazilian Amazon protection Nonprofit institution, leverages physics-enabled AI models to assist government and NGOs, to better understand fires in the tropical forest. The solution combines probabilistic and geostatistical models, providing estimations of a fire to occur in a specific area, taking into account information such as fire events history and construction of illegal roads. In other words, it produces predictions of the locations of new natural or human produced deforestation events, with over 90% accuracy[6] .

AI can also significantly help preserve species in oceans and rivers, using several different approaches. A great example is the OceanMind[7] work. The organization uses satellites and artificial intelligence to enhance data driven decision-making for fishery authorities and seafood buyers. The methodology created combines satellite images with public data banks on vessel location, tracking ships in real time. In addition, algorithms examine vessel movements to identify out of law behavior, taking permitted areas, species seasoning and fishing techniques into consideration. The solution provides information to better understand fishing activities in either near and offshore activities, assessing compliance with local legislation, giving advice and producing due diligences on the seafood industry. OceanMind supports the inhibition of prohibited, unreported and unregulated fishing activity, by examining vessel activities in real time, empowering local authorities and enhancing marine areas' rule of law, which protects marine biodiversity. OceanMind is supporting the UK Government and helping to protect marine reserves around its overseas territories, helping patrol boats in a more effective way in the Atlantic, Indian, and Pacific Oceans, totaling over 5 million square kilometers.

Above water level, AI can also make a positive impact fighting desertification, helping to identify and reestablish degraded land and soil. A prodigious example can be found in the SunCulture[8] case study. The organization created an irrigation and agricultural technology solution to benefit small farmers in Africa, helping them to optimize yields' production, increasing farmers' income. The solution combines the internet of things with big data, and uses neural network algorithmics to help farmers apply optimized agriculture. SunCulture methods use a machine learning solution that uses data form apps that collect soil samples, ground sensors and combine it with weather information and historical climate information. SunCulture provides farmers not only forecast for their yields but also planting, irrigating, fertilizing, and pest control recommendations to maximize harvests at a minimum possible cost. Recommendations are highly precise and can be made for each farm plot.

Mexico also deployed an interesting solution to protect mangrove. Besides containing rich biodiversity, mangrove represents a diverse and important ecosystem, as it provides several ecosystem services, such as fishing activities, coastal defense, and carbon capturing. Octavio Aburto, a scientist from the Scripps Institution of Oceanography[9], in partnership with Engineers for Exploration, created a methodology that uses drone technology and artificial intelligence to recognize and monitor mangrove areas in Mexico. This enhanced preservation effort results with a measurable system. His team can evaluate and quantify mangrove ecosystems, ensuring decisionmakers have accurate and measurable scientific-based data to create effective public policies and conservation efforts. Aburto is engaged with the Mexican government, to assess mangrove eras in terms of size and biodiversity in several municipalities in Mexico. In addition, the work team has also calculated the economic value of the country's ecosystem services.

3 - Social Progress

AI can provide solutions to some of society's biggest challenges and empower global humanitarian organizations, governments and NGOs, to tackle the most urgent issues such as disaster recovery, resilience, address children protection, help refugees, endorse human rights and various other global problems.

The Ministry of Children Protection in Argentina innovated with the Project Horus[10] in the province of Salta, tackling the needs of children in early infancy, specially. The project uses machine learning to analyze data from each child's individual development, relationship with parents, house conditions and family structure. In addition, data from the local community context, such as violence exposure and access to basic public services, are also considered Machine learning algorithms. They help to identify the main risks on specific vulnerable children, such as undernourishment, unplanned early age pregnancy, school dropout and diseases. Empowered with risk assessment information, social agents can create

5   https://imazon.org.br/
6   Souza Carlos, Roberts and Cochrane (2005) Combining spectral and spatial information to map canopy damage from selective logging and forest fires
7   https://www.oceanmind.global/mpas/
8   ttp://www.sunculture.com/
9   https://scripps.ucsd.edu/
10   http://boletinoficialsalta.gob.ar/boletindigital/2019/20641.pdf

specific risk mitigation plans for each child, individually, also allowing parents to better raise their children by providing risk mitigation plans, development orientations and exercises created specifically for their circumstances, enhancing individual development.

Refugees and displaced people can also benefit from AI technology. The University College Dublin and the Norwegian Refugee Council, NetHope[11] used machine learning to create a chatbot called Hakeen. Refugee adolescents gave Hakeen the persona of an older, wiser brother or sister. Hakeen could perform activities such as language understanding and translation, speech recognition, helping field social workers to communicate with displaced people who speak a diverse range of languages, in need of access to food, health services, and accommodation. Furthermore, Hakeen also had educational features providing beneficiaries access to free, high-quality educational resources, including language classes, entrepreneurship, coding, marketing, and design.

Machine learning, cloud, and AI can also have a positive impact on human rights enforcement. The Clooney Foundation for Justice, in partnership with the Office of the United Nations High Commissioner for Human Rights, the American Bar Association, Columbia Law School, and Microsoft, created the TrialWatch initiative[12]. Motivated by the fact that courts around the world are increasingly being used as an instrument of oppression, the solution used innovative technology to monitor unfair trials. This problem is especially significant in non-democratic governments, where prosecutors and judges are used to incarcerate government criticizers and minorities, such as journalists, LGBTQ community, women, and human rights advocates. The solution gathers numerous sorts of data in a cloud ambient and uses an algorithm that pulls out information to detect elements of trial fairness, empowering experts to identify human rights violations. It brings optimization analysis and allows the organization to rapidly assess a much higher number of trials than a human-analysis approach could offer.

In the field of disaster response, AI has been playing an important role in risk mitigation and resilience. After 2017 California's wildfires, Terrafuse[13] used machine learning to predict climate-risks related to forest fires. This helped to enhance disaster response plans and improve resilience in vulnerable areas. The organization built a technology infrastructure to tackle climate change events at a hyperlocal level. The solution combines historical fire data with simulations of present physical characteristics, numerical simulations, and real-time satellite image observations of rainfall, wind, soil, and moisture, producing risk assessment models. The project also includes APIs (Application Programming Interface) publicly available with the results of risk analysis, using friendly easy-to-understand graphic features. Physics-informed AI solutions empowers government agencies, companies, and society to prepare for wildfires and evacuates risk areas, potentially saving lives.

Concerning resilience applications of AI, flooding damages have also been addressed by AI solutions. The Scripps Institution of Oceanography, at UC San Diego, created the Center for Western Weather and Water Extremes (CW3E)[14]. The initiative was designed to provide weather forecasting and monitor atmospheric rivers, a weather phenomenon that causes heavy precipitation and consequent potential for sudden massive flooding. Long-term weather forecasting is especially challenging, as a small change at one place can ultimately produce large consequences in several different areas, invalidating predictions. Using AI, the CW3E is working to better understand and predict atmospheric rivers as well as other rain and storm related events in the west of the United States. CW3E is not replacing existing forecast techniques but using machine learning algorithms to decrease landfall location error. The solution uses decades of past weather data, improving the precision of the forecasts, providing governments, weather agencies and disaster response organizations better tools for flooding and drought situations. The project's objective is to use a deep learning model that precisely corrects bias and error in forecasts. In addition, the solution helps to recognize atmospheric river physical structures that can allow the enhancement of the existing forecast models capacity to foresee landfall. With a more accurate weather prediction, flooding and emergency response government organizations can create better risk mitigation plans and save lives.

4 - Health

The health sector is one of the most important areas for governments, societies and economies across the globe. Health is a particularly promising field for AI applications, considering the current digitalization of health data. AI can assist decision-making related to medical diagnosis and public health services with lower costs, potential higher accuracy and virtually unlimited reach. Nevertheless, the complexity of AI solutions leads to a scenario where doctors and health system administrators face challenges in separating good AI-based solutions from bad ones, considering that poor AI health applications can lead to risking the life of a patient. Patients also have difficulties to understand AI strengths and weaknesses, which is critical for building trust.

11   https://nethope.org/
12   ttps://cfj.org/project/trialwatch/
13   https://www.terrafuse.ai/
14   https://cw3e.ucsd.edu/

Health services are primarily a responsibility of government institutions, even when it is delivered by private companies. Therefore, the World Health Organization (WHO)has a vital role in guaranteeing that everyone can access health services needed without financial burden and AI, united with digital technologies, can be decisive in achieving health access globally. Recognizing AI's importance in health technologies, WHO approved the resolution on Digital Health during their 71st World Health Assembly 2018 in Geneva.

One of the key aspects for a successful AI health application is building a learning healthcare system. In other words, a solution that enables observation of existing data about a person or a group, building observation-based models that can assist in decision making and diagnosis. The solution must be permanently gathering data, making interventions and re-gathering information from the intervention outcomes, in order to adjust new interventions.[15]

Applications have a broad range of aspects, from virtual assistance in healthcare, diagnosis and treatment decision-making, health provisions optimization, research and advanced analytics to life coaching for individual prevention. In the next paragraphs, some examples of AI applications in Health are brought.

In March 2020, the White House[16] announced the COVID-19 High Performance Computing Consortium[17]. The initiative offers globally COVID-19 researchers access to world-class supercomputer resources, to assist the development of scientific discovery regarding treatment and vaccine. It is a public-private consortium led by The White House, with the participation of IBM, Amazon, Google Cloud, Microsoft, Hewlett Packard Enterprise and academic researchers. Most of the projects in the consortium use AI technology. One solution focuses on biomolecular systems for transmission and propagation of the virus. An app was developed to simulate large-scale viral processes. It offers fast virus behavior analyzes. Another project simulates COVID-19 envelope formation as a platform for analyzing treatments that can affect viral protein-protein relations. Drug design solutions are also being developed in this platform. One solution analyzes one billion entries from virtual molecule libraries, to rapidly recognize potential molecules that could have a therapeutic result in fighting COVID-19. This last solution is particularly important, as the amount of data available on COVID-19 is scarce, due to its short existence, which makes related diseases information much valuable.

Another example of global impact solution was created by the Integrative Brain Research Institute of Seattle Children's Hospital[18] to address SIDS - sudden infant death syndrome. Using AI and machine learning, the researchers and doctors developed the first genomics database, focused on SIDS, providing new insights to identify the disease causes, which are currently nearly unknown by the medical community. The solution used the raw data publicly available from the federal Centers for Disease Control and Prevention (CDC), including information on 29 million births and 27,000 SIDS cases. This data has not been analyzed, processed or used in any way so far. The solution developed used statistical analysis and machine learning to interpret the CDC data on SIDS, facilitating researchers' attempts to understand possible correlations. Researchers are now able to select combinations of factors that could be related to SIDS, such as a child's birth characteristics and parents' age.

IRIS (Intelligent retinal Imaging Systems)[19] created a cloud-based system to prevent blindness, using iris enhanced retinal images. The technology used is very simple and helps to detect a sight-threatening disease early. The solution takes retinal images of the patient during a regular doctor's visit. In sequence, the images are uploaded in a cloud-based platform and image colors are enhanced with artificial intelligence algorithms, making it easier for eye care to provide diagnoses.

5 - Accessibility

Billions of people globally live with some disability. This represents an immense opportunity for the expansion of assistive technologies. AI can allow people with disabilities (PWD) to improve their lives, enhancing independence and productivity, quickly changing how they live, learn, and work. Improving the quality of life of PWD is a stimulus for several AI solutions. Artificial intelligence can allow software and devices to listen, see, reason, and predict. People with vision, hearing, cognitive, learning and mobility disabilities, as well as those with a range of mental health conditions, can vastly benefit from AI in several different scenarios, such as work environment, modern life, and human interaction. Solutions such as predictive text, visual recognition, and speech-to-text transcription have demonstrated a vast range of possibilities to assist PWD. Furthermore, these technologies not only bring several possibilities for assisting disabled people but also provide comfort and assistance for us all.

15   Gregory D. Hager, Ann Drobnis, Fei Fang, Rayid Ghani, Amy Greenwald, Terah Lyons, David C. Parkes, Jason Schultz, Suchi Saria, Stephen F. Smith, and Milind Tambe (2017) Computing Community Consortium: Artificial Intelligence for Social Good

16   https://www.whitehouse.gov/briefings-statements/white-hou-se-announces-new-partnership-unleash-u-s-supercomputing-resources--fight-covid-19/

17   https://covid19-hpc-consortium.org/

18   https://pulse.seattlechildrens.org/how-microsoft-data-scien-tists-are-helping-seattle-childrens-solve-sids-2/

19   https://retinalscreenings.com/

In the work environment, software, and devices empowered with AI have been playing an important role in accessibility. Microsoft 365[20] and Windows are an example of how productivity software has been designed to meet different kinds of necessities. People with vision disabilities can use a screen audio reader and keyboard shortcuts. In addition, low-vision individuals have the option to use a virtual magnifier in Office Lens to improve reading. People with hearing disabilities also benefit from AI with speech-to-text transcription solution, which can even identify the speaker in a multiple participant meeting. Moreover, image support such as Picture Dictionary, allows users to click on a specific word, have it read aloud and also have access to images related to its meaning. Those features surely assist people with disabilities, but also enhance comprehension to individuals in general.

An even more sophisticated solution can assist people with autism and communication challenges. The app InnerVoice Artificial Intelligence[21] is a visual language solution that uses artificial intelligence to enhance language and reading skills. A camera displays what the user is looking at and takes a picture, labeling it with descriptions, using text, speech and image related content, permitting PWD to understand the relations between their environment, speech, language, and text. In addition, InnerVoice can also assist in sharing emotions, which can be specially challenging for people in the spectrum – also known as autism. The app creates an avatar from the user's picture. By touching emojis and typing messages, the avatars express emotions with facial expressions and voice tone, helping PWD to learn emotions and communicate, using their own image.

Gadgets combined with AI also play an important role in PWD's empowerment, especially for individuals with vision disabilities. ReadRing[22] is an example of an inexpensive wearable braille device attached to the user's hand, allowing a blind individual to read endless extensions of braille, extracting sentences from a screen or printed text, transforming the texts into braille. One single regular text page, when translated to braille can generate pages of material, making braille content very unpractical. Therefore, ReadingRing enables reading braille a much practical and easy activity and, at the same time, provides blind people independence from message-sender accessibility efforts. UC Berkeley [23]is building a similar research project with. The solution is a device with sensors and cameras that captures the surrounding and transform it into audio descriptions.

For people with hearing disabilities, one of the most challenging experiences is to comprehend and enjoy music. BeatCaps[24] provides a solution that transcribes rhythm using beat tracking to produce captions that picture the rhythm of a music, allowing them to experience music.

6 - Urban Environment

According to the UN, the world population will reach up to a limit of 9.7 billion by the end of 2050, and almost 70% of it will live in cities[25]. This forecast brings several urban administration challenges, such as sanitation issues, traffic congestion, water management, violence, and waste management. AI applied to Urban issues can contribute to several dimensions: urban planning, transportation, communication and distribution networks, for instance. This helps to create a safer, healthier, and efficient environment for urban cities' inhabitants. AI has the possibility to meaningfully enhance mobility, quality of life, reduce inefficiencies, save time and lives. AI's contribution to the urban environment has been popularly named as Smart Cities.

Transportation can use AI in critical roles such as self-driving vehicles, carrying passengers, predicting paths of pedestrians and cyclists, decrease traffic accidents and injuries and reduce traffic congestion. In addition, it enables a more diverse and efficient transportation usage that can reduce overall emissions. This holistic approach to transportation using bigdata can help government official decision-making toward an expansion of public transportation investments. Hence, by reducing inefficiencies in the public transportation system, costs can be reduced, consequently providing mobility to people who have been immobile due to a lack of low-cost commute options.

Regarding individual transportation, when it comes to cars, bikes, pedestrians, and motorcycles, Artificial Intelligence can be applied to traffic management creating decision-making structures to improve and reorganize traffic management. AI algorithms can distinguish the physical and environmental conditions that may lead to traffic congestion and robotically propose alternative routes to relieve any traffic that has been formed. Waze, Google maps, INRIX, Mapquest, Apple Maps, and Glob are some examples of commonly used route AI solutions.

Finding a parking slot can also be a real struggle. Parking Detection[26], a Smart Cities company provides devices with road coating sensors embedded in parking

20   https://support.microsoft.com/en-us/office/office-accessibility-center-resources-for-people-with-disabilities-ecab0fcf-d143-4fe8-a-2ff-6cd596bddc6d
21   https://innervoiceapp.com/
22   read-ring.com
23   ttp://www-video.eecs.berkeley.edu/ai4a.shtml

24   https://www.beatcaps.io/
25   https://www.un.org/development/desa/en/news/population/world-population-prospects-2017.html
26   https://www.parkingdetection.com/

slots, making it possible to identify if parking spots are free or occupied. In addition, the solution produces a real-time map for drivers, which saves drivers time, reduces congestion and CO2 emission.

Collective transportation can also benefit from AI. Traffic management modeling can consider a series of variables in decision-making, such as transportation infrastructure, demand, traffic congestion, weather conditions, unusual inputs, such as celebrating events and construction endeavors. In addition, several different data sources of travel demand and transportation options (subway, bus, walking, cars, bikes) can be combined to produce an optimized combination of public or private transportation options. The Barcelona Municipal Government, in 2011, launched a program to use data-driven and smart city technologies to enhance its transportation services using the Internet of Things (IoT) sensor network, fiber optic and Wi-Fi. One interesting application is the Orthogonal bus system, a transportation solution that uses Barcelona's famous orthogonal grid structure, taking advantage of data and AI, to place bus stops in the locations that would optimize tram, public bicycle stations and subway connections.[27]

Waste collection, management, and disposal is a vital public service. With the increase of the urban population, it is necessary to use smart approaches for sustainable waste management. ZenRobotics[28] created ZenBrain, an AI based solution for waste sorting. Numerous sensors generate an accurate real-time residue stream examination. Based on this analysis, the robots make self-sufficient choices on what waste objects to pick and where to place them.

Crime is ever-present, which requires smart policing, where law enforcement agencies use evidence-based data-driven tactics that can lower costs and raise efficiency levels. As an example, cameras and sensors widely covering public areas help to recognize robbery, parking in prohibited areas and cleanliness of public areas. Hikvision[29], an AI Chinese camera production corporation, is AI and image recognition technology to search for crime committers or missing individuals. The solution can also scan for car license plates and notice suspicious situations such as objects or bags abandoned in crowded places.

7 - Ethical issues in artificial intelligence

AI Ethical issues comprise a wide range of aspects. Most debates are related to privacy, employment and labor market, inequal distribution of AI benefits, human rights and dignity, bias and error, human relations, financial market trading, market manipulation, machine crime liability and miss use of natural resources. The complexity of the issue is huge and could not be addressed on this page. However, in the next paragraphs, it is possible to have a glance of the subject humanity needs to address and regulate, creating legislation, a mechanism to avoid problems such as misuse of personal data, fake news and mass manipulation. It is important to remember that AI is as good as what we make out of it. As many other human inventions, its applications can generate both positive and negative impacts.

In the economy and labor market, AI implications are commonly mentioned by the media since the industrial revolution. Negative impacts rely on the possibility that many jobs now performed by humans will be substituted by robots, or what some call "digital agents." In the industrial revolution, mechanics and physical tasks were substituted by machines. In this case, intellectual and analytical activities can be substituted by algorithms and machine learning.

Another important concern is about AI and its accessibility as well as potential impacts on inequality. As any other type of technology, AI has the potential to be accessible for only a few people, concentrated mostly within the higher income share of society. It is extremely important that society, companies, and governments ensure that AI's benefits do not accumulate unevenly in elites and are made available for all income level individuals.

Furthermore, AI raises concerns regarding human psychology, in special when substituting human roles in relationships. For example, the UK government is developing, along with Accenture, a robot for elderly caring. The concerns are centered on the possibility that a relationship of a human with a humanized robot can affect human-human relationships in ways still unknown and difficult to predict.

AI will present deep privacy impacts on society in the upcoming years. World data double every two years[30]. Today, smartphones and other personal devices gather and transmit data, analyzing them with highly advanced software. With the evolution of AI, important privacy issues arise, like the capacity of machine learning solutions to use personal information without the full acknowledgment of the information owner. It is not uncommon that one faces the situation of agreeing with terms and conditions to use a smartphone application and by that provides

27   https://www.barcelona.cat/infobarcelona/en/tema/mobility--and-transport
28   https://zenrobotics.com/
29   http://www.hikvision.com/

30   Bernard Marr, "How Much Data Do We Create Every Day? The Mind-Blowing Stats Everyone Should Read," Forbes, May 21, 2018. A quintillion is a 1 followed 30 zeroes.

personal information of all kinds, including location, the content of private messages, access to photos, and even conversations, as some apps might collect dialogs using the smartphone microphone and AI voice recognition technology.

One well-known example is the Facebook and Cambridge analytics scandal. Cambridge Analytica, a social media and marketing consultancy accused of collecting personal information of 87 million Facebook users, and using it to design election communication campaigns for politicians, including the Brexit campaign.

Brad Smith, President of Microsoft, believes that the world has reached a turning point on data and privacy. Smith also states human rights concerns:

"Technology raises issues that go to the heart of fundamental human rights protections like privacy and freedom of expression. These issues heighten responsibility for tech companies that create these products. In our view, they also call for thoughtful government regulation and for the development of norms around acceptable uses"[31].

Brad Smith understands that personal data must be individual's property and, therefore, cannot be for sale by anyone, other than themselves. "Every one of us as individuals must retain our own rights in our own data". He believes that individuals must have rights related to their own data and that the tech sector must be carefully regulated and work to protect individual's personal data.

8 - Conclusion

AI can help to tackle society's most challenging problems, such as global warming, inequality, and universal health access. The possible positive outcomes of AI are comprehensive. Images and sound generated by satellites or devices can help monitor and preserve biomes at a large scale, with great replication potential. Moreover, AI can allow people with disabilities (PWD) to improve their lives, enhancing independence and productivity. Regarding health, AI can assist decision-making related to medical diagnosis and public health services with lower costs. Moreover, AI applied to Urban issues, can contribute in urban planning, transportation, communication and distribution networks, creating a safer, healthier, and more efficient urban environment.

Nevertheless, similar to several human inventions, large-scale AI models can have both positive and negative outcomes, on both society and the environment. Negative

impacts include – but are not limited to – human rights harming, environmental destruction, human workforce substitutión, and psychological damage. As AI depends on data abundance, privacy invasion and misuse of personal information are one of the most dangerous and common negative impacts of AI-based solutions.

Responsible artificial intelligence requires adequate legislation, trust from society and strict ethics from tech companies and solution developers. In the past 2 years, General Data Protection Regulation (GDPR) have been implemented in several nations and regions such as Europe, US and, more recently, Brazil. This represents an important step towards protection from the potential harms of Artificial Intelligence. AI must grow in a trustworthy and understanding environment, always respecting the Universal Declaration of Human Rights. To achieve so, governments must ensure proper regulation and law enforcement, ensuring accountability, liability, transparency and equality.

References

Vinuesa, R., Azizpour, H., Leite. (2020). The role of artificial intelligence in achieving the Sustainable Development Goals. Nature Communications. Retrieved from https://www.researchgate.net/publication/338554769_The_role_of_artificial_intelligence_in_achieving_the_Sustainable_Development_Goals

Bird, Fox-Skelly, Jenner, Larbey, Weitkamp and Winfield. (2020). The ethics of artificial intelligence: Issues and initiatives. Panel for the Future of Science and Technology; European Parlament. Retrieved from https://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_STU(2020)634452

Kaplan, Andreas; Haenlein, Michael (2019). "Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence". Business Horizons. Retrieved from https://www.sciencedirect.com/science/article/pii/S0007681318301393

Shane, Janelle (2019). You Look Like a Thing and I Love You: How Artificial Intelligence Works and Why It's Making the World a Weirder Place. Little, Brown.

Anhong Guo, Ece Kamar, Jennifer Wortman Vaughan, Hanna Wallach, Meredith Ringel Morris .(2019). Toward Fairness in AI for People with Disabilities: A Research Roadmap. Microsoft Research, Human-Computer Interaction Institute, Carnegie Mellon University. Retrieved from https://arxiv.org/pdf/1907.02227.pdf

Wim Naudé, Nicola Dimitri (2018). The race for an artificial

---

31   https://news.microsoft.com/en-gb/2019/09/23/the-worlds--reached-a-turning-point-on-data-and-privacy-says-microsoft-president--brad-smith/

general intelligence: implications for public Policy. Institute of Labour Economics. Retrieved from http://ftp.iza.org/dp11737.pdf

Jayden Khakurel, Birgit Penzenstadler , Jari Porras, Antti Knutas and Wenlu Zhang (2018) The Rise of Artificial Intelligence under the Lensof Sustainability. MDPI. Retrieved from https://www.researchgate.net/publication/328653902_The_Rise_of_Artificial_Intelligence_under_the_Lens_of_Sustainability

Bernard Marr. (2018). How Much Data Do We Create Every Day? The Mind-Blowing Stats Everyone Should Read. Forbes.

Silhavy Radek (2018) Artificial Intelligence and Algorithms in Intelligent Systems

Antonio Garrido-Marijuan. (2017). The making of a smart city: best practices across Europe. AIT Austrian Institute of Technology.

Gregory D. Hager, Ann Drobnis, Fei Fang, Rayid Ghani, Amy Greenwald, Terah Lyons, David C. Parkes, Jason Schultz, Suchi Saria, Stephen F. Smith, and Milind Tambe. (2017). Artificial Intelligence for Social Good. Computing Community Consortium. Retrieved from https://arxiv.org/ftp/arxiv/papers/1901/1901.05406.pdf

Gregory D. Hager, Ann Drobnis, Fei Fang, Rayid Ghani, Amy Greenwald, Terah Lyons, David C. Parkes, Jason Schultz, Suchi Saria, Stephen F. Smith, and Milind Tambe. (2017). Artificial Intelligence for Social Good. Computing Community Consortium.

Domingos, Pedro (2015). The Master Algorithm: How the Quest for the Ultimate Learning Machine Will Remake Our World. Basic Books.

Rajani, S. (2011). Artificial intelligence: Man or machine. International Journal of Information Technology and Knowledge Management., Vol. 4, No. 1, 173-176. Retrieved from http://csjournals.com/IJITKM/PDF%204-1/35.Sandeep%20Rajani.pdf

Shi, Zhongzhi (2011). Advanced Artificial Intelligence: Series on Intelligence Science. World Scientific Publishing.

Russell, S. J. i Norvig P. (2010) Artificial intelligence: a modern approach. Prentice-Hall.

Battiti, Roberto; Mauro Brunato; Franco Mascia (2008). Reactive Search and Intelligent Optimization. Springer Verlag.

McCarthy, J. (2007). What is artificial intelligence?.

Computer Science Department Stanford University. Retrieved from http://jmc.stanford.edu/articles/whatisai/whatisai.pdf

Souza Carlos, Roberts and Cochrane. (2005). Combining spectral and spatial information to map canopy damage from selective logging and forest fires. Elsevier. Retrieved from http://www.geog.ucsb.edu/viper/viper_pubs/souza-etal2005.pdf

Warwick, K. (2004). March of the machines: The breakthrough in Artificial Intelligence. University of Illinois Press.

Russell, Stuart J.; Norvig, Peter. (2003). Artificial Intelligence: A Modern Approach. Prentice Hall. https://www.researchgate.net/profile/Peter_Norvig/publication/248725443_Prentice_Hall_Series_in_Artificial_Intelligence/links/560300bd08ae08d4f171420f.pdf

Dorffner, G., ur. (1997). Neural Networks and a New Artificial Intelligence. International Thompson Computer Press.

Casti, J.L. i KarlQvist, A., ur. (1987). Real Brains: Artificial Minds. Elsevier Science Publishing Co.

Links

1.   http://boletinoficialsalta.gob.ar/boletindigital/2019/20641.pdf
2.   http://www.helpicto.com/en/home-2/
3.   http://www.hikvision.com/
4.   http://www.sunculture.com/
5.   http://www-video.eecs.berkeley.edu/ai4a.shtml
6.   https://ai4edatasetspublicassets.blob.core.windows.net/grantee-profiles/Symbiosis%20Institute%20of%20Technology_India_Water_AI4E%20Grantee%20Profile.pdf
7.   https://cfj.org/project/trialwatch/
8.   https://covid19-hpc-consortium.org/
9.   https://cw3e.ucsd.edu/
10.   https://imazon.org.br/
11.   https://innervoiceapp.com/
12.   https://nethope.org/
13.   https://news.microsoft.com/en-gb/2019/09/23/the-worlds-reached-a-turning-point-on-data-and-privacy-says-microsoft-president-brad-smith/
14.   https://oceanobservatories.org/
15.   https://pulse.seattlechildrens.org/how-microsoft-data-scientists-are-helping-seattle-childrens-solve-sids-2/
16.   https://retinalscreenings.com/
17.   https://scripps.ucsd.edu/

18.   https://support.microsoft.com/en-us/office/office-accessibility-center-resources-for-people-with-disabilities-ecab0fcf-d143-4fe8-a2ff-6cd596bddc6d

19.   https://www.barcelona.cat/infobarcelona/en/tema/mobility-and-transport

20.   https://www.beatcaps.io/

21.   https://www.microsoft.com/en-us/research/product/soundscape/

22.   https://www.oceanmind.global/mpas/

23.   https://www.operationsmile.org/

24.   https://www.parkingdetection.com/

25.   https://www.silviaterra.com/

26.   https://www.terrafuse.ai/

27.   https://www.un.org/development/desa/en/news/population/world-population-prospects-2017.html

28.   https://www.whitehouse.gov/briefings-statements/white-house-announces-new-partnership-unleash-u-s-supercomputing-resources-fight-covid-19/

29.   https://zenrobotics.com/

30.   http://www.read-ring.com/

11

PUBLIC SECTOR INNOVATION IN TIMES OF COVID-19

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PUBLIC SECTOR INNOVATION IN TIMES OF COVID-19

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Abstract

This chapter explores the need for innovation that the COVID-19 pandemic[1] has created. It has demanded an environment of numerous general new conditions that require innovative and better services and goods.

The "perfect storm" was formed around necessities, and all sectors have been pushed to improve their actions, grow new ways of doing business, and use creativity.

Paradoxically, in the Brazilian case, political disputes became an obstacle to develop prevention strategies against the Covid-19 pandemic. Nonetheless, government sectors, at all levels, did not hesitate to start innovation journeys and produce the solutions needed, leaving political issues to the politicians. Moreover, the pandemic acted as a trigger to abrupt changes for many public leaders, and many innovations have arisen. This chapter presents some examples of improvements and new administrative procedures. Simple changes that, being permanent, could be the leap of faith to large innovations for a better and efficient public administration.

Introduction

On March 11, 2020, the World Health Organization (WHO) declared that the epidemic caused by the disease called COVID-19 had reached the level of a pandemic. Having tripled the number of countries with the disease cases in the two weeks preceding the statement, the pandemic had reached 118,000 cases, 114 countries, and 4,291 deaths. After six months, we have just passed 32 million confirmed cases (completed 1 million deaths on September 28th), having reached almost all countries in the World, as showed in figure 1.

The bright side remains on many scientific discoveries and winners over enormous challenges in several areas behind this pessimistic scenario. Among these are the industrial production of articles meeting the global demand for items related to the pandemic treatment and its logistics, the global downturn that pushed the industry innovation into the search for cheaper equipment solutions, production in scale and faster production of medicines, as those used for cases of necessary patients' intubation, and many other challenges. Under this punch, both private and public sectors have been innovating in their fields. They needed to go far beyond their capabilities, which, in the particular case of the public sector, has always been minimal.

The World and the Brazilian public sector, in particular – often associated with a slow and backward giant (a big elephant) – have faced the challenge of giving quick responses, promoting prevention and
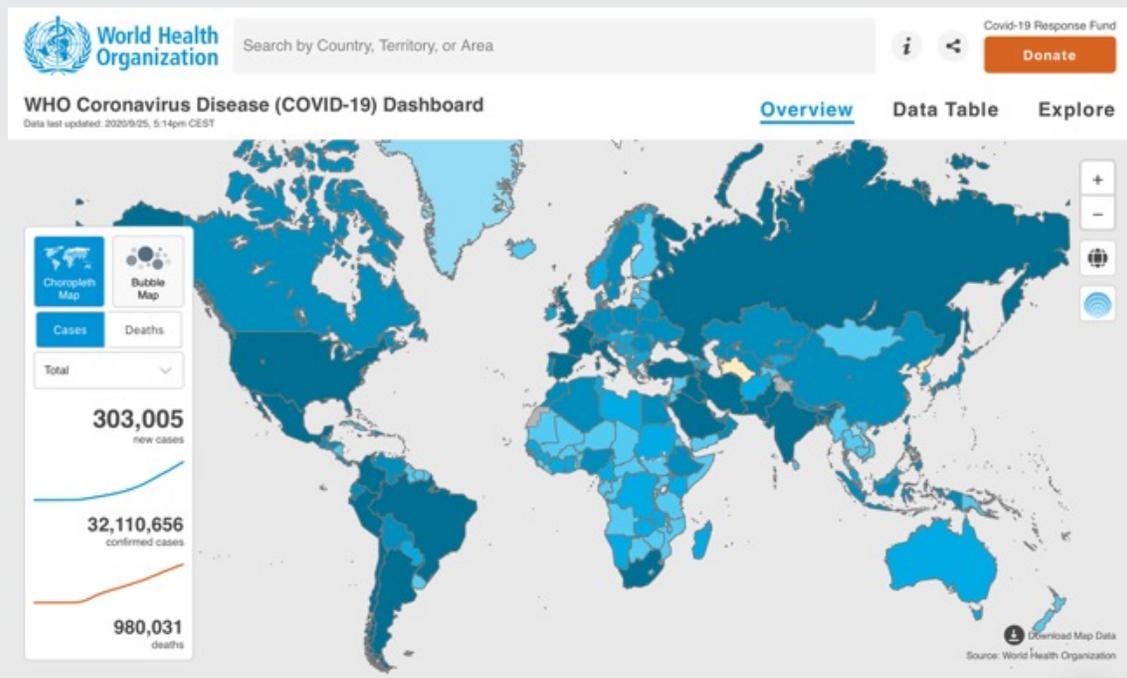
Figure 1 – OMS's Dashboard about Covid-19.[22]
Source: World Health Organization, 2020. WHO Coronavirus Disease (COVID-19) Dashboard

treatment actions in the area of health, economics, logistics, promoting the means of production, and public safety, among others. At no time in the country's recent history, or perhaps, even in the most remote past, has there been such tremendous and urgent need for government action at all levels.

Innovation has always been a requirement in the private sector, due to market dynamics, but it has been taking the top-priority position in the list of the public sector. Moreover, innovation in public sector has been unimaginably pushed to action, with a huge private sector support, never seen before in its history.

It is too early to consistently assess the advances in the discipline of innovation in the public sector, due to the pandemic. Nonetheless, it is possible to draw some conclusions that, in no way, can be said as rushed. A discreet and silent revolution beginning can be observed. This, for the better of the public sector, should yield memorable fruits and, perhaps in a few decades, can be studied in academic banks and be understood as a real innovation revolution in the public sector.

1 - Big "Elephant"

Governments worldwide are often accused of being incompetent, partly with reason. Since the public sector is extremely regulated, it creates enormous obstacles for the day-to-day life of public organizations. Aiming transparency, fair processes, and strict procedures to avoid deviations and other issues, excessive control promotes a feeling that the government does not serve to the citizen, neither provide prompt or even satisfactory, solutions. When talking about health, its natural urgency makes everything a bit more complicated. For example, a patient suffering in a public hospital, managed under restrictions and low efficiency, sees his misery as endless and blames the public power for this.

The perception that the government is incompetent has already occupied several in-depth academic studies. According to Cohen, Eimicke, and Heikkila, "Government's accomplishments are rarely discussed, but its controversies and failures are front-page stories," and more, "the proliferation mass media, and web-based News outlets throughout the twenty-first century has added to government's negative image" (COHEN, EIMICKE, and HEIKKILA, 2013, p. 2)[2]. The authors better explain:

> "In certain times of crises, such as the attacks on New York's World Trade Center and the Pentagon in Washington, DC, we find renewed reliance, if not confidence, in government. When such renewed confidence is squandered by bungled responses to crises like Hurricane Katrina in 2005 and the 2010 BP oil spill in the Gulf of Mexico, we demand even more from government – more responsiveness, more preparedness, more coordination, more oversight, more compassion and support for disaffected. You might call it a love-hate relationship." (COHEN, EIMICKE e HEIKKILA, 2013, p. 3)

The authors' analysis is based on a look at the North American government and its culture, but we know that the conclusions can be similar, when observing the dynamics described in the vast majority of the National States.

Looking specifically at Brazil's case, we find that the most pertinent conclusions tend to be very close to those explained by Cohen, Eimicke, and Heikkila, although in Brazil, significant crises such as droughts in the northeast or floods in the south are unknown to the general population and when they occur, they are treated as of minor proportions. This treatment derives mostly from the lack of capacity of the public power to respond both adequately and proportionally to the crisis and is partly covered by the recurrence of these natural emergencies, as they are facts that happen every year in specific climatic seasons.

So, as a rule, we live under a government seen as a giant pachyderm that takes time to move. Moreover, when it moves, it seldom acts to solve the problem efficiently. It can often operate oppositely, causing even more damages - like an elephant moving in a crystal shop.

This vision of the State and the government leads to the unavoidable issue that has been debated for a long time. Must we have a minimal State and let the invisible hand of the market act, self-regulating the system, or have a system acting to progressively guarantee a welfare State? Bringing another point of view to this discussion, Mariana Mazuccato presents an interesting defense to public sector in her bestseller "The Entrepreneurial State". She concludes that the majority of innovations that capitalist companies use in their products are results of public spends in research and development, highlighting the critical participation of State in this subject. The basic argument is relatively simple to understand: innovation demands investment and risk capital. However, the risk in this gamble is extremely high, in comparison to normal market risks. For example, touchscreen technology was developed under a huge public investment. When maturity was achieved and a "minimal viable product" was conceived, private companies (like Apple) decided to invest their money in this technology. Mazzucato mentions several other examples and technologies developed under public power bets and financial investments.

Nevertheless, apart from those questions, taking a more refined and objective look at the most critical moments in any country's history – and Brazil's would not be different – we observe that the government is unanimously called by the whole society to act in the face of great questions that plague humanity.

There was a curious situation, involving the business community in Brazil: it was heard that the State would be minimal[3], allowing the market's invisible hand to act freely. However, earlier pushing for a minimal State, the same entrepreneurs immediately asked for help at the beginning of this unprecedented economic crisis. They were the prompt initial voices calling for government economic support[4] and action, even before the most impoverished population itself, the ones to really suffer the direct effects of an economic-health crisis.

As much as we question the role of the State and the government, we will always have moments like this, when people really need support. The "elephant" walks between moments of love and hate, but its role becomes progressively clear:

> "in a complex world filled with threats and danger, we find ourselves looking to the government for security and safety. As the economy has become globalized, we also look to the government to help us to navigate the uncharted territory of increased global trade and interdependency. The real issue that we need to engage in is a debate about the extent and strategic direction of government involvement, not the necessity of that involvement." (COHEN, EIMICKE e HEIKKILA, 2013, p. 3)

Times like this pandemic make clear that the State and the government's role is essential to our subsistence. Nevertheless, the big remaining question is precisely what was mentioned before, the extent and the strategic direction of the government's immersion in our society. How far should we permit, or would we like it to go?

2 - Innovation in Government (The elephant needs to fly)

When talking about innovation, we almost always associate this word with agility. It is not for another reason that the large use of agile methodologies has been significantly associated with innovation. It is even well known as the main innovative tool. When thinking about agility, it seldom occurs to us that this might happen inside the public administration. Notwithstanding, several initiatives have created possibilities for innovation in the public sector, not always following an agile way, not consistently generating agility in its results, but certainly planting the right seeds for the future.

Nevertheless, we are confident that innovation in the Brazilian public sector has advanced, and today it very clearly pursues the achievement of concrete results. Public managers are following for effectiveness, as observed in Cavalcante's words (free translation):

> "To develop innovative practices in public management, however, good ideas are not enough. Undoubtedly, the creativity stage is necessary and fundamental, but in itself, it does not effectively constitute an innovation (Fórum de Inovação FGV / EAESP, 2014). It is imperative that the idea is implemented and, mainly, generates results, that is, values perceived as new by the organization's entrepreneurs and / or users of the process or service. This concept of innovation, even minimalist, reinforces the relevance of overcoming the emphasis, often

excessive, in the ideas stage." (CAVALCANTE, 2019, p. 12)[15]

This statement reminds us of the concept of innovation by Teresa Amabile: "Innovation is the successful implementation of creative ideas within an organization" (AMABILE, 1996, p. 1)[6]. Well, if innovation is the implementation of creative ideas within an organization, why would it be so difficult to innovate in the public sector? The answer given by Professor Amabile goes deep in the question analyzing the environment and the role of the leader inside organizations, but first, it is necessary to understand the role of creativity within this context.

According to Amabile, creativity must be understood as "the production of novel and useful ideas in any domain" (AMABILE, 1996, p. 1). As observed, according to the same study, it is both limited and limiting to believe that there is a human characteristic to define a person as creative or not creative. The author affirms that, currently, it is known that anyone with normal abilities is capable of producing creative works, or, in other words, anyone can be creative.

Within this context, we enter in the field of using this creative capacity that every human being has, noting that some factors directly influence the general human creative production.

Professor Eunice Alencar (1998), citing Amabile, explains that personal attributes and external factors to the individual interfere or are relevant to the expression of creativity, listing both ones. However, in this case, we will focus on external factors, which seem to be the most pertinent distinction, when comparing public and private sectors (free translation):

> "The conditions in the work environment that have an impact on creativity were also researched by Amabile and collaborators, who identified both the qualities of the environment that promote creativity and the conditions that inhibit it. Among the first, there are freedom and control, management style, flexibility, resources to put the idea into practice, support from the workgroup, encouragement, recognition and feedback, adequate time to carry out the tasks. On the other hand, among the factors that block creativity, there would be a poor organizational climate, overvaluation, and pressure, insufficient resources, emphasis on the status quo, time pressure, fierce competition, and inadequate management project." (ALENCAR, 1998)[2] [7]

Observing the public service environment albeit superficially, we can see that it is not exactly creativity friendly. Consequently, we need a closer look inside the recent public management tools, to understand what factors the pandemic has changed, in order to promote the organizational transformation that allowed the innovation we have been spotting.

3 - Pursuing Innovation in Pandemic (Giving wings to the elephant)

One of the most interesting aspects to be observed in this pandemic context is the issue of federalism. Discussions about who had the power to decide on what measures to adopt in order to contain the pandemic progress led to judicial fights. Highlighting the heads of executive powers from all spheres, from municipal to federal, this open political dispute has anticipated the succession race, at least at federal level.

The electoral battle may have caused a change in the organizational environment, where the pressure for practical and measurable results, which would typically be a negative factor, came to be seen as an incentive to develop solutions.

With the inclusion of political disputes made so openly, the competition among sides proclaiming the best solution's winner led to organizational environment transformations that may affect creativity in public administrations, as seen in the following aspects:

a) Management style: It was observed that managerial decisions – once essentially based on political interest in the foreground – have started requiring greater precision of knowledge and setting aside suppositions and guesses, to put the focus on a more scientific and technical orientation. The extreme pandemic uncertainty has inaugurated a moment of collaborative management. Contingency committees functioned as forums for discussion and deliberation for actions that were later polished and approved by political managers;

b) Freedom: Since science and technique became the best advisers at the forefront of public management, a

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1   "Para que sejam desenvolvidas práticas inovadoras na gestão pública, contudo, não bastam boas ideias. Sem dúvida, a etapa de criatividade é necessária e fundamental, mas por si só não constitui efetivamente uma inovação (Fórum de Inovação FGV/EAESP, 2014). É imperativo que a ideia seja implementada e, principalmente, gere resultados, isto é, valores percebidos como novos pelos empreendedores da organização e/ou usuários do processo ou serviço. Esse conceito da inovação, mesmo minimalista, reforça a relevância de se superar a ênfase, muitas vezes excessiva, na fase das ideias." (CAVALCANTE, 2019, p. 12)

2   As condições no ambiente de trabalho que têm impacto na criatividade foram também pesquisadas por Amabile e colaboradores que identificaram tanto as qualidades do ambiente que promovem a criatividade como as condições que a inibem. Entre as primeiras, situam-se liberdade e controle, estilo de gerenciamento, flexibilidade, recursos para se colocar a ideia em prática, apoio do grupo de trabalho, encorajamento, reconhecimento e feedback, tempo adequado para realização das tarefas. Por outro lado, dentre os fatores que bloqueiam a criatividade, estariam um clima organizacional pobre, excesso de avaliação e pressão, recursos insuficientes, ênfase no status quo, pressão de tempo, competição acirrada e projeto inadequado de gerenciamento.

suitable environment of liberty was created. The possibility to speak to peers, mainly to be heard by the senior level management – usually a political manager, with the option of expressing opinions and thoughts without a political framework – at first, made the environment remarkably free. Nobody, including political managers, could study all the information they needed to take a decision in such a short time, leaving no option but to free technicians and scientists to have a voice and time;

c) Controlling: Control, which has often been presented as an excess of implied rules, linked to a more authoritarian and bureaucratic context than regulatory in itself, started to be left aside. There was less management control. Due to the urgency of results, there was no time to adhere to such rules, neither to create a new control and measurement mechanism, mainly for the public server's behavior. Realistically, the environment has started to operate in trial-and-error basis;

d) Interaction among political institutions: At this point, there was a very significant evolution, with an extremely collaborative environment permeated with scientificity. There was no room for bureaucracy and authoritarianism – standards in the public sector – under the penalty of almost instantaneous loss of political credibility. This was observed in the clash that had the Brazilian President and some State Governors – essentially São Paulo's – as protagonists. The president acted in an authoritarian manner, changing the Ministry of Health holders due to differences about social isolation and the use of medicines (chloroquine and derivatives[8]). Under a flurry of criticism, a remarkable polarization in the Brazilian political environment led the country to suffer from absence in command, lack of direction and consensus about possible solutions to deal with this pandemic;

e) Flexibility: Under this installed environment of uncertainties, there was a need to act with extreme flexibility. As expected, evaluations and reevaluations of measures and their results became routine into the day-to-day contingency health centers. As much as the political manager would like, there was no way to instate a minimum of rigidity in this environment. The work became fluid, following – even in the political area – the experiences developed in the country and abroad, with an eye directed mainly at Italy and Spain. Monitoring articles and scientific positions around the world became the new routine. What was applicable in the morning could no longer be so in the afternoon, leading to a continuous need for reinvention;

f) Resources: Despite the need for very high volumes of financial resources to fight the pandemic, there was no lack of funds for this area (health). Through reallocation, donations, and transfers, health services were supplied with unprecedented incomes, remaining the bottleneck to the deficiency of human and material assets. In a first look, it was observed that financial resources to work with innovations do not seem to have been missing. This situation has led to a context where every possible response to the pandemic was encouraged to be developed without limits;

g) Support from the working group, encouragement, recognition, and feedback: The collaborative environment and the need to act with effective responses have created an internal environment of support, encouragement, praise, and active feedback, since collaboration led to union and mutual efforts towards a single and common goal. Administrators, who could have been less susceptible to support this environment in the past, have started to act more actively. There is a huge possibility that they (managers) were moved by the external environment and the needs of the moment. Nonetheless, it is a great improvement;

h) Adequate time to perform tasks: This is the topic where there was no improvement. Time became increasingly scarce in a global scale, increasing the pressure for more success than errors. Professionals have started to work several extra hours a day to meet the constant demand, and even so, there was no decline in the innovation activity.

In addition, a specific change seems to have been fundamental in the organizational environment: once again, as in no other moment in history, public employees directly involved in the fight against the pandemic were widely applauded and named as heroes[9]. Despite some isolated aggression cases caused by fear of contagion, it has been common to see thank-you notes in advertisements and several acknowledgments directed to professionals who are putting their lives at risk.

This last factor, as well as the aforementioned recognition within the institution (g), have produced tremendous changes in the organizational climate, fostering interest, problem-solving approach and motivation in the workforces. It has also provided a favorable social environment, stimulated great team spirit, concentration in the collective, and other socio-cultural factors (ALENCAR, 1998).

There are many examples of innovations that have arisen during this period[10]. The private sector has provided several solutions in services and goods. However, the public sector has not been left out. It has produced fast answers in several different areas, even though public administrators have been implementing many of the solutions with the private sector's help, which is an excellent example of public-private partnerships.

The public sector was already partially committed to innovation. The theme had been part of the general management agenda, basically through innovation laboratories. GNova, the federal government's pioneering

innovation laboratory, created in August 2016[11], is a good example of this. Despite not being the only form of innovation standing in public power, laboratories play a fundamental role in the research, application, and dissemination of innovative techniques and tools. They progressively become fully specialized in innovation in public sector, considering all particularities inherent to it. Such specificities appear more clearly when we look at the main focus of innovations. While customers are the focal point to the private sector, as a rule, citizens are users of public services and, respectively, the focus to the public power. Both approaches have similarities, but also significant differences.

One innovation in the private sector may represent customer fidelity, or the loss of that customer due to the lack of it. In other words, more profit, or loss. On the other hand, when talking about the public sector, it may represent the saving of lives, by correcting an inefficiency in the provision of an essential service, for example. Of course, some innovations in the private sector also drive to the same end, when it comes to critical services (saving lives). However, in the public sector, this may represent the day-to-day provision of public health services.

Going back to the COVID-19 pandemic, we see that innovation may represent the preservation of thousands of lives. Nevertheless, many successful present-day innovations will not appear as much as others because they occur in processes far from the general public. Selling products is more manageable than processes.

Gates has divided the innovation in this fight against the pandemic into five categories: "treatments, vaccines, testing, contact tracing, and policies for opening up."[12] The Bill & Melinda Gates Foundation has invested in almost all these types. Innovation research is providing a silent revolution. Many of it is being developed together with the action of governments, as we will see in the next topic.

4 - Concrete Goals of Innovation, Especially in Public Sector (The elephant's flight)

Among all processes and products that are the result of innovation during the Covid-19 pandemic, it is possible to highlight many, for example, the cases of research at Columbia University[13] in New York City: Monoclonal Antibodies; Ultraviolet Light to Kill Microbes; New Covid-19 RNA test, and others.

Brazil has also several examples of innovation in the most distinct areas. Under the suspension of public events, Brazilian hotels have seen their occupancy rates plummet. As a reaction, many of them have decided to innovate , creating a new range of service suggestions,

such as picnics, movies in a room with free popcorn, special dinners beholding a privileged view, food cooked by renowned chefs, accommodation plan for people at risk and home office packages (turning its rooms into offices).

In the financial market, banks and fintech have created services to help people in this time of uncertainty, as, for instance, in the area of combating fraud[14], which has increased during the pandemic. Financial players have implemented 'Double Check' systems with children or other relatives, prepaid cards with limits, exclusive service teams, and unique credit lines for small businesses.

Companies from numerous other sectors have also presented their innovations during this pandemic time[15]. Civil construction and real state area stablished new services on digital channels, providing everything online, from the early search of properties to the ending documentation formalities. They have also invested in digitalizing processes to improve the user's experience, hunting for properties and monitoring the development of the building project, for instance.

Telephone and internet companies with distinguished services, released pay-tv packages, internet link bonuses, and exemptions to access to official governments and health authorities' applications.

Innovation has taken every field of economy, for example, through assistance for self-employed professionals throughout remote customer service platforms, sales platforms for large retailers, to support small sellers who had to stop their activities during the pandemic. Technology companies have made platforms available to serve the education areas with remote teaching. In the health area, specifically, different companies with appropriate technology started to produce alcohol gel to contribute to providing the product at the beginning of the pandemic. Breweries and other beverage industries have been supplying it (alcohol gel) even for free.

Forbes magazine, in its Brazilian edition of June 19, 2020[16] (updated on 07/17/2020), listed several Brazilian solutions created during the pandemic. Portable air sterilizers, sanitation curtains, pet sanitizers, room disinfection machines, lung ventilators, ventilation masks, individual controlled breathing bubbles, digital platforms, applications and systems for screening, monitoring and evaluating patients, geolocation disease mapping platforms, thermographic cameras, telemedicine platforms, distance markers, several new models of protective masks with new materials and functionalities, nanotechnology antiviral fabrics, antiviral inks, antiviral thermoplastic for shoes and sanitizing mats.

Specifically in the public sector, there were innovations in numerous areas as well, from legislative innovations to public services and various products. Exame magazine[17] listed, among 50 innovations in general, three coming from governments:

Needing to transfer emergency income from the federal government, due to the pandemic, Caixa Econômica Federal (a Brazilian public bank) amplified the number of users on its application from 1 million to 65 million users in just four days.

The Brazilian Government Secretariat Digital bet on the massive offer of digital services to avoid agglomerations and queues, kept to meet citizens' needs during the pandemic. The office digitalized around 250 services. This advance led the country to appear among the 20 most digitalized countries in the United Nations' ranking.

In the State of Pernambuco, the city of Recife created an application to encourage physical exercise at home during the pandemic. 50,000 users have been downloading the Movimenta Recife app that also brings updates on policies for re-opening spaces during different phases of the pandemic.

Two innovations in the area of financial legislation, one by the Central Bank in conjunction with the National Monetary Council, and other by the Securities and Exchange Commission, Open Banking and Sandbox regulations, despite being expected, were accelerated due to the pandemic[18].

The municipality's health department of Luzerna, in the countryside of Santa Catarina State, in a partnership with a startup created in the municipality's incubator, uses an app called Prix Saúde to daily monitor users' health (free translation)[19]:

"With the app, citizens can promptly communicate their health situation to the health teams, whether they have a fever, cough, runny nose, fatigue, difficulty breathing, headache, diarrhea, vomit events, muscle pain, no smell or taste, irritation or pain in the throat, dizziness or low back pain. The application complements the management and intelligence system in the health area, focused on basic care, called prixNeuron, which is already used by the municipality. Based on metrics from the World Health Organization (WHO), prixNeuron brings together risk and immunization groups, analyzing and interpreting, through artificial intelligence, strategic information for the best approach and care for these groups." (Portal Éder Luiz, 2020) [3]

The National School of Public Administration - ENAP, supported by several institutions, launched a contest called Desafios COVID-19[20] and "in just over a month, the contest identified about 600 solutions over the five regions of Brazil". There are propositions about digital government, intergovernmental coordination, communication, material innovation and health infrastructure, always focused on combating the pandemic and its effects. 14 winners emerged from this contest.

In the "legal entity" category, there are six initiatives (the first six - As primeiras seis) and eight others in the "private individual" category (IADB, 2020):

a) Intensive Care Control - Covid-19 – "Management of several ICUs, simultaneously and in real time. It is possible to identify positions available and maximize bed release by monitoring criteria such as the need for isolation, ventilation and other resources for each patient. The tool also allows organizing the queue of patients who are candidates for ICU beds using predictive models."

b) Monitora Covid-19 – "Presents raw data and disease rates by Municipality, States and Countries, as well as options for mathematical models, temporal and spatial analyses, scenarios, general combat measures, risk population, municipal reports allowing the pandemic monitoring and its trend over time, as well as the comparison of Brazilian data with other countries'."

c) Aua – "From the Tupi-Guarani language, meaning 'people', Aua is a platform to sponsor small entrepreneurs. The idea is to connect small businesses that need support for consumers who want to get more benefits from their day-to-day purchases."

d) Coronavirus dispersion simulator – "Shows the evolution of the community disease transmission. The simulator shows the virus's contagion line with different parameters, such as the number of people in the environment, the initial number of individuals infected, the percentage of social confinement and the acquisition of herd immunity over time."

e) Community micro/nano credit – "Here, the idea is to invest in the existing Community Development Bank Network (with an emphasis on Banco do Preventório) to develop microcredit (manufacture) and nano credit (consumption) solutions, as well as community actions like the distribution of basic food baskets."

f) CovidBR: "Use of BI and geoprocessing – Pandemic progress visualization system, using Business Intelligence plus Analytics technologies and geoprocessing technologies, giving real-time data about the pandemic."

g) Increase in availability of mechanical ventilators – "The initiative proposes the use of a valve that controls

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[3] Com o aplicativo o cidadão pode comunicar instantaneamente a sua situação de saúde para as equipes de saúde. Se está com febre, tosse, coriza, fadiga, dificuldade para respirar, dor de cabeça, diarreia, vômito, dor muscular, não sente cheiro ou gosto, irritação ou dor na garganta, tonturas, dor na lombar. O aplicativo é um complemento do sistema de gestão e inteligência na área da saúde,

focado na atenção básica chamado prixNeuron que já é utilizado pela prefeitura. Baseado em métricas da Organização Mundial de Saúde (OMS), o prixNeuron reúne grupos de risco e imunização, analisando e interpretando, por meio de inteligência artificial, informações estratégicas para a melhor abordagem e atendimento a estes grupos.

the flow of oxygen generated by the mechanical ventilator in two outlets with different settings. It allows two patients to use the same equipment, at the same time, with different respiratory needs."

h) Mandando a real sobre a Covid-19 – "Communication project with strategic information about the disease in the suburb population, with a more appropriate and representative art, language and images from their surroundings, to prevent contagion."

i) Aplicativo para Cooperação em Saúde – "App to be developed to monitor the availability of ICU beds and health personnel in real time, allowing better allocation of resources from States and Municipalities."

j) App to monitor patients diagnosed with Covid-19 – "Your COVID-19 test result was positive: what to do? Avoiding unnecessary visits to the doctor and speeding up the search for help when needed, the proposal here is to create an app that shows accurate information for those people infected by the new coronavirus."

k) Bringing the community closer to its health team via Whatsapp – "the tool already exists, and the information is available. What is the next step? Bring everything together in groups with professional and responsible curatorship. This is the proposal of this initiative that idealized Whatsapp groups among community health workers and residents of a determined region. The space will serve to share scientifically based recommendations and fight against fake news."

l) Coronavirus, the game – "Educational game for young people from 12 to 16, with a focus on peripheries. It shows that accurate and good information does not need to be boring and can be accessed, even during social isolation measures. The material is already developed and seeks funding to be produced in large scale."

m) Tecer Esperança – "Through the production of personal shielding equipment for health professionals made by vulnerable communities, two ends come together: those who need protection and those who need work."

n) HiginizAção – "Common asepsis pedal-operated sinks for areas in need of basic hygiene resources - water and soap - crucial to the fight against COVID-19."

The Innovations mentioned here constitute only a fraction of everything that has been produced – especially in Brazil – by the private initiative and the public sector during the pandemic.

Perhaps the most outstanding innovation has been precisely the process of driving the capacity to innovate in the public sector. Both the speed of development and the procedures for conducting innovations have been undoubtedly unprecedented engagements in the public sector, and deserve an in-depth study, when the pandemic's urgency is gone.

5 - Conclusion

Many factors influence the mechanism that allows innovation improvement in the public sector. As we could see in this article, the COVID-19 pandemic has created an environment of numerous general needs that demanded new and better services and goods. This scenario potentialized advances and allowed innovations in all sectors, including public administration.

Far from the ideal, yet with merit, we could see public employees working faster and better, looking for alternatives and innovation. Even in sectors where most of the mechanisms became obstacles, they came down when the urgency of pandemic solutions came along. The "perfect storm" was formed around necessities, and the public sector environment grew propitious to fostering creativity.

Paradoxically, political disputes became an obstacle to promote the coalition among federative entities, in order to develop prevention strategies against the Covid-19 pandemic. This problem has become the most significant battle in Brazil among mayors, governors, and the president. Nonetheless, it is necessary to point that government sectors, at all levels, did not hesitate to start their innovation journeys and produce the solutions needed, leaving political issues to the politicians.

Based on that movement, it is possible to make some conclusions. Notwithstanding earlier ones, there is evidence linking renowned theoretical studies stating that the environment enables creativity and innovation with the facts presented in this study.

For example, there is a high relevance of the context and environment concerning innovation and creativity improvements, mainly when the institution frames the public sector. In addition, the pandemic urgency minimizes the public leaders' dependency – a real managerial problem – when the technical and scientific solutions become more necessary.

The leader's role, specifically during the public sector's innovation process, is a theme for an in-depth analysis that extrapolates this article's purpose. Nevertheless, it is necessary to put the lights on the fact that the situation has suddenly changed. Amabile and Khaire have already approached a related idea when analyzing managers' role in the private sector: "because what used to be an intellectual interest for some thoughtful executives has now become an urgent concern for many"[21], and "the shift to a more innovation-driven economy has been abrupt." There are similarities between these two statements and our conclusions about the public manager's role during crises. The pandemic acted as a trigger to this abrupt change for many public leaders, from top to bottom.

Besides the natural challenges of facing the Covid-19 pandemics, many environmental factors have also changed, as mentioned in item 3; furthermore, an avalanche of innovations has arisen from the public sector, as described in item 4 above.

Finally, this article presents some examples of improvements and new administrative procedures. Simple changes that, being permanent, could be the leap of faith to large innovations in the public sector. At the minimum, innovation is necessary to build better places to work (inside the public sector structure), stimulate a permanent seek for better services to citizens, and guarantee that expenditures become wiser and more inclusive, ultimately leading the country to a better and efficient public administration.

References

World Health Organization, (2020). WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. Retrieved from https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020.

World Health Organization, (2020). WHO Coronavirus Disease (COVID-19) Dashboard. Data last updated: 2020/9/25, 5h14pm CEST. Retrieved from https://covid19.who.int.

Cohen, S., Eimicke, W. B., & Heikkila, T. (2013). The effective public manager: Achieving success in government organizations.

A Gazeta. (2018). Pesquisa mostra que empresários querem menor presença do Estado. Retrieved from https://www.agazeta.com.br/economia/pesquisa-mostra-que-empresarios-querem-menor-presenca-do-estado-1118.

UOL (2020). Empresários pedem liderança do governo na crise e mais doações da sociedade. UOL. Retrieved from https://economia.uol.com.br/noticias/redacao/2020/03/22/coronavirus-crise-economica-debate-online-empresarios.htm

Cavalcante, P. (2019). Inovação e políticas: superando o mito da ideia. Brasília-DF. Ipea, 2019.

Amabile, Teresa M. "Creativity and Innovation in Organizations." Harvard Business School Background Note 396-239, January 1996.

Alencar, E. M. L. S. de. (1998). Promovendo um Ambiente Favorável à Criatividade nas Organizações. RAE-Revista de Administração de Empresas, 38(2), 18-25. http://dx.doi.org/10.1590/S0034-75901998000200003

Retrieved from https://veja.abril.com.br/politica/queda-de-dois-ministros-em-apenas-um-mes-deixa-saude-a-deriva/

Retrieved from https://www.ictq.com.br/guia-de-carreiras/1377-os-novos-herois-da-tv-no-brasil-e-no-mundo

Retrieved from https://exame.com/revista-exame/50-inovacoes-da-pandemia/

Retrieved from http://gnova.enap.gov.br/pt/sobre/quem-somos

Retrieved from https://www.gatesnotes.com/Health/Pandemic-Innovation

Retrieved from https://magazine.columbia.edu/article/covid-19-what-happens-next?utm_source=43329176_466480417&utm_medium=email&utm_campaign=15100797_

Retrieved from https://exame.com/negocios/piquenique-cinema-e-restaurante-privativo-hoteis-inovam-na-pandemia/

Retrieved from https://valorinveste.globo.com/produtos/servicos-financeiros/noticia/2020/06/21/fintechs-inovam-para-proteger-clientes-idosos-de-mais-golpes-virtuais-na-pandemia.ghtml

Retrieved fromhttps://gobacklog.com/blog/empresas-que-inovaram-na-crise-do-coronavirus/

Retrieved fromhttps://forbes.com.br/negocios/2020/06/criatividade-e-inovacao-22-solucoes-brasileiras-criadas-durante-a-pandemia-para-o-combate-a-covid-19/

Retrieved from https://exame.com/revista-exame/50-inovacoes-da-pandemia/

Retrieved from https://ricmais.com.br/noticias/duas-importantes-inovacoes-regulatorias-durante-a-pandemia/

Retrieved from https://www.ederluiz.com.vc/prefeitura-de-luzerna-inova-na-area-de-saude-durante-pandemia-de-covid-19

Retrieved from https://blogs.iadb.org/brasil/pt-br/desafios-covid-19-inovacao-publica-e-cocriacao-rapida-de-solucoes-para-o-combate-a-pandemia/

AMABILE, T. M.; KHAIRE, M. (2008). Creativity and the Role of the Leader. Harvard Business Review, Oct 2008

'Notas de fim'

1   World Health Organization, 2020. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020.

2   Cohen, S., Eimicke, W. B., & Heikkila, T. (2013). The effective public manager: Achieving success in government organizations.

3   https://www.agazeta.com.br/economia/pesquisa-mostra-que-empresarios-querem-menor-presenca-do-estado-1118.

4   https://economia.uol.com.br/noticias/redacao/2020/03/22/coronavirus-crise-economica-debate-online-empresarios.htm

5   Cavalcante, P. (2019). Inovação e políticas: superando o mito da ideia. Brasília-DF. Ipea, 2019.

6   Amabile, Teresa M. "Creativity and Innovation in Organizations." Harvard Business School Background Note 396-239, January 1996.

7   Alencar, E. M. L. S. de. (1998). Promovendo um Ambiente Favorável à Criatividade nas Organizações. RAE-Revista de Administração de Empresas, 38(2), 18-25. http://dx.doi.org/10.1590/S0034-75901998000200003

8   https://veja.abril.com.br/politica/queda-de-dois-ministros-em-apenas-um-mes-deixa-saude-a-deriva/

9   https://www.ictq.com.br/guia-de-carreiras/1377-os-novos-herois-da-tv-no-brasil-e-no-mundo

10   https://exame.com/revista-exame/50-inovacoes-da-pandemia/

11   http://gnova.enap.gov.br/pt/sobre/quem-somos

12   https://www.gatesnotes.com/Health/Pandemic-Innovation

13   https://magazine.columbia.edu/article/covid-19-what-happens-next?utm_source=43329176_466480417&utm_medium=email&utm_campaign=15100797_

14   https://exame.com/negocios/piquenique-cinema-e-restaurante-privativo-hoteis-inovam-na-pandemia/

15   https://valorinveste.globo.com/produtos/servicos-financeiros/noticia/2020/06/21/fintechs-inovam-para-proteger-clientes-idosos-de-mais-golpes-virtuais-na-pandemia.ghtml

16   https://gobacklog.com/blog/empresas-que-inovaram-na-crise-do-coronavirus/

17   https://forbes.com.br/negocios/2020/06/criatividade-e-inovacao-22-solucoes-brasileiras-criadas-durante-a-pandemia-para-o-combate-a-covid-19/

18   https://exame.com/revista-exame/50-inovacoes-da-pandemia/

19   https://ricmais.com.br/noticias/duas-importantes-inovacoes-regulatorias-durante-a-pandemia/

20   https://www.ederluiz.com.vc/prefeitura-de-luzerna-inova-na-area-de-saude-durante-pandemia-de-covid-19

21   https://blogs.iadb.org/brasil/pt-br/desafios-covid-19-inovacao-publica-e-cocriacao-rapida-de-solucoes-para-o-combate-a-pandemia/

22   World Health Organization, 2020. WHO Coronavirus Disease (COVID-19) Dashboard. Data last updated: 2020/9/25, 5h14pm CEST. https://covid19.who.int.

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