

PUBLIC-PRIVATE PARTNERSHIP AND THE POWER OF THE BIG DATA

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Abstract— Digital and Data are nowadays an important tools to create a significant competitive advantage, urge innovation, to increase competitiveness and to create social impact. They affect all countries, organizations and industries, in both public and private sectors. The management of Big Data in the digital area has become an obligation if not an emergency for all organizations in different sectors. It's a key for economic growth that contributes to the economy development and societal well-being. However, for the public organizations to accede and manage such information, they need to mobilize more effort and resources, which can impede and postpone reaching their main objectives. This is why public authorities have to consider appealing to partnership with the private sector.

In our paper, we will define how and why the Big Data is important for the public organizations. We will define the public-private partnership. Then, we will explain how partnerships between public and private sectors in the digital area create value to both sectors.

Key words— Digital, Big Data, PPP

I- INTRODUCTION

*"The Big Data is the new oil", European
Commission Kroes*

Digital and Data are nowadays an important tools to create a significant competitive advantage, urge innovation, to increase competitiveness and to create social impact. They affect all countries, organizations and industries, in both public and private sectors. The management of Big Data in the digital area has become an obligation if not an emergency for all organizations in different sectors. It's a key for economic growth that contributes to the economy development and societal well-being. However, for the public organizations to accede and manage such information, they need to mobilize more effort and resources which can impede and postpone reaching their main objectives. This is why public authorities have to consider appealing to partnership with the private sector.

In our paper, we will define how and why the Big Data is important for the public organizations. We will define the public-private partnership. Then, we

will explain how partnerships between public and private sectors in the digital area create value to both sectors.

II- THE IMPORTANCE FOR USING BIG DATA

A. Definition of Data

Big Data is a new concept, popularized in 2012. It is defined as information, satellite, imagery, digital picture and video, transaction record or GPS signals (European Commission, 2015). Organizations face a big number of data which they need to understand and treat to stay efficiency and up-to-date. Main issues related to the Big Data are the 3V: Volume, Velocity and Speed (VITESSE) (Gartner Group, 2001):

- **Volume:** it refers to the quantity of information and data and much they continually increase. Data sector is growing by 40% per year and generates 5 to 6% increase in productivity (European Commission, 2015).
- **Velocity:** it refers to the big number of forms that data can take. They are also unstructured,
- **Speed:** collection, analysis and exploitation of data should be realized a certain amount of time. Every single minute 1,7 million billion bytes of data are exchanged, this is equal to 360 000 DVDs (European Commission, 2015), and this equals to 6 megabytes of data for each person every day.

B. Using Big Data

Using Big Data is important. It offers the possibility to explore informations diffused by media, it can help to develop knowledge, gives a way to developing trend analysis and forecasting (climatic, environmental, socio-politic, etc). It can help also to anticipate, manage and better allocate risks in different fields: commercial, insurant, industrial and

natural risks. Furthermore, Big Data is also very helpful in energy field, ecology, security, criminal area and metrology. Moreover, Big Data is very useful and important in the health area as well. In fact, technology and innovation in the area of Big Data help professionals to more discover more, e.g., in the field neurology or ADN research progress and other complicated specialties. Hence, Big Data can lend a hand to doctors to make the right decision and choice quicker on the basis of informations collected by medical staff using Big Data. Patients, therefore, benefit from timely and appropriate treatment. They are better informed about healthcare providers. Big Data can save lives, time and money.

In addition, Big Data is very useful is education. We can note the experience of payment of registration fees via mobile money in Ivory Coast. It was delivered in partnership between the public and the private sectors. The main advantages of this partnership in digital experience can be summarized in this table:

TABLE I: PPP ADVANTAGES FOR THE EXPERIENCE OF THE PAYMENT OF REGISTRATION FEES VIA MOBILE MONEY

Ministry of Education and Technical Education	Students and parents
- A database of national register of students is more reliable and fuller	- Reducing the time, costs and safety concerns related to cash payments
- Elimination of security problems, of costs associated with handling cash, hence reducing the administrative burden	- Transparent pricing
- Improving the efficiency of the payment process and reducing financial losses	- Greater ease of payment
	- Increased confidence thanks to the simplicity of obtaining a payment receipt

- Greater transparency in managing funds	
Educational institutions	Mobile money service providers
<ul style="list-style-type: none"> - Improved cash management and budget for directors of institutions through advanced payments processes - Securing an overall increase in school fees, resulting in a larger budget for institutions - Efficient management and real-time student data due to the digitalization of databases 	<ul style="list-style-type: none"> - Increased adoption of mobile money services - Increased activity of existing customers - Seasonal viable Use Cases - Value-added offers - Additional source of revenue

Source: Payment of registration fees via mobile money in Ivory Coast: Public-Private Partnership

It is clear that advantages provided by Big Data and digital technology require changes in the business orientation and strategy or more generally in the business model. So, public organizations cannot work alone to better use and explore Data. In fact, public authorities should refer to the private sector to make efficient use of this technology and so to add some value to their system. In addition, private investors can know better about the needs and interests of the customers and the market. This knowledge helps to more focus more on investment as it works on datasets. It presents motivation for public organizations to go on partnership with the private sector.

So What's a PPP?

III- PUBLIC-PRIVATE PARTNERSHIP

A. Definition

PPPs are defined as co-operative institutional arrangements between public and private sector actors (Hodge and Greve, 2009).

The literature gives not a consensus about typical typologies of PPP. It depends mainly on the country, on history of PPP merging in that country and its legal framework and on activity fields. Sometimes governments implicitly use a similar contact of PPP but don't define it likewise. A literature immersion helps us to extricate different number of PPP types. All of these types are different combination forms of: Build, Design, Finance, Operation, Transfer, Concession, Management and Maintenance.

According to Michael Parkinson PPP is: « A genuine joint working where people from very different organizations have to understand and work with each other over a lengthy period of time which creates benefits which could not have been provided commercially at the start of the project and would not have been generated by the partners acting individually or by hiring one another. »

B. Reasons to establish a PPP

The traditional government way suffers in different fields because reasons of inefficiency and poor finance resources. From PPP, Galès (1995) supposed that this type of partnership should provide added value through the corporation between public and private sectors to enhance the national economy. Mainly, this partnership tends to reduce the role of public authorities control by introducing private sector. This strategy is subscribed under neo-liberalism perspective.

In France, public authorities with old social strategy could not insure the social and economic restructuration. Hence, horizontal and vertical partnership appears as a panacea in order to meet up

with innovation, better life, economy growth and added value.

Hence, there are many reasons to undertake a PPP. The government is a big organization and should satisfy all clients' needs. Under different social and economic pressures, it could not alone insure these requirements such as development of social projects (e.g. Housing project), enhancement of the quality of service and offer of greater life standard (Abdelhadi et al., 2011). In addition, the shortage of funding makes governments handicapped in facing the pressuring demands of citizens. The government may have funds but monopoly and without market competition, remaining passive and inefficient, continues to provide a poor quality of service to its citizens (Cheung et al., 2009; Abdelhadi et al., 2011). Or simply, it seeks to accelerate the project delivery. On the other hand, private organizations seek to invest money and are able to understand better the needs on the market. They show a strong incentive to invest in the public sector. In fact, the private sector has more to offer than the government in terms of skills, technology and knowledge therefore providing better quality services. Furthermore, it would get to know the needs of the public sector client over time (Ghobadian et al., 2004). Yet, establishing a PPP seems to be a good compromise for both parties. The private sector possesses better mobility than the government to save costs of projects in planning design, construction and operation. It avoids also the bureaucracy and relieves the administration burden. Further, the government lacks the ability of raising massive funds for the large-scale infrastructure projects, but the private participation can mitigate the government's financial burden (Walker et al., 1995).

OECD (2012) considers that PPP is a way of delivering and funding public services using a

capital asset where a certain project risks are shared in both the public private sectors.

For Mehta and al. (2010), the main reason for using PPPs is that they provide value for money (VFM), that is, better accountability for delivery of services than traditional delivery models within the public sector.

C. Public-Private Partnership types

A study conducted by Ramonjavelo Fitzgerald (2007) in Canada concluded that there are thirteen types of PPP: **Operation and maintenance; Design and build; Operation; Complementary Adding; Lease; Temporary privatization; Design-build and major maintenance; Lease-Refurbishment-Operate; Lease-expansion-operate/buy expansion and operate; Build-transfer and operate; Build-operate and transfer; Build- own-operate and transfer and Buy-Build-Operate**

- **Operation and maintenance:** the private partner assumes the responsibility of operation and maintenance under the reform of payment based on efficiency. The private partner has to respect a minimum of norms to be remunerated by the public partner.
- **Design and build:** like the first type of the contract of PPP, the responsibility is on the private partner to conduct the project under specific norms and characteristics to sustain a high quality of services. These norms and characteristics are initially defined by the public partner. For the payment, the private partner has to define initially the cost of the project and the fee or at least they have to delineate the fees. In this manner, the government benefits from economies of

scale and transfers design-related issues to the private sector.

- **Operation:** the government finances the project and the private partner insures the management side; they have to design, construct and operate the project. It is to the government to define goals and terms of contract. At the end, the private partner is still the owner of the project.
- **Complementary Adding:** the project does already exist. The private partner should complete or add some arrangements. The financing of the project is the responsibility of the investor. It continues to be remunerated from the adding installation exploitation for a pinpoint period (initially defined in the contract), or until it is totally reimbursed plus a reasonable profit.
- **Lease:** the private partner designs, finances and builds the project for the contract to be. The public partner uses the installation and remunerates the private partner by a rent/lease for a specific period. Once this period is over, the ownership of the installation goes back to the government.
- **Temporary privatization:** the installation exists but has to be refurbished or expanded. The private partner henceforth appropriates the installation, finalizes the refurbishment or the expansion and continues to operate the installation for a pinpoint period (initially defined in the contract), or until they are totally reimbursed with a reasonable profit.
- **Design, build and major maintenance:** according to a contract of design and construction, the private partner has also to

insure main maintenance of the installation. The ownership is already to the public partner who has to insure regular maintenance.

- **Lease, refurbishment and operate:** the private partner leases the public installation to operate and finance the expansion; after the end of the period of lease, they assign the installation to the public partner.
- **Lease, expansion, operate/buy expansion and operate:** the private partner buys or leases the installation from the government in order to refurbish or expand in order to operate the new building until the end of period indicated in the contract or until being reimbursed.
- **Build, transfer and operate:** the contract concluded between private and public partners in order to finance and build a new installation. Once building is completed, the private partner transfers the ownership to the government who in return lease back the installation to the investor for a long-term contract.
- **Build operate and transfer:** it is to the private partner to design, build and operate during the concession period. At the end of this period, the ownership of the infrastructure returns back to the public partner. The financing of the project is insured by the government.
- **Build, own, operate and transfer:** financing, building, operating, maintenance and management are insured by the investor during the period of concession. Once the concession period is expired, ownership is goes back to the government.

- **Buy, build and operate:** the private partner buys an infrastructure already there from the government in order to manage and finance its operation. The ownership is definitive for the investor.

The European Commission and North Ireland government (2004) gives another typology of PPP contract leaning on the level of transfer of risks between the public partner and the private partner. They distinguished four groups from the quasi responsibility to the government to take risks to mitigate taken risks and finally the responsibility to take risks is in charge of the private partner. For the first group when it's to the government to manage risks, we find: the **traditional partnership to service delivery**, the **Design-Build-Operate**, **Build-Operate-Transfer**, **Design-Build-Finance-Operate** and **Concession**.

- **Traditional partnership to service delivery:** it's the traditional of partnerships between the government and the private investor. The contract is usually a long-term contract (five years or more).
- **Design-Build-Operate / Build-Operate-Transfer:** main risks are managed by the public partner. The private investor focuses on design and building of the infrastructure under the supervision and performance criteria of the government. The private partner operates and maintains the structure for a defined period. The ownership is to the government from the beginning and still until the end of the contract to be able to operate and maintain by itself. It is important to highlight that the finance of the project is the responsibility of the public partner.
- **Design-Build-Finance-Operate:** the private partner takes charge of the whole project even

financial side. This model of contract involves long-term concession agreement. The private partner receives reimbursement from the government. At the end of contract, the ownership is back to the public partner. The government can choose to lease the asset for the private partner for a period of time. This type of contract is known as the Private Finance Initiative (PFI).

- **Concession:** this type of PPP is similar to Design-Build-Finance-Operate. The difference resides in the way the costs are retrieved. The private partner may be reimbursed from the users or both users and government.

In the healthcare field, and according to Mitchell (2002), there are eight types of PPP contracts. They are sub-categorized in two groups; those are under the government's coverage and those which are not. The first sub-category contains five types of PPP: **financing public investments by awarding service contracts**, **management contracts**, **construction maintenance and equipments contracts**, **hybrid contracts** and finally **leases**. The second category contains the rest of types of PPP which are **concession**, **private financing initiative** and the **other types of PPP without government guarantees**. A summary table follows down to define these eight types of PPP:

TABLE II: MAIN TYPES OF PPP IN THE HEALTH SECTOR

Type of PPP	Definition and Objectives
Service contracts	<p>A PPP is established in order to provide of a specific service like laboratory service.</p> <p>Objectives: - Leverage of comparative advantages of a private partner, namely experience and advanced technology.</p> <p>- Improvement of efficiency and quality of the service</p>
Management contracts	<p>It's a transfer of authority from the public partner to the private partner in order to manage a public facility and provide services. In this case, the private partner is fulfilling responsibility to manage all functions.</p> <p>Objective: efficient management.</p>
Construction, maintenance and equipment contracts	<p>The private partner is responsible to maintain equipments.</p> <p>Objective: reducing cost of repair, development, refurbishment and maintenance of healthcare facility.</p>
Hybrid contracts	<p>The hybrid contract can involve a variety of contracts mentioned below.</p>
Leases	<p>Leases involve a private partner paying a fee to the public partner to manage and operate a public facility in exchange for revenues from the facility's operating.</p> <p>Objective: improving the facility's financial situation by introducing more efficient management</p>
Concessions	<p>Concessions are used for existing or new facilities. They are an arrangements with the private partner to operate and maintain the existing assets (for existing facilities) or to designing, building and operating a new assets.</p> <p>Objective: shift most of the investment risk to the private sector.</p>
The Private Financing Initiatives (PFIs)	<p>In this type of PPP, the major capital investments financing is provided from the private partner. It is a kind of a concession contract.</p>
Divestiture / privatization	<p>It involves a sale of a public facility and transfer of ownership to the private partner.</p> <p>Objective: transfer of all commercial risk.</p>
Free entry	<p>It allows for the private partner participation in a project without contract with the public sector or the government. This later does not usually provide any guarantees, it may provide support by adjusting the regulatory framework or offering financial incentives (e.g., tax breaks) to influence the private partners' behavior.</p> <p>Objective: operational and investment risks rest with the private partner.</p>

IV- SOME DIGITAL EXPERIENCES WITH PPP

In this section, we will introduce two digital experiences in health sector. The first one is in Germany and concerns IT Portal. The second one concerns an e-Health Portal in Denmark.

A. Better IT for Better Life, Germany experience

The PPP experience in Germany is a partnership establishing a nationwide health telematics framework, named bIT4health (better IT for better health). It was in 2004 that modernization law encouraged the implementation of new processes. The nationwide framework enables health facilities to introduce the electronic patient card, and the electronic prescription system for two objectives: to increase both quality and efficiency in healthcare sector. In fact, for electronic patient card, the project includes spanning: 80 million insured, 270,000 providers, 77,000 dentists, 22,000 pharmacies, more than 2,000 hospitals and over 300 payers. The idea has emerged from German Ministry and social affairs who have established the IBM-led private partners' consortium in order to develop a health telematics infrastructure for communications within the healthcare system. As follows are the benefits:

- Electronic patient card is expected to allow for better and more efficient sharing and control of information and including better quality of care (e.g., avoidance of mistakes, ensuring correct medications), savings in the paper and imaging administration, as well as better processing and diminished card fraud/abuse
- E-Prescription component is expected to accrue annual benefits of EUR 516 Million, after the investment costs of EUR

1,190 Million and operating costs of EUR 134 Million in the first year.

The Better IT for Better health model of PPP makes marketing and sales functions more fluid.

B. E-Health Portal, Denmark experience

The next PPP experience in Europe that we will present is in Denmark, introduced in December 2003. It is also a national e-health portal (sundhed.dk), a public internet based solution that connects and distributes healthcare information among citizens and healthcare professionals nationwide. The public partner was Denmark authorities, along with some key health system stakeholders. The private partner was a consortium of private partners, including MedCom and IBM. The PPP was established to develop a national e-Health portal to:

- Enable web access to Electronic Patient Records (EPR) via central document indices to data kept in the individual hospitals and General Practitioners' (GP) offices
- Provide a portal for electronic communication between citizens and healthcare professionals (e.g., e-referrals, e-prescription)
- Allow the patients, their families, and the healthcare professionals' access to up-to-date information

The impacts of this e-health portal were focused on increasing system integration and reducing in related transaction costs:

- EUR 2.30 average savings per medical/insurance communication
- 66% reduction in hospitals' telephone calls
- 50 minutes per day saved in medical practices

- 100% of prescriptions sent electronically to pharmacies
- 97% of lab results electronically transferred

The national e-health portal makes marketing and sales function easier.

V. CONCLUSION

Digital area is the one of the most important competitive advantage that public organizations shouldn't ignore. But more additional resources can lead to reducing the performance dealing with main objectives. Hence, public authorities have to make partnerships with the private sector in order to draw all possible benefits from it.

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