

Document of
The World Bank
FOR OFFICIAL USE ONLY

Report No:

IMPLEMENTATION COMPLETION AND RESULTS REPORT

TF170130

ON A

SMALL GRANT

IN THE AMOUNT OF USD 0.395 MILLION

TO THE

Ministère de l'Enseignement Supérieur et de la Recherche Scientifique

FOR

Support to the Data Science Institute at the Institut National polytechnique Houphouët
Boigny (P170130)

June 9

DEC

Africa West Region

Regional Vice President: Carmen M. Reinhart

Country Director: Coralie Gevers

Regional Director: Aart C. Kraay

Director: Haishan Fu

Manager: Nada Hamadeh

Task Team Leader(s): Yao Kouadio Charles Kouame

ICR Main Contributor: Yao Kouadio Charles Kouame, Olivier Dupriez

ABBREVIATIONS AND ACRONYMS

ACE	Africa Centers of Excellence
ENSEA	Ecole Nationale Supérieure de Statistique et d’Economie Appliquée
IFORD	Institut de Formation et de Recherche Démographiques
INP-HB	Institut National Polytechnique Houphouët Boigny
LSMS	Living Standards monitoring Survey
TFSCB	Trust Fund for Statistical Capacity Building
WBG	World Bank Group

TABLE OF CONTENTS

DATA SHEET	ERROR! BOOKMARK NOT DEFINED.
I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES.....	4
II. OUTCOME.....	7
III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME.....	9
IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME	9
V. LESSONS LEARNED AND RECOMMENDATIONS.....	10
ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS	11
ANNEX 2. PROJECT COST BY COMPONENT.....	14
ANNEX 3. RECIPIENT, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS	15
ANNEX 4. SUPPORTING DOCUMENTS	17



DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P170130	Support to the Data Science Institute at the Institut National polytechnique Houphouet Boigny
Country	Financing Instrument
Cote d'Ivoire	Investment Project Financing
Original EA Category	Revised EA Category

Organizations

Borrower	Implementing Agency
Ministère de l'Enseignement Supérieur et de la Recherche Scientifique	National Polytechnic Institute Houphouet-Boigny (INP-HB), Data Science Institute

Project Development Objective (PDO)

Original PDO

The proposed development objective is to increase the availability of highly-skilled data scientists in Côte d'Ivoire and in the region, in response to a fast-growing demand from the public and the private sectors. This will be done in a sustainable manner by supporting the operation and expansion of the Data Science Institute at the Institut National Polytechnique Felix Houphouet Boigny (INP-HB) of Yamoussoukro.

FINANCING

	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
Donor Financing			
TF-B0992	395,000	395,000	275,000
Total	395,000	395,000	275,000
Total Project Cost	395,000	395,000	275,000

KEY DATES

Approval	Effectiveness	Original Closing	Actual Closing
23-Aug-2019	27-Nov-2019	30-Jun-2020	31-Dec-2020

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US\$M)	Key Revisions
27-Jun-2020	0.20	Change in Loan Closing Date(s) Change in Implementation Schedule

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Satisfactory	Satisfactory	Substantial

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	02-Jun-2020	Moderately Satisfactory	Moderately Satisfactory	0.20

ADM STAFF

Role	At Approval	At ICR
Regional Vice President:	Hafez M. H. Ghanem	Carmen Maria Reinhart



Country Director:	Pierre Frank Laporte	Coralie Gevers
Director:	Haishan Fu	Haishan Fu
Practice Manager:	Michael M. Lokshin	Nada Hamadeh
Task Team Leader(s):	Yao Kouadio Charles Kouame	Yao Kouadio Charles Kouame
ICR Contributing Author:		Yao Kouadio Charles Kouame



I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

Context

A. Country Context

In the 20 years following its independence in 1960, Côte d'Ivoire enjoyed political stability and experienced sustained growth thanks to its good agricultural base and natural resources. From 1981 to 1992, following a series of economic shocks, economic growth stagnated. During the period 1993 to 1999, the country experienced heightened social polarization, resulting from the marginalization of certain socio-cultural groups and the competition for increasingly scarce national resources, particularly agricultural land. During the 1999-2011 period, Côte d'Ivoire had among the lowest growth rates in Africa, averaging less than 2 percent. The country entered a period of political unrest following the 2010 Presidential Elections. The refusal of some groups to recognize the elections led to a violent post-election crisis that lasted five months.

Since the presidential inauguration of Alassane Ouattara in May 2011, the Government has paid extra attention to social cohesion and reconciliation. Côte d'Ivoire's recovery has since then been robust. The economy grew at an average of 9.7 percent from 2012 to 2013 before moderating slightly to 7.8 percent in 2017. The poverty incidence in Côte d'Ivoire slightly diminished from 48.9 percent in 2008 to 46.3 percent in 2015 (findings of the 2015 Living Standards monitoring Survey LSMS – ENV2015). The overall security situation has improved dramatically and is now stable. The country has made an impressive transition from crisis to relative stability, and from fragility to aspiring emerging economy status.

The Government's priorities were to modernize the economy and eliminate long-standing disparities aggravated by a decade of multifaceted crisis. The Government expected to accelerate implementation of measures designed to improve social cohesion, develop human capital, build a resilient economy, support territorial development and promote regional synergies towards integration.

B. Sectoral and Institutional Context

The volume and diversity of socioeconomic data growing at a fast pace gave data analytics a critical importance to the advancement of economies in Africa, as in the rest of the world. The development of the future economic and social plans of the Government of Côte d'Ivoire was informed by considerable analytical work. The development of the private sector also relied increasingly on good data and analytics. But the local and regional expertise needed to exploit these data was largely insufficient.

The Government – and to some extent the private sector - could count on cohorts of statisticians and demographers trained at the Ecole Nationale Supérieure de Statistique et d'Économie Appliquée (ENSEA) in Abidjan and Institut de Formation et de Recherche Démographiques (IFORD) in Cameroon. But this supply did not fully meet the expanding and diversifying demand. For that reason, the INP-HB established a Data Science Institute in 2017, in collaboration with the ENSEA and external partners (the Polytechnic School of Paris as an academic partner and advisor, and the Orange telecommunications company as a private sponsor). The Institute was designed to deliver a master's in data science designed to meet the needs of



private and public organizations which needed experts in data analytics and big data at the master level. The master's in data science was designed for (i) statisticians, mathematicians, econometricians, computer scientists, or equivalent having completed a bachelor's degree, and (ii) for professionals from the private or public sector who needed a specialized training in big data and data analytics. The INP-HB Data Science Institute aimed to provide these students and professionals with a possibility to acquire the required skills and qualifications for being effective data analysts in multiple industries. Several institutions in Côte d'Ivoire and elsewhere in Africa have been teaching statistics for a long time, but the INP-HB specialized training program in data science was needed to fill a gap in the data science sector. No such program existed until then in francophone Africa.

C. Higher Level Objectives to which the Project Contributes

The CPF reflected two pathways for Côte d'Ivoire identified in the Systematic Country Diagnostic to achieve the goals of eliminating extreme poverty and boosting shared prosperity. The first pathway entailed creation of better quality jobs through sustainable private sector-led growth in agriculture, agribusiness and the non-agribusiness sectors. The second pathway to attain inclusive growth was to build human capital, which entailed improving the efficiency and quality of spending in education, health and social protection and improving access and equity to basic services, while strengthening the quality of labor needed for private sector growth.

Education and market-responsive skills were critical for the economic transformation sought by the Government, and for ensuring that benefits from growth reach the poorest and are equitably shared. Côte d'Ivoire's education system, including technical and vocational training, had suffered from weak governance, lack of a clearly defined mission, and poor linkages with private sector stakeholders and labor market needs.

The World Bank aimed to support the Government in improving the relevance, quality and performance of the education and vocational training systems. The World Bank's support aimed to ensure better insertion and integration of the youth into the labor market and was planned to be pursued through targeted support to educational services at primary, secondary and higher levels. For higher education, the WBG planned to support the Government to improve employability of tertiary education graduates by focusing on strengthened and improved (i) governance of the institutions and participation of the private sector, (ii) quality and relevance with a better alignment with market needs and (iii) efficiency and equity. Furthermore, to support Côte d'Ivoire's attainment of its economic transformation goals, the WBG planned to support the strengthening of science and technology skills and applied research capacities to accelerate absorption and increase productivity. With rising interest from African governments in higher education policy reform, a regional approach would offer a cost-effective strategy to build responsiveness and excellence in Côte d'Ivoire's higher education in priority areas. Through the support under this CPF, Côte d'Ivoire would participate in the regional Centers of Excellence program, thus helping to make its human natural capital more viable for economic activities.



Project Development Objectives (PDOs)

The proposed development objective was to increase the availability of highly skilled data scientists in Côte d'Ivoire and in the region, in response to a fast-growing demand from the public and the private sectors. This was to be done in a sustainable manner by supporting the operation and expansion of the Data Science Institute at the Institut National Polytechnique Felix Houphouet Boigny (INP-HB) of Yamoussoukro.

Key Expected Outcomes and Outcome Indicators

The project's expected outcomes consisted of the following: (a) increasing the availability of highly skilled data scientists and (b) supporting the operations and expansion of the Data Science Institute.

The project outcome indicators consisted of the following:

- Procurement of IT equipment completed
- Training materials delivered by consultants
- Number of students and staff accessing the self-learning platform
- Workshop on data science curriculum held

Components

The proposed project consisted of the following components.

1. Curriculum assessment

- **Curriculum assessment:** The INP-HB established the Masters' in Data Science in 2017 in collaboration with the Ecole Nationale Supérieure de Statistique et d'Economie Appliquée (ENSEA) and the Polytechnic School of Paris as an academic partner and advisor. In June 2019, a first cohort of students was expected to graduate from the Masters' program and a second cohort was expected to have completed the first year of the two-year program. To ensure the relevance and quality of the program and its alignment with data science curriculum in other parts of the world, a review of its' curriculum was planned to be undertaken. Coordinated by INPHB, the review was planned to be conducted with trainers and students from INPHB and experts involved in data science training programs in Europe and/or North America. These external experts were planned to be contracted to (i) conduct a desk-review of the current curriculum, (ii) participate in a workshop in Cote d'Ivoire to formulate recommendations for possible adaptations of the curriculum, and (iii) define the corresponding needs in terms of trainers' skills and training materials.
- **Development of training materials:** The output of the curriculum assessment was planned to serve as input to identify new training materials to be developed. Individual consultants were planned to be contracted for the development of these materials.

2. Specialized training for students and trainers, including the maintenance of a self-learning platform

- **Specialized training for students and trainers:** The project was expected to contract consultants to deliver training to INP-HB trainers and students at the Data Science Institute. For the training of trainers, it was envisaged that some of the experts who would have developed the training materials (component 1), and other consultants, would deliver short-term specialized trainings in a twinning arrangement with local



trainers. The intervention of professors or experts from abroad were expected to focus on highly specialized topics for which no specific expertise existed (yet) in the Recipient's territory. All external facilitators were expected to be seconded by local trainers. The project was planned to also support the participation of INP-HB trainers in short-term training and exchange programs abroad. The project was also expected to facilitate exchanges with experts and facilitators outside the INP-HB by supporting the reinforcement of the video conferencing equipment.

- **Self-learning platform:** The project was expected to provide the Data Science Institute's trainers and students with access to a self-learning platform. A contract was expected to be signed with a company that maintains a specialized on-line self-training program in data science to allow staff and students at the Data Science Institute to acquire a stronger expertise in using Python, R, and SQL programming.

3. Data Library

As students in the Masters' in Data Science needed access to multiple datasets, a local Data Library was expected to be established at INP-HB to archive and provide students with on-line (intranet) access to the datasets they needed. This activity was planned to build on existing open source software and international good practice. An international consultant was expected to support the setting-up of the Data Library system, training of local staff in its maintenance, and supporting the documentation and publishing of priority datasets. The project was expected to facilitate the procurement of computer and other equipment as needed for the data library, and the purchase of books for the Data Science Institute's library.

4. Project Management

Providing general operating costs for Project management and implementation, including audit.

II. OUTCOME

Assessment of Achievement of Each Objective/Outcome

The achievement of the PDO is aligned with progress towards higher level of outcomes that are supported by the outputs and activities delivered under the project.

The Support to the Data Science Institute at the Institut National Polytechnique Houphouet Boigny Project, implemented by the Data Science Institute, was a grant funded under the Trust Fund for Statistical Capacity Building (TFSCB). It became effective in November 27, 2019 due to delays. Implementation started right after but was again delayed by the Covid-19 pandemic. The project activities have been moderately successfully completed as some activities could not be completed due to the pandemic, thus limiting the overall results of the projects. The funds have been partially exhausted, and the expected deliverables have been partially achieved or exceeded. The total disbursement to the client was \$395K and only \$232,293 was actually used by the client.



Below are the details of the activities at the end of the project in December 2020.

Activities completed

- **Curriculum Assessment.** The Data Science Institute had been established in 2017 with support from the Ecole Polytechnique de Paris and Orange. A curriculum had been developed, although not fully described. When the project started, a first cohort of student had completed the 2-year master program based on this curriculum. To assess the needs for adjustments at this early stage, an assessment was conducted with experts from the Ecole Polytechnique de Paris. The assessment was completed during the Fall 2020 and recommendations were provided to the Data Science Institute.

- **Specialized training for students and trainers, including the maintenance of a self-learning platform.**
Specialized training. The project intended to support the INPHB training program by
 - (i) providing specialized (ad-hoc) training to students,
 - (ii) providing students with unrestricted access to a self-learning platform,
 - (iii) providing training of trainers, and
 - (iv) providing equipment (computers and interactive screen/video equipment) to strengthen the IT environment at the Data Science Institute.The following specialized training were provided on site to students in Master 2, by international experts:
 - Data Engineering
 - Deep Learning
 - Natural Language processing (NLP)
 - Hadoop/Spark.

- **Self-learning platform.** All students and their trainers were provided unlimited access to the DataCamp self-learning platform. DataCamp offered 2 years of free access after a first year of subscription. DataCamp has been particularly useful for students entering for the first year of the program and has reinforced the practical aspect of the in-class work for all students.

Equipment were provided as planned and contributed to improving the classrooms and media lab of the Data Science Institute.

Activities not completed / Impact of COVID-19

The outbreak of the coronavirus disease (COVID-19) spread rapidly across the world since December 2019. Cote d'Ivoire like other countries decided to lockdown the city of Abidjan, implemented social distances and a curfew at 8pm and reopened later with limited activities at first. The authorities have also banned all international travels at the onset of the pandemic and later at the World Bank level all travels were cancelled. The project was affected by the travel bans and limitations, as all the training for the trainers scheduled were cancelled. Most of the specialized trainings for trainers were postponed and further delayed by the client's partners in Europe. Consequently, most of the specialized training did not to take place in the allotted time.



Overall Outcome Rating

Overall outcome rating: satisfactory

Other Outcomes and Impacts

The following outcomes and impacts from the project could be noted:

- The INPHB students benefited from the video-conference room and all IT equipment procured through the project.
- The project triggered a greater visibility and contributed to bring additional stakeholders support to the Institute.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

The Covid 19 pandemic as well as delays in effectiveness and the post-elections negatively affected the implementation of the project. Some activities were cancelled or postponed due to Covid-19 (all travels and most of the workshops/training) and later with the country presidential elections.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

Bank Performance

The project was implemented by the Data Science Institute. The World Bank project team, bringing years of expertise and experience, was responsible for the management and technical design of the project, as well as for the provision of technical assistance.

Overall, the Bank team involved in the project preparation and implementation process had a good mix of prior experience in implementing similar projects, substantial country experience, good project management skills and strong leadership to support the project. Lessons from earlier operations and projects, and complementarities with ongoing initiatives were taken into consideration and mainstreamed into the design of the project. Technical aspects of the project were well covered. The Bank team liaised closely with the recipient during the preparation and implementation stages, which allowed the ability to act proactively and highlight potential implementation risks and propose possible solutions quickly.

Quality of Supervision

Due to Covid-19, the supervision was done remotely. The planned March 2020 supervision mission did not take place as all trips were banned. Thus, all team members involved in the supervision, including TTLs, local FM and procurement specialists provided remote supervision providing prompt advice and assistance to the Data Science Institute.



V. LESSONS LEARNED AND RECOMMENDATIONS

- (i) Maximize involvement of client's team and potential beneficiaries from the very beginning of the project preparation.
- (ii) Ensure the country team involvement from the beginning of the project to facilitate the discussion with the recipient.

ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Increased number of highly skilled data scientists.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Training materials delivered by consultants	Yes/No	N 28-May-2019	Y 30-Jun-2020	Y 30-Jun-2020	N 31-Dec-2020

Comments (achievements against targets):

For the trainers, the training materials were not delivered by consultants as scheduled due to the Covid-19 (travels to Europe were cancelled) whereas for the students, most of the training materials were delivered.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of Students and Staff accessing the Self-Learning Platform	Number	0.00 28-May-2019	185.00 30-Jun-2020	185.00 30-Jun-2020	185.00 31-Dec-2020

Comments (achievements against targets):
 Fully achieved.

Unlinked Indicators

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Procurement of IT equipment completed	Yes/No	N 28-May-2019	Y 30-Jun-2020	Y 30-Jun-2020	Y 31-Dec-2020

Comments (achievements against targets):
 Fully achieved.

A.2 Intermediate Results Indicators

Component: Curriculum assessment

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Workshop on Data Science curriculum held	Yes/No	N 28-May-2019	Y 30-Jun-2020	Y 30-Jun-2020	N 31-Dec-2020

Comments (achievements against targets):
 The workshop under the project did not take place as no travel was allowed.

B. ORGANIZATION OF THE ASSESSMENT OF THE PDO

Objective/Outcome: Increased number of highly skilled data scientists.	
Outcome Indicators	<ol style="list-style-type: none">1. Procurement of IT equipment completed2. Training materials delivered by consultants3. Number of Students and Staff accessing the Self-Learning Platform
Intermediate Results Indicators	Workshop on Data Science curriculum held

ANNEX 2. PROJECT COST BY COMPONENT

Components	Amount at Approval (US\$)	Actual at Project Closing (US\$)	Percentage of Approval
1. Curriculum assessment	141,000.	93,226	66.12%
2. Specialized training for students and trainers, including the maintenance of a self-learning platform	178,000	139,067	78.13%
3. Data Library	70,000	0	0
4. Project Management	6,000	0	0
Total	395,000	232,293	58.8%

ANNEX 3. RECIPIENT, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

The report of the recipient is below (in French):

RAPPORT DU PROJET : Fund TF B0992

Créée depuis 2017 le « Data Science Institute », vise à accélérer la montée en compétences en « data management » en Côte d'Ivoire et en Afrique de l'Ouest. Hébergé à l'Institut National Polytechnique Félix Houphouët-Boigny (INP-HB) ce centre est le fruit de la coopération entre l'INP-HB, l'École Nationale Supérieure de Statistique et d'Économie Appliquée d'Abidjan (ENSEA) et l'École Polytechnique de Paris (X). Il prévoit la mise en place d'un cursus d'excellence de niveau international dans les sciences de la donnée, à destination d'étudiants dans un premier temps, puis de cadres en entreprise.

Ce centre forme des étudiants venant de plusieurs pays du continent africain en master data science, big data et Intelligence Artificielle

La data science ou science des données est un domaine interdisciplinaire qui s'appuie sur des outils mathématiques, d'analyse, d'optimisation, de statistiques, d'informatique. Elle emploie la théorie de l'information et la technologie de l'information, notamment le traitement de signal, des modèles probabilistes, l'apprentissage automatique, l'apprentissage statistique, la programmation informatique, l'ingénierie de données, la reconnaissance de formes et l'apprentissage, la visualisation, l'analytique prophétique, la modélisation d'incertitude, le stockage de données, la compression de données et le calcul à haute performance.

Le data Science Institute bénéficie de l'appui de plusieurs mécènes dont : le Groupe Orange, la Société Générale Côte D'Ivoire et le Groupe Sanlam.

Ce présent rapport a pour objet de mettre en exergue l'apport multiforme dont le centre a bénéficié de la part de la banque mondiale à travers le trust Fund TF B0992.

Les ressources mises à la disposition du Data Science Institute s'élèvent à 275 000 \$ dont 232 023\$ utilisés dans divers projets.

Les Activités réalisées avec les fonds :

1) Matériels :

- Cet appui nous a permis de renforcer notre parc informatique au niveau de la salle multimédia ;
- D'acheter un photocopieur ;
- D'avoir un écran de visio-conférence dans la salle multimédia ;
- D'acheter des ouvrages dans le domaine de la data science.

2) Formation :

Les étudiants ont bénéficié sur place à Yamoussoukro en Côte d'Ivoire de plusieurs formations dont :

- Data Engineering ;
- Deep Learning ;
- Natural Language processing (NLP) ;

- Hadoop/Spark.
- 3) Outils d'apprentissage : DataCamp
Grace cet appui financier nous avons pu acquérir un outil d'auto-apprentissage appelé Datacamp qui permet aux étudiants de renforcer leur capacité et de faire des certificats en ligne.
 - 4) Elaboration de Curricula
Trois experts recrutés ont permis de revisiter notre curricula et faire des propositions pertinentes afin d'avoir une formation toujours de qualité.

Au total nous avons apprécié à sa juste valeur cet appui financier permettant au centre de renforcer son matériel de formation, de renforcer les capacités de nos étudiants afin de les rendre opérationnels à la fin de leur cursus scolaire.

Nous voudrions profiter ce rapport pour remercier toutes les personnes de bonne volonté au niveau de la banque mondiale qui nous ont accompagné durant tout le projet. Toute notre reconnaissance et notre gratitude à tous les donateurs qui sans eux ces choses évoquées n'auraient pas eu lieu.

Nous regrettons toutefois le fait que nos enseignants n'aient pas pu bénéficier des formations prévues à l'extérieur à cause de la pandémie du COVID 19 et le reste de la somme allouée a dû être rétrocédé alors qu'elle pouvait servir à cette activité de formation des formateurs.

ANNEX 4. SUPPORTING DOCUMENTS

International Data Science Institute website : <https://datascience.inphb.ci/vues/datascience/>

Materials purchased and rooms equipped (see below): photocopier, books related to data science, video-conference screen, computers



