

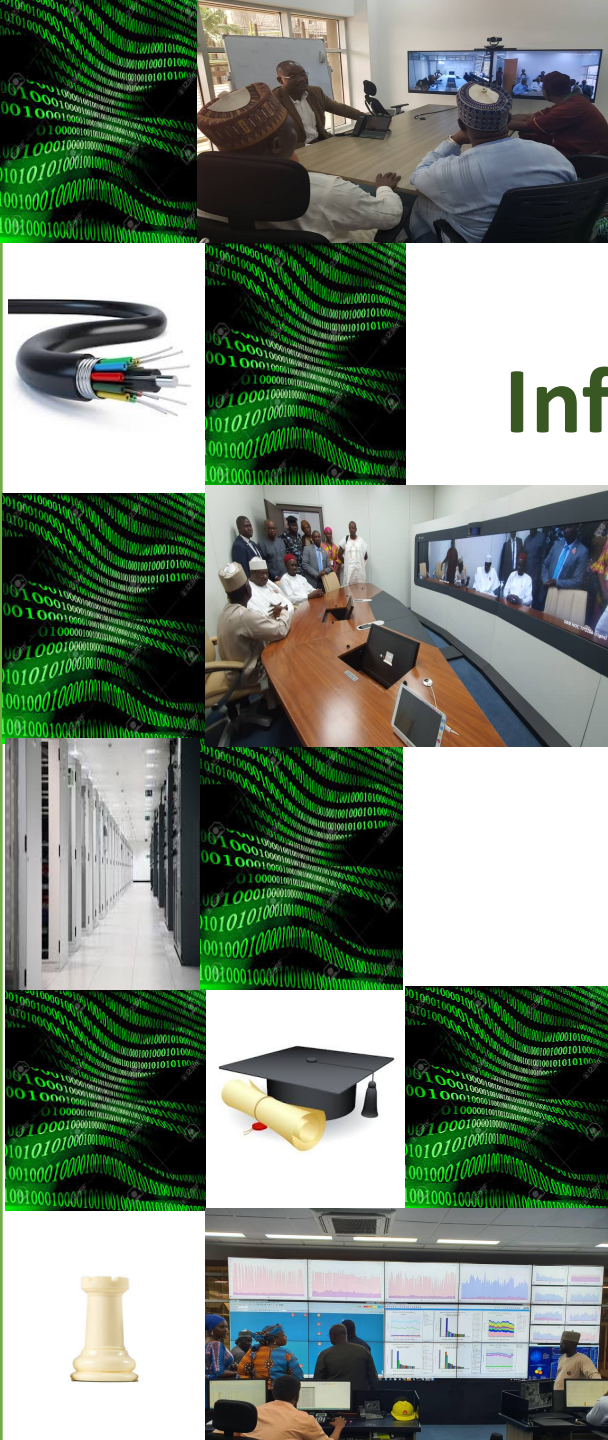
Development of a National ICT Infrastructure for Education, Research and Learning with



Presentation Delivered at the Eko-Konnect Users Conference 2020

By

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Discussion Points

- Context - About Galaxy Backbone
- Overview and History – Galaxy Backbone and Education, Research and Learning
- Galaxy's Role in the Digital Economy Transformation Strategy
- Current Imperatives in Education Research and Learning (ERL)
- Digital Platform Similarities
- Proposal for Collaboration to Support Rapid Development

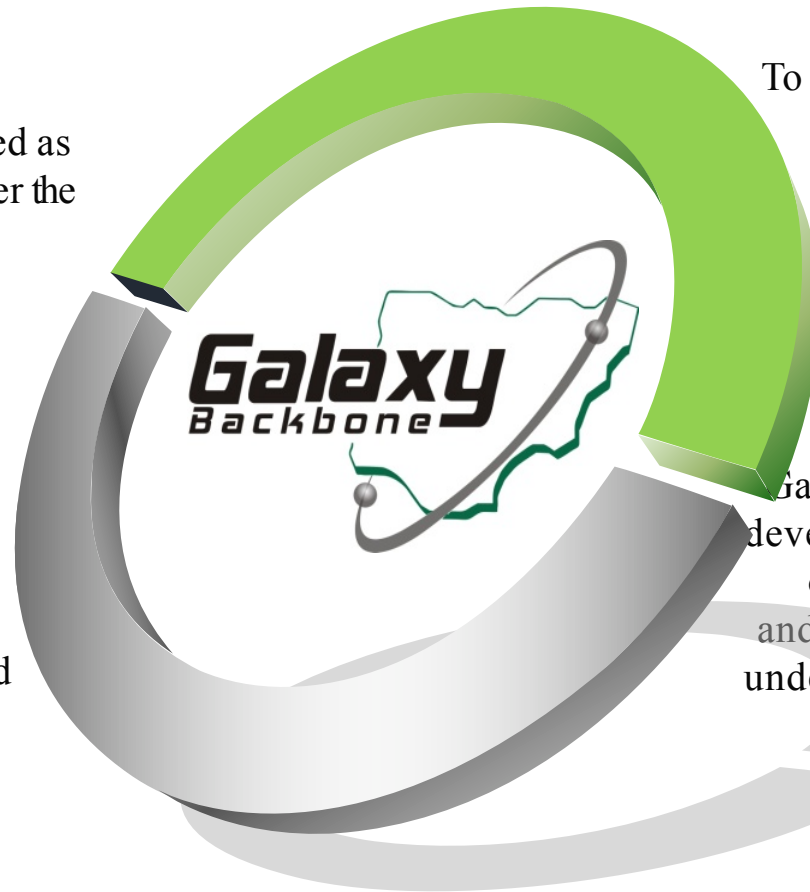
About Galaxy Backbone

STRUCTURE

Established by the Federal Government in 2006. Registered as Public Liability Company under the CAMA

MANDATE

Provide connectivity, infrastructure and transversal applications and services to public institutions and rural and underserved communities



VISION

To be the leading enabler of digital inclusion in Nigeria and Africa

MISSION

Galaxy Backbone drives national development through the provision of pervasive ICT infrastructure and services to public institutions, underserve communities and other stakeholders

Overview and History – Galaxy Backbone and ICT Infrastructure for Education Research and Learning

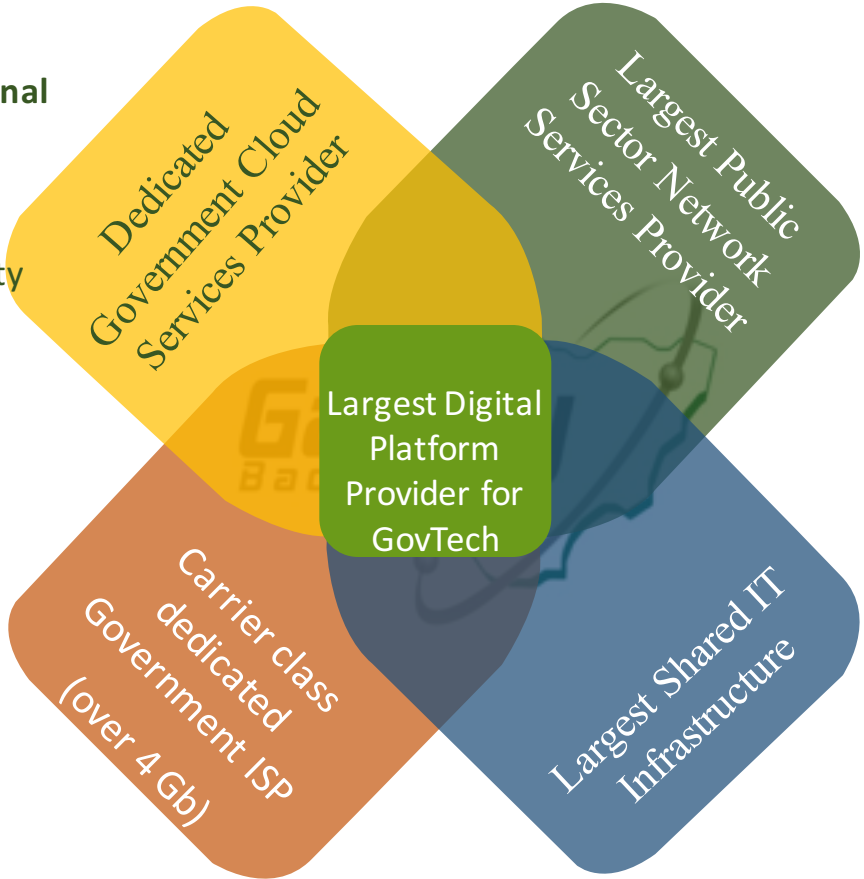
Largest Public Sector dedicated backbone network NICTIB (National ICT Infrastructure Backbone)
5000km+, 400 Towers/eLTE

NICEP – implemented connectivity infrastructure for Education and other ICT4D (2008)

Operates only Connected Government Network and VAS


Tier 3 Certified Data Centre dedicated to Government and Public Sector


NSSC – (National Shared Service Centre) government common core network and private cloud facility



 Information Security: ISO 27001 Certified

 Service Management: ISO 20000 Certified

 Tier III Data Center Uptime Institute Certified

 UN Public Sector Awardee Promoting Whole-of-Government IT Approaches

2008 - 2012

- VSAT Technology
- Connected Federal Universities
- Unity Schools
- Multi-casting Studios
- Content Editing and Production facility
- Centralized NOC

2015 –

- Fibre and eLTE technology
- Connecting Tertiary Institutions
- Partnering with Tertiary Fund (TETFUND)
- Partnering with Eko-Konnnect



Galaxy Backbone & Nassarawa State University to Partner On Enhancing Digital Services & Capacity Building



Galaxy Backbone's Role in the Digital Economy Transformation Strategy



Digital infrastructure

Universal internet network coverage

Affordable internet for all at less than 2% of GNI per capita

Interim milestone: doubling broadband connectivity by 2021



Digital platforms

Doubling online services Index rating for all governments

All individuals are able to prove their identity digitally

At least 50% of the population regularly uses the internet to access government or commercial services



Digital financial services

Universal access to digital financial services

Africa-wide payments infrastructure platforms in place



Digital entrepreneurship

Tripling the number of new digitally enabled businesses created annually

Financing for Venture Capital to reach .25% of GDP



Digital skills

All 15 year old students with basic digital skills competencies

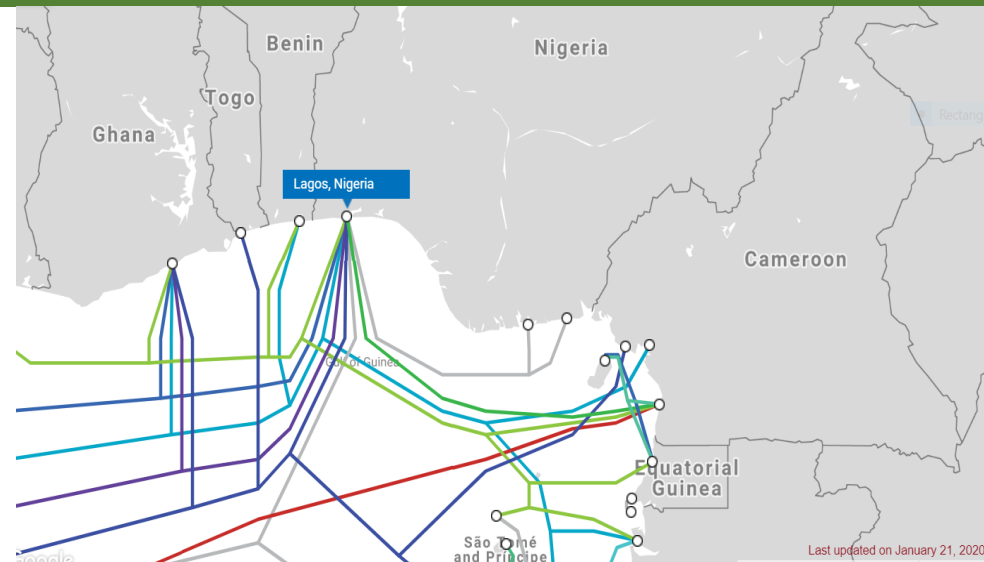
100,000 graduates in advanced digital skills programs annually

The DE4A Initiative forms part of the World Bank Group's support for the African Union's Digital Transformation Initiative for Africa, which wants to see every African individual, business, and government be digitally enabled by 2030.

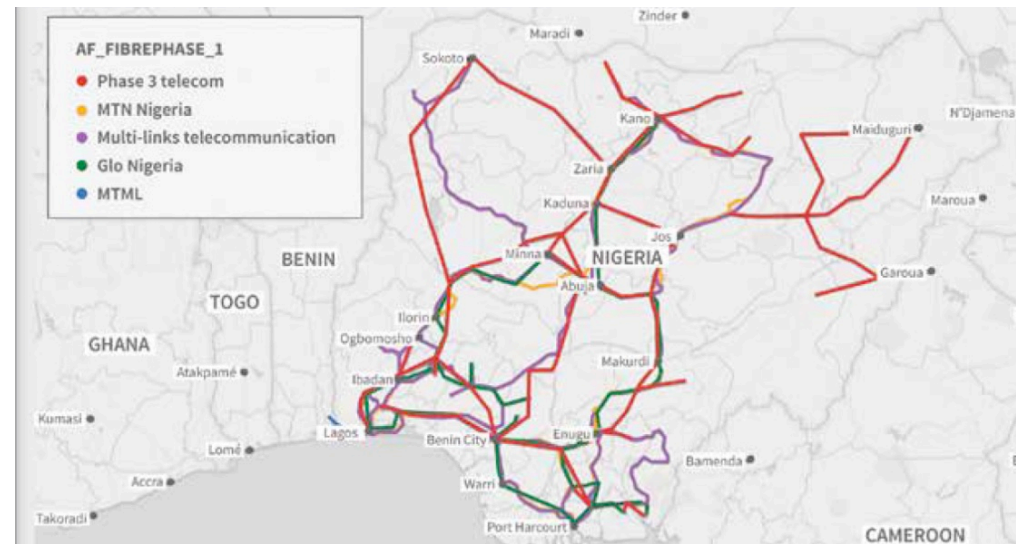
The digital economy is made up of various components, including a platform economy, a gig economy, an industry 4.0, a digital economy, data analytics, robotics and Artificial Intelligence (AI), machine learning, 3-D printing, and e-commerce among others. (Ernst & Young: Nigeria, 2018).

Source - Digital Economy Diagnostic Report – World Bank Group

Galaxy Backbone Infrastructure for Digital Economy Transformation



Source: <https://submarinecablemap.com>



Source: Song, 2017.

First Mile

Main One, Glo 1, WACS
Ducts to Qua Iboe Terminal (Glo 2 landing)

Middle Mile

5000 Km National Backbone
NorthWest Infraco (BCN + Phase 3)
IXPN interconnect
Abuja Metro Fibre

Last Mile

Abuja metro FTTx
300 Tower eLTE



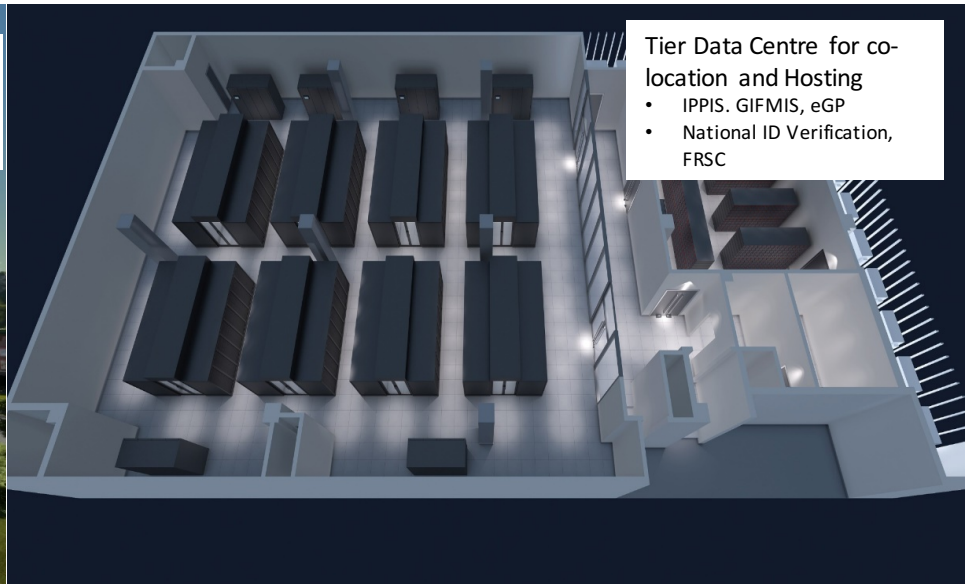
Source: Galaxy Backbone NICITB National Coverage

Galaxy Backbone Digital Platform for Digital Economy Transformation



National Shared Services Centre (Abuja)

- Tier 3 Certified Data Centre
- Government Cloud



Tier Data Centre for co-location and Hosting

- IPPIS, GIFMIS, eGP
- National ID Verification, FRSC



Connected Government

- Govt intercom
- Email/Collaboration



Common Core Network NOC/NMC

Current Imperatives in Education, Research and Learning – Open Science and Open Access Digital Repositories

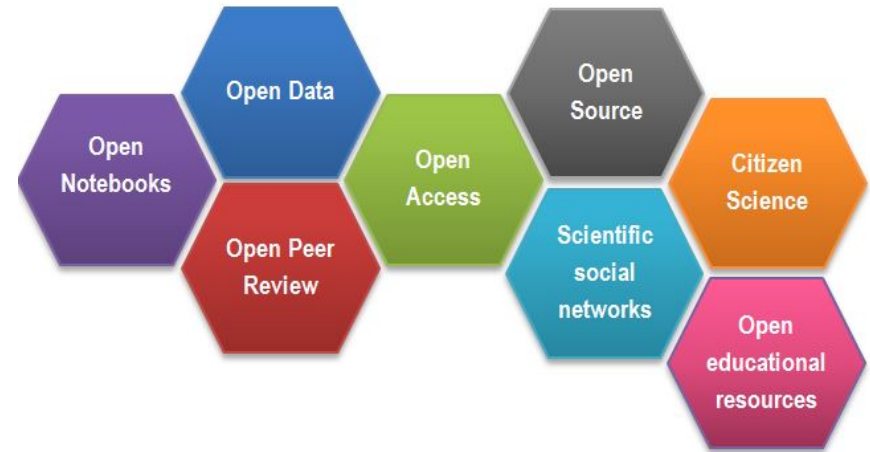
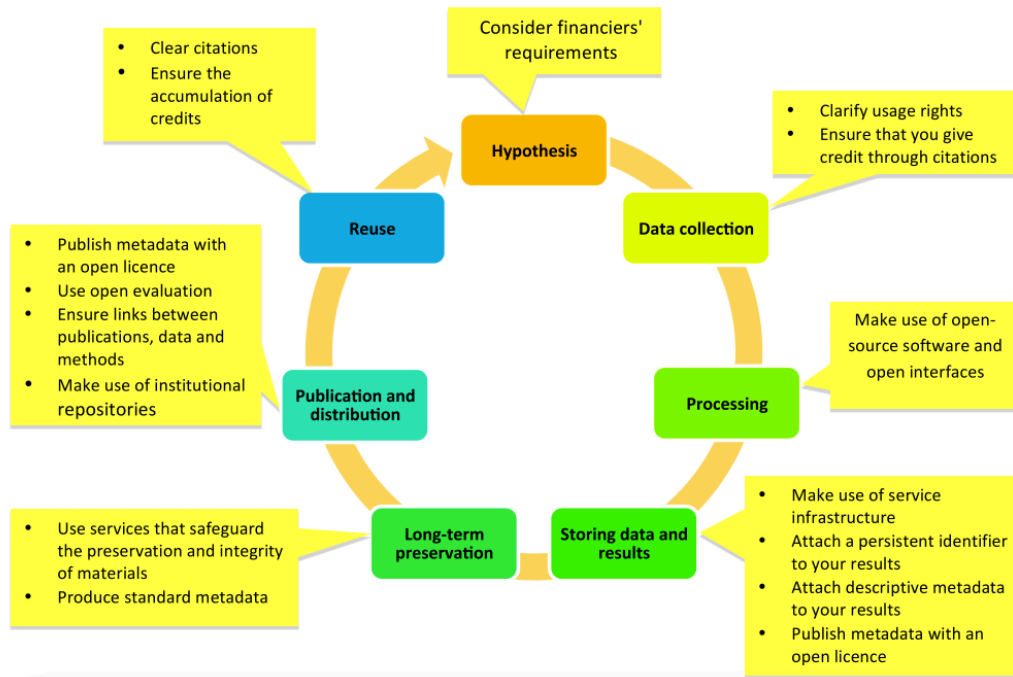


Figure: Promoting openness at different stages of the research process
Source: <https://fosteropenscience.eu>

Open Science is frequently defined as an **umbrella term** that involves various movements aiming to remove the barriers for sharing any kind of output, resources, methods or tools, at any stage of the research process. As such, open access to publications, open research data, open source software, open collaboration, open peer review, open notebooks, open educational resources, open monographs, citizen science, or research crowdfunding, fall into the boundaries of Open Science – Source: <https://fosteropenscience.eu>

A science portal or science gateway is a community-developed set of tools, applications, and data that are integrated through a web-based portal or a suite of applications. They provide scientists with access to many of the tools used in cutting-edge research – telescopes, seismic shake tables, supercomputers, sky surveys, undersea sensors, and more. Such gateways connect often diverse resources and make them easily accessible in ways that save researchers and institutions both time and money.

<https://www.sdsc.edu/>

Digital Platform Similarities – Open Access, Science Gateways , Hybrid Clouds and Data Exchange Systems

In a tutorial for Open Science, Taylor, et al. (2017) suggests:

- Researchers should publish openly using Gold or Green open access.
- Adoption of good Open Data and Reusability practices that encourage independent verification (e.g. FORCE11)
- Consider making your data, results, software, etc. openly accessible (and track-able) by submitting your works to Open Access Repositories that support the use of Digital Object Identifiers (DOIs).
- Use Creative Commons licenses to specify how your work should be shared and used.
- Use a Researcher Registry such as (Open researcher and Contributor ID) ORCID to uniquely identify yourself and link this to your works via DOIs.
- Ensure that you use both DOIs and ORCIDs when publishing or in social media to correctly identify yourself and your works so that these can be tracked through scientometrics and altmetrics.
- Consider deploying your software via a Science Gateway or similar Platform-based approach to enable the widest possible access to your work.

Typically, technologies in use to day across digital platforms which enable or complement these requirements abound;

- Electronic Document and Content Management Indexing Engines for Search and Retrieval
- Business Process Automation
- Online Impact measure and Search Engine Optimization tools for Altmetrics
- Big Data Analytics, Business Intelligence tools working with Bibliometrics and scientometrics
- Web Crawling Engines,
- Data interoperability engines
- XML messaging, Web services
- Containers, Kubernetes, orchestration, distributed computing, Hadoop
- Websites, Intranets Blogging etc.,
- Identity Federation, Directory Access protocols and Data Exchanges
- Social media
- Application Programming Interface (API) Economies , Ecosystems
- Community, Hybrid clouds *are similar to technologies enabling Science Gateways– even though the level of abstraction and virtualization varies from one gateway to another.*

Similar Features : Broad network access; On-demand; Elastic; Orchestrated; Multi-tenancy, multi-access.

Proposed Collaboration to Support Rapid Development of ICT Infrastructure for Education Research and Learning

Promote Rapid Development of Open Access Repositories and Science Gateways through re-use of Digital Platform for Govtech
Improved Regional and Global collaboration



Education and Research Institutions use shared infrastructure and Services
National level policies formulated to create enabling framework for Open Access
Joined up Government Intervention efforts of TETFUND, USPF etc., are pooled to fund expansion and integration

- Common services for the Education, Research and Learning are developed by Galaxy Backbone, Eko-Konnnect and other Knowledge and Research Clusters and content creators

COMMON DIGITAL SERVICES FOR EDU

- Dark Fibre/ Open L1 and L2 connectivity
- IP peering agreements with Regional and Global RENS
- Data Centre Servers and storage systems
- Federated Identity and Security
- Hosting/Networking Infrastructure
- Intranets
- Pooled bandwidth and administration
- Digital Platform for Open Access
- Data Analytics/ Open Data/Big Data as-as-a service
- Digital Learning
- Trust, identity & security - Academic Identity, Cybersecurity teams and Access Management Services
- Education Roaming - Campus Mobility Services for Roaming Users
- Open Access Journal, Open Access Repository, and Research Data
- Management Platforms



Galaxy Backbone represents:

- Ready broadband platform for linking National, Regional and Global Research Networks (RENS) and Knowledge Clusters
- Ready Digital Platform for Integrating Government/Govtech, Industry and Academia /Edutech
- Ready Platform to implement Open Access national policies
- Ready Platform to aggregate and consolidate resources and efforts and benefit from economies of scale

Tower of Babel and the Power of Collaboration



Genesis 11:1-9 New International Version (NIV)
The Tower of Babel

11 Now the whole world had one language and a common speech. ²As people moved eastward,^[a] they found a plain in Shinar^[b] and settled there.

³ They said to each other, “Come, let’s make bricks and bake them thoroughly.” **They used brick instead of stone, and tar for mortar.**

⁴ Then they said, “Come, let us build ourselves a city, with a tower that reaches to the heavens, so that we may make a name for ourselves; otherwise we will be scattered over the face of the whole earth.”

⁵ But the LORD came down to see the city and the tower the people were building.

⁶ The LORD said, **“If as one people speaking the same language they have begun to do this, then nothing they plan to do will be impossible for them.**



- 7 world records
- 1.5bn Usd
- 12000 workers a day
- 6 years to complete
- 22 million man-hours

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