ROADMAP FOR COMMERCIALIZATION OF TELECOMMUNICATIONS-BASED RESEARCH OUTPUTS & PROTOTYPES

INTRODUCTION

Commercialization is the conversion of research outputs into products and services to meet the needs of people.

The objectives of NCC's commercialization agenda include, among others:

- To transform the telecom-based outputs (prototypes) emanating from the research funded by the Commission into products that will impact positively on the lives of Nigerians by solving societal problems.
- Accelerate the development and conversion of the Nigerian economy into a digital economy.
- Justify the Commission's expenditure on research and development activities in tertiary institutions.
- To increase the utilization of indigenous technological outputs
- To refocus the Commission's research and development efforts in the ICT sector to become market driven.
- Wealth creation and revenue generation.

STRATEGIES FOR COMMERCIALIZATION

Strategies to be adopted for funding of commercialization depends on the decision/choice of the owner of the research outputs (prototypes). The following strategies for funding are proposed.

- Self- exploitation: Telecom-Based Researchers/Awardees could commercialize the research output without active involvement of any other party.
- Outright sale of the rights to the invention at an agreed sum of money.
- Start-ups and spin-offs: the setting up of Small and Medium Enterprises (SMEs) businesses to exploit the research output and also to explore the funding provisions from the Start-Up act.
- Joint venture with investors: partnership with investors/venture capital firms
- Industry Driven from end-to-end: This is faster for gaining target market acceptance. NCC research grants and outputs should be targeted at solutions the Industry is willing to commercialize.

STAGES OF COMMERCIALIZATION

The recommended stages are as follows:

A. Multi-Stage User Evaluation: This entails technical activities during the engineering prototype stage.

   a. Identify materials/processes/components and manufacturing steps required to meet technical performance and specifications;
   b. Test materials, components and processes;
   c. Design and construct a pilot process or engineering prototype;
   d. Optimize the design;
   e. Conduct the final tests;
   f. Estimate the pre-production prototypes costs.

Where possible, the prototypes should be vetted by the Commission and Industry stakeholders with suggestions and recommendations for further improvements (if necessary).

B. Market viability/business start-up/freedom to operate/policy/license checks:

   a. Market Viability - Process of introducing the product to the market, assessing market approaches, customer feedbacks;
   b. Business start-up - Stage in which business functions (management, production, financing, legal, marketing and human relations) are initiated by key personnel;
   c. Freedom to Operate - A legal opinion from a qualified intellectual property attorney that concludes a proposed product or process may be made, used or sold or even offered for sale without infringing another party's intellectual property rights;
   d. Policy - A deliberate system of guidelines or statement of intent to be implemented as a procedure or protocol to be adopted within the organization;
   e. License Checks- Guides/ license product validation to enable a product operate.

C. Production
   a. Describes the period during which the manufacturing process is built and full scale production runs are implemented.

D. Sales & Distribution

a. This describes the period when the product is receiving some degree of market reception by distributors and buyers

PROCESS FLOW CHART

Problem statement - The Commission should engage each segment of the telecoms industry to gather their significant challenges. This would help in coming up with a clearly defined problem statement.

S/N	Activity	Actions	Assessment by
1	Idea Generation The Commission should be responsible for sharing the problem statement with the academia who would in turn proffer solutions to each problem statement.	Problem Definition Tactical Alliance Budgeting Team Building(finding Co-Founders) Environment Validation	Telecom-Based Researchers/Awardees
2	Interaction with stakeholders Industry stakeholders should vet the solutions proffered by the academia and therefore, select or choose the solutions they intend to sponsor and will be willing to commercialize once developed.	Regulatory Policy guidance Potential User Research Stakeholder engagement Industry Analysis (SWOT or Porters Five Forces) Revise Budget	Lawyers/IP experts Innovation Hubs or Accelerators
3	Market Opportunity Analysis	Building Funding Strategy Perform 3C analysis	-Innovations hubs or accelerators

		Understand which market to operate Gather Data Build strategic Partnership Opt for Incubation or Accelerator Programme Explore Market Pricing Develop Business and Revenue Model	-Business development experts
4	Intellectual Property Right	Patent search for competition with similar products Secure Design Validation	NOTAP Patent & Design Registry (The secure validation design can only be secured at Patent & Design Registry, NOTAP can only advise based on the prior Art documents)
5	Prototyping and Industrial Demonstrations The academia should produce prototypes for the selected solutions under the Commission's close supervision.	Build Prototype Secure funding to build MVP Invention disclosure Product Valuation Seek for Funding	Technical Expert Business Development Expert Investors
6	Testing	Testing Product with segment of potential users to assess Product Market Fit Seek for Funding	Telecom-Based Researchers/Awardees, Marketing Team

7	Product Sales and Marketing	Review and Adopt Market Strategy Build Customer Relationship Seek for Funding	Marketing Team
8	Quality Management and Assurance Industrialization	Confirmation of conformity to the International Standards Organization specifications and requirements (ISO9000) ISO Certification NCC Type Approval Mass Production	Technical Expert

RESPONSIBILITY MATRIX

Responsibility Table:

S/N	Activity	Actions	Responsibility
1	Protection & Formalization	- Intellectual Property Rights - Trademarks Registration - Patents and Copyrights - Signing of Memoranda of Understanding (MoU)	**Facilitator:** The Nigerian Communications Commission (NCC) Nigerian Copyright Commission Federal Ministry of Trade and Investment National Office of Technology Acquisition and Promotion (NOTAP)
2	Market Opportunity Analysis	- Building Funding Strategy - Perform 3C Analysis - Understand which market to operate (gathering data) - Opt for Incubation or Acceleration Programme - Explore Market Pricing	**Facilitator:** Telecom-Based Researchers/Awardees Innovation Hubs or Accelerators Business Development Experts
3	Training, Business Plan Development & Funding	- Development of Business Plan -Training of Researchers /Capacity Development - Packaging and Market Viability of Prototypes. - Seek for Funding	**Facilitator:** Telecom-Based Researchers/Awardees - Innovation Hubs or Accelerators - Business Development Experts Funding – NCC

4	Policy & Licensing	- Industrial Testing of Prototypes (end user) - Investors Feedback - Seek for Funding	- Technical Experts - Marketing Team - Investors/Venture Capitalist **- Creating Policies:** NCC
5	Scaling & Commercialization	- Branding - Commercialization of Viable Prototypes - Mass Production - Marketing	Telecom-Based Researchers /Awardees (**Facilitator)** - Marketing Team/Venture Capitalist Approved prototypes should be adopted by the Commission, academia and Industry Stakeholders after which it is expected that an order for full production will be placed

Protection & Formalization

The Nigerian Communications Commission (NCC) is expected to facilitate the smooth registration of Intellectual Properties rights (IPRs) such as patents, trademarks and/or copyright of the research outputs in liaison with the relevant government agencies. The Commission, as the sponsor of the Research Grants, will establish a proper sharing formula for the prototype rights between the NCC and the Academia via execution of Memoranda of Understanding (MoU).

Market Opportunity Analysis

The Telecom-Based Researchers/Awardees are expected to do an in-depth analysis on the market to identify a potential market for the product, estimate the market size (who their customers are, the demand of the product), justify why the target market

will choose the product over the competitor's, and determine a preliminary value (price range) for the product. The researchers/Awardees are also expected to link up with business development experts or Innovation Hubs/Accelerators that operate in line with their viable prototype. For example; if a researcher has a prototype that monitors heartbeat or blood pressure, already the target market should be hospitals or clinics; therefore it is advised that the Awardee finds business experts or hubs that have access to those health facilities.

Training, Business Plan Development & Funding

This stage speaks to packaging and fine tuning the prototypes. It also involves testing the viability of the prototypes. Prototypes will be critiqued in order to enhance them to meet the needs of users. Strategic business plan will be developed, which will determine, among other things, marketing approaches and the business options which will maximize opportunity for success. Telecom-based Research innovators from the Academia are not business savvy, there is need to train them and build their capacity on business plan development, packaging, marketing and product registration so that they can demonstrate and pitch their prototypes to investors, entrepreneurs and venture capitalists efficiently.

Policy & Licensing / Industrial Testing and Investors' Feedback

One issue highlighted with existing prototypes is the lack of industrial testing or testing licensing for the prototypes to be deployed live in a production environment. The lack of such production/industrial testing automatically archived the prototypes since laboratory simulation is not the same as production-level performance. The NCC should champion the industry testing of all the prototypes by creating policies and licensing to encourage both the MNO (the industry) and the prototype developers (the academia). The success of such industrial testing facilitated by NCC automatically opens the door for local and international investors.

Scaling & Commercialization

In the triple helix (government, industry and academia) only the industry is commercially driven. Therefore, Telecom-Based Researchers/Awardees should engage with professionals in the field and a marketing team on branding of their

prototypes. Also, the Awardees should be encouraged to understand the commercialization and industrial scale of their prototypes from conception.

GENERAL INFORMATION

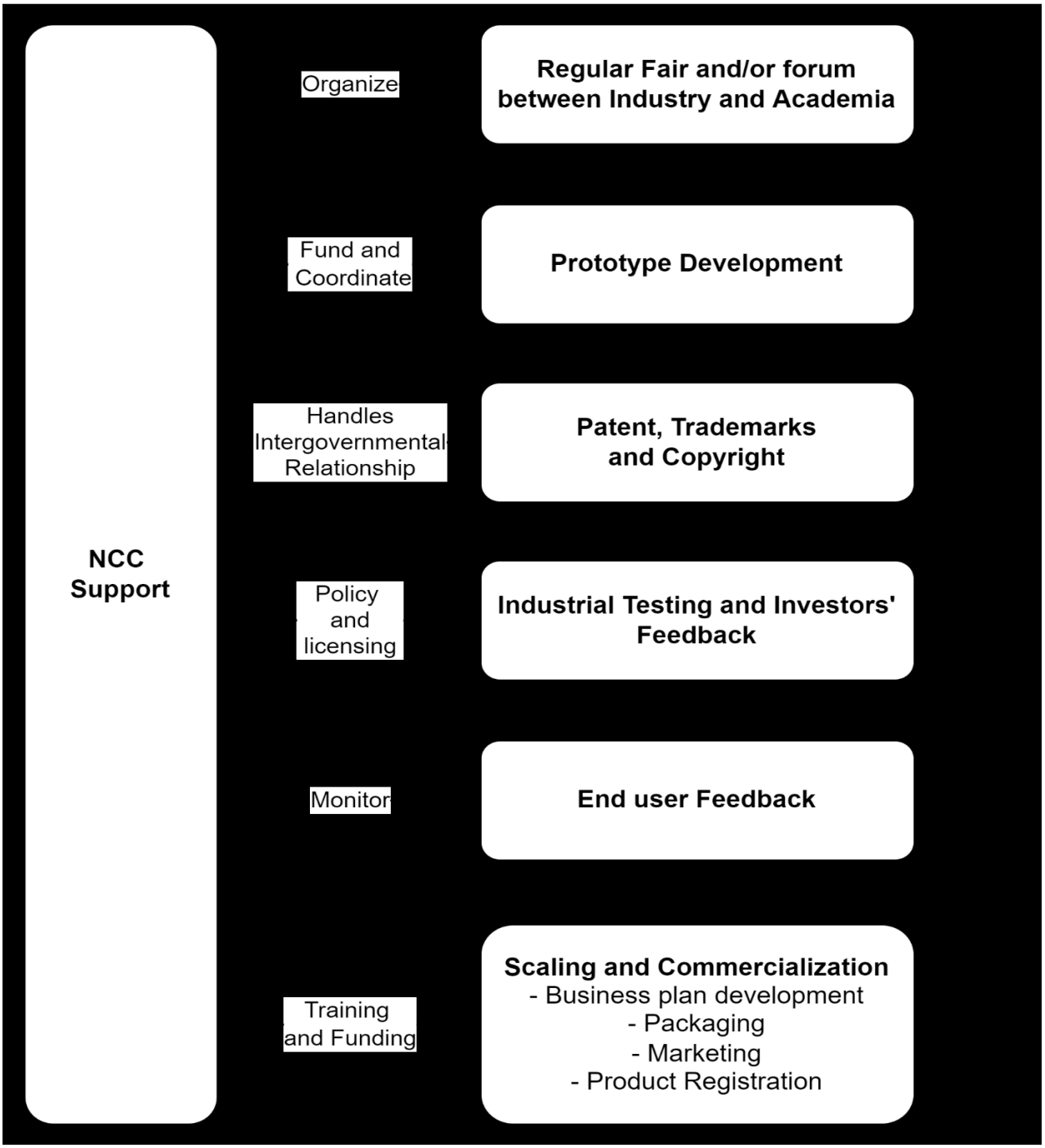

Figure 1

NCC support

The support of the Nigerian Communications Commission (NCC) throughout the process of prototype development and commercialization cannot be overemphasized. In fact, without the Commission organizing, funding, monitoring, training, and involvement with intergovernmental activities and policy, the success of commercialization of viable local products that address the telecommunication industry is difficult if not impossible to achieve. The Commission's possible roles in the triple helix of Government, Academia and Industry are discussed briefly in the Prototype Commercialization Framework developed in Figure 1 (above).

Regular Fair and/or Forum between Industry, Academia and NCC

It is expected that Fairs and/or fora (Regional Roundtables) between Industry, Academia and NCC be organized regularly in order for research and development to be driven by industry challenges. Although, the Academia can go to the Industry or vice-versa as highlighted extensively during the 2022 Regional Roundtable, the best approach remains the organization of Roundtables at least once per year. The Industry is expected to present their challenges at the fora for the Academia to find solutions.

Prototype Development

Prototype development should always be driven by Industry challenges. However, if existing prototypes were not based on established industrial challenges they could still benefit from the Prototype Commercialization Roadmap set out in this Framework. It is expected that the Commission and the Industry should fund the research and development of viable prototypes for the identified industrial challenges. In addition, the Commission is expected to coordinate the prototype development and funding by getting regular reports from both the Industry and Academia.

Prototype approval - The Commission and Industry Stakeholders should jointly approve all prototypes.

End-user Feedback

How successful a product is depends on the consumers; therefore, end-user feedback is important to the triple helix (Government, Academia and Industry). An active feedback loop from the end-user must be insisted upon - by the Commission for all its telecom-based research innovation prototype development - and monitored. This end user feedback contributes to improving the user's experience (UX). The end user feedback could be on performance, aesthetics, and/or economics.