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EVALUATION AND ASSESSMENT OF R&D RESULTS AND INVENTIONS FOR THEIR MARKETING AND COMMERCIALIZATION

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1 INTRODUCTION

Research and Development (R&D) results and inventions as important parts of the innovation process must be subjected to systematic and careful evaluation and assessment before they can be transformed into marketable products, since an invention or research result is only useful when it meets the needs of the market (demand) i.e. when it is successfully commercialized. The ultimate destination of every innovation is the market place, to serve a particular felt need, a demand. And a great majority of all inventions and R&D results do not make it to the market.

Systematic and carefully conducted evaluation and assessment of an innovation (an invention or R&D result) are critical for its successful commercialization. Though there are no rigid formulae on evaluation and assessment of an innovation, there are however some basic guidelines details of which vary, depending on the innovation and the application(s); for example, for special product in digital electronics (in say telecommunications) as opposed to construction aggregates for real estate development or household furniture, drugs as opposed to automobiles, sports kit as opposed to food products, etc.

Evaluation and assessment need to involve:

- (i) the innovator (inventor/researcher);
- (ii) the entrepreneur (venture capitalists, marketers, etc);
- (iii) plant designers, and most importantly;
- (iv) the user.

The user's (consumer's) social attitudes, affluence, etc., will to a large extent, determine the mode and design of the evaluation criteria.

Evaluation and assessment will therefore have the following components:

- technical;
- intellectual property rights issues;
- socio-cultural;
- commercial, marketing, economic and business coordination, etc.;
- legal, regulatory issues;
- capital-cost, investment level, ownership structure;
- profitability;
- product utilization/application and definition.

Results of the evaluation and assessment will inform the inventor on the next line of action, e.g.:

- further development work or drastic changes along the line of work;
- industrial property assessment or review;
- licensing rights to entrepreneurs;
- outright sell of patent rights;
- start own manufacturing/production outfit;
- get into partnership with financier(s);
- abandon project.

Typical checklists of questions for evaluating inventions and R&D results, inventors and researchers, as well as buyers of inventions and R&D results are shown in Tables 1, 2, and 3 respectively.

2 TECHNICAL ASSESSMENT

The technical assessment will first and foremost seek to fully and effectively define the product. It will compare the innovation (new product) with the existing ones in the market in all their contents and ramifications, and evaluate their relative merits.

It will also cover other such areas such as:

- (i) materials selection and design; costs, mechanical, electrical, chemical, and other properties, availability (short-term and long-term), and suitability, etc. Sometimes a suitable material may be too expensive or not readily available or may pose design and production difficulties; in such cases some serious technical and economic decisions have to be made;
- (ii) design and fabrication of prototypes, size, material, tests, etc.;
- (iii) manufacturing and production techniques to be adopted, energy, quality control considerations, production capacity, production sequence, etc.;
- (iv) continued technical support for manufacture and maintenance during production.

3 INTELLECTUAL PROPERTY RIGHTS

Intellectual Property (IP) is a foundation for business. It plays a critical role in the marketing and commercialization of inventions and R&D results, in transfer of technology, in foreign investment and in industrial development. Typically, IP begins as a new idea or

discovery that is confidential. The confidential information is written down, tests are conducted and perhaps a patentable invention is made for which a patent is granted guaranteeing intellectual property rights to the patentee.

The patent system contains a pool of technological information, thus it will be necessary to conduct a patent search to establish not only for the-state-of-heart during development of the innovation to provide guidance for improvement but also to apply for and ensure patent for the innovation. It is also important to limit the level of disclosures about the innovation prior to obtaining patent and to ensure confidentiality during the search. Considerations shall also be given to issues of licensing, royalties, payments and or outright sale of the patent rights.

4 REQUIRED FURTHER DEVELOPMENTS

Inventions and early stage research can rarely be commercialized without further investigation and development, for example, to demonstrate technical feasibility or to build a pre-production prototype. The requirements for this should be calculated in terms of time, the resources needed, and costs. An estimate of the unit cost of the finished product or cost of introducing a new process is also needed to help work out the potential economic benefits or commercialization.

5 MARKET ASSESSMENT

This should examine market potential (location of markets, volume, value, competitors, possible allies) and growth over time. A project from inventions and R&D results should have ideally a large financial "up-side"; that is to say, a market potential of several million dollars per year. This is necessary to compensate for the expense and risk of developing a project. Information should be sought on:

- a) diversity of products or processes to which the invention/R&D result is applicable;
- b) location of markets, and distribution networks;
- c) value of individual markets;
- d) market size as global sales (p.a., sales volume p.a. and growth);
- e) competitive products (price per unit and sales volume - if available);
- f) competitive firms and researchers;
- g) potential allies;
- h) suppliers of raw material inputs.

6 REGULATORY ISSUES

Most countries have regulations and laws governing the conduct of business. These can impact upon the development and launch of a new product or process. For example, before a new medicine can be released in Nigeria, typically it must satisfy efficacy and safety requirements of the National Agency for Food and Drugs Administration and Control (NAFDAC) and be passed for use by a government department of health. This is a fairly obvious example. The point is that it is prudent to check what government regulations, if any are relevant to the project and products from the inventions and R&D results. Compliance with such laws can be time consuming and costly and must be factored into the strategy for commercialization.

7 FINANCIAL REQUIREMENTS

Research commercialization can only proceed through further investment. This could be by an outside financier, manufacturer or marketer or by some other means. In developing a commercial strategy, it is helpful to establish the financial requirements for a project and the source of capital, both in terms of Naira value and also the kind of investor required to take the project forward. The characteristics of potential investors should be defined in terms of their capabilities, financial strengths and likely commitment to the project. Those meeting the requirements can then be further evaluated.

8 THE R&D TEAM

An assessment should be made of a researcher's potential to work well with others and to achieve goals in a timely fashion. Researchers are not usually experienced in managing Intellectual Property (IP), commercial law, finance, the development of a commercial product, manufacturing and marketing. However, these business activities will be important for adding value to a technology and its overall commercial success. It is a golden rule that if you have to choose between a great project with a mediocre R&D team, and mediocre project with a great R & D team, the project with the great R&D team is the best choice. (Turner, J.V. 1997).

9 ASSISTANCE/SUPPORT FOR MARKETING AND COMMERCIALIZATION OF INVENTIONS AND R&D RESULTS

There are in many countries, established Government Agencies as well as Association of Inventors who offer expert assistance to inventors and researchers on different aspects of the commercialization process, such as written information on general and specific business practices and ethics, information on the economic, financial and other laws and regulations affecting commercialization, technological information, guidelines and other materials, including lists and addresses of experts in the various fields, such as patent practitioners, patent lawyers and invention brokers.

In recognition of the critical need to provide assistance to inventors and researchers for the commercialization of their products, the Nigerian Government, through the Federal Ministry of Science and Technology (FMST) has designated the National Office for

Technology Acquisition and Promotion (NOTAP) as national agency mandated to coordinate activities in commercialization of R&D results and inventions.

NOTAP's work of sourcing and commercialization of new ideas takes place through:

- extensive information about public incentives favouring inventors, scientists, entrepreneurs and new firms;
- active search for commercially exploitable results at each of the universities and research institutes;
- assisting inventors and researchers to secure industrial property rights over their work;
- providing technological information to researchers through the patent documents in its Patents Information Documentation Centre (PIDC);
- counseling on how and when to allocate what resource and expertise in the development of a given creative idea.

NOTAP is at the same time seeking to gain experience in project portfolio management, innovation fund management and international activities of commercializing new technologies. To this end, the Office is to establish linkages with professional groups such as patent attorneys, technical experts and lawyers. Furthermore contacts are to be built up with some major international organizations and companies throughout the world.

10 CONCLUSION AND RECOMMENDATIONS

The creation and development of new technologies and industries, and the encouragement and growth of commerce, is essential to the economic well being of Africa. To achieve advances in these areas depends not only on the ingenuity of scientists, engineers and others, but also on the technical management and investment capability necessary to develop new ideas and set up new enterprises as well as the ability to market them effectively. Greater attention, care and expertise need to be directed at the evaluation and assessment of inventions and R&D results for marketing and commercialization.

The growth in the quality and integrity of evaluation and assessment will have a multiplier effect on inventive activities in Africa. It would reduce the number of failed ventures. It would reduce the inventor's frustrations. And it would bring greater rewards to the inventors and researchers and enhance the quality of their projects by providing useful feedback into the inventive activities and make their projects demand-driven, i.e. market oriented. At present many R&D results in research institutions have little relationship with the needs of the society or industry whereas societal needs are crying out for attention.

Industrial property rights, i.e. patents, industrial designs and trademarks play an important part in bringing these various factors together. In all cases, they give legal recognition to the ownership of new ideas or brand names and give the proprietor the right to stop other people exploiting his property. So they create for the innovator a system by which he can benefit from his ingenuity. Typically, the rights will be sold or licensed to others or

will be used to safeguard investment in new ventures, so that the ideas they represent may be developed and exploited to the ultimate benefit of all.

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ANNEX

**TABLE 1: CHECKLIST OF QUESTIONS FOR EVALUATING
AVAILABLE INVENTIONS AND THE R&D RESULTS**

1. What does the invention or R&D result do ?
2. What are the potential application for this invention or R&D result ?
3. Does the invention or R&D result perform reliably in the intended application ?
4. How is this invention or R&D result different from existing inventions or R&D results ?
5. Is the invention or R&D result affordable ?
6. What additional funds, if any, are needed to complete on this invention or R&D result ?
7. Does the use of the invention or R&D result require specialized skills, materials or equipment ?
8. Are all necessary skills, materials and equipment available locally ?
9. Does the invention or R&D result solve an identified problem or need ?
10. Will users need to be educated about the invention or R&D result before they will use it ?
11. Will the invention or R&D result be easy to market or difficult to market ?
12. What are the benefits of using this invention or R&D result?
 - cost savings;
 - reduced health risks;
 - reduced safety risks;
 - reduced environmental risks;
 - reduces labour needed;
 - uses locally available labour and/or materials ?
13. Are there any special regulations that must be followed in order to use the invention or R&D result ?
14. Are there any disadvantages or risks associated with using the invention R&D result ?
15. Will the market for this invention or R&D result increase or decrease in the near future ?
16. What are the anticipated changes in the market needs relating to this invention R&D result ?

**TABLE 2: CHECKLIST FOR EVALUATING INVENTORS, RESEARCHERS
AND BUYERS OF INVENTIONS OR R&D RESULTS**

1. Does the inventor have the potential ability to transfer the invention or R&D result to the buyer ?
2. Can the inventor provide the necessary training ?
3. Can the inventor provide the necessary on-going assistance ?
4. Can the inventor provide the necessary supplies and materials ?
5. Does the inventor understand the needs of the buyer of the invention or R&D result ?
6. Is the inventor truly committed to the invention or R&D result ?
7. Will the inventor be a good working partner for the term of the agreement ?
8. Can the inventor provide the necessary documentation ?

**TABLE 3: CHECKLIST FOR EVALUATING INVENTIONS OR
POTENTIAL R&D RESULTS**

1. Does the buyer understand enough about the invention/R&D result?
2. Is the buyer an appropriate buyer for this invention/R&D result?
3. Does the buyer have the technical ability to use the invention/R&D result?
4. Does the buyer have the business skills to develop and implement a business plan regarding this invention/R&D result?
5. Does the buyer have adequate financing for the intended use of the invention/R&D result?
6. Does the buyer have the necessary equipment and materials for the intended use of the invention/R&D result?
7. Is the buyer committed to a long-term working relationship?
8. Does the buyer have experience in similar types of invention/R&D result transfer arrangements?

[End of Annex]