

A FRAMEWORK FOR COLLABORATIVE MANAGEMENT OF INVENTIONS: THE PHILIPPINE EXPERIENCE

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Abstract

Technological development is the result of people trying to improve the quality of their lives or trying to extend their horizons. These people are the inventors and/or innovators who are considered to be the most important ingredient in technology. They use tools, resources, and processes in order to solve problems or to extend capabilities. This paper examines critical issues on management of inventions such as policy implementation, motivational strategies, training and development, linkage with industry, patenting of invention, and promotion of intellectual property rights. Analysis of these issues led to the conclusion that successful management of inventions is a result of collaboration among the educational institutions, government entities, private organizations, and the inventors. Inventive ideas can only be fostered in educational institutions, the excellent soil for the spread of new ideas. The inventors' technological urge to search and create, if supported and nurtured by government and private entities creating an environment conducive to technological endeavors, will result to the desired end product, technology development.

Keywords: collaborative management, technology development, management of inventions, patenting of invention, linkage with industry, intellectual property rights, policy implementation, training and development

Introduction

Technology has existed as long as people have existed. As time passed, the need to solve problems or to extend capabilities caused people to rely more and more on technology. Technology is people using tools, resources, and processes to solve problems or to extend their capabilities (Goetsch, Chalk, & Nelson, 1999).

Technology grew so much over the years. At present, people are enjoying the most advanced developments in all technology areas referred to as advanced technology. This advancement can be traced back to primitive inventions and continued to advance due to the inventors' desire to apply their inventions to society's needs or wants.

Inventiveness is one of the essential elements of human nature. Humans, by solving problems, transform their environment. This problem-solving ability enables men to survive. Inventors almost always work in response to some need. "Necessity is the mother of invention" expresses this idea.

In the past few centuries the inventor's desire has most often been economic. Invention generally responds to the economic needs of society as well as to the state of

the art in technology. The history of technology has many examples of simultaneous inventions.

Industrialization has played a major role in the economic advancement of leading countries in the world including Asian nations like Japan, Korea, Taiwan and Singapore. "In the Philippines, industrialization has been the aspiration of most vision-struck leaders in the past but failed to come up with an optimum results due to the apathetic and lackadaisical attitude of the government in terms of viable and sustainable programs for the growth and prosperity of Filipino inventions (Editorial, Achievers Magazine, April-May 1996).

To concretize the government support to Filipino Inventors, Republic Act No. 7459, known as the "Inventors and Invention Incentives Act of the Philippines", was passed by the Senate and the House of Representatives on February 7, 1992 and was subsequently approved on April 28, 1992. The implementing rules and legislations of this act was promulgated in 2005 and amended in 2010 (Republic of the Philippines, 2010). The Department of Science and Technology-Technology Application and Promotion Institute (DOST-TAPI) is the agency



tasked to implement RA 7459. When the government appropriated an amount envisioned to provide financial support to Filipino inventors through this Act, the legislators demonstrated the wisdom of their realization that the prosperity of the country's industrialization depends upon the prosperity of Filipino inventions and discoveries.

Despite the quantum leap in science and technology, the Filipino inventor is still beset with problems that hamper the development of globally competitive indigenous technology, which could accelerate the country's economic development. As perceived by the Filipino inventors, the problem lies in the obvious lack of awareness or perception on the part of the national leadership of the relevance or significance of the inventors as an economic national resource.

This study aims to objectively analyze critical issues on invention management-related areas such as policy implementation, motivational strategies, training and development, and linkage with industry leading to development of a framework for collaborative management of Filipino inventions. It sought to find out the status of Filipino inventions and the government programs on the development of the invention capabilities of Filipino inventors as assessed by the inventors and employees in science and technology institutions; the invention-management programs and practices adopted by successful inventors; and the factors that are perceived to influence current issues on the management of Filipino inventions.

Literature Review

Technological innovation is not only the movement from the idea of the product but the entrance of invention to the marketplace. Invention as the discovery of a new tool or technique is the initial event while innovation as the new application of the new tool or technique is the final event (Kelly & Kranzberg, 1980).

There are two types of technological innovation: product innovation and process innovation. Product innovation is the introduction of a new product into the market. New products can result from incremental changes in an existing product, the introduction of new tools or instruments or the creation of something original. "Product innovation is the improvement of process to increase productivity, efficiency and scale of production or to control cost, quality production etc. It can involve incremental changes or major breakthroughs" (Ebelig, n. d., p. 3).

As a process, technological innovation involves the creation, development, use and diffusion of a new product or process. It includes the full range of activities from the initial problem definition and idea generation through research and development, engineering, production and diffusion of new technical devices, processes and products. It is a response to either need or opportunity requiring creativity and resulting in the introduction of novelty (Kelly & Kranzberg, 1980).

Innovation is accomplished with the first commercial transaction involving an invention, new product, process or device. The process of innovation is better viewed as an iterative process, which encompasses knowledge generation to technology commercialization and entrance of product in the market. Empirical evidence indicates that successful innovations require not only factors pertaining to the technology per se but market, managerial and institutional-related variables (Patterson, 1992).

These commonly cited factors are: 1) technical feasibility (technical problems had been solved); 2) better or improved technology; 3) demonstration product (pilot testing with user); 4) existence of potential market (market demand, market orientation toward user requirement, marketing services); 5) profitability or pricing potential; 6) ease of implementation (minor adjustment to assimilate the technology); 7) existence of a user; 8) existence of user needs; 9) financing assistance; 10) cost sharing of user with government; 11) attitude of firm's management; 12) patenting services; 13) communication between parties involved; 14) incremental changes in the technology; 15) sufficient R & D in industry; and 16) researcher incentives (Eclar, 1991).

Technology transfer as distinguished from the innovation process is considered a more restrictive term and does not cover the many and important links of the total innovative chain, which connect the important prototype of, finished operational system with the market places. Technology transfer is concerned with the movement along the path wherein discovery, idea or invention leads into an operational system, product or service. Vertical transfer is confined within one industrial or technological sector. Horizontal transfer describes the transplantation of technology from any point on the vertical transfer path to other sections (Goldsmith, 1970).

Eclar (1991) made a study on the problems of

underutilization of science and technology, slow commercialization of technologies, weak linkages between technology generators and users and the lack of policies to encourage technological innovation. She analyzed existing policies affecting the commercialization of technologies and determined the factors that are perceived to influence the commercial success of technologies.

It was found that successful commercialization of technologies is influenced by five factors: user participation, pilot testing, techno-economic orientation of the technology user, technology transfer unit and technical advantages. The factors: market existence, information materials and technical feasibility study also highly affect successful commercialization based on their significant central tendencies.

Invention Management Problems and Related Issues

As the basis for economic prosperity, technological development needs serious attention in developing countries. Decision-makers in developing countries often fail to grasp that technology is not a public good but a marketable commodity. Many rely on half-truths, equating the presence of foreign-owned factories with local technological capability of assuming that natural resources can be exploited forever. In developing countries' imperfect markets, standard financial input/output indicators give the wrong signals for technology management. Wishful policy thinking must be abandoned, as more funding for research institutions may not help small businesses and science parks cannot act as "incubators" to commercialize nonexistent research results.

The issue of technology policy and what role the government should play in it is very critical in today's world, especially the role that government should play in civilian technology development. Technology policy involves maximizing the role of technology in enhancing the competitiveness and economic well-being of a country.

Incentives, motivational strategies and related problems. Incentives to develop basic technologies are greater if the patent holder profits from applications or other second-generation products. Assuming that such products infringe the basic patent and that there is not much delay between the innovations, it is suggested that patents on second-generation products are not necessary to encourage their development and the patent holder of the basic technology collects a larg-

er share of the profit if applications or other second-generation products are not patentable (Scotchmer, 1996).

The only time inventors receive media attention is when they have stumbled across a major scientific breakthrough or when they have proven the commercial viability of their inventions. Otherwise, many of these struggling inventors hide inside their makeshift laboratories and go through the tedious process of trial-and-error, not giving up until 99 times out of a hundred failed attempts, they get something right. Only a few of these inventors will ever get a break, and have their names included in science textbooks and journals. As for those who will make money out of their inventions, they are even fewer.

Even when inventions generate huge sums of money, the inventors often get nothing. For example, the Scottish researchers who successfully cloned a sheep are likely to profit only minimally because they do not own stock in the biotechnology company that holds exclusive rights to the cloning technology. Several inventions that did not make their inventors rich are: Jello-O, the microwave oven, FM radio, irradiated milk and lasers (Siwolop, March 1997).

Linkage with industry. Commercialization of inventions is an important part of management. The measure of success of an inventor is when his products are being sold in the market and contribute to the society. This is where linkage with industry comes in. When an inventor has no capital to keep his products going in the market, the offer of industries to market his products for a royalty arrangement is a welcome opportunity. However, there are also problems encountered by inventors regarding these offers by industries.

The US Federal Trade Commission is offering advice on how to avoid being swindled by patent broking and promotion agencies. Brokers who promise to sell their patents in return for a high fee have misled many inventors, and consequently, any complaints have been lodged to the FTC. In response, the commission has started to pursue brokers who do not give their customers a clear idea of what they get for their money (New Scientist, 1994).

Ho (1997) reports that the FTC froze the assets of several invention-promotion companies that it alleges engaged in deceptive marketing. Invention-promotion companies try to help inventors market their products. Unscrupulous promoters demand



several thousand dollars up front for the promotion service but rarely succeed in selling the invention or product. Legitimate marketing companies typically take a share of the royalties or licensing fees rather than upfront fees, according to advocates.

Research Methodology

Research Design

This study employed mainly qualitative research designs (documentary analysis, key informant interviewing, structured interview, and case study) supplemented with a few quantitative features. The descriptive-analytical method was utilized.

The present study lends itself to qualitative research methods since it sought to analyze critical issues on management, concepts that cannot be quantified. In this situation, there is a need to better understand complex interactions, tacit processes, and often hidden beliefs and values of the inventors. Engaging in exploratory research where the relevant variables had not been identified and uncovering the tacit aspects of the inventors' life demanded qualitative methods. These are appropriate for discovering relevant variables and building a thorough, rich detailed description of invention-management practices.

For more scientific and reliable data gathering and analysis procedures, the researcher used what Gall, Gall, and Borg (2006) refer to as methods triangulation. Triangulation is a procedure for organizing different types of evidence into a more coherent frame of reference and relationship so that they can be compared and contrasted (McKernan, 1991).

Sample

The subjects of this study were a random sample of the members of the Filipino Inventors' Society. The choice of the six inventors included in the case study was influenced by their prominence as successful inventors as well as by the recommendations of the DOST-TAPI and FISI, of which they are members. A random sample of the employees of the DOST-TAPI was also included on the basis of their involvement in the management of Filipino inventions.

Data-gathering Procedures

Documents on the management of inventions were personally obtained by the researcher from the Philippine government agencies. Survey questionnaires were administered to gather data on inventor-related, government-related and industry-related variables: profile of the respondents, assessment of invention-management programs and practices and policy implementation, attitudes toward the utilization of indigenous technology, and problems and difficulties encountered by inventors and government authorities in the invention management related-areas. Information about Filipino inventions and inventors were obtained from the Technology Application and Promotion Institute of the Department of Science and Technology.

The researcher attended the regular meetings of the Filipino Inventors' Society to be familiar with the culture of the inventors. Six case studies were done on selected inventors and their inventions. The selection was based on the recommendations of TAPI and FISI. The focus of the case study was on the technology management practices of these inventors.

In-depth interviews with the inventors were conducted. For more focused responses, guide questions were prepared. For effective recording of the responses to the interview questions, a video camera was used. The video recording of the interview was done with the consent of the inventors. The interviews lasted between 30-90 minutes depending upon the availability of the inventors.

Description of Respondents

Tables 1 and 2 show the profile of the respondents in terms of place of origin/office and educational attainment.

Table 1
Place of Origin/Office of Respondents

Place of Origin	INVENTORS		Office	GOV'T EMPLOYEES	
	Frequency	Percentage		Frequency	Percentage
Luzon	26	83.87	IPO TAPI- Regional TAPI- Main	1	5.56
Vizayas	2	6.45		3	17.65
Mindanao	1	3.23		14	82.35

Table 2
Educational Attainment of Respondents

	INVENTORS		GOV'T. EMPLOYEES	
	Frequency	Percentage	Frequency	Percentage
High School Graduate	2	6.45		
With College Education	4	12.90		
College Graduate	18	58.06	8	44.44
MA/Ph.D. Degree Candidates/ Holders	7	22.58	10	55.56

Inventors. There were thirty-one (31) inventors who responded to the survey questionnaire. Of these, twenty-six (83.87%) come from Luzon; two (6.45%) come from Vizayas; and 1 (3.23%) come from Mindanao. Two (6.45%) inventors did not write their address.

As far as their educational attainment is concerned, two (6.45%) are high school graduates; four (12.9%) have some college education; eighteen (58.06%) are college graduates; and seven (22.58%) are pursuing or have finished their graduate degrees.

Government Personnel. There were eighteen (18) personnel who got involved in the study. Of these, one (5.56%) works in the Intellectual Property Office. All the others are DOST-TAPI personnel: three (17.65%) are regional directors and fourteen (82.35%) work in the main office of the Technology Application and Promotion Institute of the Department of Science and Technology as division managers, science research specialists, and program managers. Two (11.1%) of them are doctoral degree holders; six (33.33%) are Master's degree holders; two (11.11%) are Master's degree candidates, and eight (44.44%) are Bachelor's degree holders.

Case Study Participants. There were six inventors who were involved in the case study. All of

them are successful inventors. They have successfully commercialized their inventions and they are known in the international market.

INVENTOR A is involved in the production of pesticides. He is an entomologist and a graduate of the University of the Philippines-Los Banos. He has thirty-eight (38) patented inventions on pest control. He is an international awardee.

INVENTOR B is manufacturing water system devices and has thirty-one (31) patented inventions. He is a Ph.D. (Management) degree holder. He was awarded by WIPO as best inventor of the year.

INVENTOR C is a dentist by profession and is an international figure in water filtration system. He is a recipient of more than a dozen of prestigious awards and as an inventor is, the International Humanitarian Foundation, Inc chose him as the Most Outstanding Inventor. All of his inventions are patented and are successfully commercialized.

INVENTOR D, a graduate of an accounting degree, is an inventor of a new sound system that he claimed "would redefine the world's concept of hi-fi." He discovered and developed a speaker and amplifier stereo system that can reproduce "live" all natural, life-size sound and give listeners a real sensible enjoyment with full emotional satisfaction that has



never been experienced before from any commercial or professional audio system. Without formal education in any science or engineering course, he has invented a wide range of items such as the Alcogas stove (an LPG-like flame, alcohol gasifier stove), the Bolaro (a multipurpose racket ball game device), and the Forest Herbs brand products (with which is the first all natural *gugo* [herbal] shampoo) to name a few. (Manila Bulletin, December 12, 1997; January 30, 1998)

INVENTOR E is involved in manufacturing and construction of pre-fabricated modular housing units. He received the best invention award in 1995.

INVENTOR F is the inventor of musical instruments, sing-along system, and creative music of the Trebel Group of Companies. A multi-warded inventor, he won a presidential award from President Ferdinand Marcos twenty-five years ago and an award on the one-man band (OMB) which became very famous. His inventions are sold in Japan, Canada, and other parts of the world.

Statistical Treatment

For the supplementary quantitative data obtained from the survey questionnaire, descriptive statistical techniques: frequencies, means and standard deviations and inferential statistical technique: t-test were utilized in the analysis.

Results

Policies Governing Filipino inventions

Documentary analysis revealed that the Phil-

ippine government legislated policies governing Filipino inventions with the aim of motivating the inventors to respond to the government’s call for support to industrialization so that the Philippines will attain economic progress and stability: These policies and guidelines are: Presidential Awards for Inventions, Tax Incentives and Tax Exemptions, Duty Free Importation, Invention Development Assistance Fund, Invention Guarantee Fund, Financial and Loan Assistance from Government Banks, and Government Agencies Assistance. Further, a Patent Office was created to regulate the issuance of patents. The Intellectual Property Office was created on January 1, 1998, prescribing the intellectual property code.

To support each other, inventors organized themselves. There are seven inventors’ organizations in the country: Filipino Inventors’ Society, Inc.; Women Inventors Association of the Philippines, Inc.; Filipino Inventors Solidarity Thru Christian Brotherhood, Inc.; Filipino Inventors Multi-purpose Cooperative; Responsible Inventors, Scientists and Engineers for the Philippines, Inc.; Women in Science and Technology Development Foundation, Inc.; and Institute for Creativity and Inventiveness, Inc.

Assessment of Filipino Inventions

One section of the survey questionnaire administered to the respondents of the study is assessment of Filipino inventions using different criteria. The result of the assessment done by the inventors and DOST-TAPI employees is shown in Table 3.

Table 3
Assessment of Filipino Inventions

Criteria	Inventors		DOST-TAPI Employees	
	M	SD	M	SD
Product quality	3.65	1.02	2.81	0.54
Product durability	3.50	1.04	2.75	0.86
Product performance	3.58	1.03	3.13	0.72
Product global competitiveness	3.10	1.30	2.25	0.68
Management capabilities of inventors	3.10	1.16	2.38	0.72
Availability of local raw materials	3.13	1.07	3.44	0.81
Engineering design	3.46	0.88	2.69	0.70

The inventors rated product quality, product durability and product performance highly satisfactory. Satisfactory ratings were assigned to product global competitiveness, management capabilities of inventors and availability of local raw materials. No concrete conclusion can be made on the rating of engineering design since out of 31 inventors who responded, only 13 (42%) gave their rating using this criterion.

Comparing the assessment of the DOST-TAPI employees with the assessment of the inventors, only two criteria: product performance and availability of locally produced raw materials received satisfactory rating. The employees rated product quality, product durability, product global competitiveness, management capabilities of inventors, and engineering design below satisfactory. The criterion product global competitiveness received the lowest rating.

The result of the assessment shows that Filipino inventions have not yet been fully developed to be globally competitive. The fact that the management capabilities of inventors are still inadequate, this has surely affected the success of commercialization of inventions.

Assessment of Government Programs on the Development of Invention Capabilities

The government programs on the development of the invention capabilities of Filipino inventions are classified into five (5) areas: Policy Implementation; Motivational Strategies; Specialized Technical Train-

ing; Linkage with Invention-Promoting Companies, and Promotion of Intellectual Property Rights. Government policies are in place to assist inventors in their invention development. However, the inventors involved in the study lack awareness of the effort of the government to promote the development of inventions.

Motivational Strategies

The two groups of respondents were asked to assess the motivational strategies generated by the government to develop the invention capabilities of the inventors. Table 4 shows the assessment of the inventors and the DOST-TAPI employees.

In the assessment of the inventors, all the programs of the government aimed to motivate the inventors to develop their invention capabilities need improvement. These inventors are not satisfied on the way the government generate these motivational strategies.

For the employees, the government programs on financial support, facilities for expertise exchange, network and linkages, facilitation of commercialization of inventions and provision of rewards are satisfactory. However, they admit that the programs on provision of scientific equipment, provision of facilities for invention development, provision for invention management training and constant monitoring should be improved.

Table 4

Assessment of Motivational Strategies

Motivational Strategies	Inventors		DOST-TAPI Employees	
	M	SD	M	SD
Financial Support	1.77	0.84	3.59	1.00
Provision of Scientific Equipment	1.50	0.73	2.76	0.90
Provision of Facilities for Invention	1.52	0.78	2.65	0.86
Provision of Invention Mgt. Training	1.54	0.74	2.82	0.73
Facilities for Expertise Exchange	1.56	0.75	3.00	0.79
Network and Linkages	1.57	0.79	3.11	0.76
Facilitation of Commercialization of Inv.	1.63	0.67	3.76	0.83
Constant Monitoring	1.50	0.64	2.94	0.83
Provision of Rewards	1.90	1.16	3.71	0.85

The assessment of the government personnel is significantly different from the assessment of the inventors as shown in Table 5.

Table 5

T-Test on Assessment of Motivational Strategies

Groups	Mean	SD	SE
Inventors	1.5604	0.675	0.141
DOST-TAPI Employees	3.1503	0.601	0.146
Pooled Variance Estimate			
t-value	Degrees of freedom		2-tail Probability
-7.71	47		0.000

Legend: SD - Standard Deviation

SE - Standard Error

The implementors are satisfied with the way they implement the government programs but the recipients do not find satisfaction. These differences in opinion need to be resolved for Filipino inventions to flourish. A thorough evaluation of these programs is necessary and an open communication between the inventors and the government personnel should be effected so that, with open minds, improvements can be introduced for the benefit not only of the inventors but also of the implementing agency.

Invention-Management Programs and Practices Adopted By Successful Inventors

The case analysis of the successful inventors revealed the following invention-management programs and practices: a) The businesses established by these inventors are family-managed; b) The successful inventors used their personal financial resources in the development and mass production of their inventions without resorting to loans from government; c) The inventors conducted pilot study on the feasibility of their inventions before mass production; d) The inventors joined trade fairs and exhibits to expose their inventions; e) The inventors practiced hands-on management, acting as both manufacturer and marketing man, in the development and commercialization process of their inventions; f) The inventors believe in education as a source of new concepts and ideas that will help them think creatively and critically and increase their potentials for success.

Factors Influencing Current Issues on the Management of Filipino Inventions

The successful inventors identified the following factors that influence current issues on the management of Filipino inventions:

Attitudes of Filipino people toward Filipino inventions. The Filipino people have developed the attitude of colonial mentality. The government, supposed to be the single biggest buyer of Filipino inventions, does not believe on Filipino technology and resorts to importation of foreign technology.

Graft and corruption. The Filipino inventors continue to fight against graft and corruption and this resulted to the lack of trust and confidence in the government. This prevents the inventors to attain their aim of improving the condition of their countrymen in a wider scale.

Relationship of inventors with fellow inventors. There is an interpersonal relationship problem that exists among the different inventors' organizations. Moreover, the problem of politics exists within each inventors' organization.

Relationship of the inventors with DOST-TAPI. There is some kind of animosity between the inventors and the leadership of DOST in general and the leadership of TAPI in particular. There is a widespread feeling of dissatisfaction with TAPI among the inventors. The good news is the leadership of TAPI is trying to bridge the gap that existed between them and the inventors and the relationship is beginning to improve.

Common attributes of successful inventors. The six inventors who participated in the case study disclosed their personality traits during the interview

process. They share in common the following attributes that contributed to their success: love of country, honesty and love of God.

Implications of Results

The results of this study have direct implications on the principles underlying the development and management of inventions as well as technology research.

Technology Development

Technological development is the result of people trying to improve the quality of their lives or

trying to extend their horizons. These people are the inventors and/or innovators who are considered to be the most important ingredient in technology. They use tools, resources and processes in order to solve problems or to extend capabilities. The inventors' technological urge to search and create, if supported and nurtured by government and private entities creating an environment conducive to technological endeavors, will result to the desired end product, technology development. Figure 1 shows the relationship of the elements of technology development.

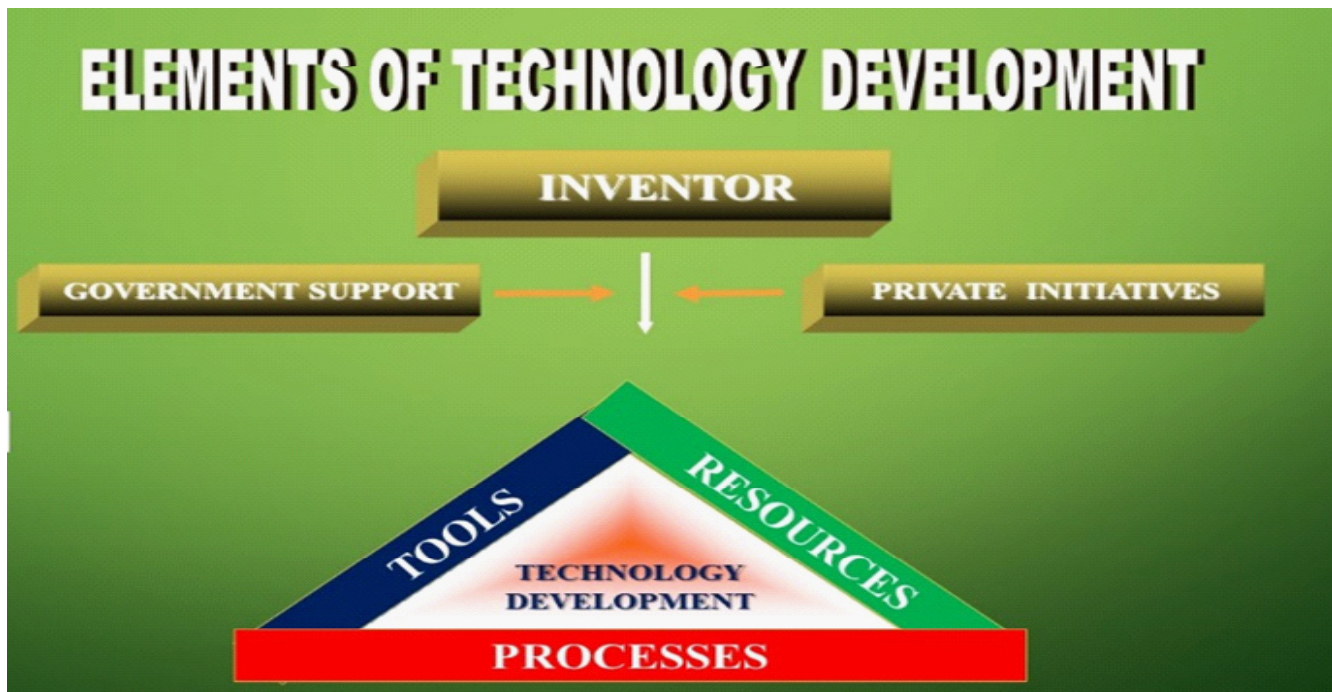


Figure 1. Elements of technology management (Role, 1999)

Inventive ideas can only be nurtured in educational institutions, the excellent soil for the spread of new ideas. To give birth to inventions, the environment must be provided from the elementary grades where ideas can start to germinate. These ideas are developed into inventions as science and technology become the foci of the educational endeavors.

Support expected of government and private entities to inventions is not much on financial assistance. Although this may be necessary, what inventors need to succeed is an environment whereby they can develop their inventions toward the attainment of product quality and global competitiveness. This environment includes government provision of scientific equipment and facilities for invention development, training, facilities for expertise exchange and rewards and recognition to motivate inventors to continue to develop their

inventive ideas as well as government network and linkages with private companies to facilitate commercialization of patented inventions. This environment can be successfully provided if the government personnel includes individuals with sophisticated technical and engineering skills and with business experience or training in economics or management.

Technology Research

Research and development is the key to technological innovation and progress. A climate conducive to this endeavor should be provided by the government so that improved products can be introduced to the market.

For a nation to be included in the mainstream of industrialization, as the Philippines has been dreaming of, it should be involved in basic

research so as to come up with an original invention. Basic research, unlike applied research, cannot be left to private industry, because the potential benefits to society often are not accompanied by profits to those who do the research. That is so because the benefits of a particular piece of basic research are uncertain, and the identity of those who will benefit from it is difficult to predict. This type of research can be successfully carried out by universities, foundations, and other nonprofit institutions. Such research requires funding and the national government is the only major source of funds on the scale needed.

Private initiatives are expected to play a major role in funding applied research especially when the results of the research will directly benefit their businesses. This is a beautiful picture of the interplay of government and private agencies in transforming the

invention into a practical and profitable product and in stimulating and implementing innovation to serve as stimulant of economic growth.

Technology Management

The inventor's invention-management flowchart is shown in Figure 2. This flowchart is the product of the researcher's interaction with the successful inventors.

"Necessity is the mother of invention," the cliché goes. Ideas are developed into reality to answer a perceived need. Successful management of these ideas would mean development of a prototype in the inventor's garage or the government's research and development facilities. This prototype should be patented to protect the rights of the inventor.

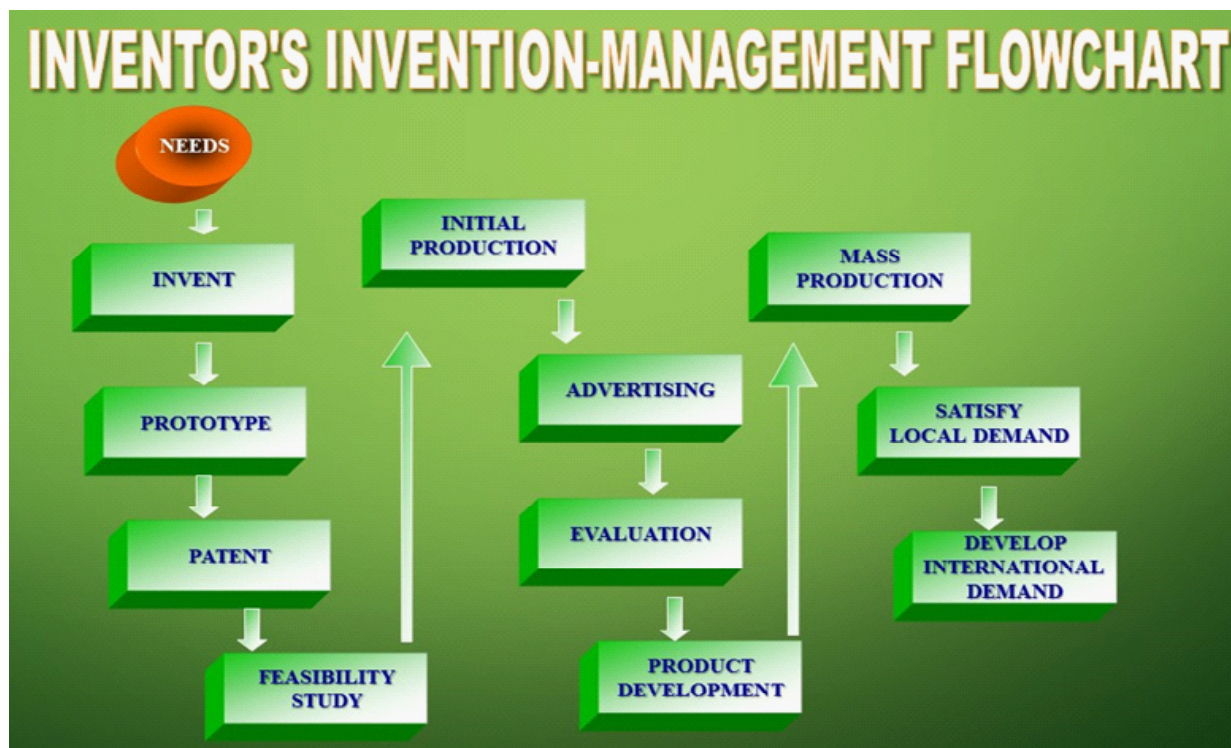


Figure 2. Inventor's invention-management flowchart (Role, 1999)

A feasibility study should be conducted to determine the marketability of the invention. In most cases, the inventor is not a business or management graduate that he has no skills in feasibility study writing. During this stage, the government agency's assistance comes in through the Technology Packaging section of TAPI

If the product is found to be marketable, initial production of the invention takes place. Since this is just small-scale, financing should be shouldered

by the inventor himself. Loans should be avoided at this point. However, if the invention is commercially viable based upon the result of the feasibility study and the inventor has no financial resources, an invention-promoting company can come in to give assistance not only in the production but also in the advertising and promotion of the product. The government must have a strong linkage and networking with this type of company.

The initial commercial success of the invention must be evaluated. Research and development should be carried out to improve the product. Then and only then can the inventor engage in mass production not only to satisfy local demand but also to develop inter-

national demand.

Figure 3 shows the invention-management flowchart of the government in the process of assisting the inventor in the development and commercialization of his invention.

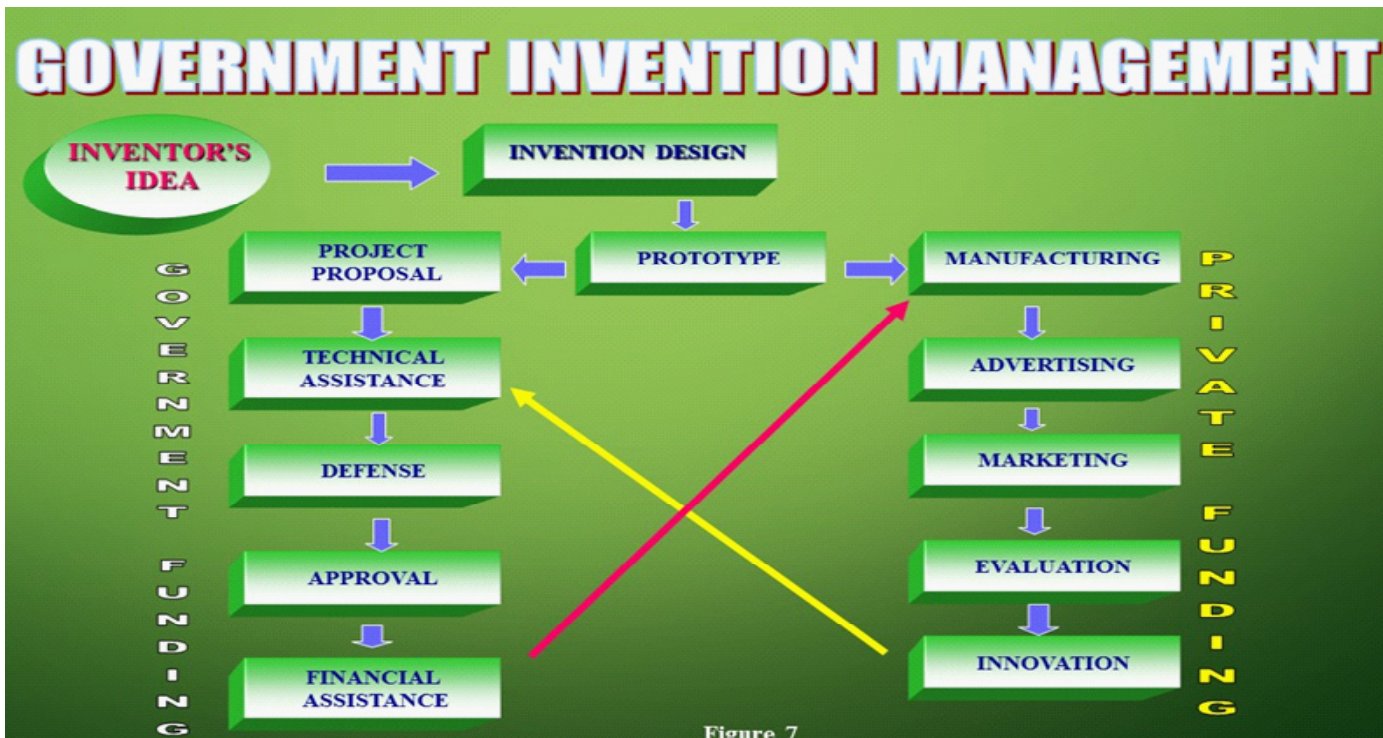


Figure 7

Figure 3. Government invention management flowchart (Role, 1999)

The development of an inventor's ideas into an invention can be done in his garage using crude equipment. However, such development can be facilitated and enhanced in an environment with modern facilities and equipment that the government can provide. The inventors must have a home, provided for them by the government, where they can turn their ideas into reality, via a design and then a prototype.

An inventor who has produced a prototype of his invention can move in any of the following directions: use his personal financial resources to manufacture and market his product or seek assistance from the government. Financing is a common problem among inventors. This is where the government comes in.

The inventor submits the prototype of the invention and a project proposal to TAPI, the agency mandated to assist inventors. These will be evaluated by the TAPI personnel. If feasible, qualified personnel will be assigned to give technical assistance to the inventor to improve the invention or the content of the project proposal or to gather all the pertinent information related to the invention that will facilitate approval

of the proposal, whichever is necessary.

During the inventor's defense of his proposal, these personnel are expected to support him. Upon approval of the proposal, the financial assistance will be released. The product will be manufactured for commercialization.

Whether the government provides financial assistance in the manufacturing or the inventor uses his personal financial resources, the support of the government is an important factor in the successful commercialization of the product. Awards and recognition will help in the promotion and advertisement. A showroom where the invention can be displayed so that people can see the product and be aware of its existence needs to be established. The government can tap private industries that can promote and market the product.

Continuous evaluation of the product is necessary to ensure quality. Innovation is an end product of research and development. The government should continually provide technical assistance. The cycle goes on. The support of the government and



private entities is the determining factor not only in successful commercialization but also in the global competitiveness of Filipino inventions.

Conclusion and Recommendations

Although the Philippine government has legislated policies governing Filipino inventions, the status of technological innovations in the country continues to lag behind in terms of quality and competitiveness. The management capabilities of Filipino inventors are inadequate resulting to low commercialization of Filipino inventions. Successful inventors are well-educated, manage their inventions with their family, use their personal financial resources in establishing their business, practice hands-on management, received awards as a result of joining trade fairs and exhibits and conduct feasibility study on their inventions before mass production for commercialization. The factors that influence current issues on the management of Filipino inventions are cultural, political, and psychological in nature.

It is recommended that the issues on the invention management-related areas such as policy implementation, motivational strategies, training and development, linkage with industry, patenting of invention, and promotion of intellectual property rights need to be properly addressed for Filipino inventions to flourish. DOST-TAPI should employ participative management in the implementation of legislated policies governing Filipino inventions. There is a need for a paradigm shift in education such that the emphasis should be geared towards excellence in science and technology especially in basic education and this means increase in government funding for facilities in educational technology.

The researcher would like to conclude this paper in these words: *“People cannot be developed, they can only develop themselves. For while it is possible for an outsider to build a man’s house, an outsider cannot give the man the pride and self-confidence in himself as a human being. Those are the things a man has to create in himself by his own actions. He develops himself by what he does; by making his own decisions, by increasing his understanding of what he is doing and why, by increasing his own knowledge and ability and by his own full participation as an equal in the life of the community he lives in.”* When the creative potential of the inventors has been liberated and their human resources have been harnessed,

then they will be capable of successfully managing their inventions, contributing to the country’s economic growth and progress. Then and only then can they be elevated to the status of being the “Philippines’ single greatest national resource.”

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