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An Analysis of Internal Environment of a Commercial-oriented Research Organization: Using Mckinsey 7S Framework in a Ghanaian Context

[1]Theophilus Francis Gyepi-Garbrah, [2]Frederick Binfor

[1]Marketing Division, CCID, Council for Scientific and Industrial Research, Accra, Ghana
Email: theogarby@gmail.com / *talk2garbrah@yahoo.com*
[2]Marketing Department, Oil Palm Research Institute, Kade, Ghana
Email: frederickbinfor@yahoo.com

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Abstract
The largest research organization in Ghana has of part of its mandate to raise internally generated funds through the commercialization of research products and services in order to supplement government's budgetary allocation. How could its internal structures, vision and mission be strategically aligned for effective commercialization performance? The study utilizes the McKinsey 7 S Framework which is an analytical tool used to help in a variety of situations, including how to improve the performance of a company, and determine how best to implement a proposed strategy. Finally, the study makes some strategic recommendations for consideration by policy makers within the public sector.

Keywords: Commercial-oriented research, internal environment, McKinsey 7 S Framework, Public sector organization, Commercialization, Ghana.

1.0 Introduction

The public sector institution under investigation is mandated to conduct applied research through laboratory and pilot scale investigation into problems of food processing and preservation, storage, marketing, distribution, and utilization in order to assist the local food industries to improve on and diversify their operations. As part of its mandate the institution is also required to commercialize its activities in order to support government's budgetary allocation. Many governmental institutions within the public sector setting are finding means of improving management in order to make the institutes more effective, accountable and deliver value for money. These come with the added challenge of retaining professional staff. (Ban *et al*, 2003). In order to transform the private sector concepts such as efficiency, accountability, transparency, value for money, etc are being considered. These concepts

which have been used to transform the domain of the private sector are being considered for the public and non-profit sectors (Harris, 2003; Macedo and Pinho, 2006). Public sector reform policies which were implemented in the past were based on the premise that all public organizations were ineffective. This assumption has become the norm because the public sector in Africa has historically performed poorly, and is generally perceived as an obstacle to development (Stein, 1994). The characteristics of the public sector also present some obstacles to strategic management because there are no clear policies to guide management (Zhou *et al*, 2009). These conditions have been the bane of much public sector organization who wants to implement market-oriented initiatives. Traditionally, government-funded public sector organizations (PSO) are required to develop and support government policies and projects, among others. However, PSO present a major financial burden on government, and to address this challenge many PS organizations in developing countries are gradually moving away from total dependence of governmental support to raise additional income through commercialization (Okoye, 2003). Many countries in the developing economies, especially in Africa have not been successful with technology commercialization, with reasons attributable to lack of careful analysis, planning and implementation (Okoye, 2003). In Ghana for instance, the CSIR, the largest public sector research organization, has not been able to meet the target of raising 30% of its budgetary through internally generated funds (IGF) since its mandate in 1997(CSIR-Finance, 2011). Nonetheless, commercialization in public organizations is gaining much attention with increased demands from liberalization of the globalized business environment. This phenomenon requires that employers in public organizations show commitment to effective management of both human and material resources. Thus, bringing new products and services to the market require new activities and resources related to the creation of demand, markets, and delivery channels (Harrison and Waluszewski, 2008). These activities may require new approaches to managing the public sector, as organizations that are engaged with the external market need to engage in continuous internal improvement to remain competitive (Zain and Kassim, 2012). The question is whether public sector organizations really engage in continuous analysis of internal environment, to align the internal resources to the external environment to enhance commercialization. Our paper uses the McKinsey 7S Framework which is sparsely used in the literature to analyze the internal environment from a non-western context and makes strategic recommendations for consideration by managers and policy makers.

2.0 Literature Review

2.1The Public Sector

Public sector organizations (PSO) provide services based on the needs and expectations of the stakeholders. The goal of the PSO has been to ensure that excellent services were delivered to the public. However, the main challenge is how to achieve results, while maintaining internal systems that would keep the organization on track to reach its goal (Wisniewski, 2001). Changes that have taken place within the public sector in recent years have called for more attention to the internal environment and value-added services to the public. These changes paved the way for public organization to adapt the way in which they approach work in general to meet the organizational goals. It also creates avenues for PSOs to try new tasks and initiate other social interventions. As a result, senior public sector executives are encouraged to develop new skills and find novel ways of management to deal with the changes that enhances meeting of corporate goals.

2.2 Public Sector Reforms Initiatives in Africa

The World Bank has made attempts to bring efficiency within the public sector and proposed a number of reforms for the sector in Africa. The World Bank public sector reform policies could be classified into two: the "quantitative" first-generation, and the "qualitative" second-generation reform programs (Numberg, 1999). The first-generation reforms were implemented between the 1980s and early 1990s, and were part of the structural adjustment policies implemented by the Bank in several African countries. The aim of the first-generation reforms was to reduce the size of the government and the policies implemented included retrenchment, cost-recovery and privatization. To some extent the policies achieved some successes with regard to lowering government wage bills, but largely, could not improve the performance of the public sector. The ineffectiveness of the policies was attributed to a narrow focus of the reforms (Numberg, 1999). In 1994, for example the Government of Ghana changed the focus of public sector reforms with the creation of the National Institutional Renewal Program (NIRP) and the launching of the Civil Service Performance Improvement Program. In consonance with the "qualitative" second generation reforms of the time, part of the main objectives was to improve efficiency and encourage the development of a well-motivated and proactive public sector. In October 1997, the government implemented the Public Sector Re-Invention and Modernization Strategy to help transform state institutions, their accountability and performance framework and their relationship with the private sector and civil society. The challenge that the NIRP's Overview Reform Committee faced was the lack of political will on the part of government to implement the proposals for the reforms. An evaluation of the reforms concluded that the Public Sector Reform Program failed to effectively manage many of the fundamental issues and challenges facing the public service. Some of the challenges cited included low salary, corruption and poor delivery of public services, among others (PricewaterhouseCoopers, 2003). Policy makers and implementers are therefore cautioned to be open-minded as they attempt to develop and implement policies in different circumstances, and the adaptation of reforms to a particular environment rather than pursuing a *'one-size-fits-all'* approach (Ohemeng, 2010).

2.3 Commercialization of Research

Commercialization refers to the development of the product concept, its successful launch, and interaction with potential buyers (Jolly, 1997; Pellikka and Virtanen, 2009). Governments of developing countries are the main financiers of public research organizations and own the patents, although resources they provide have always been woefully inadequate. Results from an empirical study has shown that the larger the share of patent-owners' costs covered by government financial support during the R&D phase, the lower is the probability of patents being commercialized (Svensson, 2007). Therefore the extent of commercialization is dependent on the terms of the financial assistance provided by the government. Competing interests have been associated with University-based technology transfer decision process and paths to commercialization, encouraging an application of multi-dimensional approaches by researcher. This may begin with the disclosure of discoveries made by scientists in their laboratories, to pursue entrepreneurial action. The suggestion is that commercial disclosure most often occurs when there is alignment between three factors, viz: a scientist's rent orientation, a university's rent doctrine, and the rent doctrine of the scientific field in which the scientist conducts research (Gianiodis and Brown, 2012). The importance of a mix of motives in order to appreciate the commercial behavior as well as the social and affective

aspects of intrinsic motivation for scientists engaged in technology transfer was noticed. Lam (2011) argues that policy to encourage commercial engagement should build on reputational and intrinsic rather than purely financial motivations. A gap was noticed between goals of institutional change and performances of commercializing research in the university, though there have been some improvements over last two decades, according to study conducted in China (Li and Morgan, 2010).

2.3.1 Challenges and Opportunities

Research institutions encounter various challenges in their commercialization drives. Universities, especially, have an additional challenge of combining commercialization of knowledge with teaching and research, since they are required to engage in technology transfer as part of their mission. There were three dimensions to the challenges identified: increasing the extent of commercialization, visualizing the contribution to economic development, and managing the relationship between commercialization and other core activities (Rasmussen *et al,* 2006). Whereas there are some benefits to derive from commercialization, a potential for conflict with teaching and learning identified. Other challenges to commercialization was the need for risk sharing among all members of a product's supply chain within the context of innovative construction products in the residential construction industry. It was observed that for successful commercialization required diverse contributions, in the form of information sharing and knowledge transfer among supply-chain members at the early stage of commercialization (McCoy *et al,* 2009). Many technology entrepreneurs have accrued significant financial benefits by integrating their innovations into an internal value chain, often including integrating with established industry (Gans and Stern, 2003). Therefore a situational analysis of the organization is relevant to identify the contribution of each member of the internal value chain. Archaic budgeting and planning procedures are some of the challenges facing many firms' innovation initiatives. Though these procedures are meant to protect decision makers from the embarrassment of over blown budgets, inability to meet deadlines or marketing targets, they end up stifling learning and adaptability (Hutchens and Muller, 2012). However, the procedures are critical to achieving successful commercialization of innovative ideas. In addressing the issue, Hutchens and Muller (2012) suggest adoption of *'assumption-driven learning'* in a series of *'sequential divergent-convergent cycles'.* They propose a cycle of learning that is centered on testing the major assumptions for each stage, and continuous learning and unlearning as essential to the process of developing raw ideas. Dealing with challenges of commercialization included consideration of market resources, as lack of it may lead to over concentration on product development and leading to lack of effective communication with end-users. Also relevant is creating effective distribution channels and in accessing market and customer information (Harrison and Waluszewski, 2008; Pellikka and Virtanen, 2009). An innovating firm needs resources to engage in customer education, distribution, marketing communication, relationship mediation, and credibility building when moving from R&D tasks to commercialization tasks (Aarikka-Stenroos and Sandberg, 2012). Saji and Mishra (2013) explained the significance of aligning a firm's environmental variables for pursuing new product commercialization in high-tech markets. They observed that environmental variables in high-tech markets act as antecedents to a firm's approach to new product commercialization, given the varying levels of resource availability.

Other issues are raised by the use of patents in university-industry technology

commercialization, and they affect the global marketplace (Bagley, 2008). An overview of the U.S. patent system reveals aspects of the process by which patents are obtained and enforced. Some of the benefits and costs to academia of the impact of the Bayh-Dole Act allow universities to capture returns from federally funded research. Though there were some challenges created from expanding scope of technologies eligible for patent protection, new opportunities were associated with strategic licensing and enforcement of patents that may influence future inventions. An examination of commercialization of university-developed technology and the synergistic relationship of the university's technology transfer office revealed four major challenges. These challenges are: having an effective program to secure early market input, building effective leadership teams, negotiating the terms of technology licenses, and developing the enthusiasm and cooperation of faculty researchers (Boni and Emerson, 2005). It was concluded that training programme in entrepreneurship could significantly enhance the effectiveness of university technology transfer initiatives, with the development of a well-focused business plans. Also, significant was the formation of well-balanced leadership teams actively monitored and mentored by the business school and its alumni and entrepreneur networks (Boni and Emerson, 2005). The above empirical results point to a need for developing appropriate internal systems for monitoring the processes, procedures, etc, and improve efficiency in the internal value chain of commercial-oriented research organizations. Hence, the need for organizations engaged with the external market to engage in continuous internal improvement to remain competitive (Zain and Kassim, 2012).

3.0 Methodology

3.1 The Context of the Study

The Context of our study is the Council for Scientific and Industrial Research (CSIR), a public-owned scientific organization established by NLC Decree 293 of October 10, 1968 in Ghana. The decree was amended by NLCD 329 of 1969, and re-established in its present form by CSIR Act 521 on November 26, 1996. The distinctive features of the 1996 Act are the emphasis on the introduction of market principles into the Council's operations through the commercialization of research. In this connection, the Council is expected to generate part of its income through the sale of its products and services. Currently, the Council exercises control over thirteen (13) research institutes. The statutory Governing Council of the CSIR is made up of a Chairman and 20 members. They include representatives of selected Ministries (Food and Agriculture, Health, Trade and Industries, Environment, Education, Science and Technology), the Universities, various production and commercial associations (Mines, Industry, Commerce, Engineers, Ghana Academy of Arts and Sciences) National Development Planning Commission, CSIR Directors, Senior Staff of CSIR, among others. The Director-General (D-G) is the Chief Executive of the CSIR. The D-G's functions include: policy issues; co-ordination; monitoring and evaluation; external relations including technical aid schemes and technical agreements; lobbying and advocacy; and CSIR relations. The choice of the CSIR for the study was informed by its strategic importance as the largest size research institution in Ghana, and the extent of its multi-disciplinary coverage in terms in research into diverse sector of the economy.

3.2 Data Collection

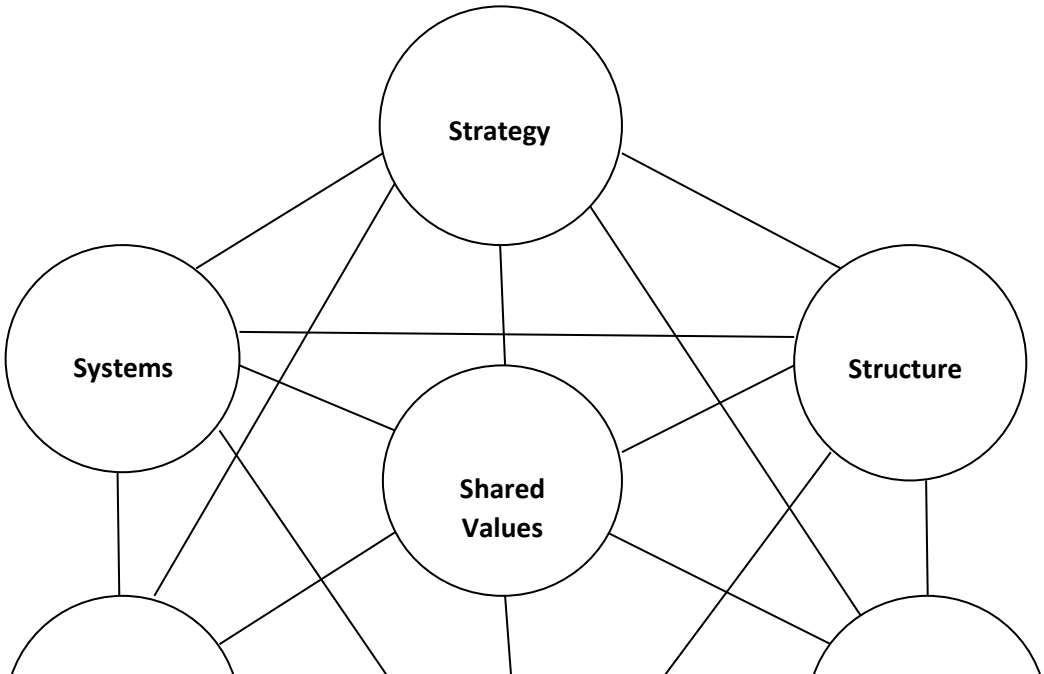
The study was guided by three principles of data collection in case study research as follows; use of multiple source of evidence, creation of case study database, and maintaining a chain

of evidence (Yin, 1984). For our study the source of evidence was largely documents; viz: strategic plan, corporate strategic marketing plan, archival records (organizational structure, annual reports, etc), and direct observation.

3.3 Overview of the *Mckinsey* 7S Framework

The study utilizes the McKinsey 7 S framework, as presented pictorially in Figure 1, identifies seven key interdependent elements that determine an organizations success or otherwise (Wilson and Gilligan, 1997). The McKinsey 7S is a strategic model that can be used for organizational alignment or performance improvement, understanding the core and most influential factors in an organization's strategy, determine how best to re-align an organization to a new strategy or other organization design, and examine the current workings and relations that an organization exhibits (*The Organizational Strategist*, 2011).

Figure1: **McKinsey 7S Framework**



The McKinsey 7 S Framework consists of seven interdependent elements which are categorized as either "soft" or "hard". The 'soft' elements include: shared values, skills, style, and staff; while the 'hard' elements comprise: strategy, structure, and systems. Whereas the hard elements are easier to identify, the soft elements are less tangible, and more influenced by culture. However, both categories of elements have equal importance to the success of the organization. Shared values, placed at the centre of the framework is an indication of how critical 'values' are to the development of all the other elements.

4.0 Results of Analysis and Discussion

The purpose of the analysis was to determine the nature of the organization's internal environment and how its internal structures, vision and mission, among others, are strategically aligned for effective commercialization performance, using the McKinsey 7 S model. In the analysis the study looked for consistency, alignment, conflicts, gaps, support, strengths and weaknesses. The analysis started with shared values, to determine its consistency with the structure, strategy, and systems. This was followed by the hard elements, and their support for one another; then the soft elements and how they support the hard elements.

4.1 Shared values

This is a set of traits, behavior, and characteristics that the organization believes in, including the vision and mission. The vision of the CSIR is - *"using the transforming power of Science and Technology (S&T) for wealth creation". Its* mission statement is - "*to become the force for accelerated social and economic development of Ghana through examining, exploring and creating Science and Technology catalysts for public and private wealth creation".* A vision must provide an intellectual framework for the institute's strategy and must define a strategic direction and present a conceptual map of how the institute moves from its current reality to a desired future (Marvis *et al.,* 2010). CSIR's Vision statement as it stands "*Using the transforming power of Science and Technology (S&T) for wealth creation*" is focused and provide a clear sense of what it hopes to become. It also expresses its distinct competence and provides assurance to stakeholders of the CSIR preparedness to serve their cause. However, the mission statement- *" to become the force for accelerated social and economic development of Ghana through examining, exploring and creating science and technology*

catalysts for public and private wealth creation" is vague as it is difficult to measure the *'force'* and does not identify key stakeholders, nor does it communicate any unique value to its stakeholders. A mission statement is expected to perform an integrating function of various stakeholders over a long period of time (Wilson and Gilligan, 2003). Lack of clear communication of the strategic intent of the CSIR to its internal clients creates images of inconsistency in the mind of stakeholders and so affects the corporate brand.

4.2 Strategy

This is the organization's alignment of resources and capabilities to "win" in the market. The current five-year strategic plan of the organization was the result of a Management organized at the beginning of the year 2011.The plan is not a product of consultation within the different levels of staff in the organization, and is not supported by different business plans initiatives and projects emanating from the different departments of organization. Ironically, the plans are not adequately communicated to the heads of department, although they have a responsibility in the roll out. This procedure of lack of broad-based consultations with key stakeholders did not allow key employees to see themselves as owners of the plan, and makes it very challenging meeting the corporate objectives and customer expectations. This situation does not allow client facing employees to handle client needs effectively, increasing customer's wrong perception of CSIR as not being adequately responsive to their concerns.

4.2 Structure

This describes how the organization is organized. It includes roles, responsibilities and accountability relationships. In CSIR the highest policy decisions are taken at the Executive Council, headed by the Council Chairman who is appointed by the government. The Director-General is responsible for ensuring that these decisions are implemented by all the 13 institutes and meet the mandate set out set out by the CSIR Act 521 of 1996. In CSIR, works are grouped together in department based on functioned performed, such as Finance, Human resources (Administration), Microbiology, etc, depending on the institute's core objectives and activities. The major advantage of placing like skills together is obtaining efficiencies and economies of scale. The chain of command is clearly defined and employees know who to contact when they have a problem and who they are responsible to. The rights for operational decision making or empowerment are inherent in heads of departments, who are responsible to the Directors at the institute, with narrow span of control. This procedure does not enable customer-facing employees to take quick decisions on customers' complaint and dissatisfaction. The organizational structure is expected to influence the way and the degree to which organizations adapt to changes and expectations in the external environment (Papasolomou, 2006).

4.3 System

This is the business and technical infrastructure that employees use on a day-to-day basis to accomplish their aims and goals. The primary business and technical systems that drive the CSIR are the usual traditional management procedures that thrives largely on 'paper' and less on 'electronic' systems. The organization does not have efficient and functional Management Information Systems capable of turning internal and external data into information. This makes it difficult for regular monitoring of market trends and stakeholder needs and expectation which must inform new technology development. The system for financial reporting uses scalar software which does not enables effective activity-based costing, vital to trace unit costs of products and to assess their value and enhance pricing of products and

services. The organization's website is not very reliable since getting access could be frustrating, and not interactive, so clients do not get real time response to their concerns. This reduces web traffic and affects CSIR's website reputation (Tom and Taves, 2004).

4.4 Staff

This element deals examines employee base, staffing plans and talent management. The staffs of the CSIR are highly qualified in their respective fields. Recruitment is by competitive interviews to select researchers, technologies and other professionals to fill gaps created when staff leaves on retirement or for better working conditions in other organizations. However, the process of recruiting staff with special expertise, when the need arises, takes a long time because the organization needs clearance from government for budgetary reasons. Employees are categorized into senior members, senior staff and junior staff depending on their academic qualifications. Promotion is by merit, so an employee is required to have worked creditably for 3-5 years, depending on the grade, and must have a favorable confidential report from the superior. Employees value higher qualifications and continuous self development as vital for career progression so the training of staff for excellence is given much prominence. The CSIR recognizes that employee output is a part of the value chain and the organizations success also depends on the capacity and capabilities of the employers. Senior members and technologist who play significant roles in research and product development are expected to work hard since their promotion depends on contribution to conferences, publications in international journals, and to commercialization.

4.5 Skills

Skills are the ability to do the organization's work, and reflect in the performance of the organization. The research employees are renowned for their involvement in collaboration research and contribution to international journals and conferences. The expertise of the core research grade workers spans different disciplines in natural and social sciences, engineering, applied sciences, etc. Non-core research workers include human resource personnel, accountants and limited numbers with expertise in marketing, human resource and accounting. The high calibre of employees has the capacity to undertake innovative programmes, which are fit to meet client expectations. CSIR believes in continuous training of its staff and therefore encourages personal academic development. The CSIR also recognizes that it does not have all the skills required in applied research. As such, it continues to create alliances with national and international organizations to offer staff the opportunity to engage at the cutting edge. This creates an environment where researchers are able to propose and pursue ideas that will increase their confidence. Many stakeholders perceive staff of CSIR as renowned for high skills and innovation, making them very competitive.

4.7 Style

Style is the behavioral element that the organizational leadership uses and influences interaction with employee. The CSIR operate a bureaucratic structure with highly routine operating tasks achieved through specialization, formalized rules and regulations, and tasks that are grouped into functional departments. Authority is centralized with narrow span of control, and decision making that follows the chain of command. The D-G is responsible for final management decisions, and is assisted by the Corporate Directors at the head office, namely, Administration, Finance, Commercialization and Internal Audit. The institutes Directors are responsibility for the running of the institutes, guarded by decisions from the quarterly DMC meetings. To a large extent, all the 13 institutes of the CSIR are semi-autonomous, and leadership is by the task culture which requires regular submission of report

of work executed. Also, all the institutes have Internal Management Committee (IMC) made up of heads of departments and representatives from identifiable group, such as the Research staff association, Senior Staff Association, etc. Decisions taken at these IMC meetings are well communicated to the other workers and this makes governance quite easy at the institute level. However, flow of vital information to subordinate is not expeditious and client-facing employees are not empowered to take quick decisions with regards to stakeholder challenges. Thus, there is less flexibility, less involvement, less autonomy and accountability of employees in decision making. This situation delays response to customer concerns, bringing the CSIR into a bad light.

5.0 Conclusion and Implications

The CSIR as a public sector research organization is endowed with highly qualified research grade team capable of delivering innovative, qualitative and competitive products and services. Also the organization is perceived as a credible organization of international repute by key stakeholders, and the culture of learning in the organization makes workers amenable to changes that would enable the development of a formidable CSIR brand. It is therefore inferable that CSIR has the potential of being developed into a strong corporate brand, capable of meeting its commercialization agenda. However, it is observed that the vision and mission statements are not clearly aligned both in terms of their fit with the external environment and in terms of their fit with all the factors internal to the organization. This confirms the assertion by Ballantyne *et al* (2011) that few companies have developed and adequately communicated formal value proposition. Therefore a successful CSIR brand will stem from a strong coherence between CSIR's strategic vision, what the organization's employees know and believe, and how it manages the commercialization strategy. The following recommendations are provided for management consideration and policy formulation for effective delivery of the value proposition.

5.1 Internal marketing orientation

Firms may adopt the internal marketing concept that gives attention to employees as internal clients. Internal marketing orientation (IMO) arises from the view that customer contact personnel are of primary importance to service industries, and that satisfied, committed and motivated are essential if external stakeholders are to perceive that they have received good service (Grönroos, 1982). Hence the organization's internal markets of employees should be encouraged and motivated to be customer-conscious, market-oriented. The application of external marketing success on customer-facing employees was emphasized by Sasser and Arbeit (1996), who opined that service employees are at the forefront of a firm's public image, and, therefore, competent and well-motivated employees are, in effect, the firm's products. By undertaking an IMO programme, organizations which are traditionally not market-focused could satisfy employees and motivate them to improve performance in the service encounter with the external stakeholders, and so increase the value they place on the technologies and services.

5.2 Innovation governance

It is opined that the accumulation of tacit knowledge and the culture of the entrepreneur are the resources essential to creation of wealth from research commercialization, and lead to technological innovation and the creation of new technology-based firms (Hindle and Yencken, 2004). It is observed that present concerns about socio-economic and environmental issues places extra demands on research scientists to step up their

technological innovation drive. Therefore research organizations may institutionalize an innovation governance system to align, allocate resources and assign decision-making authority for innovation, across the organization internal value chain (Robertson, 2009). While innovation governance has many benefits to a firm and customers alike, the potential value depends on how well the different types of investment is coordinated and controlled. Therefore an innovation matrix as a tool may help identify staff and coordinate the different innovations needed for the development of a new product.

5.3 Improving Visibility

Customer preferences keep changing with changing dynamics in the external environments research firms must put in place innovative measures to improve visibility of the market. Such measures may include leveraging technology, including the internet, wireless devices, etc, to monitor competition, capture customer related measures, and better assess operational performance. Visibility reflects an organization's ability to recognize, interpret, and respond to signals in the market to gain competitive advantage (Hendrix, 2003). Institutions can gain insight, lead time, and competitive advantage by close attention to 'informative' customers and supply channel members. For instance, visibility can enable the firm to better understand customer preferences, and how the firm's offerings match up against that of competitors. It will require customers to cooperate and share input and feed-back. The information gathered will help the firm to tailor the products to satisfy the stakeholders. To gain cooperation from external stakeholders, firms may consider providing some form of incentives to motivate them to disclose vital information in the external markets. That also raises concerns about potential response bias which firms must guard against, for example, by insisting on customers' fairness and objectivity.

5.4 Leadership Approach Required

The performance of the research scientists and technicians depends largely on availability of financial and material resources, and managers or leaders are expected to have the ability and capability to provide these resources to support the R&D projects, and to implement the corporate strategy. Much of leadership theory is developed around the idea that goals are rationally perceived and that managerial practice should be structured to achieve those goals, by aligning an individual type of leadership with rational organizational goals. Consistent with this, the dominant paradigm theory focuses on how leaders can influence others towards desired objectives within frameworks of formal hierarchical organizational structure. This paradigmatic model centres on issues such as motivating workers towards tasks objectives, leading them to produce efficiently, and effectively inspiring them to align with and commit to organizational goals (House and Mitchel, 1974). Leaders can also be said to be autocratic or democratic depending on the level of control by the leader and level of employee involvement. Whereas an autocratic leader exercises a high degree of control with little employee involvement, a democratic leader's degree of control is low with high employee involvement. A number of theories in leadership have emerged since the mid 1950s? These include; behavioral, situational, transformational, entrepreneurial and steward leadership theories (Insufficient space for details). One of the most influential contingency approaches to leadership is path-goal theory (P-GT). The essence of the P-GT is that it is the leader's job to provide followers with information, support, or other resources necessary for them to achieve their goal. The term path-goal is derived from the belief that effective leaders clarify

the path to help their followers get from where they are to the achievement of their work goals, and to make the journey along the path easier by reducing the road blocks (House, 1971). Hence, the contingency approach to leadership based on the path-goal theory (P-GT) proposed by House (1971) may be most appropriate for achieving the mandate of the research organizations. The basis of the P-GT approach is that employee performance and satisfaction are likely to be positively influenced when the leader compensates for things lacking in either the employee or the work setting. Therefore the leader must have some capacities and capabilities to be successful. According to Mumford *et al* (2007), there a number of capacities and capabilities these leaders must have to lead innovation-oriented organizations. The capacities include expertise, creative thinking skills, social skills and organizational knowledge, while the capabilities include defining problems, establishing the context, and development and fielding. However, the leader who spends time explaining task when those tasks are already clear or when the employee has the ability and experience to handle them without interference is likely to be ineffective because the employee will see such directive as redundant. Heads of division and research scientists also need expertise to plan requisite work. Leadership needs expertise credibility for role modeling, communication, and to appraise team interaction as suggested by Thamhain and Gemmil (1974). In addition to technical expertise, the leaders need creative thinking skills to envision the consequences of the ideas posed by others. The application of creative thinking skills in idea evaluation, however, is not simply a matter of seeing implications. Instead, as Mumford *et al* (2003) have pointed out, leaders in their appraisal of ideas, suggest approaches for idea revision and refinement, and require creative thinking skills (Basadur, 2000). Also, leaders need social skills that will allow them to encourage participation and build a sense of employee commitment to the commercial project being pursued. They need skills to build lasting relationship with external stakeholders. Those managing innovative projects must have organizational knowledge to be effective. More specifically, they must have an understanding of the organizational culture, the strategy, and the controls applied in managing resources. They need to be able to form and manage the multi-functional commercialization team to facilitate the delivery of the quality services and stakeholder satisfaction. This is consistent with the position of Boni and Emerson (2005) regarding the formation of well-balanced leadership team. To identify and define problems on the substantive themes guiding creative work, the leaders must identify fundamental issues that will provide a basis for defining projects and establishing the kind of projects that can be legitimately pursued within the research organization. Definition of these fundamental issues requires ongoing scanning and monitoring of both the external (Souitaris, 2001) and internal environments (Ford and Gioia, 2000) to identify emerging potentialities. This is consistent with an assertion that firms engaged with the external market need to engage in continuous internal improvement to remain competitive (Zain and Kassim, 2012).

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Corresponding author: Theophilus Francis Gyepi-Garbrah,

Marketing Division, CCID, Council for Scientific and Industrial Research, Accra, Ghana
Email: theogarby@gmail.com /talk2garbrah@yahoo.com

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