Dictating Impact of Systemic (Trans)formations on Management Re-engineering in R&D Firms

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Abstract—This paper examines challenges to the implementation and internalization of benchmarked management practices by research organizations in developing economies as transformative tools towards commercialization. The purpose is to understand the contributing influence of internal organizational factors from both situational and historical perspectives towards the practice implementation constraints, and also to provide theoretical understanding on how systemic formations and transformations in the organizations' activities influenced the level to which their desired needs are attained. The results showed that the variability in the outcomes of the organizations' transformation processes was indicative of their (in)ability to deal with the impacts of cumulated tensions in the systemic interfaces of their organizational activity systems. It is concluded that the functionalities of the systemic interfaces influence the functionality of the organizational activity system.

Keywords—Organizational activity system, practice implementation, systemic formations, systemic transformations, management re-engineering, R&D firms.

I. INTRODUCTION

THE past four decades has seen a growth in the establishment of organizations responsible for research and development growth in many developing countries. Originally, these research-oriented organizations were structured to function alongside other state-owned prostates as fully government subsidized agencies. Based on this perspective, these organizations functioned as state funded non-profit agencies, mostly offering free products and services to small and medium-scale enterprises (SMEs). The organizations assisted small and medium scale enterprises by providing them with technical and business extension services, testing facilities, problem solving services as well as research and development assistance. Starting from the mid-1980s, however, the orientation of the organizations as fully funded government agencies started to change. Along this line of change, most of them underwent technological transformations with the aim of acquiring the capacity to commercialize their operations. The underlying objective, in this respect was for them to be able to generate supplementary income to cater for the dwindling levels of government funds

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they were receiving to support their operations.

In the mid 1990's, there were attempts in many developing countries to transform the technological capacities of these research-oriented organizations. Yet, it became obvious that despite undergoing technological transformations, many of the organizations were not successful in operating as commercial enterprises. This phenomenon was studied by [1] in a research covering over sixty research organizations in Asia, Africa, Europe, North America as well as Latin America and the Caribbean. It was concluded by [1] that the key impediment to the successful performance of these organizations is often not technology, but management. This conclusion was derived from the observation that a number of research-oriented organizations in Europe and other developed countries have established networks for strengthening their management capabilities through which business principles and best practices of their daily operations are exchanged. Reference [1] recognized the potential of these practices and thus used them as a base to benchmark ten successful management practices that research-oriented organizations in developing countries (especially those in Africa and Latin America/Caribbean) could use to enhance their commercialization capacities. The benchmarked management practices were to provide the requisite guidance needed by the organizations to re-structure their management systems and consequently be able to improve upon their capabilities to generate income. The management practices benchmarked include governance, policy and programming, financial management, customer services, business development, organizational management, project management, capacity building, personnel management, and networking.

The practice of governance requires chief executives of organizations to nominate people to sit on the board with the government approving (or rejecting) his/her nominations. The management organizations have the responsibility of identifying the needs for change as well as the power to address those needs.

The practice of financial management requires an organization to have an accounting system that provides total, unit, and project financial information rapidly. Organizations are to offer few primary service types with feedback processes from clients seen as necessary for ensuring service quality.

The practice of business development requires an organization to have a corporate group responsible for customer awareness and market strategic planning with project managers conducting the bulk of selling activities.

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Rewards for business development (financial and recognition) were also seen as effective.

The practice of organizational management requires an organization to use a project-oriented management style that is based on objectives.

The project management practice requires the formation of project teams with team members having the appropriate expertise for each project, irrespective of where individuals in the team report in the organizational hierarchy.

The practice of capability building requires management teams in an organization to institute plans to encourage inputs from the market (industry), and also a client-majority board with an effective performance management system in order to facilitate the identification of capability-building opportunities in the business environment.

The approach to personnel management was to be such that a flexible recruitment system is put in place using input from managers, co-workers and human resources departments in selecting appropriate new staff and promoting existing ones. In relation to policy and programs outlines, an organization is to concentrate on providing appropriate technology such that it could compete with other technology providers.

The ten benchmarked management practices were perceived by [1] to hold much potential for the future commercialization of research-based organizations in developing countries, and worked closely with fifteen of these organizations during their implementation of these practices. Most of these fifteen organizations were unable to implement the practices successfully [1]. This is not surprising, especially if one takes into account the differences that might possibly exist in the sociocultural environments of the different organizations. Such sociocultural differences carry with them different languages of translation of the management practices in the different organizations, in terms of drawing a parallel distinction between talk and technique as well as ideas and practice. According to [2], drawing such a parallel distinction is important, because it is unreasonable to assume that ideas will always be transferred. Even when ideas are transferred, subscribing to and/or espousing them will always be associated with their enactment as techniques [2]. This raises the question of why the efforts of the research based organizations to implement and internalize the best management practices ended up being constrained, as concluded by [1].

The purpose of this study, therefore, is to understand the contributing influence of internal organizational factors from both situational and historical perspectives towards the implementation and internalization constraints to the best management practices modeled by [1], and also to provide understanding on how systemic formations and/or transformations in the organizations' activities influenced their practices implementations and internalizations and the attainment of their desired needs to commercialize their operations.

II. LITERATURE REVIEW

Activity, according to [3], is a molar and non-additive unit of a material subject's life. In a narrower and more psychological sense, activity is a unit of life mediated by mental reflection whose real function is to orient the subject to the world of objects [3]. Therefore in the view of [3], activity is not a reaction or a totality of reactions, but rather a system possessing structure, inner transformations, conversions, and development. Activity is also defined as the engagement of a subject toward a certain goal or objective [4]. An activity is therefore undertaken by a human agent (subject) who is motivated toward the solution of a problem or purpose (object), and mediated by tools (artefacts) in collaboration with others (community). These psychological views of an activity are understandable to us because the cultural-historical theory of activity was initiated by a group of psychologists in the 1920s and 1930s which included Lev Vygotsky. According to [3], the original ideas that brought [5] to the problem of the origin of internal psychic activity in external activity differ principally from the theoretical concepts of other authors who were his contemporaries. These ideas came from an analysis of the features of specifically human activity – work activity; productive activity carried on with tools, activity that is indigenously social, that is develops only under conditions of cooperation and sharing by people. This gives a correct impression of [5]'s attempt to use the concept of activity in understanding a phenomenon in the craft-type of organization, and which understanding [6] explored further in his immense contribution towards the application of the concept of activity in organization studies.

A. Organizational Activity

The localized formulation of activity theory was applied to the study of organizational activities of both individuals and groups by [6]. In his approach, [6] presented a modified view of [5] whereby the interaction between the individual and his/her community is seen to be mediated by rules. In the same vein, the interaction between the individual and the emerging object of activity is mediated by tools (such as concepts and technologies), and the interaction between the community and the emerging object of activity is mediated by a division of labor, in a triangular relationship. Historical types of activity and expansive transition range from the concept of the individual's craft activity to the concept of collective and expansively mastered activity in organizations [6] [7]. These activity types depict the historical changes of work transformations in industrial organizations reminiscent of the transition from Taylorism (i.e. craft activity) to modern organizations (i.e. collective and expansively mastered activity).

The application of the organizational activity theoretical concept in the appraisal of individual and group work organization by [6] and [7] resulted in the emergence several studies of practice in organizations (e.g., [8]-[10]). Some of these studies have generated debates with respect to their perceived drift from the interpretational power of activity

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theory. Similar formulation was applied by [8] to develop a model of organizations as activity systems which acknowledged the existence of a variety of conceptions of activities within organizations, and depicted routines as the unifying mechanism of the overall system. In this context, organizational routines are viewed to function as implicit and fragile, but nonetheless effective vehicles for truce between groups who have developed differing conceptions of their activities [8].

According to [8], in analyzing organizations as activity systems, emphasis should be directed on the interplay of actions, language, technologies, social structures, implicit and explicit rules, history and institutions. By this approach, a contribution is made to a central problem in social theory by offering an analysis of the direct and indirect relationships which link individuals and the social systems of which they are a part. Thus the theory of organizations as activity systems offers managers an antidote to simplistic interpretations of the nature of individual knowledge and action, and organizational cultures and competencies [8]. It is suggested by [8] that the origins of organizational practices lie less in rationality and more in their economic and social histories (including institutional norms, ideologies, control battles, demarcation disputes, and technological choices). Within this context, it is pragmatic routines rather than rules or mission statements that provide the actual basis for coordination within an organization, and these are embedded in the multi-faceted nature of the organization's activity system [8]. The implication here is that, changes in routines and outputs may require changes in the community's conceptions of their activities and in the workings of their activity systems.

Practice has been analyzed as activity by [9] who developed a framework for analyzing organizations as networks of activity systems, and concluded that activity theory provides the means to analyze organizations as distributed, debentured and emergent knowledge systems. Based on this framework, [9] suggested that the processes of 'perspective making', 'perspective taking' and 'perspective shaping' are central to the integration of different expert groups that need to co-operate in the pursuit of multiple, and perhaps competing, objectives.

Activity theory has also been used by [10] to analyze an empirical investigation of the micro practices of strategy in three universities. This application of activity theory provided a framework of four interactive components from which strategy emerges [10]. These components are the collective structures of the organization, the primary actors, the practical activities in which the actors interact, and the strategic practices through which interaction is conducted. This framework was used to study organizational practices, such as the formal strategic practices involved in direction setting, resource allocation, and monitoring and control, and the findings used to model an activity theory based typologies that illustrated the way practices either distribute shared interpretations or mediate between contested interpretations of strategic activity in organizations [10]. Thus, by linking activity theory to wider change literatures, its potential as an integrative methodological framework for examining the subjective and emergent processes through which strategic activity is constructed can be illustrated [10].

B. Framework for Organizational Activity System

The value of any theory is not whether it provides an objective representation of reality, but rather how well it can shape an object of study [3]. This brings to the fore the significance of theoretical frameworks as platforms that shape studies. One thing which seems obvious to us upon reflecting on the various models we have outlined above is that the premise for their developments was strongly influenced by the concept of collective activity. The differences that emerged are a result of the organizational theoretical thinking the respective authors' adopted in their interpretations of an organizational activity theory.

A theoretical framework must have the capability of providing avenues for accessing the requisite organizational activity components as well as aid in their analysis so as to provide meaning to the phenomenon under study. The works of Engeström [6], [7], [11] and [8] entail such capabilities, with [6]'s model providing a platform which we used as a dynamic starting point. The conceptual thinking of [11] is more actor-oriented, and that of [8] is more structural-oriented. By taking into account their interpretive differences, their potentials were used to outline a research framework (Fig. 1 below) for the study of practice implementation in organizations [12]. In the framework, the notion of interrelatedness [13] that an organizations (as a social system) consist of goal-oriented arrangements (containing people with a purpose), psychosocial systems (with people interacting in groups), technological systems (with people using knowledge and techniques), and an integration of structured activities (with people working together in patterned relationships) is considered. The study framework (Fig. 1 below) served as an action-oriented tool for understanding an organization's activity system [12].

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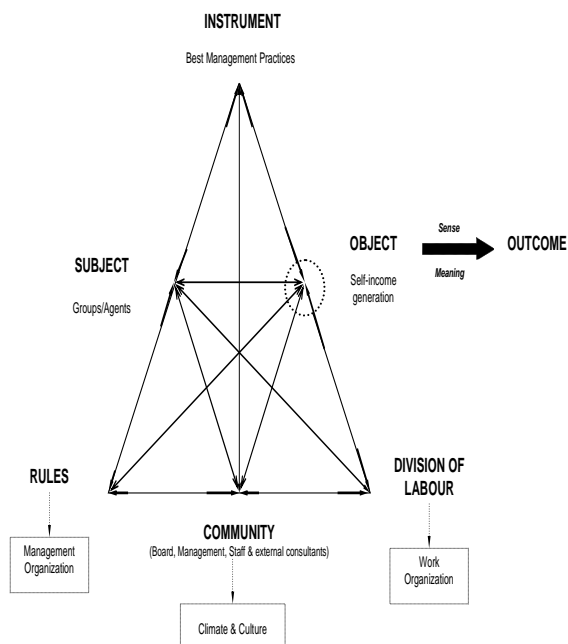International Journal of Economics and Management Engineering
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Fig. 1 Framework for an organization's activity system [12]

The study framework provided a platform for seeking an empirical understanding of the dynamics within an organization's activity system as created by the implementation of the best management practices. The study framework provided a platform for understanding the social origins of motives, the nature and significance of mediating mechanisms in the enactment of activities, the active nature of participation, the relevance of history, and the significance of inconsistency, conflict and contradiction in organizational activity systems. These focal points underlined the variability of factors considered in the analysis of activities in the organizations studied.

In order to define the specific elements to be subjected to empirical analysis, the outlined distinction between organizational climate and culture by [14] is viewed as valuable. The argument here is that the organization's community is a form of society that produces the collective activity of its community members. This reasoning, by no means, implies that such collective activity personifies the relation between the organization and its culture. As [3] have posited, there are complex transformations and transitions that connect them and make impossible any sort of simple reduction of one to the other. In this respect, we perceived an organization's climate to reflect the quality of its internal environments in which the attitudes and perceptions of its employees which are shaped and modeled with time to feature prominently. This therefore calls for the assessment of the historical impact of dimensions, such as, autonomy, cohesion, trust, pressure, support, recognition, fairness, and innovation within the organization's work environment.

In relation to the organization culture, it is perceived to embody varieties of dimensions assessable at three different levels (i.e. a relatively accessible level, intermediate level and deep level). In this respect, the most accessible level is referred to observable behaviors and associated norms within the organization. The intermediate level included attitudes and perceptions, which were not directly observable, but either inferred from behaviors or assessed through questioning. At the deepest level are core values, whose depth, breadth, progression, strength, pervasiveness, direction and localization within the organization needed to be assessed. This is in addition to organizational behavior measures relative to member attitudes, beliefs, and perceptions, which also helped in assessing certain components of the dimensions of organizational culture. The institutional rules, and the division of labor, as well as the community in the organization's activity system could therefore be viewed as the elements whose functional characteristics needed to be appraised in relation to the best management implemented. This is to provide an understanding of how each element related to the others to shape the activity systems of respective groups in the organizations.

III. METHODOLOGY

The issue of methodology in the application of activity theory is relatively debatable. This is due to the fact that there is no single method for approaching an analysis from the activity theory standpoint. This point is reinforced by the methodological conclusion drawn by [15] to the effect that activity theory does not prescribe a single method of study, and that a method should be chosen based on the research question at hand. The implication is that activity theory starts from the problem and then moves to the selection of a method. Based on this perspective, we view the choice of analytical method to depend on the context of application of specific activity theoretical concepts along the outlined components of the study framework shown in figure one above. Since the study framework provides an avenue for describing functionally-based levels within an activity, it then means that the identification of elements may be highly dependent on individual perspectives of actions and activities inside the organization. In this regard, there have been a number of attempts to provide a structured approach to the application of activity theory. Yet, there is obviously no unified approach and methods differ in their applicability to different types of analysis. As such, the system of data generation and recording considered most appropriate also vary. In this regard, [16] has outlined five principles to summarize the current shape of organizational activity theory.

The first principle postulates that a collective, artefact-mediated and object-oriented activity system, seen in its network relations to other activity systems, is taken as the prime unit of analysis. According to [16], goal-directed individual and group actions, as well as automatic operations, are relatively independent but subordinate units of analysis, eventually understandable only when interpreted against the background of entire activity systems.

The second principle concerns the multivoicedness of activity systems. According to [16], an activity system is

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always a community of multiple points of view, traditions and interests. The division of labor in an activity creates different positions for the participants, the participants carry their own diverse histories, and the activity system itself carries multiple layers and strands of history engraved in its artefacts, rules and conventions [16]. The multivoicedness is multiplied in networks of interacting activity systems. It is a source of trouble and a source of innovation, demanding actions of translation and negotiation [16].

The third principle is on historicity. According to [16], an activity system take shape and get transformed over lengthy periods of time and their problems and potentials can only be understood against their own history. History itself needs to be studied as local history of the activity and its objects, and also as history of the theoretical ideas and tools that have shaped the activity [16]. Thus an activity needs to be analyzed against the history of its local organization and against the more global history of the organizational concepts, procedures and tools employed and accumulated in the local activity [16].

The fourth principle relates to the central role of contradictions as sources of change and development. In this context, [16] explained that contradictions are not the same as problems or conflicts, but they are historically accumulating structural tensions within and between activity systems. This contradiction pervades all elements of activity systems [16]. Activities are open systems. When an activity system adopts a new element from the outside (for example, a new technology or a new object), it often leads to an aggravated contradiction where some old element (for example, the rules or the division of labor) collides with the new one. Such contradictions generate disturbances and conflicts, but also innovative attempts to change the activity [16].

The fifth principle proclaims the possibility of expansive transformations in activity systems. According to [16], activity systems move through relatively long cycles of qualitative transformations. As the contradictions of an activity system are aggravated, some individual participants begin to question and deviate from its established norms. In some cases, this escalates into collaborative envisioning and a deliberate collective change effort.

A. Data Collection

Qualitative data was collected from identifiable groups (agents) such as the management team and staff members by triggering the conflictual questioning of the existing standard practices in the organizations. In the data collection approach, a preliminary phenomenological insight into the nature of the discourse and problems as experienced by those involved in the activity was firstly gained [6] before the activity system under investigation was delineated. This provided the space for grasping the need state and primary contradiction beneath the surface of the problems, doubts and uncertainties experienced among employees who are the participants of activities in the organizations.

In the data collection, comprehensive reading of the internal and public discussion concerning the activities in the

organizations was undertaken through participant on-site observations and conversations (interviews) with employees involved in specific activities or having expertise about it. In this respect, the quality managers in each organization were interviewed to provide overviews of their organizations change processes from their inceptions. Seventeen staff members in each organization with ranks ranging from senior managers to middle level personnel who were key actors during the best management practices implementation process were also interviewed on various contingent factors relative to their organizations' institutional rules, division of labor, and the community (as shaped by the human resource, information flow and/or communication system, as well as the organization's values and norms). The rationale behind the data collection approach was that collective learning about activities follows an expansive course which depicted a transition from attention to the internal contradictions in a particular activity system to a broader concern with the implications for change for other systems [11]. Therefore, it was necessary for to recognize the contradictions that existed within the embedded elements of the organization's activity system. It was also to highlight the inconsistencies that existed between these elements towards identifying possible conflicts in the organizations' activity systems.

B. Data Analysis

The comparative analytical approach is used to analyze the qualitative data. Historic developments associated with the transformation that occurred in the organizational activity systems of the four organizations are analyzed. The analytical approach in this respect is based on analysis of contradictions ([7]) guided by the five principles of organizational activity [16]. According to [16], the idea of internal contradictions as the driving force of change and development in activity systems, gained its due status as a guiding principle of empirical research. These principles are applicable within the outlines of the study framework shown in figure one, and useful in enriching the interpretation of the various scenarios that emerged in the analysis. In this analytical approach, the main unit of analysis is the collective activity system (i.e. groups/agents). The sub-units of analysis are actions of groups and individuals.

IV. RESULTS AND ANALYSIS

In this analysis, pattern-matching is used to appraise and compare the tensions and contradictions that existed between the elements (i.e. institutional rules, division of labor and the community) in the respective organizations' organizational activity systems. In this regard, the functionality of the sub-activity systems of both managers and staff in the respective organizations are appraised and compared.

A. Comparative Appraisal of Organizations' Institutional Rules

The characteristic of each organization's institutional rules was appraised from the perspectives of the benchmarked

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management practices for governance, personnel management, and organizational management was appraised. Analysis of the results, with respect to how these practices shaped each organization's management structures and also how they impacted on employees' psychosocial environment showed that these practices were not fully utilized by the organizations in Ghana and Botswana. For these two organizations, their attempts to utilize these practices were highlighted by conflicts and disturbances that gave rise to the emergence of contradictions in their respective organizational activity systems. With respect to the organization in Ghana, it was unable to fully implement and internalize these practices as a result of its management's inability to manage the contradiction that prevailed in the association between the organization's workforce and the organizational rules underlying the practices of governance, organizational and personnel management. This was largely due to the complex decision-making matrix that binds the organization to a supervisory body, and for which no major attempt was made to overhaul. For the organization in Botswana, it was not able to utilize the practices because of the conflicts and contradictions that were associated with its attempt. The presence of contradictions in the sub-activity system of the organization's management contributed in defining the character of the sub-activity system of the staff. The inability of the organization's management to manage these contradictions was due to their failure to deal with the tensions that accumulated both within and between their respective activity systems. The rules that prevailed in these two organizations were shaped by civil service codes which lacked the requisite flexibility to relate to the requirements of their efforts to commercialize. As such, the practices of governance in these two organizations were characterized by bureaucratic organizational structures that remained vertical and hierarchical (based on job description) as against the benchmarked practices for organizational management which is based on objectives.

In contrast to the organizations in Ghana and Botswana, the organizations in South Africa and Trinidad were able to shape their institutional rules in conformity with the guidelines provided by the benchmarked practices for governance, personnel management, and organizational management. The commercialization effort of the organization in South Africa was found to be enhanced by the overhaul of its civil service structure using the specific guidelines provided in the benchmarked management practices, while the effort of the organization in Trinidad was slightly hampered as a result of the partial overhaul of its civil service structure (i.e. it retained some civil service-oriented codes as a way of protecting the government's interest in the organization).

For the organization in Trinidad, its attempt to adapt the benchmarked management practices alongside elements from its partially overhauled civil service structure resulted in conflicts and disturbances inside the organization, leading to a contradiction between the management team (as subject of activity) and the institutional rules, but which could not be

dealt with. Comparatively, the organization in South Africa was able to utilize the guidelines provided by the benchmarked management practices for governance, personnel management, and organizational management. This was found to be due to the ability of its management to deal with conflicts and disturbances that emerged in their (i.e. management) sub-activity system. The organization was able to identify and simultaneously deal with contradictions that emerged between the management and the community as well as between the community and the institutional rules. An example in this respect was the way it (i.e. organization in South Africa) dealt with the tensions and contradictions that emerged between the sub-activity system of the management and that of the staff members, as a result of the staff members' initial opposition to the organization being transformed into a commercial entity.

The organization in South Africa was able to manage this contradiction by enhancing the efficiency of its communication system with an effective information flow process. This contributed to the creation of an empowering psychosocial environment in the organization which motivated employees to relate positively to the organization's commercialization process. Unlike the organization in Ghana and Botswana (to a large extent), and the case in Trinidad (to some extent), the organization in South Africa was able to create a participatory platform that enabled it internalized the benchmarked management practices for both organizational management (i.e. project-oriented management style which is based on objectives) and governance. From the perspectives of governance, the organization in South Africa was able to put in place a legal structure that enabled it to operate with both financial and decision-making autonomy. Additionally, a majority of the representatives on the organization's board were also industry clients and the board's mandate was defined accordingly to fit the roles played by these clients in the innovation chain. In the same vein, the management was responsible for identifying the needs for change with the power to address those needs. Thus the organization (i.e. South Africa) was able to sustain this system due to its management's ability to simultaneously identify and deal with emerging contradictions within their sub-activity system.

B. Comparative Appraisal of Organizations' Division of Labor

In the appraisal of the organizations division of labor, it is found that for both the organizations in Ghana and Botswana, the expected changes in their approach to project management and business development did not occur. The divisions of labor in these two organizations were found to be not properly oriented toward ensuring effective coordination of activities during the commercialization process. The severity of the impact created by this phenomenon appears to have weighed more on the commercialization process of the organization in Botswana than that in Ghana. For the organization in Botswana, the tensed working relationship among employees appeared to have made the different units and/or divisions of

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the organization dysfunctional. Collision between the old way of handling projects and the new one occurred within the division of labor during the organization's commercialization process. The consequence of this was that the expected synergy within the organization's community did not materialize. What emerged in the organization's work climate was rather a sense of distrust among different groups and also structural tensions within the organization. This was due to the organization's inability to deal with the contradiction that emerged in the sub-activity system of the employees as a result of their reluctance to adequately relate to the outlined practices for project management and business development, both of which define the characteristics of the division of labor. Additionally, the organization in Botswana was not able to manage a subsequent contradiction that emerged in its work environment. This also resulted in the creation of disturbance and tension between the different members of the organization's community (i.e. employees, management and other stakeholders). But for the organization in Ghana, it is the reluctance of its senior staff (researchers) to accept change that appeared to have resulted in such a dysfunctional working relation in the organization, an issue which the organization could not deal with. Thus, as it is with the organization in Botswana, collision between old ways of handling projects and the new one is clearly visible within the division of labor during the organization's commercialization process. The consequence of this was that the synergy that was to have emerged within the organization's community did not materialize. What emerged was rather a sense of distrust among different groups in the organization.

For the organizations in South Africa and Trinidad, their divisions of labor were oriented to ensure effective coordination by virtue of changes that were guided by the benchmarked management practices for both project management and business development. Employees in the organization in South Africa fully accepted the changes associated with these two practices. The same could not be said of the organization in Trinidad in which the management practices for business development was not fully accepted by employees. For the organization in South Africa, teamwork was used in the handling of projects, as a result of the synergy within and between different units/division. For the organization in Trinidad, teamwork was evident and functional within individual units, but not among cross-unit teams). Generally, the functionality of the division of labor within the organization was negatively affected by conflicts (i.e. on the handling of the business aspect of projects) between its different specialized units and a new business unit created to enhance the best practice for business development. The prevalence of this conflict also contributed to the creation of tension among the different units themselves and the consequent emergence of contradictions in the sub-activity system of the organization's management. Since the management was not able to deal with such contradictions, it ended up constraining their (i.e. management) attempt to manage the work functions of the different units in the organization.

The organization in South Africa was able to streamline its operations by encouraging adequate clarity in its operational processes in line with the guidelines enshrined in the benchmarked management practices, especially as it concerns the practices of business development and project management as well as for personnel management. The organization was able to implement and internalize these practices by virtue of the management's ability to recognize the conflicts that emerged from the competition among the different units in the organization and the subsequent contradictions they (i.e. conflicts) caused in the sub-activity system of the management. By implication, the contradictions that emerged between the organization's management (i.e. as subject of activity) and the division of labor, on the one hand, and between the organization's employees (i.e. community) and the division of labor, on the other, were identified and subsequently dealt with by the management.

Unlike the organizations in Ghana and Botswana (to a larger extent) and the organization in Trinidad (to a lesser extent) in which the working relationships among different units were highlighted by tensions, the organization in South Africa rather showed the existence of a healthy working relationship among different units with a common platform for the various managers to network. The division of labor during the commercialization process of the organization in South Africa therefore, entailed signs of trust and mutual respect as well as high degree of positive collaboration and cooperation among the members of the various units and divisions within the organization.

C. Comparative Appraisal of the Characteristics of Organizations' Communities

Appraisal of the community characteristics in the respective organizations showed that the changes necessitated by the practices for governance, capability building and project management did not materialize in the organizations in Ghana and Botswana, and to some extent, the organization in Trinidad. For the organization in Botswana, it was unable to develop the required competence needed for the effective functioning of its human resource as a result of the significant tension that pervaded its community (i.e. management team, staff members, and board) and the consequent contradiction that emerged between the management team (as subjects of activity) and the benchmarked management practices for governance, personnel management, capability building and project management. For the organization in Ghana and Trinidad, their organizational performance capabilities were found to have been affected negatively by the low morale that pervaded their operating environment. This was due to the inability of these organizations to manage the contradictions encountered by their management teams in their personnel management practices. Management teams in the two organizations could not provide their employees with effective motivators (such as market-competitive salary scales and

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formal/informal recognition events) as recommended by the practices for personnel management.

In comparison to the organizations in Botswana, Ghana and Trinidad, the organization in South Africa was able to effect changes necessitated by the benchmarked practices for governance, capability building and project management. The organization in South Africa effectively developed its human resource by upgrading the competences of its staff as well as providing them with effective motivators, such as market-competitive salary scales and both formal/informal recognition for achievements. This was a result of the organization's ability to manage the contradictions that emerged between dissenting employees (as subjects of activity) and the income generation element (i.e. object) of its commercialization process. As a consequence, the organization was also able to manage contradictions that evolved between the management (as subjects of activity) and the dissenting staff (as members of the community). Therefore, unlike the organizations in Botswana, Ghana and Trinidad, the organization in South Africa was able to adequately deal with conflicts and contradictions associated with its human resource development through a good recruitment policy and improvement in staff education, training and development in line with the best practices for capacity building and business development.

The organizations in Ghana, Botswana and Trinidad were also found to have encountered breakdowns in their information flow processes and feedback mechanisms with non-regular interaction between their respective managements and employees (i.e. there were tensions between managers and their staff in all the three organizations). Employees in these three organizations were found to have harbored the feelings that their work environments did not provide them with the possibility to enhance their individual growths and abilities to become innovative. Comparatively, the organization in South Africa had an efficient information flow process and feedback mechanism. There was also regular interaction between management and staff members as well as positive collaboration among the workforce in the organization in South Africa. This was due to the organization's ability to deal with contradictions that emerged in its activity system as a result of tensions created by employees who initially dissented to the idea of transforming the organization into a commercial entity. In this regard, communication within the organization was enhanced by putting in place facilities that allowed easy and regular access to information.

The orientations of organizational norms/values in the organizations in Ghana and Botswana were found to be non-conforming to the requirements for the commercialization process. Both organizations retained their old identities as fully government-subvented entities (with a weak management system) in contrast to the new identities they were to acquire (i.e. a scientific-oriented research organization with an income generation capability). For the organization in Trinidad, it was able to re-orient its norms/values to a significant degree towards the requirements of the

commercialization process, but not enough to enhance its (i.e. new norms/values) internalization in the organization. With respect to the organization in South Africa, it was able to change its organizational norms/values in line with its commercialization process by acquiring a new identity as a scientific-oriented research organization with a strong management system and the capability to self-generate income. But unlike the organization in Trinidad, the organization in South Africa was able to internalize its new values/norms.

V. DISCUSSION

In the result analysis, the elements (i.e. the institutional rules, division of labor and the community) in the respective organization's activity systems were comparatively appraised. It is noted that the managements of the organizations in Ghana and Botswana were unable to transform their organization's civil-service oriented cultures into business-oriented corporate culture. The consequences of these inactions in both organizations are that their managers found it difficult to effect change as a result of the enormous tensions and subsequent disturbances that pervaded the organizations' communities. In comparison to the organizations in Ghana and Botswana, the organization in Trinidad was able to introduce changes that moved it closer towards the acquisition of a business-oriented corporate culture, but its retention of some civil service-related elements from its previous system during the commercialization process resulted in the emergence of a degree of tensions in its community. In contrast to these three organizations, the organization in South Africa was found to have been able to completely overhaul its civil-service oriented system prior to the commercialization process.

A. Functionalities of the Organizations' Activity Systems

The functioning of elements in the organizational activity system of the organization in South Africa was managed effectively during the organization's commercialization process, and this appears to have contributed to the success of the process' outcome. In contrast, the functioning of elements in the organizational activity system of the organization in Trinidad was slightly affected, and this contributed in the commercialization process of the organization posting an outcome whose success level is quite moderate. The functioning of elements in the organizational activity system of the organization in Ghana was affected to an extent that it contributed to the organization's commercialization process achieving a significantly low outcome. Comparatively, the functionality of elements in the organizational activity system of the organization in Botswana was significantly constrained to the extent that it contributed to the apparent failure of the organization's commercialization process.

The general observation that emerges here is that the degree to which the outcomes of the respective cases' commercialization processes were dictated is also indicative of the extent to which conflicts and disturbances prevailed in their collective activity systems. Such relative variation (i.e.

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associating the degree of outcome to the level of conflicts and disturbances in the activity system) is shown by the organizations in Ghana, Botswana and Trinidad. For the organization in Trinidad, it was able to attain a moderate commercialization outcome because the level of conflicts and disturbances that the organization encountered were reinforced by constraints that were associated with the functioning of the institutional rules and community elements in the organization's activity system. For the organizations in Ghana and Botswana, their respective attainment of a relative poor (i.e. Ghana) and poor (i.e. Botswana) commercialization outcomes could be attributed to constraints (to a larger extent for the case in Botswana) that were associated with the functioning of the institutional rules, communities and the divisions of labor elements in their respective organizational activity systems. The only difference between these two organizations (i.e. Botswana and Ghana) is that, the level of conflicts and disturbances in the collective activity system of the organization in Botswana were of greater magnitude as compared to that of the organization in Ghana. Comparatively, for the organization in South Africa, its achievement of a successful commercialization outcome could be attributed to the elimination of conflicts and disturbances as well as the prevention of their re-emergence in its organizational activity system due to the synergy associated with the functioning of all the system's elements.

By implication, the observations above point to the significance of the interrelated linkages among the elements in an organization's activity system and whose functions are inter-dependent. It is by virtue of this systemic character of the activity system that a constraint to the function of one element goes on to constraint the functions of the others, as it is evident in the organizations in Trinidad, Ghana and Botswana, but not for the organization in South Africa. It is therefore obvious that the level of constraints to the functioning of one element in the organizations' activity systems also determines the extent to which the functions of the remaining elements are impaired. In this regard, the actions entailed in the organizational activity system of each of these organizations are collective, artifact-mediated and object-oriented actions, which could also be seen in their network relations to actions emanating from other activity systems. In this respect, it is argued that the division of labor in the collective activity systems of the organizations in Trinidad, Botswana, and Ghana created different positions for their respective actors, who appeared to hold on to their organizations' diverse histories for which individualism was an integral component of values and norms. The implication of this was that the requisite communal motives that were to underlie their commercialization process did not emerge. This is in sharp contrast to the organization in South Africa where such communal motive was visible. The presence of such communal motive in the organization in South Africa shows that there was widely distributed interaction in the organization between its actors (i.e. the community), structures (i.e. the institutional rules) and actions (i.e. the

division of labor) which provided its management with systemic knowledge of how to act strategically [17], especially in dealing with the multivoicedness associated with the organization's activity system. The converse appears to have occurred with respect to the cases in Trinidad, Botswana, and Ghana.

B. Multivoicedness in Organizations' Activity Systems

In the results analysis, we outlined a scenario which reflected the observable conflicts and disturbances (i.e. situated actions) in the respective communities of the organizations in Ghana, Trinidad and Botswana. As it is argued by [18], situated actions are inherently tension-laden, unstable and open-ended, and that instead of just retrospectively asking why an action or an utterance occurred, one should also ask of what dynamics and possibilities of change and development are involved in a given action. These situated actions, by virtue of their being inherently tension-laden, unstable and open-ended, as [18] posits, are reinforced by the adoption of different positions by the actors who constituted the communities of these cases. These conflicts and disturbances were also reinforced by the respective organizations' own multiple layers and strands of history which we identified to be engraved in their respective institutional rules and organizational norms, and thus were associated with the multivoicedness in the organizations' activity systems. Therefore, the analysis has shown that the adoption of different positions by the actors constituting the communities created problems of multivoicedness within their activity systems. This agrees with the observation by [16] that an activity system is always a community of multiple points of view, traditions and interests.

As it is found in the analysis, the division of labour in an organization's activity creates different positions for employees who carry their own diverse histories which could either be accommodated by the organization or otherwise. This is because the organizational activity system itself carries multiple layers and strands of history that are engraved in its artifacts, rules and conventions. This explains the implication of the multivoicedness in some of the organizations' networks of interacting activity systems, serving as sources of both troubles and innovations, demanding actions of translation and negotiation [16]. The multivoicedness in some of the organizations' activity system are created by the organizations' own multiple layers and strands of history which we identified to be engraved in their communal climate and culture. This multivoicedness generate the contradictions that appear as problems, ruptures, breakdowns, and clashes in their organizational activity systems, but for which the actions of translations and negotiation are not realized. In this regard, therefore, the variability in the contradictions encountered by the organizations in Trinidad, Botswana and Ghana in relation to their practices implementations and the quality of their collective activity systems, are only understandable against their own history. In this respect therefore, the ability of organizations (such as in Ghana, Botswana and Trinidad) to

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manage emerging conflicts and disturbances in their activity systems, as it is indicative of the organization in South Africa, is dependent on the extent to which they can manage the climatic and cultural characteristics of their communities.

C. Dynamics of Systemic Interfaces in Organization's Activity Systems

The analyses have shown that the dictating factor in the variable outcomes of the four organizations' usage of the benchmarked management practices to enhance their commercialization process is their ability or inability to deal with the systemic interfaces in their organizational activity systems. The functionalities of these interfaces influenced the functionality of the organizational activity system and the corresponding output that emerges from it. The transformations in all the four organizations are underlined by the setting of similarly new objects of activities (i.e., income-generation). The theoretical expectation here is that such new object of activity will be divided by the distribution interface of the organizational activity system, after which it is to have been parceled out by the exchange interface in accordance with its collective needs [6]. This is based on the theoretical presumption that by parceling the object in accord with the organization's collective needs, the consumption interface in its activity system will lead to the product (i.e. income-generation) stepping outside this social movement so that it becomes a direct object and servant of individual needs within the organization [6], [19], [20]. In this respect, therefore, the outcome variability of the transformation processes of the four organizations could be explained to mean that the unifying processes of the production, consumption and exchange interfaces in the organizational activity system of the organizations materialized for the organization in South Africa, not for the organizations in Ghana, Botswana and Trinidad. Also, the production that emerged from the transformation processes was able to create the new object to meet the need of the organization in South Africa, but not for those in Ghana Botswana and Trinidad. Though an element of distribution is observed in the activity systems of the organizations in Ghana and Trinidad, its exchange did not materialize.

For the case in Botswana, there are no distribution and exchange in its collective activity system. The exception here is the organization in South Africa in which there is a distribution of activities, and for which exchange also materialized. The analysis also shows that the consumption interface in the activity systems of the organizations in Ghana and Botswana is constrained. This is because the production factor could not become the direct object of individual needs in these organizations. With respect to the organizations in Trinidad, this consumption factor is evident, but it is slightly affected in a negative sense due to the inability of the production factor to totally become the direct object of individual staff needs in the organization. But for the organizations in South Africa, the consumption factor is evident. This is due to the ability of the production factor to step outside the social movement in the organization to become the direct object and servant of individual staff needs. This observation clearly indicates the interrelated linkages among the various embedded activity elements within the organizations activity system and whose functions are inter-dependent. It agrees to the observation by [21] that activities inside an organization are not isolated units, but are influenced by other activities and environmental changes, which may cause imbalances. In activity theory, the term contradiction as a source of tension in the activity system [6] indicates a misfit between elements within an activity, and/or between different activities. These contradictions manifest themselves as problems, ruptures, breakdowns, and clashes. Hence, the presence of tensions in the function of one embedded element goes on to constrain the functions of the others, as it is evident in this case. It is also obvious that the level of these constraints also determine the extent to which the functions of the activity nodes are impaired.

The tension that arises between elements of the activity system identify areas where systems no longer match the activities they model [19]. According to [23], to recognize the irreducible tension between agent and mediational means is not to conceptualize mediated action as an undifferentiated whole. Instead, it is to conceptualize it as a system characterized by dynamic tension among various elements. As such, it is important to keep sight of the elements within this system for at least two reasons [22]. Firstly, many of the analytic strategies for examining mediated action are made possible by the fact that one can isolate its elements [22]. According to [22], such isolation allows various specialized perspectives to bring their insights to bear, and it also is often the key to understanding how change occurs in mediated action. In this respect, the division of labor created different positions for the organization's actors, with some holding on to historical past, and others relating to new work culture envisioned by the management.

The implication here is that the requisite communal motive is not embedded in the objectives of the best management practices implementation. The positive interaction that was to have been established between the actors, structures and actions in the organization which should have provided them systemic knowledge of how to act strategically was missing. In this respect, distribution appears to be a key factor in mediation that enhances shared interpretations and collective action. Within this context, tension in the organizational activity system is conceptualized as a generative process of continuity and displacement between old and new players. New participants learn from continuing members how to use the practices of the system, and in the process re-socializing the continuing players and reinforcing the existing practices [10]. However, due to their low socialization to the system, new members also question the practices, so creating the potential for their re-evaluation and adaptation [23]-[25]. This scenario is reflective of the instability of the community as it exists in the organization's activity systems after the implementation process. It is therefore apparent that the

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constraints encountered by the organizations in Ghana, Botswana and Trinidad, in relation to the benchmarked management practices they implemented and the defined quality of their organizational activity systems is only understood against the historical dynamics of their operating environment. As [16] noted, Activity systems take shape and get transformed over lengthy periods of time. Their problems and potentials can only be understood against their own history. In this respect, organizational history itself needs to be studied as local history of the organizational activity and its objects, and also as history of the theoretical ideas and tools that have shaped the activity [16].

It is therefore argued from the perspectives of [16] that an organizational activity needs to be analyzed against the history of its local organization and against the more global history of the organizational concepts, procedures and tools employed and accumulated in the local activity. This is because, the usage of the explanatory power of organizational activity theory has enabled us to explain and create an understanding of the rationale behind the ability of one organization to be successful in its implementation of the benchmarked management whereas three other organizations were variably constrained in their practices implementation efforts. The indication we derive from this which in our opinion relates to an earlier opinion by [8], is that analyzing organizations as activity systems facilitate the capturing of everyday routines and the overall pattern that such routines fall into. This is because, the analysis allows for the exploration of the origins of (i) the routine patterns, (ii) what sustains them, (iii) the imagery used in describing them, (iv) the inconsistencies and conflicts that they embrace, and (v) the stimulation that new challenges may provide.

In this respect therefore, the functions of the institutional rules, division of labor, and the community's climate/culture) in organizations contribute significantly in shaping the outcome of their organizational change efforts. Thus, it is important to understand the functionalities of these systemic components for two reasons, as outlined by [22]. Firstly, many of the analytic strategies for examining mediated action are made possible by the fact that one can isolate its elements, with such isolation allowing various specialized perspectives to bring their insights to bear on understanding how change occurs in mediated action. Secondly, considering various elements in the mediated action encourages their examination since an analysis that focuses solely on the irreducibility of mediated action as a bounded system all too naturally suggests a static system in which dialectic tension is involved. This helps to enrich the understanding of their dynamic actions as well as interaction from the perspectives of organizational activity theory.

VI. Conclusions

This study has shown that the theory of organizations as activity systems offers managers an antidote to simplistic interpretations of the nature of individual knowledge and action, and organizational cultures and competencies. The approach reframes the recurrent and embedded nature of human activities in organizations, reveals the tentative nature of knowledge and its action orientation, and thus points to opportunities for organizational development through engagement. In this respect therefore, it is concluded that in the organizations' transformation pursuit, the production factor of such process should have been seen by each organization as the consumption of their individual staff's abilities and, also as the means of production (organization in South Africa). Correspondingly, the organizations should have also seen the consumption factor as a production of their individual staff members and also a key factor for internalization to occur among the staff (organization in South Africa). Similarly, the organizations should have seen the distribution factor as not just a consequence of production (organizations in Ghana, Botswana and Trinidad), but also as its immanent prerequisite in the form of the distribution of the instrument of production as well as the distribution of members of the organization among the different kinds of production (organization in South Africa). Finally, the organizations should have found the exchange factor inside their production in the form of communication, interaction and exchange (organization in South Africa).

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