Managing Sustainable Innovation in the Organisation: The Role of Workers’ Autonomy and Knowledge Management

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This study aimed at investigating how firms can manage sustainable innovation through workers’ autonomy and knowledge management. Data for this study was collected from 391 employees working in two brewing firms in Nigeria. Participants were made to respond to questionnaire on workers’ autonomy, knowledge management and innovation. The study was cross-sectional, and it adopted both quantitative and qualitative approach. Semi-structured questionnaire was used to elicit information on impact of workers’ autonomy and knowledge management on firm level innovation (product, process and administrative innovation). In-depth and key informant interviews were conducted using interview guides. Regression was used to analyze data from the quantitative source, while the qualitative data was content analyzed. Workers’ autonomy and knowledge management had positive impact on process and administrative innovation in the two breweries. Autonomy and knowledge management had no impact on product innovation. Findings from in-depth and key informant interviews provide no support and revealed why workers’ autonomy and knowledge management do not have impact on product innovation in the brewing firms but provide support for process and administrative innovation. The practical implication of these findings and recommendations for future research on workers’ autonomy and knowledge management to enhance creativity and innovation were discussed.

Keywords: Brewing Firms, Firm Innovation, Knowledge Management, Nigeria, Workers Autonomy
INTRODUCTION

The propensity of organisations to produce new or enhanced products/services through their employees, and the success of bringing those products/services to the market (Gumusluoglu and Ilsev, 2009), is what innovation is all about. Innovation has been perceived to play a vital role in the knowledge-based economy, but until lately, the intricate process of innovation has been inadequately understood (OECD, 2005). Innovation is directly proportional to the attitude of those who manage the human capital of an organization, their ability to adopt best policy and practices with the view to encourage and support innovation, as well as create an environment where creativity and innovation are allowed to flourish. Availability of right resources may act as a catalyst, but creativity will not flourish if organizations do not build a culture that will encourage and support innovation (Ogbo, Okechukwu and Ukpere, 2012).

Innovation in firms is not just about developing and applying new technologies but also to adopt and re-organize business routines, internal organization, external relations and marketing. It is viewed as a complex and intricate series of events involving a multitude of activities, decisions, individual behaviours and social system; and the impact of cognitive process of the organizational members upon organizational innovativeness (Cropanzano and Mitchell, 2005). Recently, organizational sociologists and social scientists generally intensified investigation on social, behavioral and organizational factors influencing innovation; and are primarily interested in the organizational features that are compatible with enhancement and adoption of innovation within organizations. They assess the relative importance of contextual, structural and individual factors in explaining innovation at the organizational level (Gopalakrishnan and Damanpour, 1997). Previous research evidenced the relationship between organizational factors and innovation (Tan and Nasurdin, 2011; Amabile, 2008; Damanpour, 1998; Shipton, et al. 2005; Jiménez-Jiménez and SanzValle, 2005; Laursen and Foss, 2003). However, intensive competition, the pace of technological changes and changing demand from customers have made the mission of innovation much more complex (Bukhamsin, 2015); driving organizations concerned about building the culture of innovation into the consciousness of their employees.

Work has become more knowledge-based and less rigidly defined and employees can help to improve performance through their ability to generate new ideas and use them as building blocks for new and better products, services and work processes (De Jong and Den Hartog, 2008). Practitioners and academics have provided support for the view that, individuals often play a key role in helping to attain organizational success (Amabile, 1998). It can be generally agreed that organizations in recent times have adopted several change programs in attempts to transform organizational structures and processes, in order to enhance effectiveness, productivity and competitiveness. Modern management approaches, policies and strategies aimed at improving all stages of production and service provision, and innovation are at the epicenter of many firms’ initiatives (Jackson and Schuler, 1995). A successful innovation is usually generated from ideas that find their way into the organizations and are accepted by the market.
Employees represent the backbone of organizations, and therefore behaviours demonstrated by them at the workplace can have serious effects on the success or failure of organizations (Mathias, 2006). Individual employees alone or together in groups, are the source of creative ideas and subsequent innovations (Scott and Bruce, 1994). Organizational culture is critical for encouraging positive workplace behaviors such as commitment, trust, turnover intentions, and employee innovativeness (Carmeli, 2005). Indeed, there are features of organizational culture that can either inhibit or enable innovativeness (Amabile, Conti, Coon, Lazenby, and Herron, 1996). The possibility of enhancing innovations by firms depends largely on the type of policies and strategies adopted, since workers who are part of the business are considered as the sources of new ideas and concepts (Mumford, 2000). Workers in the organisation are seen as being capable of developing new ideas and suggesting methods of implementation of generated ideas. Resulting from the reflection that the foundation of all innovations is worthy ideas that are then developed further, individuals rationally play a vital role in innovation because they are the receptacles and work stations of ideas (Alavi and Leidner, 2001). In order to increase the understanding of how individual workers can be motivated to exploit these ideas for innovative outcomes, it is essential to examine the major drivers of innovation from the managerial perspective in order to establish what encourages individual innovative behavior (Scott and Bruce, 1994). Previous studies have revealed that factors such as individual, environmental and organizational structural factors are strong determinants of innovation (Tan and Nasurdin, 2011). In fact, the role of employees in the whole innovation process has now occupied the center stage in academic work due to the impact of work environment related factors in creativity and innovation.

The outcomes of innovative activities are dependent on workers’ intentional and premeditated efforts to provide beneficial and novel outcomes at work (Janssen, 2000). For instance, it is believed that most knowledge workers engage in creative work with higher independence and strong self-motivations, they are prone to ask for the requirements of job autonomy strongly (Wang and Cheng, 2010). These characteristics embedded in knowledge workers suggest organizations to focus on job autonomy which can maximize the effective practices of new concept development and innovation (Vicari and Troilo, 2000); in order to contribute to creative performance of knowledge workers. In contrast, when supervisors are controlling, the reduction in employees’ intrinsic motivation is then expected to stifle individual’s creativity combining with lower creative performance (Hackman and Oldham, 1975). One of the major factors identified in the literature that impedes creative performance leading to low innovation among firms is control (Amabile, 1998). These could be control in decision making, control of information flow, or even perceived control in the form of reward systems that put too much emphasis on increasing extrinsic motivation. The primary reason for this is that control negatively affects intrinsic motivation, therefore diminishes the inner drive for individual creativity. As stated by Amabile (1998), expertise and creativity skills must be accompanied by intrinsic motivation to produce highly creative behavior.
Organizations in contemporary times require employees who can work with minimum supervision, and this recent development in organization calls for autonomy in the workplace. Despite numerous research findings linking autonomy to organizational commitment (Laursen and Foss, 2012), there has been little research to examine how autonomy impacts innovation which is considered vital for the success of an organization (Amabile, 1996). Autonomy is related to granting and allowing freedom to employees for determining the means by which to achieve a goal (Amabile, 1996), not necessarily autonomy for selecting what goals to go after. Individuals who stand out in their ability to perform creative acts often value independence and autonomy. An environment of freedom and autonomy is more likely to tap into the intrinsic motivation of an employee, which is a key factor in promoting innovation in organizations (Amabile, 1988). Autonomy or empowerment to some extent involves allowing employees to use their own discretion at the workplace. This freedom might lead employees to discover new ways of doing things, perhaps leading to innovative behavior. In a study among German middle managers, Krause (2004) investigated whether leaders can influence the innovation process by granting their subordinates freedom and autonomy. The study found that granting freedom and autonomy was positively related to implementation of new ideas. Similar study conducted among early NASA scientists concluded that providing subordinates with more freedom to explore, discuss and challenge ideas was associated with higher innovation performance (Andrews and Farris 1967).

On the other hand, learning occurs to improve the stock of knowledge available to the organization and to amplify the value of its intellectual assets, such as innovation and capital (Laursen and Foss, 2012). Knowledge management (KM) has been broadly defined from many perspectives. For instance, Wiig (1997), referred to it as a set of activities that leads an organization in acquiring knowledge both internally and externally. As reported by Rui (2013), knowledge management is an integrated and systematic approach which contains database, documents, policies and procedures including the current expertise and experience and which is related to determining, managing and sharing all information assets of the enterprise. In the value creation process, the knowledge, expertise and commitment of the employees are the key input on which the innovation initiative tends to depend mainly (Shipton, Fay, West, Petterson and Birdi, 2005). Knowledge management enhances engagement in innovation through generating, using, and sharing new ideas and exploitation of the organization’s thinking power (Huang and Li, 2009; Plessis, 2007). In general, KM can be conceived as the effectiveness of an organization in managing the knowledge acquired, shared, and applied by its employees. Organizations that effectively manage their knowledge will promote higher innovation performance among its employees which are needed to achieve breakthrough competitive advantage.

In competitive environment, knowledge management is an increasingly critical component of sustainable competitive advantage and provides long-term benefits for organizations (Damanpour, 1991; Alavi and Leidner, 2001). Beugelsdijk (2008) states that knowledge
management is achieving organizational goals through the strategy-driven motivation and facilitation of knowledge-workers to develop, enhance and use their capability to interpret data and information (by using available sources of information, experience, skills, culture, character, personality, feelings, etc.) through a process of giving meaning to these data and information. Knowledge management is also a management function that allows knowledge sharing and provides easy access to knowledge, know-how, experience, and expertise (Damanpour, 1991).

An organization’s innovativeness is closely related to its ability to utilize its knowledge resources (Shipton et al., 2005). It helps organisations to create a capability that enables firms to seize opportunities while analyzing information, and is crucial to achieving competitiveness (Jackson and Schuler, 1995). Studies have established that only the advanced application of knowledge can lead to a sustained competitive advantage and innovation. The key challenge in the process of identifying and measuring the effects of applying knowledge management to improve employees’ capabilities to enhance creativity and innovation is linked to the fact that neither practice nor theory has been able to develop an approach that would perform the sole function of examining the effects of knowledge management practices in firms creative and innovation process.

Following this, the present study examines the impact of workers’ autonomy and knowledge management on firm innovation in selected brewing firms in Nigeria. This study acknowledges that, an employee can be innovative when he or she is autonomous because an employee who is autonomous has control over work schedules, criteria, and methods or procedures necessary to properly execute a task in the organization. Accordingly, this study proposes that knowledge management capacity in terms of acquisition; sharing and application provide a positive contribution to a firm’s innovative performance. This study also makes a significant contribution by highlighting relevant literature supporting the positive link between organizational factors such as autonomy on innovation. The paper begins by providing an introduction as a framework for the study. This is followed by a brief review of relevant literature, while the third section stated the methodology. The final section offers a discussion on the findings and further recommendations.

**BRIEF LITERATURE**

**Workers’ Autonomy, Creativity and Innovation**

Autonomy is related to granting and allowing freedom to employees for determining the means by which to achieve a goal not necessarily the freedom for selecting what goals to go after in the organisation (Amabile, 1996). An environment of freedom is more likely to tap into the intrinsic motivation of the employees, which is a major factor in promoting creativity among employees in the organizations (Amaile, 1988, 1997 and 1996). Empowered employees feel more
responsible for their work and might therefore develop a more active approach towards the search for solutions and the implementation of new ideas (Chew, 2000). Studies have shown that a job designs that increases autonomy and focus on empowerment were found to influence the motivation for being creative, to contribute to innovations (Jiang, Wang, and Zhao, 2012), and to generate more product innovation (Beugelsdijk, 2008). Autonomy raises the psychological empowerment of the workers and it is said to be a source of creativity. People who are empowered are more likely to exhibit creative behavior, (Delery and Doty, 1996).

Research suggests that, workers who enjoy greater autonomy at work will be encouraged to exhibit innovative behaviors (Amabile 1996). In addition, employees who enjoy less flexibility at work are less likely to report high innovative behaviors, because more control over managing work does not give room for creativity on the part of employees. From the literature, there is evidence that autonomy is associated with innovativeness, whilst control leads to lower creativity levels or inhibits innovativeness (Amabile, 1998). By extension, autonomy in decision making concerning procedures, methods, and criteria should translate into greater employee ability to innovate. Job autonomy refers to the employees’ self-rule and independence in conducting their tasks in terms of process, decision making, and time management (Hackman and Oldham, 1975). It is believed that most knowledge workers who engage in creative work with higher independence and strong self-motivations, are prone to ask for the requirements of job autonomy strongly (Hackman and Oldham, 1975; Wang and Cheng, 2010). These characteristics embedded in knowledge workers suggest organizations to focus on job autonomy which can maximize the effective practices of new concept development and innovation (Vicari and Troilo, 2000) in order to contribute to creative performance of knowledge workers. In contrast, when supervisors are controlling, the reduction in employees’ intrinsic motivation is then expected to stifle individuals’ creativity combining with lower creative performance (Hackman and Oldham, 1975).

The significance of autonomy as an organizational variable has been affirmed by several research work (Mumford, 2000). The knowledge creation theory stated that the level of autonomy in the workplace could define the quality and occurrence of innovative thinking and creative challenges among individual employees, which would eventually be the foundation of innovation in both levels of process and product (Nonaka and Toyama, 2004). As an essential part of organizational climate, job autonomy, including process autonomy, work and content selection autonomy, and decision-making autonomy can not only impose a direct effect on firm innovation performance, but also play mediating and moderating roles in ensuring psychological safety and emotional encouragement for team/group members, initiating more creative activities in the workplace (Song, Ujm and Kim 2012). Along with many other organizational factors, task-related job autonomy plays a critical role in increasing the level of innovation (Song et al., 2012); this will in turn promote organizational long-term success (Wang and Cheng, 2010). Increased autonomy will allow workers more chances for creation with a more flexible work
process for conducting tasks through the task-related responsibility to define their roles and process to perform the tasks (Wang and Cheng, 2010; Song et al., 2012).

Research on creativity and innovation has been attempted from various levels including individual, group, team, and organizational level (Hennessey and Amabile, 2010). Accordingly, a study conducted by Scott and Bruce (1994), reported that team autonomy has strong positive effect on new product development. Perspectives across studies related to psychology of person and work are concerned that managers may feel relegated when employee autonomy increases, particularly when there is a change to a traditional work environment. Managers may feel that by giving workers autonomy, they no long contribute as much to the organization or that their jobs may be at stake (Jiang, Wang and Zhao, 2012); therefore, some cautions and restraints must be taken particularly on method of achieving tasks. Although, worker autonomy generally is a positive attribute for employees, managers, teams, and organizations as a whole to promote idea generation and implementation for innovation, employees naturally aspire for autonomy, and its introduction can increase motivation and satisfaction which are precedents of innovative behaviour (Adegbite and Okafor, 2018). Because too much autonomy can lead to organizational drawbacks, care should be taken when increasing it for workers in other to preserve the hierarchy and relation between supervisor and subordinates (Sauermann and Cohen, 2008).

**KNOWLEDGE MANAGEMENT, CREATIVITY AND INNOVATION**

Throughout modern creative activities, knowledge workers are the main actors of innovation, dissemination and application of knowledge and vital sources of renewing products, services and creative processes in an organization. Knowledge management is clearly defined to create and uncover knowledge, to make it concrete, and then to transfer and reutilize it (Sauermann and Cohen, 2008). Accordingly, it is tougher for organisations to form and maintain a long term competitive advantage in the context of low-knowledge capacity. As noted by Jimenez-Jimenez and Sanz-Valle (2005), most innovative activities come from borrowing rather than invention. Borrowing in this context refers to perceiving knowledge or experiences from other organizations and creating new ideas, whereas invention means creating new ideas.

The ability of introducing new knowledge in the organization is a key factor to building innovation capabilities (Cohen and Levinthal, 1990). The ability to recognize knowledge value, and to assimilate and use knowledge are known as absorptive capacity, which is defined as the capacity to acquire, recognize, assimilate, and use external knowledge on the basis of prior related knowledge is a precondition for innovation. Innovation behaviors may consist of internal process improvements, the development of new products, and novel strategic plans of product line management and organizational management. The creation of innovation is based on a series of intricate novel activities which form a value chain (Tsai, 2010). The emergence of knowledge management into the civilization era as conceptualized by the resource-based view of the firm
is a relevant reference point for conceptual framework in understanding strategic management gaining a new dimension in the knowledge-based theory of the firm (Spender and Grant, 1996). Knowledge is perceived as a strategic talent of an organization that needs to be managed (Song et al., 2012). It means ascertaining, evolving, and leveraging knowledge across the organization with a view to achieving competitive advantage (Alavi and Leidner, 2001). The dominant perspectives from the literature on relationship between knowledge management and innovation encompasses a wide continuum of activities intended to enable management interchange, create, or improve the intellectual assets within an organization (Song et al., 2012).

Argote and Ingram (2000) maintained that increasing knowledge capabilities for creativity and innovation in the organization can be done in two ways - by creating knowledge, which includes internal expansion of fresh and relevant knowledge or the enhancement of existing knowledge; and by capturing knowledge through the inflow of external knowledge into the organization. Similarly, McElroy (2002) divided the procedures of knowledge creation into two main categories: production of knowledge, which equals the process of organizational learning during which new organizational knowledge is created; and integration of knowledge that empowers sharing and distribution of knowledge. Due to the complex nature of knowledge management activities particularly in achieving the innovation desires of organisations, scholars have attempted to interrogate the phenomenon using managerial and practical perspectives with a view to documenting the implications of knowledge management activities and processes on innovation. These strands of studies emphasized formulation and implementation of knowledge management strategy, which are viewed by many as semantic rather than substantive (Bhatt, 2000). Although the main concept in knowledge management overlaps, the processes of knowledge creation, knowledge sharing, and knowledge utilization are often seen as independent and separate because in practice these processes occur simultaneously. This is particularly pronounced in the case of knowledge transfer and application, because the strategy of socialization (Kor and Maden, 2013), that is, personalization, (Argote and Ingram, 2000)) directly supports the simultaneity of these processes.

Studies conducted to date have shown a positive impact of knowledge management on various organizational outcomes including innovation. Related studies in the field of knowledge and innovation management had theoretically characterized and dedicated some work to the establishment of a link between different aspects of knowledge management and listed organizational outcomes including innovation performance (Argote and Ingram, 2000; Kor and Maden, 2013). Conclusion from literature on organizational learning established that studies related to impact of knowledge management and its consequential effect on employees’ creative ability did not focus only on ways to transform existing knowledge, but also on how to create new knowledge that will transform the organisation (Tsai, 2010). Knowledge management process facilitates another important process in organizations such as learning process. Effective
knowledge management can also increase the amount of knowledge required for organizational members and facilitate the rapid diffusion of knowledge within the organization. Hence, knowledge management has a profound effect on transforming power of knowledge into innovation processes (Huang and Li, 2009). Many scholars have thus far argued that effective management of knowledge leads to increased innovation performance (Huang and Li, 2009; Lin and Lee, 2005; Plessis, 2007). The nature of the activities in each innovation type is different, and they necessitate different strategies. Knowledge acquisition, which is related to using either existing knowledge or capturing new knowledge (Lin and Lee, 2005) enhances an employee’s ability to efficiently perform his/her tasks as well as increasing organization learning (McElroy, 2000; Lin and Lee, 2005). Through acquiring knowledge from both inside and/or outside the organization, each organizational member can increase his/her capacity to transform current knowledge into new knowledge and to generate new knowledge (Chen and Huang, 2009). Newly acquired knowledge increases stocks of knowledge available to organizations, decreases the uncertainty, and opens new opportunities for both applying and exploiting knowledge, thereby promoting the creation of innovative results (Nonaka and Toyama, 2004).

Accordingly, knowledge acquisition is positively related to innovation. The process of knowledge management and knowledge application is related to the actual use of the current knowledge in order to solve existing problems (Alavi and Tiwana, 2002), and with making knowledge more active and relevant in creating values for organizations (Nonaka and Toyama, 2004). Lin and Lee (2005) define knowledge application as the business processes through which effective storage and retrieval mechanisms enable workers to access knowledge easily. By effectively applying knowledge, employees and organizations increase their capabilities of managing different sources and types of knowledge effectively, using the right knowledge in the right form, decreasing making mistakes, and converting collective knowledge to advantages for organizations (Alavi and Leidner, 2001; Huang and Li, 2009). Sharing of knowledge also involves the exchange of employee knowledge, experiences, and skills throughout the whole organization in order to establish new routines and mental models (Nonaka and Toyama, 2004). Organizational members can easily have access to knowledge by sharing knowledge among themselves and/or across different units, which reduces the amount of time and investment required to gather information.

**METHODOLOGY**

**Instrument**

Three hundred and ninety-one (391) workers from two brewing firms in Nigeria participated in this study. The study employed quantitative and qualitative approach in which 361 copies of questionnaire were administered, twenty (24) In-depth Interviews and six (6) Key informant interviews were conducted. Multi-stage sampling method (purposive, stratified and convenient
sampling technique) was used to select the participating organisations and respondents. Two brewing firms were purposively selected from the South-western and South-eastern parts of Nigeria. The population was stratified into senior and junior workers, and Yamane formula (1967) was used to determine the sampling size (361) which was stratified into senior and junior workers. A total of 231 and 130 respondents were selected from Brewery A and B respectively. Eight departments/units out of eleven were purposively selected owing to the fact that their activities are related to innovation in their respective breweries. This study adopted the benchmark of three years for measuring innovation (i.e 2014-2016), hence new/improved product, new/improved process and new/improved administrative practices and procedures introduced within three years were considered as innovation in the selected breweries. Although 361 copies of questionnaire were administered to respondents in the two breweries, only 351 copies of questionnaire were retrieved, representing 97.2% response rate. Twenty-four (24) in-depth interviews (IDIs) were conducted in the study locations. A total of eight (8) respondents each from two breweries comprising mainly heads of departments/units, and four (4) respondents each from the two organizations comprising of workers at senior levels who were not captured by the questionnaire also took part in the in-depth interview through purposive selection. Six (6) key informants’ interviews (KIIs) were conducted to gather rich and experienced information (3 senior managers from each Brewery) and the interviews were conducted in each of the plant site of the two breweries. The interviews were conducted face-to-face using interview guide.

**Variable Measurement**

Workers autonomy and knowledge management comprised of 12 items, which were adapted from previous study. The response format was based on five-point Liker scales (1=strongly disagree and 5=strongly agree). Firm innovation (Technological and non-technological) was measured using 11 items that included product innovation (4 items), process innovation (4 items) and administrative innovation (3 items). Measurement of firm innovation adopted a modified version of innovation questionnaire which has been employed in previous studies using two proxy variables indicating whether the brewing firms introduced new products or engaged in product reformulation and/or rebranding; whether the firms introduced new production process or modified the existing process for optimization and improved quality; and whether the firms introduced new work procedures, routines and design or modified the existing administrative procedures between 2014-2016.

**Data Analysis**

Data collected through questionnaire necessitated statistical analysis at univariate and multi-variate levels. Data on the socio-demographic characteristics of the respondents were analyzed at the univariate level using descriptive statistics. At the multi-variate level, linear regression was used to show the relationship between the dependent and independents variables. This study used
linear regression to estimate the coefficients of the linear equation, involving workers’ autonomy and knowledge management which best predict the value of the dependent variable – firm innovation. The models show that the independent variables were good predictors of firm innovation with the F-score as 4.98 and p-value is less than 0.05 (F = 4.98, p < 0.05) in the selected breweries. The coefficients of determination R-square (R2) is 0.375, indicating that the models are reliable and the independents variables were good predictors of firm innovation. Data generated through Key Informant Interviews and In-depth Interviews were content analyzed. Verbatim quotations were used in the course of the analysis where necessary. Major themes were identified, corroborating and contradicting phrases and responses were grouped separately using qualitative data analysis software.

RESULTS AND DISCUSSION

Participant Profile

Most respondents from the two breweries (72.6%) were male. The age distribution showed that most of the respondents (34.2%) were between 28-32 years. The distribution of respondents according to marital status indicated that majority (66.1%) were married, while 42.7% of the respondent had bachelors’ degree. The distribution of respondents according to length of service indicated that most of the respondents (43%) had spent between 3-5 years with the two Breweries. Because no organization share perfectly the same environment, culture, policies and mode of operations, the regression analysis was conducted separate for the two firms using their respective sample sizes.

Table 1: Autonomy, Knowledge Management and Innovation (Brewery A)

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Standardized Coefficients</th>
<th>Beta</th>
<th>T</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td></td>
<td>11.293</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Sharing of job related knowledge and new administrative procedure.</td>
<td>0.151</td>
<td>1.988</td>
<td>0.001*</td>
<td></td>
</tr>
<tr>
<td>Acquisition &amp; transfer of new knowledge and new processes</td>
<td>0.149</td>
<td>1.538</td>
<td>0.003*</td>
<td></td>
</tr>
<tr>
<td>External knowledge collaboration and new products</td>
<td>0.189</td>
<td>1.478</td>
<td>0.010*</td>
<td></td>
</tr>
<tr>
<td>Freedom to adopt best administrative procedures</td>
<td>0.222</td>
<td>2.103</td>
<td>0.002*</td>
<td></td>
</tr>
<tr>
<td>Freedom on development of new process</td>
<td>0.262</td>
<td>2.999</td>
<td>0.003*</td>
<td></td>
</tr>
</tbody>
</table>

Key: * Significant at P < 0.05

Findings from table 1 above show the impact of workers’ autonomy and knowledge management on product, process and administrative innovation in brewery A. It appears that the two
dimensions of organizational practices have significant effect on firm innovation in the brewery. Specifically, workers’ autonomy has effect on the development of new process and new administrative procedures ($\beta = 0.262, t = 2.999, p= 0.003; \beta = -0.222, t = 2.103, p= 0.002$) indicating a significant positive impact on process and administrative innovation. The impact of employee autonomy in the brewery is 26.2% more likely to increase the level of process innovation as unit change would make its innovation increase. Similarly, autonomy is 22.2% likely to increase administrative innovation in the organization. It is important to states that the regression result show that workers’ autonomy had no positive effect on product innovation.

Qualitative data showed how autonomy particularly during work process has widened their knowledge on the job and encourage them to learn when faced with challenges of how to make things better. Interestingly, findings from the qualitative analysis revealed that employees’ autonomy enhances creativity and innovation in the brewery. The general perception of respondents showed that workers autonomy contributes to employees’ innovativeness particularly process and administrative innovation. Both process and administrative innovation were enhanced by employees’ autonomy occasioned by some level of freedom in performing their task. Findings from the qualitative analysis suggested why there was no relationship between autonomy and product innovation. It was revealed that, it is extremely difficult for any employees to use autonomy during production or beer making since the procedures for beer making are clearly specified in the production manual. A senior manager in the production section explains:

Although, our production processes are standardized, it may be very difficult to use initiative or any forms of freedom for producing beer, but to a large extent, the processes of packaging, supply, administrative and marketing activities accommodate so much freedom and our people fully keyed into that with good result to show for it in terms improvement on our existing routines. (IDI/Male/44 years)

Accordingly, findings revealed that autonomy during work assist the employees to explored options available to them with a view to come up with new ideas that will be implemented to drive innovation in the organization. A senior staff in-charge of customer care stated that autonomy allowed employees to voice their opinion and encourage them to go out of their way to bring new things into the organization, she said:

Most of the new ideas propelling this organization at the moment actually come from within this organization; people go out of their comfort zone to create new things. This is just possible because we allow them to voice their ideas; we use our culture and policy to encourage them to contribute to the system. (IDI/Female/37 years)

The perception of respondents in the production section on the impact of autonomy on innovation clearly revealed the dynamic nature of production activities in the brewery. According to a participant, for workers in non-production units, job autonomy was largely permitted due to the flexible nature of the job roles in non-production functions which can accommodate creativity without affecting the quality of product, but this may not be possible in the production unit. Autonomy in the brewing and production sections is not absolute,
particularly in terms of product development and innovation. An idea that could possibly lead to innovation cannot be implemented unilaterally during production, such idea(s) will be subjected to global experiment and trials before it can be considered for implementation. Corroborating the above, a production manager explains:

*You cannot improve the product because there are standards, any idea in this direction will be subjected to a very rigorous and stringent trial, but you can improve the process through your initiative as long as it is within the standard operating procedures.* (KII/Male/41 years)

Generally, findings from this study suggest that workers’ autonomy have significant effect on process and administrative innovation. Findings from the quantitative analysis also provides support that autonomy contributes to process and administrative innovation but explained why it may be difficult for workers’ autonomy to have positive impact on product innovation especially in the brewing firm.

On the other hand, in brewery A, sharing of job-related experience impact positively on the development of new administrative processes and procedures indicating a significant positive relationship with administrative innovation. An increase in sharing of job-related experience is 15.1% more likely to increase the level of administrative innovation, as unit change would make its innovations increase, which was statistically significant (β = 0.151, t = 1.988, p=0.001). As indicated in table 1 above, knowledge acquisition and transfer have significant impact (β = 0.149, t = 1.538, p=0.003) on new process suggesting a positive relationship with process innovation. Collaboration and seeking of knowledge from external sources show a positive relationship (β = 0.189, t = 1.478, p=0.010) with product innovation in the brewery. The perception of workers on how the practice of effective knowledge management system can improve on firm innovation was examined through in-depth interview and key informant interview. Findings reveal how knowledge management system through sharing of job-related experience can promote acquisition, institutionalization of skills and competence in enhancing innovation, and in turn positioned the organisation for better competition. A respondent stated thus:

*We have gain a lot from knowledge sharing, the global group refocused our knowledge management system into more of online and employees to employees’ mechanisms. It is easy for us here on the site to come up with any kind of product whether existed elsewhere within the group or entirely new because we have access to what is obtainable in Tanzania, South African, Europe and even America, all we need to do is to add local content and pay attention to our immediate environment.* (IDI/Male/36 years)

In the opinion of another participant on the important contribution and benefits of having effective knowledge management system in promoting innovation in the organization, it was stated that knowledge management system promotes open learning and assists employees to
acquire necessary knowledge and technicalities needed to be creative on the job. He further explained:

Our parent company does not play with knowledge and information. There are several medium through which we share and transfer knowledge, experiences and information among ourselves. One of the newest of such is what we refer to as shared learning. It has help to improve in the area of cost effectiveness and also promote open learning; you can find almost all information on the portal on how to solve most problems. (KII/Male/47 years)

Knowledge management had positive impact on the three levels of innovation in the organization. The qualitative finding equally provided support for this relationship by stating the mechanisms through which the organization organize its knowledge structure to the benefit of the workers and the brewery. Table 2 below show the regression result of workers’ autonomy and knowledge management impact on firm innovation in brewery B.

Table 2: Autonomy, Knowledge Management and Innovation (Brewery B)

<table>
<thead>
<tr>
<th>HRM Practices</th>
<th>Standardized Coefficients</th>
<th>Beta</th>
<th>T</th>
<th>P-value</th>
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<tbody>
<tr>
<td>Constant</td>
<td></td>
<td>11.608</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Sharing of job related knowledge and new administrative procedures</td>
<td>0.143</td>
<td>2.074</td>
<td>0.004*</td>
<td></td>
</tr>
<tr>
<td>Acquisition &amp; transfer of new knowledge and new processes</td>
<td>0.126</td>
<td>1.989</td>
<td>0.001*</td>
<td></td>
</tr>
<tr>
<td>Freedom to adopt best administrative procedures</td>
<td>0.225</td>
<td>3.563</td>
<td>0.020*</td>
<td></td>
</tr>
<tr>
<td>Freedom on development of new products</td>
<td>-0.108</td>
<td>-2.327</td>
<td>0.041*</td>
<td></td>
</tr>
<tr>
<td>Freedom on development of new process</td>
<td>0.161</td>
<td>2.589</td>
<td>0.000*</td>
<td></td>
</tr>
</tbody>
</table>

Key: * Significant at p < 0.05

As shown above, workers’ autonomy had negative impact on the development of new product indicating an inverse relationship (β = -0.108, t = -2.327, p= 0.041) with product innovation. This implies that autonomy is 18.8% more likely to decrease the level product innovation in the brewery. Autonomy had positive impact (p= 0.000; p= 0.020) on process and administrative innovation. Findings from qualitative analysis was similar to what was obtainable in the brewery A. Supporting the views on the contributions of autonomy to innovation in brewery B, finding revealed that it is very difficult to exercise autonomy or use discretion during product development and production process because there are standard operating procedures, formula and recipe for producing beer and other products. A respondent who is a production engineer was quoted thus:
You cannot use your discretion to produce beer, there is a formula and recipe, there is nothing like freedom or autonomy when it comes to production. There is no way you can interfere with the process of beer making, you enjoy freedom and use discretion in the area of decision making and marketing department, these are free thinking department where ideas that can break new ground are needed. You cannot use your discretion to determine the quality of a beer. (IDI/Male/50 years)

The regression results obtained from brewery B on the impact of workers’ autonomy on firm innovation show that autonomy had positive impact on process and administrative innovation. Interviews conducted in brewery B, and indeed the two breweries revealed that autonomy can be more applicable in the free-thinking departments like innovation and marketing department. Workers are not permitted to use their discretion during product design, development and during production process in the breweries.

On knowledge management in brewery B, sharing of job related experience impact positively on the development of new administrative processes and procedures indicating a significant positive relationship ($\beta = 0.143, t = 2.074, p=0.004$) with administrative innovation. By implication, sharing of job related experience is 14.3% more likely to increase the level of administrative innovation. Acquisition and transfer of knowledge had significant impact ($\beta = 0.126, t = 1.989, p=0.001$) on new process, suggesting a positive relationship with process innovation. Supporting the findings from the regression result, perception among respondents during the interviews show that knowledge management and its various mechanisms can support innovation through sharing of knowledge, information and experience that are job related. It was revealed that workers are sent to breweries in other part of the world to learn how they implement their processes (benchmark) and come back to replicate those processes for better performance. The management of the organization belief that learning is important in the process of innovation; therefore, it is important to take a clue from what breweries in other part of the world are doing to meet with customers’ demand. According to one of the participants during the interview session, she said:

We benchmark ourselves against best breweries in the world, we send our staff out to learn new things and when they come back they share what they have learnt with other colleagues. By this our workers are familiar with best practices in brewing business around the world and this has improved the way they come up with new ideas. (IDI/Female/32 years)

Findings further reveals that job schedule in the brewery is based on shift which requires an effective knowledge channel within teams and between shifts. It is expected that when problem occur during shift, the leader of the team must develop what is referred to as “One Point Lesson” (OPL), detailing the causes and the processes through which the problem was resolved with diagram and pictures pointing at each stage and location on the machine. The OPL will be published on the notice board at the shop-floor for staff to learn from that particular experience – sharing of job related knowledge and experience. Undoubtedly, responses from the interviews
conducted revealed that the OPL and its various mechanisms are considered as an important method of sharing information and experiences related to the job due to the shift nature of the work schedule in brewing organization. The team that resumed duties may have no information about the challenges faced by the outgoing team and in most cases the handover note may not be detailed enough to effectively communicate all necessary information, hence the need for effective knowledge management system. To the team and individuals staff on shift during the challenge, it is a problem solving situation, but to the incoming shift, it is learning and a way of getting to know the root-cause and solution to a problem. The statement below was quoted from one of the senior staff in the brewery, he said:

*One of our prominent but new methods in transferring knowledge which is a complete modification of existing method of knowledge management and information is called “One-Point-Lesson” (OPL). If an issue occurs during operation and a particular team solve that problem and restore the machine or the operational process to normal. The team leader will develop an OPL detailing the process in resolving the problem with explanation and diagram, this will be pasted on notice board on the shop-floor for staff to learn from that experience.*

(IDI/Male/38 years)

The findings above showed that there exists a positive relationship between knowledge management practice and firm innovation in brewery B. This was also supported by findings from the qualitative analysis.

**CONCLUSION AND RECOMMENDATION**

This study demonstrated that organisational and individual factors play an important role in enhancing firm’s innovation. Following from the findings from the quantitative and qualitative results, it is reasonable to say that it is possible that when employees are given autonomy, they will be creative because if the culture of the organization encourages such behaviors, some amount of autonomy would result in innovation at the firm level. Similarly, effective knowledge management system is also a necessary precondition for innovation in the organization. Regression results from the two breweries show that workers’ autonomy had positive impact on process and administrative innovation, but not on product innovation. Further findings from the qualitative analysis provided the reasons for the inability of autonomy to have influence on product innovation in the breweries. It was revealed that production process and inputs in the brewing industry are standardized, and therefore could not be alter using discretion or any form of autonomy. Knowledge management show a strong relational impact on product, process and administrative innovation and this was supported by the qualitative findings. The above results confirm the fact that, when an employee had autonomy at the workplace, it will perhaps guarantee for innovative behavior. It therefore important that organization build a culture that
will encourage workers’ autonomy in other to strengthen the creative ability of the workers for better innovation at the firm level.

From the foregoing, this study recommends that due to the dynamic and complex nature of innovation activities and process at the organizational level, researchers, practitioners, and policy makers should pay attention to vital organizational and managerial factors which can serve as drivers of innovation at the organizational level. This study also recommends that there is need to recognize that apart from financial resources, research & development activities and technology; organizational factors that are related to workers’ personality, organizational culture/structures, and relationships between /and among teams, and individual workers are essential input in the innovation process, therefore should be embedded in innovation framework at the organizational level.

LIMITATION AND FURTHER STUDY

Although this study to certain extent has provided empirical support for the impact of workers’ autonomy and knowledge management on firm innovation, it does have some limitations. One of the major limitations of this research is the limited coverage of brewing plants in Nigeria due to company policy stipulating plant’s and site locations where the study can be carried out. The present study is restricted to brewing firms in Nigeria, hence, findings from the study cannot be generalized for other samples within the manufacturing sector in Nigeria. Further studies in this area should be replicated with another sample from different sub-sector within the manufacturing sector to advance generalization. Based on the findings and experience from this study, it is suggested that future research should emphasize more on qualitative methods due to the fact that investigation into this phenomenon requires in-depth knowledge and understanding of the subject matter from the organization’s point of view which may be difficult to capture through only quantitative techniques, hence the need for triangulation.

REFERENCES


