D’Aveni (1994) states that environmental uncertainty is creating such a situation where means and ends relationships are unknown and survival is in danger. Now question arises how firms can route towards better performance and sustainability? The top management demography (Milliken and Martins, 1996), learning (Dodgson, 1993 and Meyer, 1982), and innovation (Russell and Russell, 1992), researchers endorse that in volatile environment creating and maintaining requisite variety is pre requisite for learning, innovation and better performance. Current study is an effort to check out the effect of requisite variety on organizational learning and innovation directly and on performance directly as well as indirectly through mediation of learning and innovation in cellular sector of Pakistan. Results show that requisite variety has direct and significant impact on learning and innovation whereas, direct effect of requisite variety could not be verified on performance, however model highlights that it influences the performance through the mediation of learning and innovation.

**Keywords:** Requisite Variety, Organizational Learning, Organizational Innovation, Organizational Performance

**INTRODUCTION**

D’Aveni (1994) states that environmental uncertainty is creating such a situation where means and ends relationships are unknown and survival is in danger. Now question arises how firms can route towards better performance and sustainability? The top management demography (Milliken and Martins, 1996), learning (Dodgson, 1993 and Meyer, 1982), and innovation (Russell and Russell, 1992), researchers endorse that in volatile environment creating and maintaining requisite variety is pre requisite for learning, innovation and better performance. Current study is an effort to check out the effect of requisite variety on organizational learning and innovation directly and on performance directly as well as indirectly through mediation of learning and innovation in cellular sector of Pakistan. Results show that requisite variety has direct and significant impact on learning and innovation whereas, direct effect of requisite variety could not be verified on performance, however model highlights that it influences the performance through the mediation of learning and innovation.
management demography (Milliken and Martins, 1996), learning (Dodgson, 1993 and Meyer, 1982), and innovation (Russell and Russell, 1992), researchers endorse that in volatile environment creating and maintaining requisite variety is pre requisite for learning, innovation and better performance. Weick (1995) offers a representative quotation when he asserts, “organizations with access to more varied images will engage in sense- making (learning) that is more adaptive than will organizations with more limited vocabularies”. Ashby (1956) first suggested that the law of requisite variety which states that, “variety within a system must be at least as great as the environmental variety against which it is attempting to regulate itself”. Hence, requisite variety in organization is compulsory for match between the organizational competencies and environmental demands. Although it is difficult to truly implement the principal of requisite variety due high costs, however, the organizations that are nearer to the principal are more likely to perform extraordinary than their rivals (Vogus and Sutcliffe). Weick (1979) emphasizes on this by stating that “organizations need to become anxious for development of sufficient variety in the organization, required to scan precisely the variations in external environment.

The literature related to variety in organizational demography, learning and adaptability in form of innovation facilitate with testable solutions. More the required variety within organizational management is, more it will be able to notice, respond to, and subsequently will go towards better adaptability with aggressive environment (Bogner and Barr, 2000). Similarly, Morrison (1992) states that organizations which are internally as much diverse as their customer base are more efficient in anticipating the changes in their customer needs and tastes. This paper is trying to empirically test the impact of law of requisite variety on learning, innovation and performance. Study is testing the effect of law of requisite variety on learning, innovation and performance directly as well as on performance through mediation of learning and innovation.

The study is going to test the law of requisite variety in cellular sector of Pakistan which is multifaceted, comprehensively regulated and swiftly progressing to keep pace with the international markets and creativity. Extremely competitive and volatile environment in the cellular sector is imposing its organizations to devise novel and innovative methods in order to learn and serve customers’ needs in better way. The progression in technology, globalization, and resultant changing in customers’ demands are pushing the cellular sector to create requisite verity within the organizations. The cellular sector works in team based structure (to ensure variety) in order to maximize the output so, presence of requisite variety and its impact on learning, innovation and performance will be worth testing in it. This sample is also good for testing of requisite variety because if it remains unable to produce required learning, innovation, and performance in this sector, it will be very doubtful that law of requisite of variety will matter for organizations which operate in steadier environment where already learned reactions and well tatty strategies may be more than sufficient for required performance.

**Understanding the “Requisite Variety” Concept in Management Sciences**

Ashby (1956) states that the concept of requisite variety was first introduced in the areas of cybernetics and biology as a fundamental processes of system regulation. For better understanding and application of law of requisite variety in management sciences, it is important to recognize its general meaning and relation to the management of organizations. Its two terms are “requisite” and “variety”, first, the adjective “requisite” suggests that the
noun to which it is related is essential or it is beneficial for a specific purpose. So, in this specific background it indicates that variety is desirable to attain a required state. From the point of view of complex systems that are based upon the interconnections of a large number of elements, “variety” can also assume the number of likely situations that a system can hold time to time by combining and recombining its different elements (Bartel-Radic and Lesca, 2011). Actually, law of requisite variety is founded on the postulation that “variety can destroy variety” (Ashby, 1956) and variety can be created through different combinations of elements. Or we can say that to attain the stability, a system must possess a control method which permits to achieve a number of conditions that is larger than or at least equal to the number of conceivable states in the system under control. As, Bartel-Radic & Lesca (2011) state that for the control of any specific system under consideration its variety must be enough.

By analyzing the requisite variety definition suggested by Ashby, Beer (1981) proposes that the application of this principle from the point of view of management sciences requires that an organization must be able to develop at least the minimum number of actions which are required to tackle with the environmental vagueness for long-term sustainability because only variety can destroy the variety. Achievement of more variety in the organizational knowledge resources enables the organization to devise the innovative solutions to unknown and ambiguous problems (Nonaka and Takeuchi, 1995). So, to cope up with the complexity and uncertainty of environment an organization need to create enough information management and decision making capability as, Lewis & Stewart (2003) state that Ashby’s law of requisite variety should be considered as a an essential law for viable organizations.

LITERATURE REVIEW

Requisite Variety and Organizational Learning

Articulating real learning and creating shared understanding requires, what Daft & Weick (1984) refer to as an interpretation. They describe interpretation as the “process of translating events and developing shared understanding and conceptual schemes among members of upper management” (Daft & Weick, 1984). Requisite variety is something that will help the organization in the development of all-inclusive and less biased interpretations because the availability of more intricate and divergent series of understandings to reach at more comprehensive solutions and resultantly will limit functionally driven or narrow-minded decisions. As, Daft and Weick (1984) state that the vague and unanalyzable information environment may require that firms carry on such strategies that help the organizations in constructing their own environments and gathering information by stabbing new behaviors and seeing what happens. Obviously in such situation organization with larger requisite variety should be in the position to better interpret and enact their information and create learning require to cater complexity and uncertainty in the environment.

As, learning is a process of information acquisition, dissemination, interpretation and behavioral & cognitive changes (Huber, 1991) so, it can be encouraged and boost up through cautiously cultivated practices, traditions and coordination among team members which make the requisite variety necessary as a basic necessity. On the other side, knowledge based view is that the organization is collection of competencies and capabilities that can be consumed to grow competitive advantage (Grant, 1996; Grant and Spender, 1996) means variety in form competencies and capabilities help the organization to achieve sustainable advantage. Literature review makes obvious
that an organization which applied learning as an effective and consistent strategy ultimately attain the target of higher performance (Chirico, 2008; Garcia-Morales, Ruiz Moreno, & Liorens-Montes, 2006; Whitwell, Bell, & Lukas, 2002; Senge, 1990; Garvin, 1993) directly and indirectly. This study is utilizing Garvin (1993) and Huber (1991) notion of organizational learning and they state that to make the learning happen there is a requirement for information acquisition, information understanding and ultimately conversion of this information in to action.

According to them organizational learning is centered upon the stages of:

- Information acquisition,
- Information interpretation and
- Behavioral and Cognitive changes

Information acquisition means the obtaining or getting of information, information interpretation means making understanding and assigning meaning to the information obtained or gained and behavioral & cognitive changes is relevant to changes in the behavior, action and conduct of organizational employees as well as organizational culture. Based upon the relationship of requisite variety and learning literatures study hypothesizes that:

H1: Organizations with greater requisite variety will be able to create better organizational learning.

**Requisite Variety and Organizational Innovation**

This study is utilizing the description of Van de Ven (1986), who define innovation as “may be a recombination of old ideas, a scheme that challenges the present order, a formula, or a unique approach which is perceived as new by the individuals involved”. Jacobs & Snijders, (2008) define innovation as the creation of something new with value addition. Requisite variety helps to generate something new in form of innovation because it encourages the contrary thinking and ideas consistent with the brainstorming and exploration for/of new ideas. However, innovation cannot be just perception of individuals for exploration of new idea but an additional principle for innovation generation is capitalization on new idea by organization (Vogus & Sutcliffe). They further prepositioned that capitalizing on a new idea does not essentially involve the realization of financial achievement, but rather it denotes the production of something perceptible as an outcome of generated idea. This conceptualization is in line with the Kanter’s (1988) idea of innovation who defines it as a concerted activity that depends on organizational structure and social arrangements along with the individual idea generation. Requisite variety promotes this social structure to the degree that each functional sub-unit is extra sensitive to each other sub-unit. This sensitivity to and between sub-units in turn reduce the “technological utopianism.” As, Stinchcombe (1990) states that if engineers are more talented and aware of a complete interpretation of the social system of innovation (i.e., aware of other’s competences and requirements) they will be highly in the cards to implore and recognize input from sales and marketing professionals and, consequently will generate more worthwhile innovation. According to Vogus & Sutcliffe Requisite variety can enhance organizational capacity to innovate in four ways. Firstly, requisite variety enables the firm to pursue a broader agenda with more variables under contemplation (Arrow, 1974). The broader agenda results in innovation because of such organizational ability to consider more stuff before the rivals’ agendas. Secondly, larger requisite variety promotes innovation through the management of competing viewpoints or what Van de Ven
(1986) mentions as knowledge of part-whole associations or what Schumpeter (1934) denotes as sighting and generating innovative recombination. Thirdly, larger requisite variety in the top management affects the organizational innovation ability by fostering more absorptive capacity (Cohen and Levinthal, 1990). This absorptive capacity expedites for spill-overs as well as for knowledge of technological development of the sector. Likewise, Stinchcombe (1990) affirms that larger requisite variety enables the organization to be more receptive to their environment and subsequently more informed about relevant data. Looking more comprehensively in new zones in different ways will ultimately excavate the newness, extremely required for innovation (Vogus & Sutcliffe). Previous studies also empirically solidify the connection between demographic heterogeneity (i.e. requisite variety) and innovation (O’Reilly, Caldwell, & Barnett, 1989; Bantel & Jackson, 1989). Although innovation may be in form of new idea and implementation of new technology but its victory and fiasco totally hinges on the managerial capabilities, values and approaches. This point empowers us to recognize the connection among kinds of innovation. So, this study, as like Atuahene Gima, (1996); Han et al., (1998); Damanpour et al., (1989) is relying on the view point that technical innovation works competently only in the company of administrative/process innovation. That’s why this study focuses on organizational innovation as a combination of:

- Product/technical innovation,
- Administrative/process innovation and
- Innovative culture

Technical innovation is related to utilization of new and novel technologies, administrative/process innovation is up-dation of service or production process and lastly innovative culture means the prevalence of innovative environment in the organization. Based upon the relationship of requisite variety and innovation literatures study hypothesizes that:

H2: Organizations with greater requisite variety will have more innovative capacity.

Organizational learning and organizational innovation

Jacobs & Snijders, (2008) define innovation as the creation of something new with value addition. Learning process helps to generate something new in form of innovation because it encourages the contrary thinking and ideas consistent with the brainstorming and exploration for/of new ideas. Learning is a source to create knowledge and joining of new as well as old knowledge in such a way that consequently leads towards the innovation as defined by Van de Ven (1986), a recombination of old ideas, a scheme that challenges the present order, a formula, or a unique approach which is perceived as new by the individuals involved” is innovation.

Calantone, Cavusgil and Zhao, (2002) also of the view that learning positively contributes towards innovation. Koch & Kieser, (2008) highlights that organizational learning and innovations are strongly related to each other. Similalry, Agyris and Sechon, (1978) highlight that learning strengthens the organizational innovative capabilities. Nonaka & Takeuchi, (1995); García, Ruiz & Llorens (2007) are at the same sight that innovation is consequence of organizational knowledge sources. Various researchers explored the correlation between learning and innovation and found it positive so, on the basis of literature we can propose that:

H3: Organizational learning significantly contributes towards the organizational innovation.
Requisite Variety, Organizational Learning, Innovation and Performance

Performance is the ultimate goal of organization. So, all organizational strategies must lead towards the better performance. As highlighted by a study carried on 164 companies of 6 different countries that learning has noteworthy effect on the performance (Bates and Junttila, 2002). Hulland, Crossan, Bontis, (2002) confirm that contribution of organizational learning is positive in elevating the performance. Gnyawali, Steward and Grant, (1997); Brockmand and Morgan, (2003); Nevis, Dibella, Gould, (1995) propose that learning is a significant source to improve the organizational performance. Similarly, organizational learning culture is basic requirement to enhance the performance (Ussahawanitchakit, 2008; Keskin, 2006). On the way study suggests:

H4: Organizational learning will significantly contribute towards the organizational performance.

Zaltman et al., (1973) state that highly innovative organizations are able to attain abilities needed to boost the performance and realize competitive advantage. Calantone et al., (2002) also propose that to achieve competitive advantage innovation is vivacious aspect. The same study highlights the encouraging association between organization innovation and performance. Klomp & Leeuwan, (2001) demonstrate that organizations which are high in innovations can outperform as compare to low innovative organizations. So, study proposes that:

H5: Organizational Innovation will significantly contribute towards the organizational performance.

Lastly, study hypothesizes that learning and innovation mediates the relationship between the requisite variety and firm performance. This proposition assumes that requisite variety empowers organizations to adjust through ample learning and copious innovation. The transformer suggests that organizations are able to utilize the variety for creation of required learning as well as greater idea generation and creativity in the areas needed while decreasing the costs of conflict that outbreaks studies exploring the association between highest diversity and performance (Eisenhardt, Pelled, & Xin, 1999). As literature shows link between learning & performance and between innovation & performance is established empirically, so this study is going further and trying to find the mediating role of organizational learning and innovation between requisite variety and organizational performance.

H6: Organizations with greater requisite variety will perform better.

H6 (a): Organizations with greater requisite variety (mediation of learning) will perform better.

H6 (b): Organizations with greater requisite variety (mediation of innovation) will perform better.

HYPOTHESESIZED FRAMEWORK

Figure 1 highlights proposed framework of the paper which is based upon the literature review of associations between requisite variety, organizational learning, innovation and organizational performance. The model in figure 1 shows the research hypotheses in form of arrows.

FIGURE 1 HERE
METHODOLOGY

Pakistani cellular sector consists of five organizations that are Mobilink, Telenor, Zong, Ufone and Warid. Data was collected from the corporate employees of cellular sector. Sample was consisted of 359 employees of cellular sector. Data analysis was carried out using SPSS and AMOS. Total of 400 questionnaires were distributed for data collection, researcher get back 373 questionnaire out of which 359 were found ok for analysis so, response rate remained 89%. SPSS 20 was employed to check the reliability of the questionnaire, whereas, AMOS 18 was utilized to explore the validity of the data as well as to verify hypotheses.

Measures

In order to measure presence of requisite variety in cellular sector of Pakistan, study is extracting a scale developed by The Institute of Internal Auditors (IIA) Florida, USA. It is a very long scale catering more than one constructs so, researcher extracted four questions related to the presence of requisite variety in the organization. It is a 5 point likert scale ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Nuetral, 4 = Agree, 5 = Strongly Agree. Current study is measuring organizational learning by utilizing 5 point likert scale created by Škerlavaj et al., (2007) where for information acquisition and information interpretation 1 = Strongly Disagree, 2 = Disagree, 3 = Nuetral, 4 = Agree, 5 = Strongly Agree and for behavioral and cognitive changes 1 = Substantial Decline/Decrease, 2 = Moderate Decline/Decrease, 3 = No Change, 4 = Moderate Improvement/Increase, 5 = Substantial Improvement/Increase. Study is utilizing different scales for measuring different aspects of innovation such as Innovativeness is being measured through scale developed by Daft, (1982) & Tsai, (1997) innovations items by Liao et al., (2008), Wang & Ahmed, (2004) innovative culture by Hurley & Hult, (1998) 5 point likert scales. For financial and non financial performance study is utilizing Emden, Yaprak, Cavusgil, (2005) and DLOQ 5 point likert scales developed by Watkins & Marsick, (2003).

DATA ANALYSIS

Validity and Reliability Analysis

Researcher performed validity & reliability analyses of the scale utilized by making use of AMOS 18 and SPSS 20 software.

Validity Analysis

Confirmatory Factor Analysis has been performed to ensure the validity of all scales being employed in this study. Items that achieved factor loading <0.5 and items bearing negative/low correlations are eradicated from the CFA diagram for validity of the scale. Scale was consisted of total of four main constructs containing of forty six items, thirty one items were appeared as a result of repetitive runs of CFA. Figure 2 shows finally attained CFA model for current research. Retained items have factor loadings higher than 0.5 which forecast that these items are adding considerably in the determination of construct and also establish validity of the utilized instrument.

Below table 1 demonstrates the values for fitness ratios for CFA shown in figure 2 above:

Table 1 shows values of model fit indices along with required limits. It is obvious from analyzing the table that CFA model for utilized instrument is up to mark.

Reliability Analysis
SPSS 20 software has been used to check the reliability of data. Results of analysis are being shown in table 2 to verify the reliability of scales. Attained values of Cronbach’s alpha verify the reliability of scale being used for the measurement of each variable. Cronbach’s alpha value greater than 0.5 is assumed satisfactory for the instrument to be proved reliable (Ven & Ferry, 1980) and table 2 shows that values of all scales are higher than 0.5.

**TABLE 2 HERE**

**Mean, Standard Deviation and Correlation among Variables**

Table 3 exhibits Mean and Standard Deviation for all variables and correlation values between all variables. By examining the table it becomes obvious that correlations among variables attained as was desirable i.e. all variables have positive and significant relationship with each other.

**TABLE 3 HERE**

**Model and Hypotheses Testing**

In order to verify the model as well as hypotheses researcher carried out path analysis by utilizing structure equation model (SEM) through AMOS 18. Diagram for first run has been shown in figure 3 below:

**FIGURE 3 HERE**

Below table 4 demonstrates the values for fitness ratios of figure 3:

**TABLE 4 HERE**

Table 3 shows values of CMIN/DF, GFI, CFI, NFI and RMSEA along with required limits. By analyzing table it comes to know that proposed model does not completely fit because of two reasons one is that hypothesis i.e. H6: Organizations with greater requisite variety will perform better could not provide required positive beta β value and also not significant, second one is that values of CMIN/DF, CFI, NFI and RMSEA are not within established limits. So, by following modification indices, H6 hypothesis path removed and path analysis came out with new model shown in figure 4 below:

**FIGURE 4 HERE**

Below table 5 demonstrates the values for fitness ratios of figure 4:

**TABLE 5 HERE**

Table 5 shows values of model fit indices along with required limits. It is obvious from analyzing the table that values of CMIN/DF, GFI, CFI, NFI and RMSEA are within established limits and this model is fit. This model fitness highlights that hypotheses H6 (a) and H6 (b) that are Organizations with greater requisite variety (mediation of learning) will perform better and Organizations with greater requisite variety (mediation of innovation) will perform better respectively have been proved, but H6 i.e. Organizations with greater requisite variety will perform better could not be proved because SEM fitness ratios are not up to mark in this case, So, it has been explored that requisite variety does not have direct impact on organizational performance of the organization but through the mediation of learning and innovation. Hypotheses H1 and H2 that are Organizations with greater requisite variety will be able to create better organizational learning and Organizations with greater requisite variety will have more innovative capacity respectively have been proved at the P-Value 0.000 with the beta β 0.28 and 0.25 respectively which means requisite variety count for 28% uplift in learning and 25% improvement in innovation capacity of organization. Similarly, H3 i.e. organizational learning significantly contributes towards the organizational innovation has also been
verified at P-Value 0.000 and beta \( \beta \) 0.45 which shows that learning contribute 45% in enhancing the innovation of organization. If we see on the other side, path analysis highlights that learning and innovation influence the performance with the \( \beta \) 0.24 and \( \beta \) 0.51 at the P-Value of 0.000 which is positive as well as significant and prove both hypotheses. Results of hypotheses H4 i.e. organizational learning will significantly contribute towards the organizational performance and H5 i.e. organizational Innovation will significantly contribute towards the organizational performance highlight that learning effects the performance positively by 24% whereas, innovation contributes 51% in uplifting the performance of the organization.

**DISCUSSION AND CONCLUSION**

Results of the study highlight that requisite variety contributes directly in learning and innovation, whereas add in performance through the mediation of learning and innovation. Requisite variety does not add directly in enhancing the performance because obviously performance can be enhanced by adding variety in the employees but by utilizing this variety through effective strategies such as creating learning and innovative culture in the organization. Current study look in to learning as a process the last stage of which is behavioral and cognitive changes i.e. unless organization and its diversified employees does not change their behavior and organizational culture which encourages learning and ultimately foster the performance of organization as highlighted by Hulland, Crossan, Bontis, (2002) that contribution of organizational learning is positive in elevating the performance, Gnyawali, Steward and Grant, (1997); Brockmand and Morgan, (2003); Nevis, Dibella, Gould, (1995) that learning is a significant source to improve the organizational performance. Similarly, endorsed by Ussahawanitchakit (2008); Keskin (2006) that organizational learning culture is basic requirement to enhance the performance.

Study focuses on the innovation as a complete package in form of technical and administrative innovation as well as innovative culture. So, organizations which focus on innovation as a complete strategy by focusing on bringing changes in its technology, processes and culture will be ultimately able to achieve higher performance as a result of diversity in its top management. Similar thing is already endorsed by Zaltman et al., (1973) by stating that highly innovative organizations are able to attain abilities needed to boost the performance and realize competitive advantage. Calantone et al., (2002) verify the same by proposing that to achieve competitive advantage innovation is vivacious aspect. The same study highlights the encouraging association between organization innovation and performance. Similarly, Klomp & Leeuwan, (2001) demonstrate that organizations which are high in innovations can outperform as compare to low innovative organizations and provide assurance to the results of current study. The study provides implications for organizations that, by just adding requisite variety in top management is not enough but to enhance performance it needs to be focused on learning as well as on innovation as key strategies.

**REFERENCES**


APPENDIX

Table 1 Fitness Ratio of Confirmatory Analysis (CFA)

<table>
<thead>
<tr>
<th>Model Fit indices</th>
<th>Values</th>
<th>Range</th>
<th>By Researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMIN/DF</td>
<td>2.653</td>
<td>1-5</td>
<td>Kline, (1993)</td>
</tr>
<tr>
<td>GFI</td>
<td>0.915</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFI</td>
<td>0.911</td>
<td>&gt;0.90</td>
<td>Byrne, (1994)</td>
</tr>
<tr>
<td>NFI</td>
<td>0.908</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RMSEA</td>
<td>0.068</td>
<td>&lt;0.08</td>
<td>Hu &amp; Bentler, (1999)</td>
</tr>
</tbody>
</table>

Table 2 Reliability Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requisite Variety</td>
<td>0.647</td>
</tr>
<tr>
<td>Organizational Learning</td>
<td>0.643</td>
</tr>
<tr>
<td>Organizational Innovation</td>
<td>0.727</td>
</tr>
<tr>
<td>Organizational Performance</td>
<td>0.650</td>
</tr>
</tbody>
</table>

Table 3 Mean, Standard Deviation and Correlation Matrix

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Variable</th>
<th>S.D.</th>
<th>Mean</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Requisite Variety</td>
<td>0.667</td>
<td>3.724</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Organizational Learning</td>
<td>0.400</td>
<td>3.742</td>
<td>0.461**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Organizational Innovation</td>
<td>0.486</td>
<td>3.667</td>
<td>0.517**</td>
<td>0.528**</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Organizational Performance</td>
<td>0.463</td>
<td>3.681</td>
<td>0.331**</td>
<td>0.486**</td>
<td>0.641**</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed)
**Table 4 Fitness Ratio of Path Analysis (SEM)**

<table>
<thead>
<tr>
<th>Model Fit Indices</th>
<th>Values</th>
<th>Range</th>
<th>By Researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMIN/DF</td>
<td>56.276</td>
<td>1-5</td>
<td>Kline, (1993)</td>
</tr>
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<td>GFI</td>
<td>0.932</td>
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<tr>
<td>CFI</td>
<td>0.879</td>
<td>&gt;0.90</td>
<td>Byrne, (1994)</td>
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<td>NFI</td>
<td>0.878</td>
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<td></td>
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<tr>
<td>RMSEA</td>
<td>0.393</td>
<td>&lt;0.08</td>
<td>Hu &amp; Bentler, (1999)</td>
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**Table 5 Fitness Ratio of Path Analysis (SEM)**

<table>
<thead>
<tr>
<th>Model Fit Indices</th>
<th>Values</th>
<th>Range</th>
<th>By Researcher</th>
</tr>
</thead>
<tbody>
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<td>CMIN/DF</td>
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<td>Kline, (1993)</td>
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<td>GFI</td>
<td>0.998</td>
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<tr>
<td>CFI</td>
<td>0.999</td>
<td>&gt;0.90</td>
<td>Byrne, (1994)</td>
</tr>
<tr>
<td>NFI</td>
<td>0.997</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RMSEA</td>
<td>0.034</td>
<td>&lt;0.08</td>
<td>Hu &amp; Bentler, (1999)</td>
</tr>
</tbody>
</table>
Figure 1 Theoretical Framework

H6 (a) Organizational Learning

H6 (b) Organizational Innovation

H6 (a) Information Acquisition, Information Interpretation and Behavioral & Cognitive Changes

H6 (b) Technical Innovation, Process Innovation and Innovative Culture

H1 Requisite Variety

H2 Qualification, Experience and Manpower

H3 Financial and Non-Financial

H4 Organizational Performance

H5
Figure 2 Confirmatory Factor Analyses (CFA)