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Review

Review of the principles of complexity in business administration and application in financial statements

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This paper introduces the background and fundamental aspects of chaos and complexity together with the differences and the links between chaos and complexity, and the distinction between complicatedness and complexity with reference to issues in business administration. There is a need to be cautious when using chaos and complexity models in business administration, not to provide a superficial characterization of reality within a confused narrative. Besides, the application of these theories and models is accompanied with several rationales and logic, such as dialogic reasoning, circumscription, the logic of belief, paraconsistent logic, adductive and default reasoning. All these logic and rationale are applied in business administration and specifically in financial statements analysis, management discussion and analysis and notes to financial statements. There seems to be a need and an opportunity for the use of chaos and complexity in business administration; new logic and models are ready to be applied with solid foundations, but they require new forms of thinking.

Key words: Business administration, management, chaos, complexity, financial statements.

INTRODUCTION

BACKGROUND AND FUNDAMENTAL ASPECTS OF CHAOS AND COMPLEXITY

The sciences of chaos and complexity have been introduced in business administration and their possibilities have been explored (Lewin, 1999); management science is also interested in this new form of approaching reality and its developments. Complexity is evident in papers dating back as early as the 1900s concerning government, in which it is shown how some methods produce paradoxical effects and how simple ideas result in complex methods (Rogers, 1900). In particular, national government growth has been understood to be a product of external complexity, whereas at lower levels of government, growth comes from internal complexity (Appleby, 1954). Complexity can also be found in problems of land registration (Brewter, 1904). In relation to interaction

among scientific disciplines, it has been argued that stating this term serves to mask our scientific insufficiency (Bain, 1929). Furthermore, expressive richness has also been defined in terms of complexity (Kemeny, 1955), amongst other concepts.

Later on, Simon (1962) defined a complex system as one made up of a large number of parts, with non-simple interactions among them, in an architecture of levels. Still later, Kauffman (1971) stated the idea that a complex system can be decomposed into different perspectives or non-isomorphic parts, and Wimsatt (1972) described a complex system as characterized by decomposition into parts with non-coincident boundaries.

Finally, regarding information, complexity can be defined as the utility or probability changes that information can produce in a maximal open system (Driver and Streufert, 1969), the amount of information that a

proposition holds (Good, 1974), the inherent difficulty implied in the message of a sentence (Williams, 1979), or the information that makes a predicate capable of expressing more than others (Kemeny, 1955).

These stimulating definitions have endured through time but as part of a non-unified set of theories. Complexity is an intriguing concept (Ekstig, 2010) and scientists must deal with a plurality of incomplete and partially contradictory/supplementary theories (Wimsatt, 1972) as complexity is not a unified set of thoughts or theories (Bousquet and Geyer, 2011). However, the sciences in which the notion of complexity is employed share certain principles (Dooley, 1997), such as basic elements interacting one with another and with the environment, resulting in non-linearity with a feedback loop and self-regulation. Furthermore, complexity theories have in common the idea that the whole is different from its basic elements and emerges from them (Klijn, 2008), that it is more than the sum of its parts.

The notions of a multivalent reality, patterns and indetermination (Dooley, 1997) make complexity an interdisciplinary concept (Mitchell, 2009, p. 4), consisting of methods, reasoning, logic, formulations and narratives about reality. However, core to these approaches are the ideas of non-linearity and uncertainty. Uncertainty permeates many organizational activities, such as planning (Magellan, 2011); complexity, on the other hand, comprises scales and levels that reconcile the whole (Pribam, 1996, p. 41) with interrelations among every part of the system (Richardson, 2008) in a non-linear manner. Complexity also includes one mapping for each micro and macro level (Wimsatt, 1972).

Within complex adaptive systems, there are several models and characteristics, among which Dooley (1997) identifies the following:

- a) Complex Adaptive Systems: patterns determining system evolution, attractors, chaotic structures, emerging control and order, transition between equilibrium points, adaptation and self-organization;
- b) Autopoiesis: structural change, self-renewal, reproduction, ontogeny of structural change, dynamics of change, adaptation and self-organization;
- c) Dynamic systems: large-scale modeling, nonlinearity and self-regulation,
- d) Dissipative systems: conditions far from equilibrium, triggering by events, paradoxical dynamic stability and randomness;
- e) Dynamics of chaos: chaotic nature of changes, alternation between inertia and change, moves away from equilibrium and cumulative changes.

Thus, complexity introduces a rich set of concepts and models, but it is necessary to make a clear distinction between concepts and models to avoid confusion in their application. While linear models are intuitively easy to understand, complexity needs to be accessible

conceptually before its application. Usually, the popular narratives of complexity that exist in management science describe uncertainty and multiple elements as characteristics that impede understanding and control of a system and the making of predictions.

However, in the absence of understanding of a system, it is not possible to operate within it, so to model it as complex requires a rigorous application of the principles of complexity theory. There is a lack of control and predictability in complexity theory; however, once a system can be modeled as complex, it is possible to operate it by introducing some variations in parameters. This is not like the classical deterministic approach to science, but rather concerns the circumscription of reality, its logic and the application of known models of complexity. Moreover, just as chaos is not unpredictability and disorder (Morin, 2007), so it is with complexity. Yet, the principle of uncertainty implies that variations in parameters tend not to be provided by a rigid set of conditions but by a large number of conditions, which are mostly unknown.

DIFFERENCES AND LINKS BETWEEN CHAOS AND COMPLEXITY

The concept of chaos has received wide spread attention within complexity theory; studies on chaos in complex systems and co-evolution (Anderson, 1999) and chaotic behavior in organizations (Dooley and Van de Ven, 1999) show the links between chaos and complexity. Chaos theory is attributed to the second generation of complexity theory (Alhadeff-Jones, 2008) and connected to the theory of catastrophe (Jakimowicz, 2010; McKelvey, 1999).

The dynamics of chaos comprise irregular periodicity, sensitivity to initial conditions and lack of predictability (Brown, 1995), and it is sufficient that the system is sensitively dependent on initial conditions (Lorenz, 1995, p.8). Chaos theory involves the qualitative study of unstable and non-periodic behavior in deterministic nonlinear dynamical systems (Kellert, 1993, p.2).

Meaningful information seems to be located between order and chaos (Adriaans, 2009) and consequently chaos is associated with disorder (Villacís, 2005). Complex systems seem to have a more robust structure (Cilliers, 2000). Nevertheless, deterministic chaos is composed of well-defined formulations and analytical solutions (Alligood et al., 1996) that provide a clear structure to chaotic models. Moreover, chaotic mathematical models show that simple models result in complex properties (Morel and Ramanujam, 1999).

Complex systems and chaos can have a weak relationship (Cilliers, 2000) and differences between them could have their origin in narrative and metaphorical language, rather than a deterministic and mathematical perspective. In this regard, several types of language can

be related to chaos and complexity, but each generates different explanations and models that do not converge. Both chaos and complexity show the potential for generalization and large doses of subjectivism, which are necessary qualities in dealing with uncertainty and unknown information, but this promotes non-convergence.

Although complex systems do not imply chaos and chaos does not imply complexity (Morel and Ramanujam, 1999), it is possible that chaos is a part of complexity. Concerning this possibility, chaos theory could be part of complexity theory (Klijn, 2008), and chaos may be a class of behavior within complex systems (Dooley, 1997). Both chaos and complexity belong to a category of models that deal with unknown information, indeterminism, and a certain and partial representation of reality. In relation to both chaos and complexity, a circumscription is made about reality and models are derived from that circumscription. However, the many factors affecting the parameters of the models also confer uncertainty. With regard to this, complexity is a humble approach within which there is recognition of its limits in relation to predictability and control (Bousquet and Geyer, 2011).

Moreover, circumscription is a type of non-monotonic logic; in this logic, certainty is not accomplished through the accumulation of knowledge and error reduction. Defining the system involves determining its characteristics of non-linearity, openness and environmental interaction through a construction comprised of identified patterns. In this sense, a single measure of all-over complexity is not realistic (Bunge, 1962).

THE DISTINCTION BETWEEN COMPLICATION AND COMPLEXITY AND ASSOCIATED LOGICS

Simplicity is not easy to accomplish and ultimately simplicity itself is a complex concept (Bunge, 1962). Bunge (1962) defines the material and ideal objects to be classified within the categories of simplicity and complexity. Whereas it is possible for complexity to be a state of the world, complication is a state of mind (Norman, 2010, p.2); this introduces a distinction between the logic of decision making and the logic of the real world. Managerial or business logic acts upon a world which is never fully known, so the first step is defining partial systems or worlds.

Certainly, it is not easy to build a logical architecture every time a manager needs to make a decision. Furthermore, conceptual complexity might obscure the organization's true situation (Michael, 1968) in the case that it is not based on solid foundations. If complexity spreads across different levels of the world, the boundaries in the part in which we are interested define the level at which complexity arises and the levels where basic elements are located. Complexity arises from simplicity in a hierarchical manner (Simon, 1962) and comprises hierarchical stages (Lampont, 2008).

However, it may be difficult to distinguish between what is complex and what is complicated (see Richardson, 2008), and it might be the case that business administration could be operating on a complicated basis while subjacent processes in the world are operating on a complex one. Vasconcelos and Ramirez (2011) argue that organizations cope with both complexity and complication and state that natural complexity guides the actions of the organization. They follow Atlan (1979) in his distinction between complication as algorithmic complexity and complexity as contextual or natural complexity.

Thus, contextual complexity constitutes a right to act in a context in which there is incomplete information, intuitive notions, or contextual pattern recognition concerning the course of action or consequences (Juárez and Contreras, 2012, pp. 15–16). In acting, it is necessary to be adaptive and a precondition for survival is the ability to distinguish between the world as sensed and the world as acted upon through an iterative process (Simon, 1962). That is, information is obtained through action; the complex nature of the world does not allow the development of a framework with complete information, rather it is action that provides information in terms of consequences. Thus, actions can comprise complicated algorithms developed from a complex and unknown world.

Prediction implies complication. Whilst prediction may be based on a well-defined set of premises, in complex contexts it depends on the interaction between elements (Sargut and McGrath, 2011). This means that prediction depends on actions, but is not reduced to them. Furthermore, interaction is circumscribed by the operations of the observer, determining a part of reality as complex. Ultimately, it is impossible artificially to differentiate between what is complicated and what complex as both are, to some degree, presentany context (Juárez and Contreras, 2012, p. 19).

Accordingly, managers operate on the basis of a logic that does not follow the rules of classical logic, i.e., they do not follow the condition $p \rightarrow q$, or the law of the excluded middle, $A \vee \neg A$. This logic admits different states and dynamics of reality. For instance, in circumscription, a minimum set of elements of reality, $C(\text{Business Reality}) = (C_m \mid C_m \text{ is a minimum set of Business Reality})$, is determined by $C_m = \{x_1, x_2, \dots, x_n\}$, comprising all the basic interacting units associated by the circumscription.

In paraconsistent logic, different and opposite states must be taken into account in relation to simultaneous existing and decision-making needs. Moreover, dialogic reasoning overcomes the law of the excluded middle (Morin, 2007). Accordingly, B and C , being $C = \neg B$, coexist and the decision-making process can verify that one of them is true if – and only if – the other is false.

The final logic considered here is the logic of belief (Smullyan, 1986), which consists of analyzing the beliefs held on the part of the person reasoning. That is, for all propositions p , $\neg p$ ($Bp \rightarrow (B'\neg p)$), and any belief B that a person holds in relation to a proposition p implies another

belief in p , B' , or just p being true.

This set of logics (for a detailed description, see Juárez, 2013) helps to address complexity and allows the application of minimum rules in complex daily situations at the managerial level.

SOME CONCEPTUAL CAUTIONARY REMARKS ON APPLYING CHAOS AND COMPLEXITY IN BUSINESS ADMINISTRATION

In business administration, metaphors help to build strategies and planning. However, the metaphor of complexity sometimes results in a confused narrative and instead of describing a circumscription of business reality, introduces a superficial characterization. To avoid this, several types of language related to complexity and chaos are useful in business administration. Neo-reductionist, metaphorical and critical pluralistic languages (Richardson, 2008) refer to complexity in different ways.

Based on simulation studies and under the assumption that empirical-analytical formulations can give an account of complexity, neo-reductionist language searches for objectivity in testing hypotheses; in contrast, metaphorical language is the language of daily interactions and is highly subjective. Everyday language does not represent objective neo-reductionist models, but creates new models, employing implicit knowledge that uses non-classical logics in their simple forms. Critical pluralism avoids the excesses of the other two (Richardson, 2008) and consists of a critical reflection, a deconstruction and construction of reasoning about complexity.

The use of these different narratives and complexity models indicates that translating business reality into an intelligible and considered explanation it is not an easy task. It is necessary to avoid common-sense recommendations. The world is complex (Elsner et al., 2010; Urry, 2011), but the fact that complexity is an intriguing concept with no agreed definition (Ekstig, 2010) and that many models comprise complex properties (Morin, 2007) does not justify an excessive simplification of logic.

INSIGHTS INTO THE APPLICATION OF CHAOS AND COMPLEXITY IN FINANCIAL STATEMENTS

There are many applications of chaos and complexity in the field of business administration. In particular, in relation to corporate finance, there are examples of chaotic models of macroeconomics explaining failure, transformations and sources of economic complexity (Jakimowicz, 2010), or explaining how financial markets correct their mistakes (Haley, 2010), as well as chaotic and complex models of financial health (Juárez, 2010a, 2010b, 2011a, 2011b).

Furthermore, the notion of complex adaptive systems has been applied in supply chains (Choi et al., 2001),

breeding programmes (Teisman, 2008), government (Teisman and Klijn, 2008), strategic public management (Bovaird, 2008), management (Boisot and Child, 1999; Salmadora et al., 2008; Sterman and Wittenberg, 1999; Tait and Richardson, 2008), organization and capabilities (Augier and Teece, 2006), bargaining games (Chatterjee and Sabourian, 2000), market analysis (Gale and Sabourian, 2005), competitive advantage (Stefanović et al., 2011), the development of new products (Kim and Wilemon, 2007), and landscape design (Levinthal and Warglien, 1999).

Other areas of interest in applying complexity to business administration are entrepreneurship (Swanson and Zhang, 2011), leadership (Denis et al., 2000; Hannah and Lester, 2009; Hooijberg et al., 1997; Juárez and Contreras, 2012; Ussahawanitchakit, 2011), and culture generation (Frank and Fahrback, 1999).

No doubt many of these studies have had an impact on financial statements, but it seems that the financial statement remains embedded in a normative paradigm. Financial accounting as a whole is rather normative (Frezatti et al., 2009) and as such is not permeated by chaos and complexity approaches. Many issues in financial statements are under scrutiny, for instance intangibles (Lev, 2008; Skinner, 2008a, 2008b), and are the subject of disagreement among experts (Springer and Borthick, 2004), as are competency-based education (Boritz and Carnaghan, 2003), human resources accounting (Grant et al., 1976), natural resources accounting (Harris and Fraser, 2002), goodwill (Ketz, 2002), codes of conduct (Neill et al., 2005), and critical accounting policies (Levine and Smith, 2011).

Moreover, basic concepts have been discussed in relation to Financial statements, such as income (Bedford, 1951), Assets, Liabilities and Equity (Chambers, 1975), cash flow (Gombola and Ketz, 1983), earnings management (Jiraporna et al., 2008), financial distress (Purnanandam, 2008; Titman and Tsyplakov, 2007), and financial health and chaos theory (Juárez, 2010a, 2010b, 2011a, 2011b; Juárez and Farfán, 2012). In addition, the use of concepts from biology (Mărăcine and Delcea, 2009; McKelvey, 1999; Morel and Ramanujam, 1999) in terms of syndromes such as bankruptcy (Scarlat and Delcea, 2011) has been introduced in the analysis of financial statements.

Accordingly, critical thinking is necessary (Camp and Schnader, 2010; McBride et al., 2005) due to the presence of uncertainty in estimates (Billings, 2011) and accounting principles (Manninen, 1997), as well as the fact that financial information admits different interpretations (Bjurklo, 2008). Another logic allowing for uncertainty and the existence of contradictions could provide a different view.

Regarding the fundamental aspects of accounting, the basic model $\text{Assets} = \text{Liabilities} + \text{Stockholders' Equity}$ is based on logical reasoning and not a mathematical computation. A well-established set of standards for

accounting sustains this model. However, from a different viewpoint, the sum of liabilities and stockholders' equity is not equal to assets; they are different categories. In general, we could say that assets comprise real amounts, and liabilities and stockholders' equity are claims against those assets. Classical logic, which does not allow for the existence of opposites, cannot explain this; something cannot be and not be at the same time (the principle of the excluded middle).

Other logics are capable of explaining the operations in financial statements, i.e., dialogic reasoning allows for the existence of contradictions (Morin, 2007) and default reasoning explains the assignment of transactions to items in the absence of examples that contradict the rule. Also, abductive reasoning makes it possible to perform a transaction whenever an adequate explanation exists, by a rule of generalization.

Moreover, it might be possible to define a proposition p by applying a true-false value, for example, "transaction X is made in unearned service revenue". Now, bearing in mind the principles of circumscription logic (McCarthy, 1980), a proposition is considered true only if necessary and if it is possible that a proposition is false, it is false. In this case, it is possible that proposition p is false because the service could not be provided and thus, according to circumscription logic, this explanation, which did not exist in initial premises, must be taken into account. Accepting the minimum of truth means applying circumscription logic to financial statements.

In addition, the Management Discussion and Analysis (MD&A) section in financial statements, Critical Accounting Policy (CAP) and Critical Accounting Estimates (CAE) present uncertainties, and estimate determination and accuracy (O'Shaughnessy and Rashty, 2005, 2007), but all of them are highly subjective. In the same manner, Notes to financial statements deal with policies and information concerning doubts in financial statements. These reports tend to contain contradictory sentences – violating classical logical principles – and to be based on a set of beliefs.

This can be overcome through paraconsistent logic, which admits contradictions. According to this, and assigning true (T) and false (F) values, it is possible to say that a sentence is true if and only if the opposite is false: $T(B) \leftrightarrow F(\neg B)$. Thus, the contradiction is solved by a logical relationship between contrasts. Furthermore, Notes to financial statements are based on a set of assumptions that are sustained as long as none of them fail. This set of beliefs $B(b_1, b_2, b_3, \dots, b_n)$ makes reasoners of financial analysts. Thus, there are several options, depending on the reasoner (Smullyan, 1986) engaging in the analysis and the degree of certainty that the analyst attributes to himself or herself. Moreover, the analyst can always change some beliefs.

Finally, the use of logarithmic transformation results in chaotic distribution in many items of financial statements (Juárez, 2010a, 2010b, 2012, 2013). Logarithmic transformations are examples of the emergence of complex

systems or patterns from initially simple origins (Morel and Ramanujam, 1999).

CONCLUSION

A link is needed between complexity/chaos theory and management and financial statements. This link must be explained in management language and logic using different approaches based on models of the social and natural world. This means avoiding linguistic idealism (Manninen, 1997), unrealistic experimental tasks (Booth and Cocks, 1990), and living in an "ivory tower" (Elwin, 2008). Management and financial statements demand new explanations. It is not possible for business administration to make a transition to chaos and complexity models while continuing to base financial statements on the same principles that have been in force for decades. There is a new logic (Lewin, 1999) to be applied to organizational routines (Morel and Ramanujam, 1999) and new forms of thinking about these routines are needed.

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Full Length Research Paper

Clients' service perceptions of private higher education institutions in South Africa: An importance-performance analysis for strategic managers

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Globally, higher education institutions (HEI) are required to be more business-like in their functioning. Students are increasingly being recognised as discerning customers, selecting a provider based on its ability to provide a superior value proposition. Unlike their public counterparts, private higher education institutions (PHEI) in South Africa receive no financial support from the government. To ensure students' patronage, it is imperative for private providers to determine their expectations and how they rate the PHEIs performance. An importance performance analysis (IP) was done based on data gathered from a quantitative survey on 600 full-time students at three different PHEIs. A comparative IP matrix was also constructed to provide the PHEIs with a visual interpretation of the gathered data. The IP analysis yielded significant negative gaps between performance and importance regarding the attributes. The comparative IP matrix indicates important areas for strategic consideration to the three PHEIs respectively. This should assist management in improving their service offerings. This study should also contribute towards the body of knowledge regarding PHEIs in South Africa.

Key words: Choice attributes, customer satisfaction, private higher education, importance-performance, service quality, strategic management.

INTRODUCTION

Globally, higher education (HE) landscapes have been characterised by a move towards the "commodification" of HE. Higher education institutions (HEIs) are required to be more business-like in their functioning and with students, viewed as clients, who are displaying a more consumerist behaviour towards HE, selecting HEIs on the basis of aspects such as value for money, and the future possibilities of securing employment, as opposed to the love of the subject (Maringe, 2006, 466, 467). The marked proliferation of private higher education institutions (PHEI), capitalising on governments' inability to provide

for the ever increasing demand for HE, has probably contributed to the above mentioned trend. Whether or not morally justified, most PHEIs are essentially businesses that, in their search for profit, exploit opportunities in the HE industry (Levy, 2008:7). Add to this the fact that, unlike their public counterparts, PHEIs in South Africa receive no state subsidies (De Villiers and Nieuwoudt, 2010:13), and it becomes clear that they have to subscribe to sound business principles in order to ensure their long term survival.

To ensure long term sustainability, the marketing

concept philosophy propagates the creation, communication, and the delivering of meaningful superior customer value (Kotler and Keller, 2009: 59-63). This implies that students, as potential customers, select a HEI based on its superior ability to fulfil his or her most important needs (the perceived benefits), compared to the perceived costs of the offering. Based on this premise, in order to design a superior needs satisfaction offering, PHEIs should thus identify what those needs or expectations are. Even if a student select a specific HE, this does not guarantee long term patronage to the point where the student graduates. Students' attrition will inevitably lead to loss of potential long term profit. In line with modern marketing philosophy, the delivery of superior customer value is inextricably linked to customer relations management (Strydom, 2011:287). PHEIs thus need to identify the expectations of students and constantly monitor if the students' expectations are met, as a negative gap between the expectations and the experiences of students at a PHEI may lead to students' attrition or negative word-of-mouth communication.

Numerous studies have investigated aspects in the HE field like students' expectations and experiences, students' satisfaction and service quality (Joseph et al., 2003; National Survey of Student Engagement, 2012; Martilla and James, 1977; Parasuraman et al., 1986; Yooyen et al., 2011). Research on the PHEI landscape in South Africa is limited and the researcher was unable to find any evidence of research regarding the comparison between expectations and experiences of PHEI-students in South Africa. Considering this problem, a research question was formulated:

RQ1: What are the differences between the important expectations and perceived experiences of students at different private higher education institutions in South Africa?

The purpose of this paper was to identify the important expectations that students had in deciding on a specific PHEI, and to compare it with the students' perceived experiences regarding these important expectations at the PHEIs that they have chosen and were now studying at. It was envisaged that a comparison of the attributes of their service offerings in terms of their importance and perceived performance and an IP matrix, constructed from this analysis, would provide PHEIs with an indication of important areas for strategic consideration. Data gathered from this study can thus assist PHEIs to enhance their value propositions to their primary customers, namely their students.

LITERATURE REVIEW

The higher education industry and its increasing reliance

on a marketing orientation were firstly studied and related to consumer satisfaction. Different approaches to the measurement of consumer satisfaction in HE were further investigated, linking it to the value thereof in management decision making.

The "marketisation" of higher education

It seems that, in many parts of the world, there is a shift towards a market orientation among HEIs. HE is increasingly being viewed as a marketable commodity where the student as primary customer determines the offerings as opposed to HE as a public good (Yooyen *et al.*, 2011:25). Gaziel (2012:290) refers to the shift in HE towards market forces, where governments attempt to relieve HE demand pressures, moving away from "ownership to regulation". In addition to increasing demand pressures, aspects like reduced funding (Altbach *et al.*, 2009:69; Maslen, 2011), the significant growth of PHE (Altbach *et al.*, 2009:69; Levy, 2010:12) and globalisation (Mabizela, 2007:23) have forced HEIs to be more business-like and entrepreneurial in their functioning, relying more on tuition fees and alternative revenue generation to survive. Mabizela (2007: 23) remarks that the role of the government is progressively being replaced by the private sector with the objectives of profit-maximisation, as opposed to social development; this is thus a subscription to "marketisation". Maringe (2006: 477) postulates that the HE environment has become increasingly competitive. He suggests that potential students are becoming discerning choosers in this HE marketplace, and that HEIs should adapt accordingly. According to Virgiyanti *et al.* (2011:578), globally, HEIs are realising the value of marketing theory and are applying these theories and concepts to gain competitive advantages. Tait and De Jager (2009:1026) concur with this view by stating that the educational environment "has not only become competitive, but also more commercialised".

Worldwide, enrolment through PHEIs is currently the fastest-growing HE segment (Altbach and Levy, 2005:1). Drawing on Gürüz, Altbach *et al.* (2009:67-77) point out that 30% of global student enrolment is in PHE. Altbach *et al.* (2009:67-77), as well as Levy (2008:7), contend that the largest increase in private provision is in "demand absorbing", emanating from excess demand created by the "massification" of HE. They conclude that most for-profit PHEIs seem to operate in this non-elite sector. Gupta (2008:572) notes that this trend is also observed in South Africa, where the number of profit seeking PHEIs in the demand absorbing sector is growing significantly. The increase in non-governmental HE provision may be attributed to the inability of governmental funding to meet the growing demand for HE (Levy, 2009:3). Additionally,

Levy (2010:12) refers to the trend of many PHEIs focusing on occupation-oriented fields, and thereby providing programmes that prepare students for a specific job. This is an area, according to him, from which public higher education institutions (PBHEI) have traditionally shied away. In March 2013, there were 87 registered and 31 provisionally registered PHEIs in South Africa (South Africa, Department of Higher Education and Training, 2013:9-72). Even though these PHEIs educate thousands of students, perceptions of PHEIs' inferiority in the South African HE landscape still prevail (Setswe, 2013:101). PHEIs are viewed as profit-seeking enterprises that deliver education of "questionable quality, only in areas of great demand and that they contribute little to research". PHEIs may not include the word "university" in their titles (Bezuidenhout, 2012:151,152). In contrast to PBHEIs, PHEIs do not receive subsidies, tax rebates, or facilities from Government. It thus seems that PHEIs are not truly regarded as full partners in the HE landscape. Without the above-mentioned support from Government and the HE fraternity, private providers are forced to charge more for their programme offerings and mostly cannot afford to award bursaries. Because of these higher fees and lack of bursaries, the demand-absorption capabilities of PHEIs, relieving the pressing need for HE in South Africa, are grossly underutilised (Bezuidenhout, 2012:151,152). With all the above-mentioned additional challenges facing them, the view that HEIs of today should subscribe to a marketing orientation, should thus ring even more true for PHEIs in South Africa.

A marketing orientation for higher education institutions

Modern marketing thought dictates that the customer and the satisfaction of his/ her needs is in essence the reason for enterprises' existence and that all organisational activities should revolve around this philosophy (Kotler and Keller, 2009:59-63; Lamb et al., 2010:5-15). Organisations that adopt this orientation thus aim to create superior needs satisfaction (Venter and Jansen van Rensburg, 2009:9) believing that the creation of superior customer value (perceived benefits minus costs) stands central to the success of any organisation (Safarnia et al., 2011:135). With maximising consumer satisfaction in mind, organisations need ways to measure customer satisfaction levels.

There is a worldwide increase in customer satisfaction studies in HE. Institutions' ability to fulfil students' needs is increasingly being scrutinised and compared. The annual National Student Survey in the United Kingdom (UK), Australia and Ireland allows students, in their respective countries, to complete a survey to evaluate the institution where they study. The results of the surveys,

completed by hundreds of thousands of students, are open for access to anyone who has an interest in the results, including prospective students (National Student Survey, 2012; Student Marketing Australia, 2013; Studentsurvey.ie, 2013). The National Survey of Student Engagement in the United States and Canada is a similar survey that measure student experiences across North America (National Survey of Student Engagement, 2013). Similar national studies have been done in New Zealand (Education Counts, 2013). The above surveys should alert HEIs to the fact that, failing to meet student expectations, could lead to negative post-purchase communication. Citing various authors, Ramaiyah et al. (2007) concur and refer to the value of positive word-of-mouth post enrolment communication, as well as to the notion that the levels of satisfaction or dissatisfaction strongly influences students' performance at HEIs. Round (2005: 1) refers to numerous studies, including her own, that have indicated that students tend to leave a HEI if their expectations are not met.

Measuring customers' satisfaction in HE

There is no generally accepted approach to the measurement of customer satisfaction (Al-Alak and Alnaser, 2012:157). Numerous researches in the HE field have followed different measurement approaches that are prevalent in general customer satisfaction studies. Yoochen *et al.* (2011, 26) mention that service encounter evaluations in HE lead to varying degrees of "satisfaction" or "dissatisfaction" outcomes. The disconfirmation of expectations paradigm (DP) proposes that meeting or exceeding a customer's expectations will result in satisfaction, but perceived organisational performance that falls short of the customer's expectations will lead to the disconfirmation of those expectations and, ultimately, dissatisfaction (Oliver, 1980: 460-469; Lamb *et al.*, 2010:5). Patterson and Johnson (1993:91) refer to the extensive use of this "post-purchase, evaluative judgement concerning a specific transaction" model in HE. They also cite numerous studies that have indicated that the disconfirmation construct is a robust indicator of satisfaction/ dissatisfaction. Using the DP as conceptual framework, Parasuraman *et al.* (1985) have developed a similar conceptual model that examines dimensions of service quality, namely SERVQUAL (SQ), as opposed to the DP approach, which was, according to them, more suited to product related measurement (Boshoff and Du Plessis, 2009:37). The SQ approach advocate that perceived service quality is determined by a customer's comparison of his/her expectations and the organisation's perceived performance, resulting in performance-expectation gaps (Patterson and Johnson, 1993:92). Whereas the DP paradigm pertains to specific

consumption experiences, SQ refers more to an overall attitude towards service quality. Unlike the SQ approach, the DP identifies disconfirmation as intervening factor that has a distinct effect on a customer's satisfaction (Patterson and Johnson, 1993:93). Citing Mukherjee and Nath, Yoochen et al. (2011, 28) state that the SQ model is the most widely followed measurement approach in HE.

Joseph et al. (2003:22) suggest that the importance-performance (IP) paradigm provides an alternative to SQ, contending that, similarly to DP, IP allows for a detection of specific variance in different service offerings, as opposed to a more general attitudinal approach of SQ. Where DP and SQ is concerned with comparing expectations with perceived performance, IP, a methodology based on the original IP theory of Martilla and James (1977), investigates the importance that customers attach to different variables and then compare it with the customers' perceived experience of each specific variable, resulting in a P-I score (performance minus importance). These P-I scores can then also be plotted on an IP grid or matrix that indicates important areas for HEIs to consider in improving their service offerings (Boshoff and du Plessis, 2009: 47, Kitcharoen, 2004:21; Olimpia, 2012:475). The IP grid is a marketing instrument suited to decision making concerning customer satisfaction improvement (Olimpia, 2012:474).

All three above approaches have unlocked theoretical, conceptual and operational critique (Arokiasamy, 2012: 57; Boshoff and du Plessis, 2009:48; Patterson and Johnson, 1993:92; Olimpia, 2012:476). Despite its alleged shortfalls, these measurement approaches do, at the very least, provide an indication to HEIs of their primary clients' expectations and how they evaluate their service offerings. According to Khodayari and Khodayari (2011: 42), most studies on HE identify service quality as antecedent to customer satisfaction. Most customer satisfaction/ service quality studies in HE also identify significant gaps between expectations and perceived performance. (Joseph et al., 2003:14; Khodayari and Khodayari, 2011: 43; Yoochen et al., 2011:33; Yorke and Vaughan, 2012: 18;). Service quality, specifically in service organisations like HEIs, refers to a customer's evaluative judgement of his/her expectations and perceived experiences, resulting in gaps between these constructs (Boshoff and Du Plessis, 2009:37). Based on this viewpoint, a lack of service quality or elements thereof, as identified at most HEIs, should have a significant influence on student satisfaction and thus on their resulting post enrolment communication and on their decision regarding the continuation of their studies. Currently, there is no study that has investigated the expectations and perceived performance evaluations of PHEI-students in South Africa. The focus of this paper is not to define the dimensions of service quality or critically evaluate the different service quality measurement

approaches, nor is it to provide a pin-point accurate measurement of customer satisfaction or dissatisfaction. The focus of this paper is rather to alert PHEIs in South Africa as to the importance that students assign to different attributes in their choice of a PHEI compared with their perception of the PHEIs performance regarding each attribute.

Key research objectives

1. To conduct an analysis of the importance-performance evaluations of various service offering attributes among respondents at different private higher education institutions in South Africa
2. To construct an importance-performance matrix of various service-offering attributes among respondents at different private higher education institutions in South Africa.

Secondary objectives

To determine whether there are significant differences in the importance that students from different ethnic backgrounds have assigned to the top three overall most important service offering attributes identified in this study. The above secondary objective alludes to the fact that the sample of this study exhibited quite a diverse racial make-up.

Hypotheses

To address the above secondary objective, the following hypotheses were developed to provide a specific testable expectation of empirical reality:

1. $H_{1(0)}$: There are no significant differences in levels of importance that students from different ethnic backgrounds have assigned to security and safety conditions on campus.
2. $H_{1(a)}$: There are significant differences in levels of importance that students from different ethnic backgrounds have assigned to security and safety conditions on campus.
3. $H_{2(0)}$: There are no significant differences in levels of importance that students from different ethnic backgrounds have assigned to employment prospects.
4. $H_{2(a)}$: There are significant differences in levels of importance that students from different ethnic backgrounds have assigned to employment prospects.
5. $H_{3(0)}$: There are no significant differences in levels of importance that students from different ethnic backgrounds have assigned to well-equipped computer

facilities.

6. H_{3(a)}: There are significant differences in levels of importance that students from different ethnic backgrounds have assigned to well-equipped computer facilities..

RESEARCH METHODOLOGY

The social research conducted in this cross-sectional study fell within a quantitative paradigm and was descriptive in nature. In addition to a literature review, the study included an empirical investigation by means of a self-report survey design. The quantitative self-report survey design enabled the researcher to include a large number of respondents in the study. The importance-performance (IP) measurement approach as was followed in the survey (Joseph et al., 2003; Kitcharoen, 2004; Martilla and James, 1977; Olimpia, 2012). Martilla and James (1977:79) propose that this “low-cost, easily understood” technique provide organisations with an indication of where to focusing terms of their resources and marketing mix. The above authors state that value of the techniques lies in determining the relative importance and performance of attributes to prioritise marketing actions. This approach has enabled the researcher to identify the underlying relative importance of various service offering attributes to respondents in their choice of PHEI and their evaluation of the PHEIs offering in terms of these attributes. The gaps between the dimensions of importance and corresponding performance were identified and incorporated into an IP-grid or matrix. An IP-grid can provide a way to graphically present data-interpretation for organisations (Martilla and James, 1977:79). Citing Slack and Barsky, Kitcharoen (2004:21) postulates that attributes of a service offering that are deemed (by customers) to be of high importance, will play a critical role customers’ overall satisfaction. By identifying these important elements or attributes and their corresponding perceived performance, PHEIs should receive an indication of the most important performance areas that need improvement.

The sample framework

The target population consisted of full-time students registered at three PHEIs. A purposive sample was employed; consequently, 600 full-time students (200 per PHEI) were targeted across all the academic departments of each PHEI. 458 usable questionnaires were received back. 55.3% of the respondents were female versus 44.7% male. This is in line with an overall female-to-male student ratio of 54.5 to 45.5% found in a study of 82 PHEIs that yielded a head count of 65 755 students registered at private providers in 2010 (Tladi, 2012:12).

The research instrument

The primary data collection method involved a quantitative survey with a paper-based, self-administered questionnaire as the research instrument. Interval scale questions were posed to respondents to determine the importance of 45 attributes to them in selecting a PHEI by rating it on a five-point scale from “not important at all” to “very important”. These choice-related attributes were selected from various existing choice-studies in HE worldwide. A similar scale was used to request the respondents’ perceived performance evaluation (from “not good at all” to “excellent”) of the 45 attributes regarding the PHEI where they studied. To facilitate the content validity of the

data collection instrument, the researcher consulted established questionnaires and followed the guidelines of good questionnaire design and asking questions. The questionnaire was presented to a panel of experts for their scrutiny. It was also subjected to a pre-test study among students attending a PHEI. The internal reliability of the instrument was measured by using Cronbach’s Alpha technique to indicate the internal consistency of the instrument. An overall correlation coefficient of 0.96 that was obtained provides a strong indication that respondents would have scored the same at different points in time (Field, 2005, 666).

The data collection and ethical considerations

A representative of each of the three institutions of this study was identified and contacted by the researcher, after which each PHEI gave formal permission for the study. The representatives distributed 200 questionnaires among the respective academic departments of each PHEI. Lecturers, who were used as field workers, handed out the questionnaires to students attending classes, which they completed there and then in the lecture rooms.

The respondents were fully informed about the nature of the study being conducted and given a choice of either participation or non-participation. The anonymity of all participants was protected. The respondents were allowed to withdraw from the study at any time. An informed consent form accompanied the questionnaire. This form was signed by all the participants.

The data analysis

The data were analysed with the help of SPSS, version 18.0. The statistical analysis of data included descriptive, as well as inferential statistics. The relative importance and performance rating of the 45 attributes in the questionnaire were determined by calculating the means of the ratings per group of respondents for each of the PHEIs respectively. The sum of the means of all three PHEIs’ respondents was also calculated to identify the 10 overall most and 10 overall least important attributes. A performance minus importance (P-I) gap analysis for each PHEI was done based on the 10 overall most important and 10 overall least important attributes. A comparative IP grid between the three PHEIs of this study was constructed to indicate areas for strategic consideration. Univariate tests (ANOVA or analysis of variance) were employed to test the set null hypotheses (see section 3) regarding the effects of categorical (independent) variables on individual dependent interval variables (Field 2005, 288, 571–573, 725). A significance level (α) of 0.05 was chosen as a cut-off point for rejecting or accepting all the null-hypotheses of this study.

RESULTS

200 questionnaires were distributed to three PHEIs respectively. 458 usable questionnaires were returned out of the 600 that were distributed, yielding a very high response rate per institution and a high subsequent overall response rate (76%).

Table 1 depicts the overall (combined mean scores of the three PHEIs) 10 most important attributes to students when they decided to study at a PHEI. Table 2 provides a look at the 10 overall least important attributes to PHEI-students. From this, the following noteworthy

Table 1. Overall 10 most important attributes that have influenced PHEI choice.

Overall rank	Attribute	Mean
1	Security/ safety conditions on campus	4.38
2	Employment prospects	4.34
3	Well-equipped computer facilities	4.28
4	Spacious, well-equipped classes	4.27
5	International links (e.g. study & job opportunities)	4.26
6	Academic staff approachable/informed	4.26
7	Reputation of the study programme	4.24
8	Reasonable class fees (not too expensive)	4.22
9	Academic reputation of the institution	4.20
10	Availability of information about the institution	4.18

Table 2. Overall 10 least important attributes that have influenced PHEI choice.

Overall rank	Attribute	Mean
36	Recreation facilities	3.54
37	Dining halls on campus	3.45
38	Social activities/night life	3.45
39	Private accommodation near the institution	3.43
40	Availability of public transport	3.39
41	Size of the student population	3.36
42	Hostel accommodation	3.17
43	Sport facilities of the institution	3.06
44	Sport reputation of the institution	2.95
45	Tradition (my brother/sister or parents went there)	2.41

observations:

1. Overall, the respondents identified safety and security conditions as being the most important attribute in their choice of PHEI. The second most important overall variable in this study was employment prospects.
2. Interestingly, institutional facility factors such as well-equipped computer facilities and spacious, well-equipped classes ranked overall third and fourth, respectively, among the choice variables.
3. The availability of facilities, including those for recreation, sport, dining halls, hostels and private accommodation, were ranked the lowest in importance among the 45 choice variables by the respondents at all three PHEIs.
4. Tradition was, by a large margin, the least important choice variable.

Tables 3 to 5 provide a P-I gap analysis (mean score of perceived performances minus the mean score of perceived importance) of the 10 overall most important attributes to students for each of the three PHEIs respectively and Tables 6 to 8 a gap analysis of the 10

overall least important attributes to students per PHEI. Salient observations include:

1. There are significant negative gaps for all 10 most important attributes for all three PHEIs. Negative gaps indicate that students' expectations with regards to a specific service offering attribute have not been met and vice versa. Higher negative gaps indicate higher levels of dissatisfaction (as discussed earlier in the study).
2. The gap analysis for PHEI two displays much lower negative gap scores. This may allude to this private provider's superior ability, in relation to the other two PHEIs, in addressing the important expectations of students. The negative gaps though indicate that PHEI two still needs to improve regarding all 10 attributes.
3. Reasonable class fees consistently display the biggest negative gap.
4. The P-I gap analyses of the 10 least important attributes yield quite a few positive scores.

Figures 1 and 2 display I-P matrices for the three PHEIs of this study. The importance and perceived performance of attributes (based on mean scores) of

Table 3. P-I gap analysis of the overall 10 most important attributes for PHEI 1.

Overall rank	Attribute	Importance	Performance	P- I Gap score
1	Security/ safety conditions on campus	4.33	3.71	-0.62
2	Employment prospects	4.29	3.24	-1.05
3	Well-equipped computer facilities	4.48	3.08	-1.4
4	Spacious, well-equipped classes	4.21	3.50	-0.71
5	International links (e.g. study & job opportunities)	4.29	3.43	-0.86
6	Academic staff approachable/informed	4.23	3.64	-0.59
7	Reputation of the study programme	4.15	3.49	-0.66
8	Reasonable class fees (not too expensive)	4.25	2.99	-1.26
9	Academic reputation of the institution	4.13	3.50	-0.63
10	Availability of information about the institution	4.11	3.74	-0.37

Table 4. P-I gap analysis of the overall 10 most important attributes for PHEI 2.

Overall rank	Attribute	Importance	Performance	P- I Gap score
1	Security/ safety conditions on campus	4.25	3.83	-0.42
2	Employment prospects	4.22	3.75	-0.47
3	Well-equipped computer facilities	4.01	3.56	-0.45
4	Spacious, well-equipped classes	4.22	3.87	-0.35
5	International links (e.g. study & job opportunities)	4.16	3.50	-0.66
6	Academic staff approachable/informed	4.16	3.91	-0.25
7	Reputation of the study programme	4.14	3.49	-0.65
8	Reasonable class fees (not too expensive)	4.09	3.12	-0.97
9	Academic reputation of the institution	4.03	3.82	-0.21
10	Availability of information about the institution	4.13	3.82	-0.31

Table 5. P-I gap analysis of the overall 10 most important attributes for PHEI 3.

Overall rank	Attribute	Importance	Performance	P- I Gap score
1	Security/ safety conditions on campus	4.62	3.86	-0.76
2	Employment prospects	4.55	3.10	-1.45
3	Well-equipped computer facilities	4.41	3.26	-1.15
4	Spacious, well-equipped classes	4.38	3.79	-0.59
5	International links (e.g. study & job opportunities)	4.37	3.02	-1.35
6	Academic staff approachable/informed	4.43	3.83	-0.60
7	Reputation of the study programme	4.47	3.69	-0.78
8	Reasonable class fees (not too expensive)	4.37	2.21	-2.16
9	Academic reputation of the institution	4.49	3.65	-0.84
10	Availability of information about the institution	4.34	3.55	-0.79

each of the PHEIs are plotted on a matrix. Figure 1 depicts a matrix of the 10 overall most important attributes (attributes 1-10) to students and Figure 2, the 10 overall least important attributes (attributes 36-45). The matrix depicts four quadrants (Martilla and James, 1977:

78):

1. Quadrant A: Concentrate here. This quadrant represents attributes with high importance to students, but where they report low satisfaction with the PHEIs

Table 6. P-I gap analysis of the overall 10 least important attributes for PHEI 1.

Overall rank	Attribute	Importance	Performance	P- I Gap score
36	Recreation facilities	3.32	2.72	-0.60
37	Dining halls on campus	3.35	2.72	-0.63
38	Social activities/night life	3.49	3.10	-0.39
39	Private accommodation near the institution	2.90	3.29	0.39
40	Availability of public transport	2.95	3.38	0.43
41	Size of the student population	3.11	3.52	0.41
42	Hostel accommodation	2.67	3.45	0.78
43	Sport facilities of the institution	2.67	1.77	-0.9
44	Sport reputation of the institution	2.63	1.81	-0.82
45	Tradition (my brother/sister or parents went there)	2.07	2.33	0.26

Table 7. P-I gap analysis of the overall 10 least important attributes for PHEI 2.

Overall rank	Attribute	Importance	Performance	P- I Gap score
36	Recreation facilities	3.76	3.36	-0.4
37	Dining halls on campus	3.64	3.22	-0.42
38	Social activities/night life	3.93	3.76	-0.17
39	Private accommodation near the institution	3.67	3.67	0
40	Availability of public transport	3.16	3.37	0.21
41	Size of the student population	3.44	3.8	0.36
42	Hostel accommodation	3.32	3.16	-0.16
43	Sport facilities of the institution	3.32	3.12	-0.2
44	Sport reputation of the institution	3.31	3.21	-0.1
45	Tradition (my brother/sister or parents went there)	2.89	2.86	-0.03

Table 8. P-I gap analysis of the overall 10 least important attributes for PHEI 3.

Overall rank	Attribute	Importance	Performance	P- I Gap score
36	Recreation facilities	3.51	2.78	-0.73
37	Dining halls on campus	3.33	2.43	-0.9
38	Social activities/night life	2.76	2.68	-0.08
39	Private accommodation near the institution	3.72	3.49	-0.23
40	Availability of public transport	4.16	3.3	-0.86
41	Size of the student population	3.54	3.73	0.19
42	Hostel accommodation	3.55	3.3	-0.25
43	Sport facilities of the institution	3.17	2.42	-0.75
44	Sport reputation of the institution	2.84	2.27	-0.57
45	Tradition (my brother/sister or parents went there)	2.19	2.37	0.18

performance. It is imperative for the PHEIs to improve their performance regarding these attributes. It is interesting to note that, in correspondence with its better P-I gap scores, PHEI two only have four attributes that require concerted improvement effort. In contrast to this,

the other two PHEIs have significantly more attributes in this quadrant.

2. Quadrant B: Keep up the good work. Students are generally pleased with the provider's performance. The PHEIs nonetheless need to take cognisance of the fact

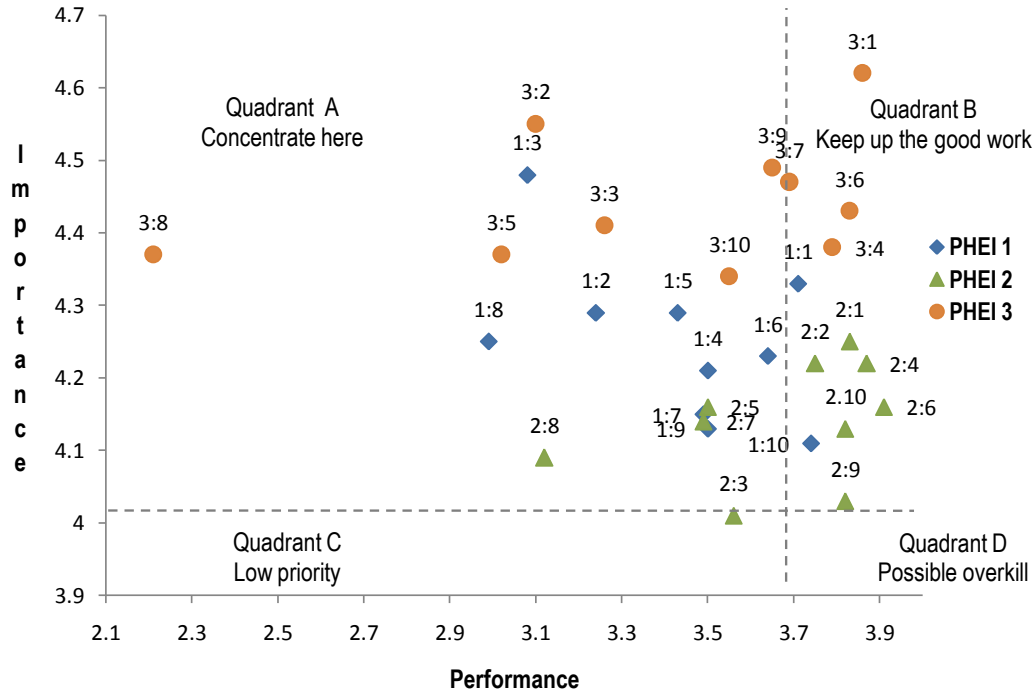


Figure 1. I-P matrix for three PHEIs concerning the 10 overall most important attributes.

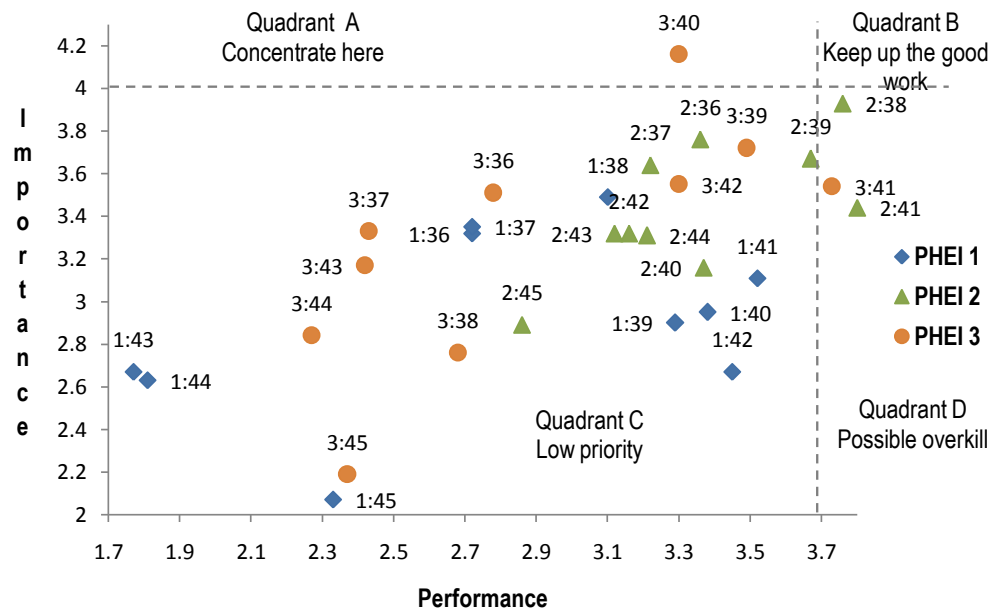


Figure 2. I-P matrix for three PHEIs concerning the 10 overall least important attributes.

that all the attributes in this quadrant still display negative P-I gap scores.

3. Quadrant C: Low priority. The students did not rate the

attributes in this quadrant as being very important. PHEIs should thus focus more urgently on the attributes in quadrant A. Considering the propositions of the two-

Table 9. The ethnic-specific importance of the top three overall attributes.

Overall rank	Attribute	Overall Mean	Mean: Black Students	Mean: Coloured Students	Mean: White students
1	Security/ safety conditions on campus	4.38	4.66 (n=134)	4.56 (n=50)	4.27 (n=273)
2	Employment prospects	4.34	4.56 (n=131)	4.20 (n=49)	4.24 (n=269)
3	Well-equipped computer facilities	4.28	4.50 (n=131)	4.17 (n=52)	4.03 (n=270)

Table 10. The ethnic-specific importance of security/ safety on campus.

Tests of between-subjects effects						
Source	Dependent variable	Type III sum of squares	df	Mean square	F	Sig.
Ethnic background	Security/ safety conditions on campus	42.872	3	14.291	6.352	.000

Table 11. The ethnic-specific importance of employment prospects.

Tests of between-subjects effects						
Source	Dependent variable	Type III sum of squares	df	Mean square	F	Sig.
Ethnic background	Employment prospects	6.889	3	2.296	1.603	.188

factor theory of Herzberg, as applied to student satisfaction (DeShields et al., 2005:131,132), PHEIs should take caution not to neglect these potential “dissatisfiers”.

4. Quadrant D: Possible overkill. In this quadrant, students do not rate the attributes as being very important, yet they are pleased with the PHEIs performance. Overall, there are only three attributes among the PHEIs in this area.

Table 9 depicts a description of the top three overall (combined mean scores of the three PHEIs – see Table 1) most important attributes to students when they decided to study at a PHEI, as well as the mean scores of the importance that were assigned to each of these three attributes by three different ethnic groups respectively. From this, the following noteworthy observations were seen:

1. Regarding security/ safety on campus: Black and coloured students have assigned a relatively higher (based on mean score) importance to this attribute. Table 10 indicates a statistical rejection ($\alpha = 0.00$) of the null hypothesis (first hypothesis, see section 3), thus confirming that there are significant differences between different ethnic groups’ performance rating of this attribute.

2. Regarding employment prospects: All ethnic groupings exhibit a high importance rating, with black students displaying the highest mean score. Table 11 indicates a statistical acceptance ($\alpha = 0.188$) of the null hypothesis (second hypothesis, see section 3), thus confirming that no significant differences exist between different ethnic groups’ performance rating of this attribute.

3. Regarding well equipped computer facilities: Black students exhibited a significantly higher assigned importance rating. This notion is confirmed by the statistical rejection ($\alpha = 0.00$, see Table 12) of the null hypothesis (third hypotheses, see section 3), thus confirming that significant differences do exist between the different ethnic groupings’ importance rating of this attribute.

DISCUSSION AND RECOMMENDATIONS

From an investigation of the relevant literature (see section one and two) certain issues are evident:

1. With the recent drastic changes in the HE landscape and dwindling subsidies, HEIs need to be more business-like in order to survive. This means that HEIs should subscribe to the modern marketing concept, advocating the imperativeness of consumer satisfaction. The marked

Table 12. The ethnic-specific importance of spacious, well equipped facilities.

Tests of between-subjects effects						
Source	Dependent variable	Type III sum of squares	df	Mean square	F	Sig.
Ethnic background	Spacious, well equipped computer facilities	51.944	3	17.315	15.532	.000

proliferation of consumer satisfaction studies in HE bears testament to the notion that students are discerning consumers who will select those institutions that would potentially satisfy their needs in the best way.

2. There is no one generally accepted method that researchers use to measure customer satisfaction in HE (see section 2.3). In contrast to a more general attitudinal approach to customer satisfaction of the SERVQUAL (SQ) technique, this study followed an importance-performance (IP) approach. This approach based on the original IP theory of Martilla and James (1977), enables researchers to detect specific variance in regarding different service offering variables. The perceived (by students) importance subtracted from the perceived performance of a specific service related attribute yields a score that indicates students' possible satisfaction/dissatisfaction regarding this attribute. High negative scores indicates high dissatisfaction and vice versa. These scores are plotted on an IP matrix to specifically indicate attributes that managers need focus on to enhance customer satisfaction. Both the SQ and PI have its supporters and detractors in the literature (see section two). The researcher though supports the notion of Martilla and James (1977:79) that the "low-cost, easily understood" IP technique provides organisations with an indication of where to focus in terms of their resources and marketing mix.

3. There are currently only a few studies concerning PHEIs in South Africa, especially in the fields of student choice and satisfaction. There is no continuous research to document the historic and current development of private higher education provision in South Africa. There are numerous PHEIs in South Africa, serving thousands of South African and international students. Many of the facets of these institutions still need investigation.

From the empirical study, the following is evident regarding the 45 choice attributes:

1. HEIs should consider safety and security (see Table 1 that depicts the ten overall most important choice attributes), as well as employment prospects, as very important choice attributes. The respondents in this study rated these attributes as the most and second most important, respectively. This is in contrast with many international studies, where studies did not even include security and safety conditions in their surveys. The only

other study where respondents also recognised the very high importance of campus safety and security was a local study of 1500 respondents at six PBHEIs (Wiese, 2008, 233). This possible pattern in recent studies may allude to the influence of the current crime situation in South Africa on the psyche of HE students (Bezuidenhout, 2012:163). The current high unemployment rate in South Africa might have also influenced the respondents in their high importance rating of employment prospects. The high importance of employment prospects is comparable to the Wiese-study mentioned above, as well as the comprehensive Cooperative Institutional Research Programme (CIRP) longitudinal study that has already investigated more than 15 million American students from about 1900 HEIs since 1966 (HERI, 2012).

The respondents of this study identified facility variables, including spacious, well-equipped computer facilities and spacious, well-equipped classes, as being very important.

From the IP gap analysis of the collected data, the following is evident:

1. There are significant negative gaps for all 10 most important attributes for all three PHEIs (see Tables 3, 4 and 5). This is consistent with numerous studies, referred to earlier in this study, that conclude that perceived performance is markedly lower than the importance of attributes in HE. This should have a significant negative influence on student satisfaction and thus on their resulting post enrolment communication and on their decision regarding the continuation of their studies. The ten overall most attributes especially yielded very big negative P-I gaps with PHEI 1 and 3; this should be of great concern to them (see Tables 3, 4 and 5). All three PHEIs should specifically consider strategies around their price of their offerings, as this attribute consistently displayed the biggest negative P-I gap. This may be as a result of PHEIs in South Africa not receiving any state subsidies like their public counterparts (see section two).

2. The positive P-I gap analyses of the 10 least important attributes indicates where perceived performance is thus higher than the importance of attributes. This does not necessarily mean that perceived performance is very high, but rather that the importance attached to these attributes is so low.

The IP matrix that was constructed from the collected data indicates the following:

3. The PHEIs should take cognisance of the numerous attributes in quadrant A in the comparative IP matrix (see Figures 1 and 2) that require their urgent attention. It is imperative that the PHEIs seek to improve their performance with regards to these attributes as identified in their respective analyses (see section 5). The respondents at PHEI two appears to be, in general, more content than their counterparts at the other PHEIs. This could be seen in the significant lower number of attributes in quadrant A (concentrate here) and the subsequent higher number of attributes in quadrant B (keep up the good work).

From an empirical investigation of differences between ethnic backgrounds with regards to attribute importance, the following is evident:

4. Black and coloured students have placed a significantly higher premium on safety and security than their white counterparts (see section 5 and Table 10). No similar study is available to compare this with.

5. Students from all three ethnic groupings have assigned a similar high importance on employment prospects. This is in line with comprehensive international studies (CIRP, as mentioned earlier) and a local study (Wiese, as mentioned earlier in this study).

6. Black students have rated the availability of well-equipped computer facilities as significantly more important than the other two ethnic groups. The researcher can only speculate that this may allude to the possibility that more black students do not have computers.

LIMITATIONS

This study has investigated the “institutional” factors that influence service quality and student satisfaction. It did not venture into the “individual” factors like student motivation; preparedness; personal background, etc. (Round, 2005: ii). It thus addressed the “what” rather than the “why” of student behaviour. The study was limited to three PHEIs in South Africa. The results can thus not be extrapolated to all PHEI-students in South Africa. IP’s value lies in identifying the relative importance of attributes of service offerings and then ascertaining the organisation’s performance, as perceived by its customers, especially regarding the most important attributes, resulting in a practical, easy to understand, indication of important areas for strategic consideration. This method thus provides indications, rather than pin-point accurate measurements. It is doubtful that any social research

method in this field will in any case yield exact measurements.

Conclusion

The study provided a strong indication that the perceived performance of PHEIs are significantly lower than the corresponding importance that respondents attach to attributes, resulting thus, similarly to numerous studies, in negative P-I gap scores. The study identified a rank-order list of important choice attributes to respondents at three PHEIs and indicated how respondents rate these attributes in terms of the PHEIs performance. A comparative IP matrix was constructed to provide the PHEIs with a graphical means to interpret the gathered data. The IP grid indicated areas for strategic consideration to the three PHEIs, respectively. This will assist the PHEIs to customise their service offerings to the needs of their primary customers (students). This study may contribute towards the body of knowledge regarding student choice, service quality and student satisfaction, especially regarding PHEIs in South Africa.

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Full Length Research Paper

Role of internal audit in managerial practice in organisations

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Owing to transactional evolution among business entities, mostly related to globalization, the internal audit function (IAF) has assumed a relevant role in the organisational context as it advises and supports management. In this scenario there is an inquiry into the activities of internal auditing related not only to the technical perspective but also to its contribution to the managerial duties. Thus, the current study aims to provide answers to the questions concerning: what is the perception of the management about the role of Internal Audit Function (IAF) in the managerial practice and decision making process in business entities and organisations at large? The study was restricted to non-financial institutions of the State of São Paulo with shares traded at Bovespa Stock Market. As primary data have been gathered through structured questionnaire, we adopted the descriptive approach for the treatment of the data. Based on our analysis, taking the perception of the management, IAF is a managerial enhancing tool, supporting the organisations to meet up with objectives, thus implying a contributively source of information derived from continuous assessment of strategic risks to strengthen the internal control systems for decision making.

Key words: Internal audit function, organisations, management enhancement tool, decision-making.

INTRODUCTION

With the transformations experienced by the corporate world, virtually related to globalization, there has been increased competition between organisations which forced management to take decisions with greater confidence. This does not only mean to keep pace with the rate at which businesses are growing, but also to develop them in a more sustainable manner. Thus, to achieve these goals, it has been necessary to improve the management methods, tools and techniques enhanced by the internal auditing function.

The Internal Audit Function (IAF) fits into this scenario

because it is an important tool available to stakeholders, internal and externally, as it is construed as an ongoing function, in order to support management in monitoring and surveillance of the planned activities, in both productive and financial areas, evaluating and reporting improvements with respect to the weaknesses, aiming to add value to the organisation.

Recently, there has been a more sharply adoption of Internal Audit by Brazilian organisations, probably due to the emergence of more large conglomerates and the more the strength of internal auditors advisory function is

felt in the country's growth and as it is felt is similar emerging economies. Invariably it is as a result of a very large volume of business and operations within organisations that cannot be personally dealt with by the corporate management individually.

Thus, although the Internal Audit has arisen from the need for better monitoring of company activities, little is known about organisational managerial perception on the role that Internal Audit plays in the management practices and decision making.

In this context, this study was based on the answers to the following question: what is the perception of management on the role that Internal Audit plays in management practices and decision-making within the organisations? The present study has its relevance in exploring the role IAF is playing to mitigate the dissatisfaction of the business community after accounting and financial scandals which involved auditing as a whole and as has been notoriously publicised. These Media also showed situations where there have been failures by auditing, causing discredit to the activity. Additionally, there is the lack of academic researches on the role that Internal Audit has in management practices and decision making in organisations.

This research is aimed at provoking a reflection upon the contribution of Internal Audit Function in decision making in the organisations in order to bring greater credibility to this area of applied social sciences. We hope it inspires further researches on topics addressing Internal Audit Functions in the academic environment.

The study focused on non-financial organisations in the State of São Paulo, whose shares are traded at São Paulo Stock Exchange, excluding telephone organisations, sanitation, electricity and gas, because these organisations provide services of basic needs to the population and have a different administrative focus.

The delimitation of the research to the State of São Paulo was due to the fact that it is the Brazilian state with the highest concentration of organisations with shares traded at BM&FBOVESPA. This entity requires of the organisations in its portfolio a good organisational structure and high degree of disclosure, which somehow gave credibility to the data obtained.

THEORETICAL BACKGROUND

Concept and objectives of internal audit

It is barely impossible to conceptualise internal audit considering the diversity of its application in business entities. Even so, one would cite the concept provided by the Brazilian Institute of Internal Auditors (AUDIBRA, 1991, p. 33). Internal Audit is an activity of independent evaluation and management assistance, directed to the examination and evaluation of the adequacy, efficiency and effectiveness of the internal control system, as well

as of the quality of performance of the operational areas in relation to their tasks and plans, goals, objectives, and policies defined for them.

Noteworthy, that effectiveness means adequate exploitation of the resources to achieve the goals while efficiency means that required indexes were achieved using the minimum and necessary efforts. Thus, the internal auditor's opinion should state whether the entity is being effective and efficient in achieving its goals.

According to Vasconcelos and Pereira (2004, p. 69-70), the scope of binomial efficiency and effectiveness is a functional view that the organisation's stakeholders have of the Internal Audit work [...] The Internal Auditor, in our view, should monitor and seek to understand these dynamics and their effects on the economic and financial status. Therefore, we argue that this professional is the best suited to signal the potential risks of going concern of organisations considering operational anomalies.

That is, it would be up to him, based on analysis to provide a straight forward assistance in the monitoring of the financial situation. Our most important argument rests on the following premise: the internal auditor may propose directives and valuable information based on their historical data and rapport with the organisations' management.

Quoting CFC (2005) NBC TI 01, the Brazilian Federal Council of Accountants, characterizes the functions of Internal Audit: [...] as structured with technical, objective, systematic and disciplined procedures, that aims to add value to the results of the organisation, providing data for the improvement of processes, management and internal controls through the recommendation of solutions for nonconformities identified in the reports.

In this same way, CFC (2011) emphasizes the managerial support that internal audit has to provide so that business objectives are attained in a more adequate manner. This explicitly defines Internal Audit as an advisory body to the management of the entities, aiming to add value by providing data for improvement of management processes.

According to Mendes (1996, p. 9), the objective of the Internal Audit is, in particular, "[...] forming opinion about the criteria, procedures, methods and quantification, cost rationalization and providing information so that the top management decisions are based on concrete information." The decisions to be made by management always depend on good information, that is, accurate and timely.

The Internal Audit is an instrument of administrative control and systematic verification of the effectiveness and efficiency of occupational activities in the company; it evaluates the entity's internal controls and its administrative and occupational processes, analyzing the failures and the risk involved and gives broad based recommendations for remediation of anomalies. The Internal Audit work aims to protect the company's assets against frauds or intentional misstatements. Classified by

Moyes et al. (2013) as i) misstatements resulting from fraudulent financial reporting and ii) misstatement resulting from misappropriation of assets.

Characteristics of the internal audit function (IAF)

The role of Internal Audit is presented through various concepts expressed by scholars with different characteristics of its functions and activities that converge to its main objective, which is to add value to organisations through assessments and advisory support to management.

Since WorldCom whistle-blowing and other financial scandals that besieged the stock markets in the last decade, internal audit has assumed a more important role. The NYSE now requires all companies listed there to maintain internal audit functions to provide management and the audit committee with ongoing assessment of the company's risk management process and of internal control, (Harrington, 2004 p. 65).

Thus, Internal Audit should be knowledgeable, insightful, have the method, and the intelligence to check the best for the company, aiming to add value with the least resources. Internal Audit should be "[...] a highly qualified adviser, which allows the management to have a systematic view of their organisation. It must be a unit engaged in achievement of end results (Mendes 1996., p. 9).

Authors such as Carvalho and Pinho (2004, p. 24), Vasconcelos and Pereira (2004, p. 68), who understand that the Internal Audit has a professional duty to issue independent opinions, justify the assumptions of technical skills and personal attributes required of the auditor, as well as the high level of demand from users and the need to add value to users of their services.

The IAF in the organisation is to review, evaluate and produce report containing information on all activities of the organisation, to assist the management in their decision making process. Internal Audit performs a task that shareholders would like to perform in order to be always aware of how their investments are managed.

Apart from overseeing the activities, based on the broad knowledge of the business, IAF could be used to substitute certain strategic functions most importantly when a need for rotation arises. Companies that have an IAF specifically hire internal auditors with the purpose of rotating them into management positions or cycle current employees into the IAF for a short stint before promoting them into management positions (Messier et al., 2011, p. 2131).

Vasconcelos and Pereira (2004, p. 70) emphatically point out that "[...] the exercise of Internal Audit is not a commodity. It is not a consumable service much less a mere cog. It is a potential value aggregator. "This characterization clearly demonstrates how valuable the internal function is when fully exerting its activities.

Internal audit function adding value

It is of paramount importance to characterize what adding value is, so that we can analyze the contribution of Internal Audit to the management of the entities. The interpretation of value, in this study, is not only limited to the financial aspects; it is more comprehensive, as it includes human and physical aspects. So, to add value in the internal audit concept is to harness all available resources, within and outside the company, with an aim of assuring gains, which may be financial, material and human, and will assist management in fulfilling their goals.

Internal Audit Function may add value in various accounting processes where transactions are originated in an organisation. For instance, the evaluation of capital investments and their association with the capital budget when adequately checked to guarantee that such project is feasible tends to add value. Another value adding function is the assessment and or follow-up of the development and implementation of ERPs; which ensures the timing of the systems at an affordable cost and to meet up with operational necessities. The continuous auditing also adds value by installing the required technologies in the control environment to ensure that alerts are given when unusual transactions are run in the operational environment of the organisation. Directors believe that top management is appropriately defining the organisation's internal audit function, and that the profession should concentrate its effects on providing guidance and support. "...most of their audit departments have shifted toward a more value-added" (Nagy and Cenker, pp. 136, 2002).

Be it known that the wealth of knowledge acquired by the IAF during the auditing of the business, which makes one say that it knows it better than any other person in the organisation makes the IAF a training ground for the management posts.

The Internal Audit, when monitoring and assessing the adequacy of internal controls, as well as the rules and procedures implemented by management, becomes an ally of real value to the management. It is a tool that, according to Santos (2007, p. 9) "[...] plays a role of great importance, helping to eliminate wastes, simplify tasks, support management and report to management on the development of tasks performed". The thought is in line with the implementation of loss prevention nowadays when artefacts are installed to safeguard assets.

Whistle blowing has been termed as more effective when considering some tools monitored by IAF to track frauds and corruption, notwithstanding, internal audit collaborates in the minimisation of the risks of frauds and potential errors that could result in a material misstatement. The level of the IAF and the extent to which the IAF incorporates quality assurance techniques into fieldwork and audits activities related to financial reporting, monitors the remediation of previously identified

control problems. Also, the timing of Section 404 work and the nature of follow-up monitoring suggests that these aspects of IAF quality help prevent material weaknesses (MWs) from occurring (Lin et al., 2011, p. 287).

Internal Audit plays a strategic role in organisations because it aims to add value to the results of the organisation, providing information to improve risk management and internal controls procedures. It is considered one of the pillars of corporate governance as it provides evaluation services and consulting. In other words, it is an important piece to the management of organisations, since it matches the results obtained with the strategy and the action plan prepared by the company in order to identify threats and/or opportunities for the achievement of future results.

The existence of a good and active internal audit in the organisation is in itself a value-addition, considering that it could be used to reduce the amount of work that is required of the independent auditor with reference to IFAC 610. The usage of internal audit work by the independent auditors is generally considered in the extent deemed satisfactory to cover certain tests that ought to be corroborated by the engagement.

Internal audit in the context of corporate governance

Internal audit is acting from the watch tower of the business operations in order to support the governance of the business. This occurs right from origination of economic, financial and accounting transactions, recording and fulfilment of individual and collective responsibilities.

Meaning that right from inception, IAF is being identified as a tool that assures the workability of the corporate governance. Internal audit function (IAF) is an increasingly common internal governance mechanism, on a firm's financial reporting quality (Johl et al 2013).

Corporate governance seeks to identify ways to prevent the abuse of power by administrators. It monitors the relationship between management and shareholders by minimizing inequalities of information disseminated between these agents. It is in this context that internal audit plays a formidable role in minimising information asymmetry by abridging the relationship between the Supervisory Boards and the Audit Committee (AC) when available.

The Code of the Brazilian Institute of Corporate Governance - IBGC recognizes the importance of Internal Audit for entities, but does not ask that its absence be justified. However, in the chapters concerning the Administrative and the Supervisory Boards, it emphasizes aspects of Internal Audit. It highlights its responsibility when it mentions that Internal Audit is in charge of monitoring and evaluating the adequacy of the internal control environment and the rules and procedures established by the management. The auditors must act proactively on the recommendation to improve controls, standards and procedures, in line with the best practices. (IBGC, 2010,

p. 47)

A close relationship between the IAF with the Supervisory Board in an organisation transmits respect for its activities and the support it tends to give to the management. The right reporting lines – to the Supervisory Board and AC – also gives the right message to the whole company. IA serves the board, not any particular operational manager. Reporting at the highest level also provides the IAF with a reasonable amount of independence, which it needs to operate with optimum effectiveness (Paape et al., 2003 p. 259).

METHODOLOGY

Considering the objective of this research, it is characterized as descriptive. Collis and Hussey (2006, 24-26) observed that the descriptive research is “[...] the one that describes the behaviour of the phenomena. It is used to identify information about the characteristics of a given problem. When quantitatively focused “[...] its objective is on the measurement of phenomena. Consequently, the quantitative method involves collecting and analyzing numerical data and applying statistical tests.”

In this study, we visited the corporate Website of BM&F-BOVESPA on July 5th, 2011 which had a stock of 683 organisations listed. Of the mentioned number, 284 were financial institutions; 91 grouped telephone, power, gas and sanitation organisations; 209 were from states other than São Paulo, leaving 99 non-financial organisations in São Paulo State.

Upon contact with the non-financial organisations in São Paulo State via telephone, from December 2011 to April 2012 aiming to send the questionnaires, we found that 38 non-financial organisations in the State of São Paulo had no Internal Audit, therefore allowing only 61 organisations to be explored. There were four (4) cases in which the respondents were responsible for the Internal Audit area in two (2) other firms on our list, belonging to the same group, so the sample was reduced to 57 elements.

Data collection took place with two questionnaires: one addressed to the Director/Head of Internal Audit Department (QD), another to the Fiscal or Supervisory Board (QG) which the Internal Audit reports, in order to process the intersections of the respective responses. These documents were enhanced with the use of pre-tests applied to graduate students enrolled in the Master of Science course in the Accounting program at *FECAP – Fundação Escola de Comércio Álvares Penteado* and executives of Internal Audit.

RESULTS, DATA ANALYSIS AND INTERPRETATION

Research results

The data collection of this research resulted in 16 responses from Directors/Heads of Internal Audit Departments and 8 from the Fiscal or Supervisory Board, which reached 28.07% (16 x 100/57) of answers by the elements surveyed.

Considering the understanding by Marconi and Lakatos (2011, p. 86) that “[...] on average, the questionnaires sent to elements surveyed achieved 25% return”, the result reached by the research lies within the parameter of significance.

The data collected were selected, tabulated, analyzed and interpreted with the application of descriptive and

Table 1. (QD2) Approval of the internal audit annual plan by the board of directors.

Approval of the Internal Audit annual plan by the Board of Directors	n^o	%
I strongly disagree	0	0,00
I disagree	0	0,00
I do not agree nor disagree	4	25,00
I agree	8	50,00
I totally agree	4	25,00
Total	16	100,00

Source: Authors.

Table 2. (QD5) Monitoring of internal audit by the supervisory board.

Supervisory Board monitoring of Internal Audit through independent communication channels	n^o	%
I strongly disagree	3	21,43
I disagree	4	28,58
I do not agree, nor disagree	2	14,28
I agree	3	21,43
I totally agree	2	14,28
Total	14	100,00

Source: Authors.

Table 3. (QD7) Adequate number of auditors to carry out the work.

Sufficient number of auditors to carry out the work?	n^o	%
Yes	11	68,75
No	5	31,25
Total	16	100,00

Source: Authors.

inferential statistics which allowed us to show results which demonstrate the contribution and recognition of the management and the concerns of internal audit to improve managerial procedures.

Responses obtained through the questionnaire addressed to the director / head of internal audit department

As could be observed in Table 1 majority agreed with the approval of the Internal Audit Annual Plan by the Board of Directors. This shows a consistent culture of corporate governance being pursued within the organisations.

The monitoring of the IAF by the supervisory board seems to be attracting higher discordance as in Table 2. This could be related to non obligatory maintenance of the supervisory board, giving room in first place to the administrative board according to Brazilian Corporate Law.

Owing to a more important task that the IAF is holding today, as expressed by the respondents, resources are available to enable it carry out its tasks as in Tables 3 and 4. This is in-line with prior findings of Harrington (2004, p. 65) that reported 50% companies that increased their staffs to comply with Sarbanes-Oxley and 33% businesses that have allocated increased resources to comply with Sarbanes-Oxley.

There is an expressed cooperation of the supervisory, administrative boards and the auditee at large in the audit process as shown in Table 5.

The Fiscal or Supervisory Board is the governing body that supports corporate governance which has the task of streamlining the use of resources by the IAF. Responses in Table 6 show that the fiscal board is not out to interfere in the auditing scopes for efficiency. This converges with the thoughts gathered in Table 7 which shows a high level of freedom of action and independence by the IAF is identified. The two factors that may influence the independence and objectivity of internal audit are: The first,

Table 4. (QD8) Sufficiency of resources available for implementation of the internal audit.

Sufficiency of resources available for the implementation of the Internal Audit	n^o	%
Yes	14	87,50
No	2	12,50
Total	16	100,00

Source: Authors.

Table 5. (QD9) Cooperation of the fiscal board in the internal audit process.

Cooperation of the managing agency in the Internal Audit process	n^o	%
I strongly disagree	1	6,25
I disagree	3	18,75
I do not agree, nor disagree	1	6,25
I agree	8	50,00
I totally agree	3	18,75
Total	16	100,00

Source: Authors.

Table 6. (QD10) Interference in the scope of audit by the fiscal board.

Rationalisation by the governing body with regard to Scope of Internal Audit	n^o	%
I strongly disagree	7	43,75
I disagree	4	25,00
I do not agree, nor disagree	1	6,25
I agree	3	18,75
I totally agree	1	6,25
Total	16	100,00

Source: Authors.

Table 7. (QD11) Internal audit degree of freedom of action and independence.

Internal Audit degree of freedom of action and independence	n^o	%
High	12	75,00
Medium	4	25,00
Low	0	0,00
Total	16	100,00

Source: Authors.

affecting the organizational independence of the internal audit function, is its relationship with the audit committee; and the second is the use of the function as a management training ground, (Goodwin and Yeo, p. 107, 2001).

The role the IAF plays with the provision for periodic reporting on the effectiveness of internal control systems and compliance with standards is seen as very significant.

As in Table 8, 75% of the respondents see a high degree of internal audit function in this process.

In Table 9, there is agreement in fact and total

agreement to the impact of information provided by IAF in the decision making process. As in Table 10 the aggregated value is felt in the enterprise as a whole.

Responses obtained through the questionnaire addressed to governing body of the internal audit

When we combine the number of neutral responses with the agreement in fact and total agreement to the approval

Table 8. (QD12) Importance of internal audit in the supervision of internal control systems and compliance with standards and procedures.

Degree of importance of Internal Audit in the supervision of internal control systems and compliance with procedures and standards	nº	%
High	2	75,00
Medium	4	25,00
Low	0	0,00
Total	16	100,00

Source Authors.

Table 9. (QD13) Influence of information provided by the internal audit on the process of decision making.

Information provided by the Internal Audit influences the process of decision making	nº	%
I strongly disagree	0	0,00
I disagree	0	0,00
I do not agree, nor disagree	1	6,25
I agree	10	62,50
I totally agree	5	31,25
Total	16	100,00

Source: Authors.

Table 10. (QD14) the aggregate value by internal audit.

Areas of added value by Internal Audit	nº	%
The enterprise in general	15	93,75
Operational areas	0	0,00
Processes	0	0,00
Another: High risk critical processes	1	6,25
Total	16	100,00

Source: Authors.

Table 11. (QG11) Approval of internal audit's annual plan by the board of directors.

Approval of Internal Audit's annual plan by the Board of Directors	nº	%
I strongly Disagree	0	0,00
I disagree	2	25,00
I do not agree nor disagree	3	37,50
I agree	1	12,50
I totally agree	2	25,00
Total	8	100,00

Source: Authors.

of Internal Audit's annual plan by the Board of Directors in Table 11, one obtains 75%, meaning that a majority agree with the plans for IAF adequately discussed and approved by the Fiscal Board.

As in Tables 12, 13 and 14 the responses given by the

Auditors and Management match the thoughts of the Supervisory Board.

No doubts have been expressed about the contribution of auditor information as a support for decision making as shown in Table 15 and as it also pinpoints strengths and

Table 12. (QG7) Sufficient number of auditors.

Adequate number of auditors to carry out the work	n°	%
Yes	7	87,50
No	1	12,50
Total	8	100,00

Source: Authors.

Table 13. (QG15) Internal Audit degree of freedom of action and independence.

Internal Audit degree of freedom of action and independence	n°	%
Top	7	87,50
Medium	1	12,50
Low	0	0,00
Total	8	100,00

Source: Authors.

Table 14. (QG16) Importance of internal audit in the supervision of control systems, as well as compliance with standards and procedures.

Importance of Internal Audit in the supervision of control systems, as well as compliance with standards and procedures	n°	%
High	6	75,00
Medium	2	25,00
Low	0	0,00
Total	8	100,00

Source: Authors.

Table 15. (QG17) Influence of information provided by the internal audit on the process of decision making.

Information provided by the Internal Audit influences the process of decision making	n°	%
I strongly Disagree	0	0,00
I disagree	0	0,00
I do not agree, nor disagree	1	12,50
I agree	5	62,50
I totally agree	2	25,00
Total	8	100,00

Source: Authors.

Table 16. (QG18) The company's strengths and weaknesses are pointed by the internal audit.

The company's strengths and weaknesses are pointed by the Internal Audit	n°	%
Yes	7	87,50
No	1	12,50
Total	8	100,00

Source: Authors.

weaknesses during the procedures in Table 16.

Results shown in Tables 17 through 21 emphasize the contribution of IAF to the organisations be it in aspect of

social responsibility, minimisation of risks, aggregate values and satisfaction of the management on reporting effectiveness of internal control and probable weaknesses

Table 17. (QG19) Contribution of internal audit for increased social responsibility.

Contribution of Internal Audit for increased social responsibility	n^o	%
I strongly disagree	0	0,00
I disagree	1	12,50
I do not agree, nor disagree	0	0,00
I agree	4	50,00
I totally agree	3	37,50
Total	8	100,00

Source: Authors.

Table 18. (QG20) The internal audit contributed to minimize the risks of the company.

The Internal Audit's contribution to minimize the risks of the company	n^o	%
I strongly disagree	0	0,00
I disagree	0	0,00
I do not agree, nor disagree	0	0,00
I agree	4	50,00
I totally agree	4	50,00
Total	8	100,00

Source: Authors.

Table 19. (QG21) Internal audit contribution to efficiency, effectiveness and economy.

Internal Audit contribution to efficiency, effectiveness and economy	n^o	%
Management in general	6	75,00
Operations	1	12,50
Process	1	12,50
Other	0	0,00
Total	8	100,00

Source: Authors.

Table 20. (QG22) The aggregate value by Internal Audit.

Internal Audit adds value	n^o	%
The enterprise in general	8	100,00
Operating areas	0	0,00
Processes	0	0,00
Other	0	0,00
Totals	8	100,00

Source: Authors.

for remediation. The majority of the responses range from 75% agreement to 95%.

Comparison of responses of directors/heads of IAF – administrative and supervisory boards

We used inferential statistics with the aim of comparing

the responses given by the Directors/Heads of Internal Audits Departments and the ones given by Administrative or the Supervisory Board in Table 22. By so doing, we try to show the closeness of interaction and their ways of thinking. The evidence of audit committees and internal audit functions engaging in informal interactions in addition to formal pre-scheduled regular meetings represent additional opportunities for the audit committees to monitor internal audit functions (Zaman and Sarens, 2013, p 495).

Thus, it is notable that only Mann-Whitney test for QD2 x QG2 is statistically significant. This indicates differences between the medians of the Directors/ Heads of Internal Audit Departments and the Supervisory Board, regarding the approval of the annual planning's of the Internal Audit, evidently after risk assessment might have been duly considered. To corroborate this stand, Allegrinni and D'Onza (2003) mentioned that 1. A few companies (25%) in Italy carry out mainly traditional compliance activities and they generally follow an audit cycle approach for the

Table 21. (QG24) Satisfaction of the organisation about the final results presented by the internal audit.

The organisation's satisfaction with the final results presented by the Internal Audit	nº	%
I strongly Disagree	0	0,00
I disagree	0	0,00
I do not agree, nor disagree	0	0,00
I agree	5	62,50
I totally agree	3	37,50
Totals	8	100,00

Source: Authors.

Table 22. Descriptive levels of inferential tests – summary.

Mann-Whitney test	p-value	Comparison of Proportions	p-value
Median QD2 x Median QG2	0,0335	% QD1=YES x % QG10=YES	0,2537
Median QD3 x Median QG3	0,6664	% QD11=HIGH x % QG15=HIGH	0,6779
Median QD4 x Median QG4	0,7446	% QD12=THE ENTERPRISE IN GENERAL x % QG16= THE ENTERPRISE IN GENERAL	0,6959
Median QD5 x Median QG5	0,1061	% QD14=THE ENTERPRISE IN GENERAL x % QG22= THE ENTERPRISE IN GENERAL	0,5308
Median QD6 x Median QG6	0,6115		
Median QD13 x Median QG17	0,4101		
Median QD16 x Median QG23	>0,9999		

annual audit planning; 2. In most companies (67%), internal auditors adopt the COSO model and perform mainly operational auditing. Risk based approach is applied predominantly at macro level; and 3. Finally, it is possible to identify a very few large companies (8%), in which auditors are applying a risk-based approach both at macro and micro level.

Analysis and interpretation of results

The data obtained showed that management is concerned with the Internal Audit function, by providing it with necessary resources so that it could excel. There does not seem to be a restriction regarding the scope of the activities of Internal Audit, since auditors have liberty and independence of action for the charter.

Independence is paramount to the development of the Internal Audit work and in as much as it contributes effectively to the achievement of organisational goals. This study confirms this principle, since there were consistent responses by the Administrative and Supervisory Boards, stating that the necessary degree of freedom of action and independence of the activity that lies within the “upper” and “middle” range of the management, not

having choices registered by the “lower” level echelon of management.

It was found through inferential tests, when confronting answers to questions common to the Directors/Heads of IAF and managing bodies, that only the question referring to the approval of the annual plan of the Internal Audit by the Board of Directors presented statistical significance (p-value = 0.0335), showing that the segments have different views as to the understanding of recommendations by the Brazilian Institute of Corporate Governance -IBGC.

This Institute recommends that this plan be approved by the Administration Board taking into account that it is up to the Board the overall control of the activities of the organisation. With respect to other observations of the recommendation prescribed by IBGC for good governance, related to Internal Audit, the variables investigated also show the discrepancies. The monitoring of Internal Audit by the Supervisory Board is not performed, according to the answers given by the respondents to the questionnaire that were sent to the Directors / Heads of Internal Audit and the managing bodies. Nonetheless, this function is recommended by the IBGC so that the managing body is able to analyze and opine on the recommendations of the Internal and External Audit in

parallel with the Audit Committee. However, according to the Brazilian Law, except that it is the monitoring activities done by the Administrative Board, organisations are not obliged to install a Supervisory Board, which explains why some did not have it.

It was also evident in most of the responses that the Internal Audit is subordinated to the President/CEO, which is contrary to good corporate governance structure, since there is guidance in the sense that the activity should be submitted to the Supervisory Board of Directors. The purpose of this binding is to provide the Internal Audit with independence of action to exert their activities without restriction.

This anomaly, however, is not highlighted in the answers given by respondents, when evaluating the degree of freedom and independence of action given to the Internal Audit, nor when talking about the management body's restricting the scope of works.

In line with all the responses, we see that Internal Audit is concerned with the improvement of management, in as much as the evaluation of risk management and internal controls predominate in the areas of their operations.

It was evident that there is support to auditing work when it comes to providing the necessary number of auditors as well as resources for the execution of the works. Furthermore, the research shows through most of the responses, the management body cooperates during the work and there is a Manual of Standards and audit procedures in the majority of the researched organisations.

The respondents who are in the Administrative and Supervisory Boards showed a high and medium level importance of Internal Auditor, for the Internal Control systems and standards and procedures to comply with. In other words, no one showed lower level cognisance of the work of internal auditing.

This recognition was extended when the majority of the respondents agreed that the Internal Audit shows the weaknesses and strengths of their organisations, which shows a paradigm shift, insofar as it is notorious that internal auditors show only weaknesses. The most important recognition was the considerations that end results of Internal Auditors' involvement in managerial decision as "satisfactory".

Conclusion

The research showed that the Internal Audit has evolved from simple verifier of acts and administrative facts, on the watch out for operational anomaly, as been construed decades ago, to other duties in a wider sphere of enterprises that include strategic planning of organisations. The Internal Audit is consolidating itself as one of the pillars of corporate governance by supporting managements on decision making.

The transformation process has greatly evolved in

recent years because of the market dynamism and most especially after the turbulence that corroded the image of independent auditors and invariably that of the internal auditors.

Therefore, the internal audit tasks of ensuring compliance within the organisations and outside to avoid transgressions of rules that were set up to curb further financial misstatement whether intentionally or unintentionally allows the stakeholders at large to notably recognise the role of internal auditors as management advisory.

Thus, Internal Audit greater insertion in the management environment, through the adoption of a systematic and disciplined approach on the evaluation and improvement of the effectiveness of the processes of risk management, control and corporate governance has proven to be effective for its recognition as an important ally in the partnership with the management, when it comes to adding value to the organisation.

Observations from this research would allow one to mention the following additional roles of IAF apart from those considered as notorious:

- a. Improvement of organisations management, providing useful information for decisions making, especially concerning the identification of strengths and weaknesses of the organisations, which allows the management to make a critical analysis of the productive and economical processes to allocate their scarce resources;
- b. Increase the social responsibility of organisations, which in one manner or the other tends to add value to the organisation in the human aspect;
- c. Minimise the organisation's risks, loss prevention, adding value to the organisation, since minimizing the risks avoids financial losses;
- d. To the efficiency, effectiveness and economy of the company's performance and of resources utilisation, helping management to achieve the company's goals.

Noteworthy, that the study was based on 57 elements of the sample, representing 61 organisations selected among 683 organisations listed at the BM&F-BOVESPA, as it was at the site of this entity on July 5th, 2011 which is highly representative of the perception of the IAFs in Brazil.

Our research has shown that Internal Audit, in the perception of management in organisations, is a tool for managerial support, helping organisations achieves their goals through the information provided. This also contributes to the continuous assessment and mitigation of strategic risks and strengthening internal control systems for timely decision making, thereby answering the research question that was posed on the perception of management on the role that Internal Audit plays in management practices and decision making in the organisations.

Even though it is totally impossible to deplete the subject researched and taking into account the limitations

of the work, that is, internal audit departments in the state of São Paulo, even though relevant in the Brazilian context, it is understood that further researches may explore the subject, including the use of our results, as well as raising the number of organisations selected for the next surveys.

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Full Length Research Paper

Measuring queuing system and time standards: A case study of student affairs in universities

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The objective of the study is to examine the behavior and patterns of arrival of students in a university through observation method. Student affairs department of different universities are investigated in this study. Queuing theory is adopted for waiting in lines/queues. The results show that more than 70% of the students in universities are unhappy and dissatisfied with the service of student affairs. The results conclude that waiting in line or queue causes inconvenience to the students and ultimately it results in economic costs to the universities. Students usually wait for minutes, hours, days or months to receive desired service for which they were waiting.

Key words: Waiting line, student affairs, arrival patterns, universities, Pakistan.

INTRODUCTION

Waiting is often an unavoidable experience in many business settings. At the hospital, petrol pumps, bus stop, or in the canteen, people wait for their turn so waiting in lines seems to be part of everyday life. People usually wait in line when the demand for a service exceeds its supply (Kandemir-Cavas and Cavas, 2007). Sometimes, customers wait for a few minutes, hours, days or months to receive the ordered service. People not only wait in a line in front of a service window or cash register, but waiting sometimes might occur at home as well while waiting for a package to be delivered. In modern world service sector dominates the economies, yet basic features of services mean that queues or waiting lines cannot be avoided. One of the basic features of services is that they cannot be stored or carried in inventory and that demand is not predictable (Zeithaml et al., 1985).

This is also a problem for manufacturing industries, because now-a-days manufacturing industry is also providing services to their customer, e.g.: with offers of after-sales service or toll-free help numbers, to differentiate themselves and to keep their customer retained. The media have reported queue rage and telephone rage with

increasing frequency. Marketing department put its all efforts to communicate and create a favorable image of a service organization; the first impression by the consumer of the organization itself which opposed to all its advertising efforts may be a line of waiting, frustrated and possibly angry consumers. Evaluation of customer of many services is critically influenced by waiting time.

Even though the concept of waiting for the services or goods appears to come in many different forms, in general, but customers take waiting as a negative construct. The waiting in line for services can often have a negative effect and also creates a negative perception about the particular firm. Hence the way in which managers address the waiting line issue is critical to the long term success of their firms. People waiting in queue sometimes raise problems also like, while the norm in many retail banks is to serve customers on a first-come-first-served basis, some customers try to cut the line, usually by providing an excuse for their urgency. Therefore, service managers often try to offset the negative effects of waiting by implementing a number of solutions, like, shortening waiting times, informing

customers about the length of the wait, and providing different kinds of entertainment like television etc during the wait. However, despite the wide variety in methods available to influence customer satisfaction, it is definitely not an easy practice to do. An organization may not be able to have full control over waiting process or queue. In addition reducing objective waiting time might not influence a customer's subjective interpretation of the waiting for the services (Pruyn and Smidts, 1998).

There are a number of studies stresses the importance of perception in queues and waiting situations (Davis and Heineke, 1998; Davis and Maggard, 1990; Jones and Peppiat, 1996). Queuing has become a symbol of inefficiency for organizations. Universities also face the same kind of problems. Despite the managing the length of the line few of the factors that are responsible for long waiting lines or delays in providing service are: lack of passion and commitment to work on the part of the staff (Belson, 1988) overloading of available staff, and insufficient staff etc. These put staff under stress and tension, hence tends to dispose off a customer/student without in-depth probing, which often leads to dissatisfaction (Babes and Sarma, 1991). This paper is based on the understanding that most of these difficulties can be managed by using queuing model to determine the waiting line performance.

The structure of the paper is as follows: Section 2 presents a brief literature review. Section 3 elaborates the methodological framework. Section 4 shows results and discussions. Final section concludes the study.

LITERATURE REVIEW

Literature available on waiting line management indicates that waiting in line or queue causes inconvenience to customers and economic costs to individuals and organizations. Hospitals, airline companies, banks, manufacturing firms etc., try to minimize the cost involved in waiting, and the cost of providing service to their customers. Therefore, speed of service is very important and increasingly becoming a competitive parameter (Katz et al., 1991). Many studies have shown the negative effect of queues on consumers (Katz et al., 1991; Taylor, 1994; Hui and Tse, 1996). It is very common for customers to overestimate the time which they spend for waiting (Hornik, 1984; Katz et al., 1991). As the perceived time of waiting increases, customers get dissatisfaction (Katz et al., 1991).

First, in today's fast moving life time has become more precious and valuable commodity especially in developed countries where the standards of living are very high. So as a result people are less willing to wait for services. Second, this is a growing realization by organizations to make their customer satisfied and also to retain them to get business in today's competitive environment. Finally, advances in technology such as computers, internet etc.,

have provided firms with the ability to provide faster services. Addressing the problems of queuing involves a trade-off between the costs of customers waiting time and the cost of providing faster service.

Katz et al. (1991) argued that we can control service waits by two techniques: the first one is operations management and second one is perceptions management. The operation management deals with the management of how customers (students), queues and servers can be coordinated and cooperative towards the goal of providing effective service at the least cost. Most of the firms have tried the obvious approach to the problem, which is managing the actual wait time for the services through operations management, like, modifying service delivery systems (Shostack, 1985), conducting maintenance work at offices at night, or differential pricing to shift demand, (Maister, 1985; Taylor, 1994, 1995). However, the frequency of queues attests to the limits of operations management. Davis and Vollman (1990) say that the amount of time customers must spend waiting for services can significantly influence their satisfaction. Furthermore, Taylor, (1994) has demonstrated that customer satisfaction is not only affected by waiting time but also by customer expectations towards services or attribution of the causes for the waiting. As a result, one of the issues in queue management is not only the actual amount of time the customer has to wait for services, but also the perception of the customer's to wait (Davis and Heineke, 1994).

There are two ways to increase customers' satisfaction with regard to waiting time: by decreasing actual waiting time, and through enhancing customer's waiting experience. If the organizations cannot control the actual duration of the waiting, then it might consider how it manipulate the perceived wait time. As Taylor et al. (1994) have observed that the perceived waiting time is usually different from the actual waiting time. It means that understanding the factors that effect the perceptions of waiting, and their subsequent have effect on consumer behavior, provides valuable clues to strategies makers for marketing communications.

Apart from operations management, that is making changes to reduce the actual waiting time, studies conducted previously on waiting and its impacts on customer satisfaction have focused on customer perceptions of the waiting and how this will be affected by the factors like, filled wait time which is providing distractions or activities (Taylor, 1994), services provider control that is can the firm be blamed for the delay (Tom and Lucey, 1995; Taylor, 1994; Baker and Cameron 1996), the duration to wait or queuing information which is related to the providing feedback on how long the delay is expected (Hui and Tse, 1996), the impacts of lighting, color, music and temperature (Baker and Cameron, 1996) and finally attribution of the cause of waiting for services (Baker and Cameron, 1996; Taylor, 1994).

Queuing theory is basically a mathematical approach which is applied to the analysis of waiting lines within the field of operations management (Nosek and Wilson, 2001). Any system in which arrivals of customers place demand upon a finite capacity resource may be termed as a queuing system (Singh, 2007). Gorney (1981) and Bunday (1996) argue that queuing theory uses queuing or mathematical models as well as performance measures to assess and expectedly improves the flow of customers through a queuing system. A good flow of customers means that the customers queuing is minimized while a poor customers flow means customers suffer considerable queuing delays (Hall, 2006). Queuing theory can be diversely applied and has been used mainly by the service industries (Nosek and Wilson, 2001). A queuing system or waiting lines consists of six major components: the population, the arrival, queues itself queue discipline, service mechanism and departure or exit.

a) The population source serves as from where arrivals are generated. Arrivals of customers or students at the university may be drawn from either a finite or an infinite population. A finite population source usually refers to the limited size of the customer pool. Alternatively, an infinite source is unlimited.

b) The queue discipline is the sequence in which customers or students are processed or served. The most common and widely used discipline is first come, first served (FCFS). Other disciplines are last come, first served (LCFS) and service in random order (SIRO). Sometimes customers may also be selected from the queue based on some order of priority (Taha, 2005).

c) The service mechanism describes how the customer is served at source. Nosek and Wilson (2001) conclude that the number of servers and the duration of the service time-both of which may vary time to time and also in a random fashion. The choices of facility structure can be determined by the number of lines and servers. The common service facility structures are: single-channel, single – phase; single-channel, multiphase; multi-channel, single phase and multi-channel, multiphase.

d) The departure or exit occurs when a customer is served. There are two possible exit scenarios that are: (a) the customer may return to the source population and immediately become a competing candidate for service again; (b) there may be a low probability of re-service.

RESEARCH METHODOLOGY

Before discussing the methodology of research, first it is better to understand the structure and working of student affairs in universities.

The student affair department for different universities is almost similar in nature; the study brings in to the consideration of different universities which are located in the Abbottabad, Khyber Pakhtoonkhawa (KPK) province of Pakistan namely, COMSATS

Abbottabad campus, COMWAVE Abbottabad, Hazara University, Mansehra campus and UET Abbottabad campus. Student Affairs is facing a problem of queue management. A survey of the students of different universities showed that more than 70% of the students in universities are unhappy and dissatisfied with their services of student affairs. One of the big problems in the student affairs is the large waiting lines that build up just before exams when students have to collect their sessional or exam coupons. In order to collect them they need to clear their dues, fines, and any other such defaults. At time like this students have less time to stay in line because of the ongoing classes so they simply break lines and try to get to the server first which causes a kind of chaos in the student affairs. Another such phenomenon is seen during the new admission time. Students flock in students affairs to clear their queries, submit forms, documents, clear fee dues, enable installments, education fund, etc. once again the same thing happens. So in order to reduce these waiting lines and managing them the queue system of the student affairs need to be re-designed and improved. Student affairs major work is to deal with the following three functions in the universities,

i) Information: Information area in student affairs provides the arrivals all kind of information that they require else than that information portion deals with all the queries related to academic and non academic issues of both students and faculty members and their other services are information providing facility to parents, notice board, online course registration, registered course status, attendance monitoring, fee status, marks, result card, overall progress, login history, changing password.

ii) Student issues: The student affairs section basically deals with the following matters that are admissions, student counseling for academic as well as non academic issues, provision of certificates, information / query center for students, liaison with the guardians / parents, student refunds.

iii) Admission: It deals with the admission for the new candidates. In this admission desk the students are provided by the student applications for academic as well as non academic issues. It also deals with the provision of certificates, student counseling and student refunds. These set of modules provide all the academic functions including admissions, academic activities, student fees, examination, head of department activities, faculty activities, user management, student transport, HRMS & payroll system, library access, ID-cards.

RESULTS AND DISCUSSION

The study used the observation method for research purpose. Direct investigation method is used to observe students and staff for seven days to find out the arrival pattern, arrival rate, service rate and the queue system in practice. The research findings are discussed as follows.

Customer arrivals / population: Arrivals at student affairs is infinite. As the admission process is in progress and it is unpredictable for the department to predict the arrivals for the admission.

Arrival rate: The customer arrivals for one hour that visit the student affairs are approximately ranges between 40-50. The study classified these arrivals according to the desk system that are to be used which are:

a) Into the student issues desk the total number of

arrivals observed in one hour are ranges from 15-20. The range may vary due to the size of the respective universities.

b) Into the accounts desk the total number of arrivals observed in one hour are ranges from 10-15.

c) Into the information desk the total number of arrivals observed in one hour are ranges from 15-20.

Distribution of arrivals

Since the arrival rate is random in nature so the study used exponential distribution of the arrival rate.

$$F(t) = \lambda e^{-\lambda T}$$

Since there are three desks or servers so the study calculated the probability of expected customers for the following three desks of student affairs. We present a specific case for one university for ready reference.

Students' desk

Data

$$\lambda = 17/\text{hr}$$

$$F(t) = 17 \cdot e^{-17 \times 1}$$

$$F(t) = 0.0000000703$$

This means that there is a probability of 0.0% that 17 people would come in the next hour.

Normal time

At student disk number of arrivals = 17 students/h
 Normal time = time per unit x performance rating
 Normal time = 3.52 x 110%
 Normal time = 3.88 min
 So it means student disk deals with 1 student in 3.88 min.

Standard time

Standard time = Normal time (1+Allowance time)
 Standard time = 3.88 (1+25%)
 Standard time = 4.85 min

Accounts desk

Data

$$\lambda = 12/\text{hr}$$

$$F(t) = 12 \cdot e^{-14 \times 1}$$

$$F(t) = 0.000000997$$

It means at the accounts desk there is 0.0% chance that

there will be 12 students in the next hour.

Normal time

At accounts disk number of arrivals = 12 students/hours
 Normal time = time per unit x performance rating
 Normal time = 5 x 110%
 Normal time = 5.5 min
 So it means accounts disk deals with 1 student in 5.5 min.

Standard time

Standard time = Normal time (1+Allowance time)
 Standard time = 5.5 (1+25%)
 Standard time = 6.8 min

Information desk

Data

$$\lambda = 20/\text{hr}$$

$$F(t) = 20 \cdot e^{-20 \times 1}$$

$$F(t) = 0.00000000412$$

This also means that there is a chance of 0.0% that 20 people would come in the following hour.

Normal time

At information disk number of arrivals = 20 students/h
 Normal time = time per unit x performance rating
 Normal time = 3 x 110%
 Normal time = 3.3 min
 So it means information disk deals with 1 student in 3.3 min.

Standard time

Standard time = Normal time (1+Allowance time)
 Standard time = 3.3 (1+25%)
 Standard time = 4.12 min

Figure 1 shows the overview of the arrival pattern for the student affairs that from the portion at the very bottom of the picture the customers are going to be arriving to that unit. After that they take the necessary information according to their query from the information desk which is straight forward to the entrance and then if they want to take admission or any of the accounts or document issue then they further proceed towards it. While through the exit portion they exit by completing their work.

Services: The services according to the system designed in Figure 1 are categorized into the three desks

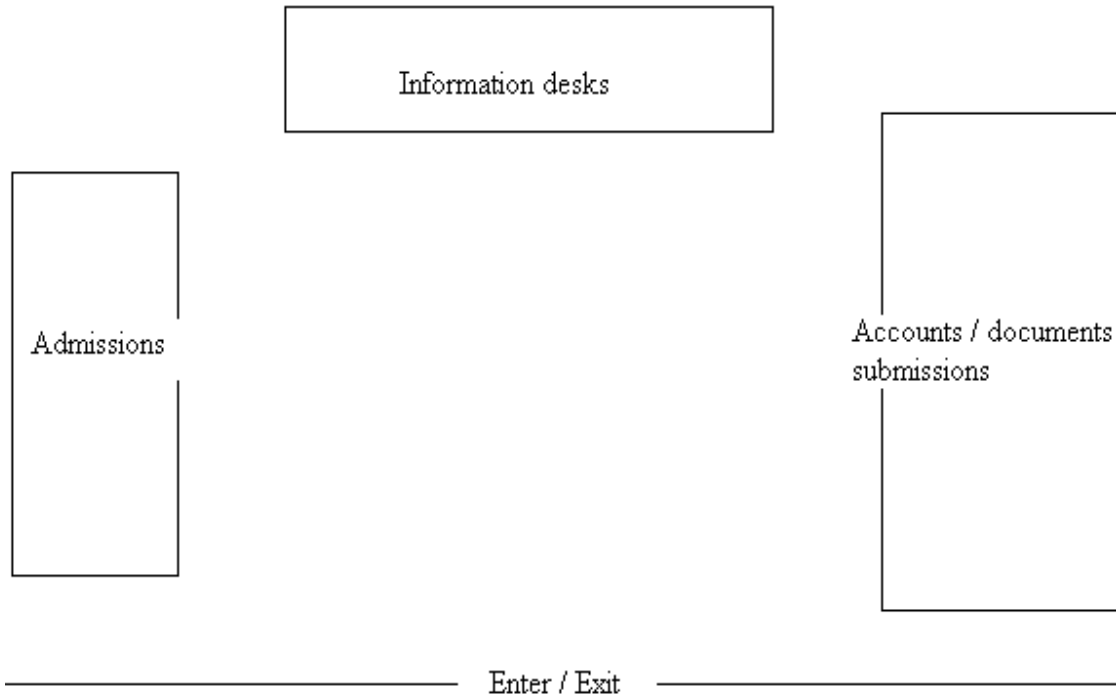


Figure 1. Arrival pattern.

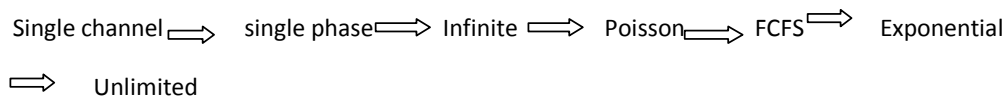


Figure 2. Line structure model for the student affairs.

which are admission, information, and the accounts / documents issuance and submission. These three desks basically act as servers which provide the service on the arrivals of the customers.

Service rate: The service rate is calculated on the overall services that are provided to the arrivals which are 72 per h and as the unit (student affairs) is categorized into the three servers so according to each server the observed service rate is:

- For the student issues desk the total service rate observed per hour are 24;
- For the accounts desk the total service rate observed per hour is 30 and
- For the information desk the total service rate observed per hour is 18.

Waiting line model

Line structure model for the student affairs is shown in Figure 2. The explanation of the model is given as

follows. Single channel is to be adapted by the queue system. Single Phase is involved in process. The population on the arrival basis is observed is infinite. The arrivals calculations are on the base of the Poisson distribution. First come first serve is the queue system is being followed. The service rate is calculated on the base of the exponential distribution. As a whole the queue length is unlimited.

Exit system: The procedure is to be adopting by the arrivals after getting the service from the servers to exit from the system are on the two bases i.e., first is the arrival who directly exits from the system when they get the necessary information from the information desk. Other one is those who exit from the information desk and enter to the line for the admissions or accounts / documents issuance and submission. They do not directly exit from the system at once but they enter into another queue after one.

Figure 3 shows that flow chart for the existing system followed by student affairs of different universities. The study extracted all similarities of student affairs in the

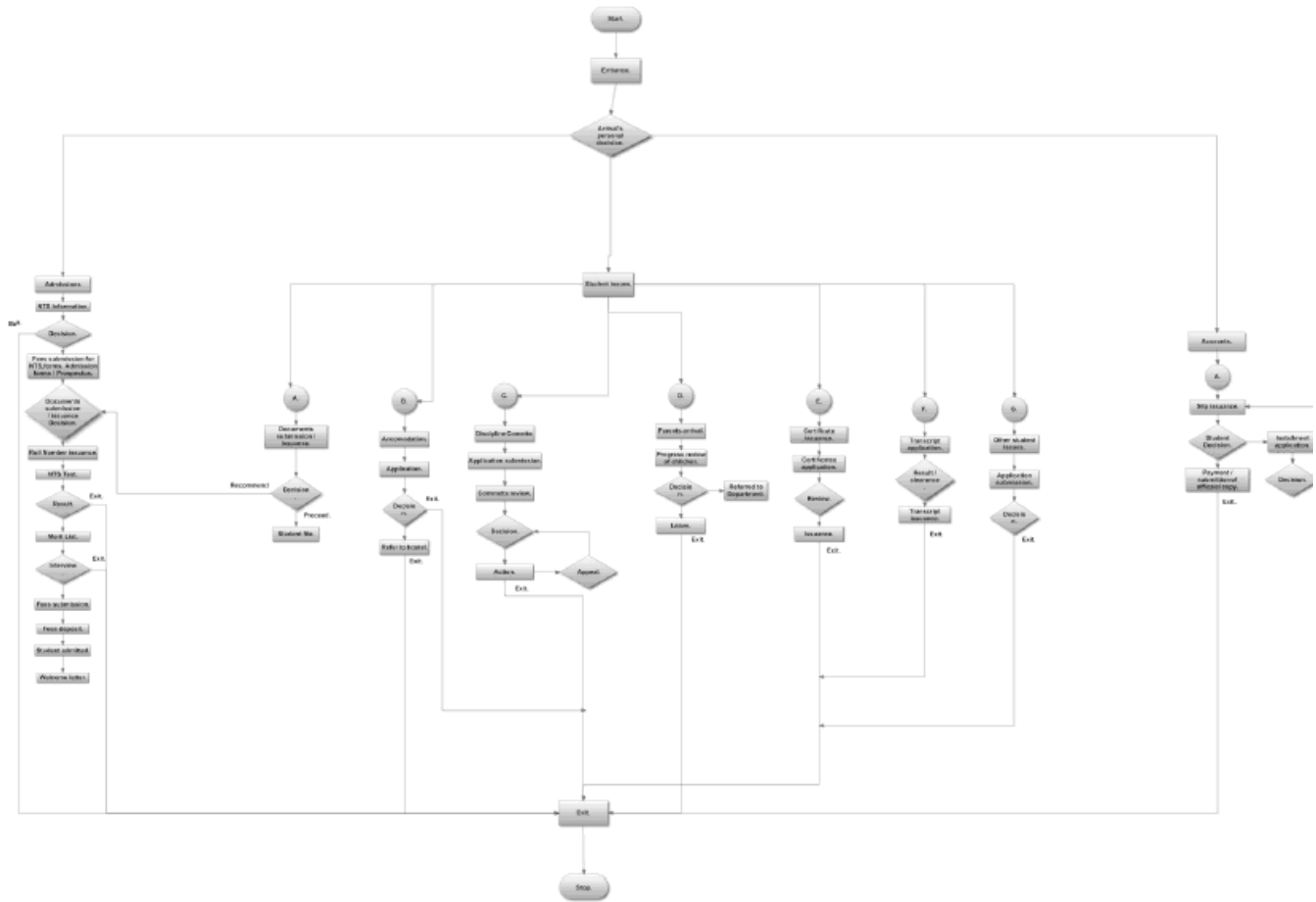


Figure 3. Existing flow chart of student affairs in universities.

different universities and makes a common flow chart. The existing student affairs department of the universities has the process layout having the same entrance and exit point. Any new person arriving from the entrance points does not know at which desk to go for the concerned purpose, as when he/she enters they see a number of help desks and they are not aware of the functions being handled on each desk. They themselves choose to go for any one of them to ask for the concerned to go for the solution of his problem work. There are three help desks currently serving the activities of the student affairs which are:

i. Admissions: This desk is located on the extreme left corner of the hall with two officers responsible for handling different activities which are issuance of national testing services (NTS) registration numbers / conduction of tests, displaying merit lists, conducting interview with the help of concerned departments, displaying final merit lists, and final is to confirm the admission process and pass the data toward the student issues to manage a file for it while with this the student is finally admitted into the

university.
ii. Student issues: Student issues desk is in front of the entrance and exit point of the hall. This desk has two officers as well who are responsible for the following functions; enrollment of newly admitted students, preparation of file of the student, arrangement of hostel facility to new students, address the parents with the progress of their children, discipline committee issues, certificates / achievements, and management of the major events for the campus like the convocation etc.

iii. Accounts, documents submission / issuance: Accounts desk is present at the extreme right side of the hall comprising three officers responsible for functions like issuance of Chelan slip / fee slip, management of student fees issues and along with it there is a document submission / issuance desk which is responsible for the issuance at the time of admissions and transcript at the time of the graduation and verification where necessary.

The above three mentioned desks are responsible for the functions allotted to them but are inefficient; for instance at the time of new admissions there is a huge rush of

people moving and going out, first draw back comes up at the entrance and exit point. Secondly when a person enters at that time the student issues desk appears just in front so that desk refers half of them to admissions desk and half towards accounts desk. Those referred to admissions desk are again sent back to the accounts desks which has the function of documents submission and issuance. The huge queue in front of student issues desk creates a hurdle in moment from admissions desk extreme left to accounts desks extreme right while getting through the large queue in the mid. When the arrivals are served from the accounts desk half of people are coming towards that desk this activity creates some mix up situation. As a result of which the extra burden comes upon the officers because there activities according to the desks are mixed up while the arrivals in the form of students and outsiders feel that they are ignored that also creates sometimes a huge problem as they think that they are misguided and may not be treated properly. The model that can be used in this whole scenario of student affairs is the model1 which actually is;

$$Lq = \lambda / \mu (\mu - \lambda) \quad Wq = Lq / \lambda$$

$$Ls = \lambda / \mu - \lambda \quad Ws = Ls / \lambda$$

To apply the model and find the utilization of the three desks we proceed as follows;

For students' issuance desk

Utilization

Utilization can be calculated with the following formula

$$P = \lambda / \mu$$

As $\lambda = 17$ students/hr and $\mu = 0.40$ students/ min or 24 students/ h

Utilization can be calculated as:

$$P = 17/24 \\ = 0.708$$

So the utilization of student issues desk is 70%

Average number in waiting line

To find average number in waiting line we can use the following formula

$$Lq = \lambda^2 / \mu (\mu - \lambda) \\ = 17^2 / 24 (24-17) \\ = 1.72 \text{ students}$$

So approximately 2 students would be there in the waiting line.

Average number in system

Average waiting time can be calculated with the formula

$$Ls = \lambda / \mu - \lambda \\ = 17/24-17 \\ = 2.4 \text{ students}$$

So there will be 2.4 or 2 students in waiting.

Average waiting time in line

Average time in line is calculated as,

$$Wq = Lq / \lambda \\ = 1.72/17 \\ = 0.10 \text{ hour or 6 min}$$

So the average waiting time in line for a student is 6 min.

Average waiting time in system

This can be calculated as,

$$Ws = Ls / \lambda \\ = 2.4/17 \\ = 0.14 \text{ hour or 8.4 min}$$

So the average waiting time of the system is 8.4 min.

For information desk

Utilization

Utilization can be calculated with the following formula,

$$P = \lambda / \mu$$

As $\lambda = 20$ students/hr and $\mu = 0.50$ students/ min or 30 students/ h

Utilization can be calculated as:

$$P = 20/30 \\ = 0.66$$

So the utilization of information desk is 66%.

Average number in waiting line

To find average number in waiting line we can use the following formula,

$$Lq = \lambda^2 / \mu (\mu - \lambda) \\ = 20^2 / 30 (30-20) \\ = 1.33 \text{ students}$$

So there will be 1.33 or 1 student waiting in line.

Average number in system

Average waiting time can be calculated with the formula,

$$\begin{aligned} L_s &= \lambda / \mu - \lambda \\ &= 20/30 - 20 \\ &= 2 \text{ students} \end{aligned}$$

The average number of students waiting in the system is 2 students.

Average waiting time in line

Average time in line is calculated as,

$$\begin{aligned} W_q &= L_q / \lambda \\ &= 1.33/20 \\ &= 0.06 \text{ hour or } 3.99 \text{ min} \end{aligned}$$

So a student waiting in line will for approximately 4 min for his/her turn.

Average waiting time in system

This can be calculated as

$$\begin{aligned} W_s &= L_s / \lambda \\ &= 2/20 \\ &= 0.1 \text{ h or } 6 \text{ min.} \end{aligned}$$

The average time to wait in the whole system is 6 min.

For account desk

Utilization

Utilization can be calculated with the following formula,

$$\begin{aligned} P &= \lambda / \mu \\ \text{As } \lambda &= 12 \text{ students/hr and } \mu = 0.30 \text{ students/ min or } 18 \\ &\text{students/ h} \\ \text{Utilization can be calculated as:} \\ P &= 12/18 \\ &= 0.66 \end{aligned}$$

So the utilization of information desk is 66%

Average number in waiting line

To find average number in waiting line we can use the following formula,

$$\begin{aligned} L_q &= \lambda^2 / \mu (\mu - \lambda) \\ &= 12^2 / 18 (18 - 12) \\ &= 1.33 \text{ students} \end{aligned}$$

There will be 1.33 or 1 student waiting in line.

Average number in system

Average waiting time can be calculated with the formula,

$$L_s = \lambda / \mu - \lambda$$

$$\begin{aligned} &= 12/18 - 12 \\ &= 2 \text{ students} \end{aligned}$$

So in the whole system, there will be 2 students.

Average waiting time in line

Average time in line is calculated as,

$$\begin{aligned} W_q &= L_q / \lambda \\ &= 1.33/12 \\ &= 0.11 \text{ h or } 6.65 \text{ min.} \end{aligned}$$

The average waiting time of a student is 6.65 or 7 min approximately.

Average waiting time in system

This can be calculated as,

$$\begin{aligned} W_s &= L_s / \lambda \\ &= 2/12 \\ &= 0.16 \text{ h or } 9.6 \text{ min} \end{aligned}$$

The average waiting time in the system for a student is 9.6 or 10 minutes approximately.

CONCLUSION AND RECOMMENDATIONS

Queuing models have found widespread use in the analysis of service facilities, production and many other situations where congestion or competition for scarce resources may occur. This paper has introduced the basic concepts of queuing models, and their implication to student affairs because queuing is a problem of student affairs like other service sector. Student affairs face queuing problems especially during admissions opening and before internal exams. So both, students and staff of student affairs, face problems.

There are a few suggestions that maybe useful if implemented:

1. Student affairs can hire two people per desk. This can be useful during the new admissions and examination time. This will increase the service rate and reduce the work load and stress making the communication between staff and students pleasant and easy.
2. The staff should be provided some kind of on the job training as well as re briefing about their job tasks and duties. Apart from that the whole system of the student affairs is needed to be explained since some of the staff members doesn't know about the system on which the student affairs is actually running.
3. There should be a proper arrangement of the desks so that when a person enters he or she may understand right away where exactly to go i.e. the information desk.
4. Systematic processes which ensure minimum time

consumption should be introduced. This will be highly appropriate for the new admissions e.g. the process that involves repetition of the desks should be made in such a way that the students are able to visit one desk only once and move on to the other, and their problems may be solved as they move on.

5. In order to make the staff more dedicated towards their respective tasks and jobs irrelevant tasks that only cause burden should be removed and for such "miscellaneous" activities a separate desk should be created. E.g. asking the information personnel to take care of hostels, couriers, parcels, transportation etc only adds burden and diversion of attention.

If these recommendations are taken under consideration then researcher is quite sure that the service at student affairs will improve to a great degree.

Limitations of the study

Despite its contributions, this study also has its own limitations. Most particularly, the study recognizes that the data was gathered during seven days, so this may limit the generalization of findings. As a result, a further study is recommended to cover some other aspects for a longer period of time. Moreover, only a student affair of the different universities was considered in this study. The related aspects or departments should also be considered, which indirectly affects student affairs efficiency and also creates hurdles in smooth operations of student affairs. Additionally, this study takes into consideration the actual waiting time but ignores the effect of perception of waiting time on students' satisfaction.

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