CONSUMERISATION OF INFORMATION TECHNOLOGY, USER AUTONOMY AND PERSONAL INNOVATIVENESS AMONG SELF-SPONSORED STUDENTS OF THE UNIVERSITY OF NAIROBI'S SCHOOL OF BUSINESS

BY

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DECLARATION

This management research report is my original work and has not been submitted for a degree in any other university.

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This management research report has been submitted for examination with my approval as the supervisor.

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DEDICATION

To Crystal and Daystar. You keep exposing—and filling—my knowledge gap that no research ever will.

ACKNOWLEDGEMENT

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CONTENTS

FIGURES

TABLES

ABSTRACT

The purpose of this study was to empirically identify and explain consumerisation of information technology (IT) in educational settings, and to establish its relationship with user autonomy and personal innovativeness. We used a cross-sectional survey involving 143 self-sponsored students in six different classes in both undergraduate and postgraduate sections of the School of Business of the University of Nairobi. The choice of self-sponsored students enrolled in part-time programmes was premised on the observation that many students undertaking these programmes were employed in the workforce full-time and took classes in the evenings. They were thus in the unique position of being able to evaluate technology in the context of both the commercial arena (their workplace) as well as, for their academic programme, the educational arena. Our study established that the rate of Bring Your Own Device (BYOD) and the basic level of consumerisation of IT in the sample was about 91%, and found significant positive correlations among the research variables of consumerisation of IT, user autonomy and personal innovativeness. We also established that the respondent's BYOD status (that is, whether or not they owned a device that they brought to class) was a statistically significant factor in understanding the research variables, but that there were no statistically significant differences in the respondent's single or multiple device ownership and similarly in the respondent categories of gender, academic programme and age group. Our study produced useful insights into the factors that influence innovation in the classroom and significantly contributed new ideas towards the understanding of the concept of consumerisation of IT in educational settings, recommending that educators should look for innovative ways to use mobile technologies in their classrooms.

CHAPTER ONE: INTRODUCTION

In this chapter, we review the background of the study on the concepts of consumerisation of information technology (IT) and the related "Bring Your Own Device" (BYOD) phenomenon, user autonomy, and personal innovativeness. We also review the problem statement, outline the research objectives, and anticipate the value of the study.

1.1 Background

Scientific interest in the phenomenon of consumerisation of IT is growing, reflected by its extensive discussion in current practitioner literature (Ruch & Gregory, 2014), but only recently becoming the focus of information systems (IS) research (Niehaves, Köffer, Ortbach, & Katschewitz, 2012). Dedeche, Liu, Le, and Lajami (2013) suggest that the rapid adoption of smartphones and tablets has led to the consumerisation of IT or more specifically, diffusion of consumer devices into the enterprise. Similarly, IT industry experts note that consumerisation of IT and the BYOD phenomenon often go hand in hand, with consumerisation of IT being identified as the main driver of BYOD (ZDNet, 2013); they also are sometimes viewed as synonymous and recognised that they have become an unstoppable force (PwC, 2012).

This research report establishes the definitions of these concepts in academic and practitioner literature, and reports on the investigation to establish the level of consumerisation of IT among the self-sponsored students of the University of Nairobi's School of Business. It also reports on the examination that followed to establish if this level of consumerisation of IT is found to have an association with user autonomy, which in turn affects personal innovativeness and productivity, as suggested by Elie-Dit-Cosaque, Pallud, and Kalika (2011). This research report also ascertains which theories in IS literature increase our understanding of consumerisation of IT (including BYOD), user autonomy and personal innovativeness.

1.1.1 Consumerisation of IT and BYOD

An early description of consumerisation as provided by Moschella, Neal, Opperman, and Taylor (2004) centred on the concept of dual use, "in which hardware devices,

network infrastructure and value-added services will increasingly be used by both businesses and consumers." Consumerisation has been identified as innovations that originate in the consumer sector that have increasingly infiltrated the corporate environment (Weiß & Leimeister, 2012) and "the specific impact that consumer-originated technologies can have on enterprises" (Gartner, 2013). Specifically, consumerisation of IT refers to "privately-owned IT resources, such as devices or software that are also used for business purposes" with consumerisation of IT being regarded as a significant driver which is redefining the relationship between employees (consumers of enterprise IT) and the IT organisation (Niehaves, Köffer, & Ortbach, 2013).

Bring Your Own Device (BYOD) collectively refers to the related technologies, concepts and policies, where employees access an organisation's internal IT resources, such as database and applications, using their personal mobile devices like laptops, smartphones and tablets (Koh, Oh, & Im, 2014). BYOD is considered part of the broader phenomenon of consumerisation of IT. Industry analysts have defined BYOD as the policy of permitting employees to bring personally-owned mobile devices (laptops, tablets, and smartphones) to their workplace, and to use those devices to access privileged company information and applications (PCWorld, 2011). The term is also used to describe the same practice applied to students using personally-owned devices in education settings (Lee, 2012), "where students are increasingly coming to class with technology in their pockets" (Hockly, 2012). Vanwelsenaers (2012) observes that while many institutions of learning have offered a fixed technology menu of computers in a computer lab or a designated technology area in a classroom, mobile technologies "are not likely to go away and educators should look for ways to use these technologies in their classrooms."

BYOD is reshaping the way IT is purchased, managed, delivered, and secured (ZDNet, 2013). Researchers have identified that the BYOD trend has a number of underlying business drivers. Organisations are responding to a generational shift in expectations from their employees who demand job flexibility and desire to perform their work on the latest technological gadgets (Gatewood, 2012; Thomson, 2012, cited in Dedeche et al., 2013). Thus BYOD is a response to growing pressure from the connected workforce of tomorrow and is a tactic for attracting and retaining top talent (Dedeche et al., 2013).

The ubiquity and utility of mobile devices in the consumer domain has led organisations to consider the benefits and challenges of allowing their employees to bring their own devices. It is notable that the consumerisation of IT is a natural transition considering that devices are now commonplace in the personal lives of employees, and clear that consumerisation of IT and the BYOD phenomenon are emerging forces in today's organisations due to identified benefits despite challenges and risks associated with them (Marshall, 2014).

1.1.2 User Autonomy and Personal Innovativeness

User autonomy is "the capability to act on the basis of one's own decisions; to be guided by one's own reasons, desires, and goals" (Friedman & Nissenbaum, 1996). In the context of consumerisation of IT and BYOD, user autonomy is viewed by Niehaves et al. (2012) as often associated with "greater freedom" or "new freedoms" for employees, and with "increased autonomy and independence for employees, as they may make IT decisions on their own or provide technical support for themselves."

Personal innovativeness in the domain of information technology is "the willingness of an individual to try out any new information technology" (Agarwal & Prasad, 1998); it thus describes the extent to which the individual has an innate propensity toward adopting a new IT, and this plays an important role in determining the outcomes of user acceptance of technology (Yi, Jackson, Park, & Probst, 2006).

1.1.3 Self-sponsored Students of the University of Nairobi's School of Business

The University of Nairobi is the largest university in Kenya, and the pioneer institution of university education in Kenya. It currently provides over 300 programmes to a student population of 84,000, of which 70,000 are undergraduate and 14,000 are postgraduate (University of Nairobi, 2013). Module I admission for undergraduate students that are sponsored by the government is done through the Joint Admission Board (JAB), the national body that manages admission of students for all public universities in Kenya. Since the government sponsorship can cater for very few qualifying candidates, the university gives an option for self-sponsored undergraduate (module II) students, where the admission is done internally at the university. Admission to any postgraduate programme at the university is carried out by the Board of Postgraduate Studies (BPS) in close consultation with the relevant school or faculty.

All postgraduate students are self-sponsored, apart from a few who may have secured scholarships through various means.

Module II (parallel track) programmes were introduced in Kenyan public universities in 1998, and have witnessed an unprecedented growth (Wainaina, 2011). For their study, Agarwal and Prasad's (1998) choice of business professionals enrolled in part-time programmes was premised on the observation that the students undertaking these programmes are employed in the workforce full-time and take classes in the evenings; thus, they are in the unique position of being able to evaluate technology in the context of both the commercial arena (i.e., in their workplace) as well as the educational arena (i.e., for their education programme). In the local Kenyan context, Mabinda (2014) suggests, among other reasons, that students who enroll in the self-sponsored programmes are more mature and are likely to take their education more seriously than the students in their late teens and early twenties (that is, the government-sponsored students). Different terminologies have been used to describe these programmes: parallel programmes, self-sponsored programmes, direct entry programmes, full fee paying academic programmes and module II programmes. Within the context of this research report, the term "self-sponsored" will be used throughout.

The University of Nairobi's School of Business has slightly over 13,000 students spread across seven programmes (University of Nairobi, 2014). These are Bachelor of Commerce (BCom), Master of Business Administration (MBA), Master of Science in Finance (MSc. Finance), Master of Science in Marketing (MSc. Marketing), Master of Science in Human Resource Management (MSc. HR), Master of Science in Entrepreneurship and Innovations Management, and Doctor of Philosophy in Business Administration (PhD).

This study examined a cross-section of the self-sponsored students in the Nairobi campus of the School of Business, both in the undergraduate and postgraduate sections. There were 9,138 self-sponsored students undertaking BCom and MBA programmes thus forming about 70% of the student population of the School. These programmes were chosen to represent the undergraduate and postgraduate categories respectively. It was expected that the diverse nature of the students represented—with their industry experience and perceived purchasing power as most were working and paying their own fees (Agarwal & Prasad, 1998; Mabinda, 2014)—will provide a complete picture

of the level of consumerisation of IT prevalent with self-sponsored students and its relationship with user autonomy and personal innovativeness.

1.2   Statement of the Problem

Although consumer IT is becoming a vital part of the workplace and the classroom, researchers are still searching for comprehensive factors contributing towards this trend (Yi et al., 2006). Lamentably, most academic research and practitioner literature is focused on consumerisation of IT in the workplace, and virtually none on consumerisation of IT in educational settings, as has been endeavoured by Lee (2012) and Hockly (2012). Furthermore, Niehaves et al. (2012) concede that consumerisation of IT has only recently become a research focus and that little scientific research has yet been conducted in this area, as most studies on the topic are executed by consulting firms.

Mbalanya (2013) determined that over 90% of organisations listed at the Nairobi Securities Exchange (NSE) have allowed BYOD in one form or the other, with over half of the companies allowing a substantial portion of staff to use their own personal devices for work-related tasks. Kamau (2013) observes that management in Kenyan firms do understand the BYOD concept very well, and are also aware of BYOD impact on productivity. Following these local studies on BYOD that centred on whole firms, this study took a different approach and focused on users themselves (and in an education context) to investigate the level of consumerisation of IT, and to establish its relationship with user autonomy and personal innovativeness.

Broadly, this study sought to answer the question: What is the level of consumerisation of IT among the self-sponsored students of the University of Nairobi's School of Business, and what relationship does it have with user autonomy and personal innovativeness?

1.3   Research Objectives

The main objective of this study was to establish the level of consumerisation of IT among the self-sponsored students of the University of Nairobi's School of Business and to establish its relationship with user autonomy and personal innovativeness. To

realise this main objective, the focus of the study was through the following specific objectives:

i. To establish the level of consumerisation of IT in this sample.
ii. To establish the relationship between the level of consumerisation of IT and user autonomy.
iii. To establish the relationship between user autonomy and personal innovativeness.

1.4 Value of the Study

The Kenyan education sector (especially the local universities) will potentially benefit by having more insight into the consumerisation of IT trend. The special case of self-sponsored students (who likely have both industry experience and purchasing power) will provide the education institutions with a deeper understanding of how their students innovate in the classroom.

Researchers and IT practitioners will benefit as they seek to further clarify the productivity gains from IT innovations. This study also has the potential to bring to the fore the concept of consumerisation of IT and deeper appreciation of the concepts of user autonomy and personal innovativeness, and how they relate with consumerisation of IT.

This study will also be of interest to the academia as it relates to how students innovate in the classroom, and has the potential to inform their consumerisation of IT-related curricula. Shedding light on the current trend of consumerisation of IT among self-sponsored students (who typically are also in the workforce) could also help inform Government policy on IT.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

In this chapter, we focus on reviewing current knowledge and studies involving consumerisation of IT and the Bring Your Own Device (BYOD) phenomenon, user autonomy and personal innovativeness, and review the theoretical perspectives in information systems (IS) that increase our understanding of these concepts. A summary of the review clearly brings out the research gap. We then illustrate the variables of the study and the research hypotheses that the study tested through a conceptual framework.

2.2 Consumerisation of IT

Consumerisation of IT refers to "privately-owned IT resources, such as devices or software that are also used for business purposes" (Niehaves et al., 2013). Gartner (2012) views consumerisation as the leading of five major IT megatrends and argues that although the topic has been discussed for a decade, the big wave of changes is still to come. Greengard (2012) observes that for years, organisations and their IT departments dictated what hardware employees would use and how they would use it, which in turn controlled what software employees used and how they went about their work. Ushering the consumerisation trend is the "democratisation of technology" where users of all types and status within organisations can now have similar technology available to them (Gartner, 2013). Unisys (2012) views consumerisation of IT as an "an employee-led revolution," revealing the employee as a new locus of control and represents a "blending of personal and business technology," while Moschella et al. (2004) assess consumerisation as "blurring of personal boundaries" between work time and personal time that has been happening ever since the emergence of the first PCs and then the remote network access that made working at home more feasible.

Moschella et al. (2004) are believed to be the first to publish a scholarly paper on consumerisation of IT (Niehaves et al., 2012; Ruch & Gregory, 2014). In that position paper, Moschella et al. (2004) observed that for much of the history of technological innovation, top-down processes have been dominant. The early users of most new technologies were corporate customers with significant financial resources and sophisticated needs, with military projects often the primary source of major advances

in IT. However, over time, the benefits of this research and development trickled down, first to large organisations, and then eventually to consumers and small businesses. They thus postulated that the consumerisation of IT promises many significant long-term business consequences, including radically lower costs, greatly improved functionality, and successive generations of users who are ever more technology-savvy. They also noted that consumer devices and infrastructure are also becoming an important platform for a wide variety of innovative new products, services and applications.

The term "consumerisation" is now widely used throughout the IT industry, and is the topic of numerous conferences and articles, prominently as a special insert in *The Economist* magazine on 8th October 2011. In recounting the shift from *personal* to *personalised* computing, the author of the article opines that "whereas the PC may have been personal, a smartphone or tablet, held in someone's hand rather than perched on a desk, is almost intimate, and it can be taken almost anywhere" (The Economist, 2011). Due to the ubiquity of privately owned mobile devices, there is a clear trend of consumers rather than enterprises increasingly diffusing technology innovations into work environments (Dernbecher, Beck, & Weber, 2013) and this significantly contributes to organisational productivity. It is thus clear that the rapid adoption of smartphones and tablets has led to the consumerisation of IT or diffusion of consumer devices into the enterprise (Dedeche et al., 2013), and therefore to meet the mobility demands of today's employees, organisations have started to embrace BYOD to realise productivity gains and cost benefits from allowing employees to use their technology of choice in the workplace.

Trend Micro (2011) concludes that consumerisation has reached the tipping point. Majority of companies surveyed in this report (from U.S., Germany and Japan) already allow employees to use their personal devices for work-related activities. 56% of the respondents (IT personnel responsible for endpoint operational management) affirmed the consumerisation trend as their end-users favour personal devices because they are easier to use, more convenient and allowed them to mix personal and work activities. However, the report notes that while the trend is clearly affecting organisations worldwide, not all regions have adapted at the same pace: the U.S. leads this innovation with 75% of companies surveyed allowing personal devices, the more conservative Japan with 36% and Germany in between with 59%.

2.3   Bring Your Own Device (BYOD)

BYOD collectively refers to the related technologies, concepts and policies, where employees access an organisation's internal IT resources, such as database and applications, using their personal mobile devices like laptops, smartphones and tablets (Koh et al., 2014). IT industry pundits observe that the BYOD phenomenon and consumerisation of IT often go hand in hand, with the main driver of BYOD being consumerisation of IT; this phenomenon is thus reshaping the way IT is purchased, managed, delivered, and secured (ZDNet, 2013). With increased mobility and a shift in regular working hours, employees are being asked to work at any time and from any place; therefore it is vital that companies find ways to maintain job satisfaction and loyalty (Amerland, 2012). "Information workers today are increasingly tech-savvy and self-empowered. The typical employee owns an assortment of laptops, smartphones, tablets and PCs that are often more advanced than what most information technology departments can offer. Not surprisingly, many employees prefer to access corporate resources using their own technology because it is familiar, powerful and already an integral part of their everyday lives" (PwC, 2012).

BYOD also applies to students using personally-owned devices in education settings (Lee, 2012), "where students are increasingly coming to class with technology in their pockets" (Hockly, 2012). Vanwelsenaers (2012) observes that while many institutions of learning have offered a fixed technology menu of computers in a computer lab or a designated technology area in a classroom, mobile technologies "are not likely to go away and educators should look for ways to use these technologies in their classrooms."

2.3.1   BYOD Opportunities

While many organisations want to run away from the security risks of the BYOD trend, others such as Intel chose to run toward them (Information Security Media Group, 2014). Since January 2010, the number of employee-owned mobile devices on the job has tripled from 10,000 to 30,000, and Intel Chief Information Security Officer (CISO) Malcolm Harkins expects that in 2014, 70% of Intel's 80,000 employees will be using their own devices for at least part of their job. The report notes that Intel's payback so far on embracing BYOD has been better productivity as employees who use their own devices respond faster to communication and over a greater percentage of the day,

improved security as mobility improves Intel's time to respond, contain and recover from incidents, and also greater control. Since personally-owned devices are encouraged, Intel now has markedly fewer unauthorised devices on its network.

PCWorld (2011) also highlights that businesses that embrace BYOD have some advantages over competitors, as BYOD programs generally shift costs to the user. With the worker paying for most, or all of the costs for the hardware, voice or data services, and other associated expenses, companies save a lot of money. Cisco Internet Business Solutions Group calculated that companies can save as much as $3,150 per employee per year if they implement a "comprehensive" BYOD program that basically gives employees access to all the information they need to do their jobs from their personal devices (Cisco IBSG, 2013). Part of the gains come from shifting costs to employees who Cisco estimates will each spend an average of $965 on their devices as well as $734 each year on data plans. The rest comes from estimated productivity increases. Therefore, in embracing BYOD, companies are discovering that they are no longer responsible for the purchase, upkeep and maintenance of expensive devices; employees are happier, more productive and show greater flexibility, as people prefer to use a single device that they have chosen, and do not need to juggle two different devices (Amerland, 2012).

2.3.2   BYOD Challenges

All new technologies are accompanied by new security challenges, and BYOD is no exception. Such include a scenario where an organisation's IT department must secure corporate data on devices the company does not own, while helpdesks may need to support a larger selection of devices and operating systems than they currently do (ZDNet, 2013). "This volume of personal devices in corporate settings implies a convergence that's never happened before. This convergence of digital personas—work and personal—is going to have other impacts that are, at present, unknown" (Amerland, 2012). In the BYOD approach in a classroom, Hockly (2012) discerns various challenges such as, devices and hardware ("different devices can accentuate the difference between the 'haves' with the latest [devices] and the 'have-nots', within the same classroom"), safety (among other safety concerns, students could "use their devices to access or download inappropriate material"), and most importantly, classroom management where "teachers are often concerned that students will spend

class time checking their Facebook accounts, texting friends, or accessing inappropriate material, rather than spending time on task." In the corporate environment, Dedeche et al. (2013), citing various researchers, classifies three most frequently identified BYOD risks as data leakage, loss of control and visibility, and ease of device loss, while Marshall (2014) concludes that despite the potential benefits to both the organisation and employees, the use of employee-owned devices raises issues relating to security, governance, processes, and even organisational culture.

Other significant challenges to using BYOD include an out-of-control enterprise environment: device chaos (where different devices with different operating systems are connected to the corporate network), application chaos (where different versions of corporate applications may be required for the different devices), and data chaos (where corporate data is in personal devices and thus may fall in unauthorised hands) (Citrix, 2011). Also, new policies and procedures for device procurement and management, application deployment, and data ownership may need to be developed (ZDNet, 2013).

Amerland (2012) summarises BYOD challenges aptly: "That old corporate chestnut: security," in which "a plethora of devices, all of them private, each with its own configuration, accessing a corporate network with potentially sensitive data. Without controls, you get a massive security nightmare."

2.4 Consumerisation of IT and BYOD Summary

The foregoing clearly illustrates that consumerisation of IT and the BYOD phenomenon are on the rise, with enterprises enjoying lowered IT capital and operating expenditure since purchase and maintenance costs of the devices are generally shifted to the employees. The enterprise are also aware of the risks and challenges posed by the management of corporate data in personal devices. BYOD in education institutions is also growing as students come to class with the latest technology but institutions may not have quite caught up, many offering a fixed technology menu of computers in a computer lab. These institutions should look for more innovative ways of using mobile technologies in the classroom.

2.4.1 Disruptive Innovation

Moschella et al. (2004) predicted that consumerisation would be such a difficult issue to manage for many organisations, as consumerisation showed all the signs of being a "textbook case of disruptive technology." This is because new technologies are often viewed first as a joke, then as a threat, and finally as obvious. They believed that the then current evidence (in 2004) strongly suggested that robust consumer facilities had moved well past the joke phase and were to soon prove increasingly disruptive to existing business infrastructures. This turned prophetic when consumer-friendly devices such as iPhone, iPad and Android devices hit the market and radically reshaped the business world (Greengard, 2012). These devices represented a classic case of disruptive innovation, viewed by Christensen (1997) as "technologically straightforward … components put together in a product architecture that [is] often simpler than prior approaches." The iPhone, for instance, when it was introduced in 2008, "was a consumer device that seemed to have no place in the then BlackBerry-dominated enterprise" but IT-savvy employees and influential executives began carrying their new iPhones into meetings and boardrooms, and consequently, BYOD was born (Greengard, 2012).

2.5 User Autonomy

User autonomy is "the capability to act on the basis of one's own decisions; to be guided by one's own reasons, desires, and goals" (Friedman & Nissenbaum, 1996). In the context of consumerisation of IT and BYOD, user autonomy is viewed by Niehaves et al. (2012) as often associated with "greater freedom" or "new freedoms" for employees, and with "increased autonomy and independence for employees, as they may make IT decisions on their own or provide technical support for themselves." Dell and Intel (2011) observed that six out of every ten, or 59%, of employees would "enjoy work more if able to choose their own technologies." Their study clearly established the connection between IT provision and employee morale, concluding that technology choice leads to productivity.

Elie-Dit-Cosaque et al. (2011) suggest that organisations are increasingly concerned about ensuring that workers have sufficient sense of control over the IT that they use, observing that "autonomy is what enables individuals to cope effectively with changing

work conditions, including those from IT." Ahuja and Thatcher (2005) found a significant correlation between user autonomy and IT innovativeness, while Niehaves et al. (2012) suggest that if people feel more self-confident in the use of IT, it is likely that they will find more innovative and faster ways for dealing with a particular task and will thus be more productive.

2.6 Personal Innovativeness

Personal innovativeness in the domain of information technology is "the willingness of an individual to try out any new information technology" (Agarwal & Prasad, 1998); it thus describes the extent to which the individual has an innate propensity toward adopting a new IT, and this plays an important role in determining the outcomes of user acceptance of technology (Yi et al., 2006). Agarwal and Prasad (1998) argue that from the perspective of practice, personal innovativeness helps identify individuals who are likely to adopt information technology innovations earlier than others. Such individuals can then serve as key change agents and opinion leaders to facilitate further diffusion of a new technology. Agarwal and Prasad (1998) further suggest that personal innovativeness is operationalised as "time of adoption."

2.7 Theoretical Perspectives

Niehaves et al. (2012) argue that the traditional direction of diffusion of innovations from enterprises into private households is increasingly changing to a more consumer-driven one, and observe that "there is a common understanding regarding the direction of technology adoption covered by consumerisation," clearly being from consumers to enterprises. They however lament that due to the fact that consumerisation of IT has only recently become a research focus, the body of IS-related journals is yet to provide a comprehensive theory to grasp the phenomenon. Still, they observe that "several well-established theories in the IS context cover different aspects of IT consumerisation" and proceed to draw on the cognitive model of stress and self-determination theory.

To inform our study, and to increase our understanding of the concepts of consumerisation of IT (and BYOD), user autonomy and personal innovativeness, we drew on the following theories: Unified theory of acceptance and use of technology, self-determination and self-efficacy theories, and social learning theory.

2.7.1 Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) aims to explain user intentions to use an information system (IS) and subsequent usage behaviour. The theory holds that four key constructs (performance expectancy, effort expectancy, social influence, and facilitating conditions) are direct determinants of usage intention and behaviour (Venkatesh, Morris, Davis, & Davis, 2003). Gender, age, experience, and voluntariness of use are posited to moderate the impact of the four key constructs on usage intention and behaviour. The theory was developed through a review and consolidation of the constructs of eight models that earlier research had employed to explain IS usage behaviour (theory of reasoned action, technology acceptance model, motivational model, theory of planned behaviour, a combined theory of planned behaviour / technology acceptance model, model of PC utilisation, innovation diffusion theory, and social cognitive theory). Venkatesh et al. (2003) subsequently validated UTAUT in a longitudinal study and found it to account for 70% of the variance in usage intention.

For BYOD, increased productivity (performance expectancy), ease of use (effort expectancy), status symbol (social influence), and low cost of mobile devices (facilitating conditions) have led to the BYOD phenomenon of employees using their devices for business-related tasks (Mbalanya, 2013).

2.7.2 Self-determination and Self-efficacy Theories

Self-determination theory is concerned with the motivation behind the choices that people make without any external influence and interference, and focuses on the degree to which an individual's behaviour is self-motivated and self-determined (Deci & Ryan, 2002). Consumerisation of IT is hypothesised to affect user autonomy and choice to select and to use IT tools in the business context. Practitioner literature suggests that this increased autonomy enhances work performance, because users select devices and software with which they are familiar and are able to handle more productively (Niehaves et al., 2012).

Elie-Dit-Cosaque et al. (2011) suggest that organisations are increasingly concerned about ensuring that workers have sufficient sense of control over the IT that they use, concluding that "autonomy is what enables individuals to cope effectively with

changing work conditions, including those from IT." Ahuja and Thatcher (2005) found a significant correlation between user autonomy and IT innovativeness. Conversely, Moore (2000), and subsequently replicated by Ahuja, Chudoba, Kacmar, McKnight, and George (2007) demonstrated that a lack of autonomy is correlated with work exhaustion for IT professionals.

Self-efficacy is a person's perception of their ability to plan and take action to reach a particular goal, while computer self-efficacy refers to an individual's judgment of their capabilities to use computers in diverse situations. Computer self-efficacy therefore affects choices about how to behave and act, as well as the persistence and effort exerted when facing obstacles (Compeau & Higgins, 1995). Niehaves et al. (2012) posit that if people feel more self-confident in the use of IT, it is likely that they will find more innovative and faster ways of dealing with a particular task and thus will be more productive.

2.7.3 Social Learning Theory

Learning theories attempt to explain how people think and what factors determine their behaviour. Social learning theory is a category of learning theories which is grounded in the belief that human behaviour is determined by a three-way relationship between cognitive factors, environmental influences, and behaviour (Bandura, 1977). Clark (2012) argues that the BYOD phenomenon is grounded in social learning theory or social constructivism, pointing out that social constructivism relates to how users bring their own understandings to the enterprise and based on their interactions and experiences, new knowledge is formed.

2.8 Literature Review Summary

In the foregoing, we have attempted comprehensive academic and practitioner definitions and reviewed current knowledge on the concepts of consumerisation of IT, BYOD, user autonomy, and personal innovativeness, together with the theoretical perspectives that increase our understanding of these concepts. The literature strongly suggests that consumerisation of IT has contributed significantly to the BYOD phenomenon, evidenced by growing scientific interest in consumerisation of IT and

BYOD and accompanied by extensive discussion in current practitioner literature (Ruch & Gregory, 2014).

It has also clearly emerged from the literature that although consumer IT is becoming a vital part of the workplace and the classroom, researchers are still searching for comprehensive factors contributing towards this trend (Yi et al., 2006), and are yet to propose a comprehensive or unified theory of consumerisation of IT to grasp the phenomenon (Niehaves et al., 2012). It is also evident that most academic research and practitioner literature is focused on consumerisation of IT in the workplace, and virtually none on consumerisation of IT in educational settings.

Our study endeavoured to fill this research gap by seeking to empirically identify and explain consumerisation of IT in educational settings, and to investigate its relationship with user autonomy and personal innovativeness.

2.9   Conceptual Framework

Following the review of the literature and the theoretical perspectives that increase our understanding of the concepts of the study, the variables for this study were identified as consumerisation of IT, user autonomy and personal innovativeness. Consumerisation of IT was recognised as the independent variable, user autonomy the intervening variable and personal innovativeness the dependent variable.

The conceptual framework diagram below depicts the relationships and the hypotheses among these variables.

Figure 1: Conceptual Framework
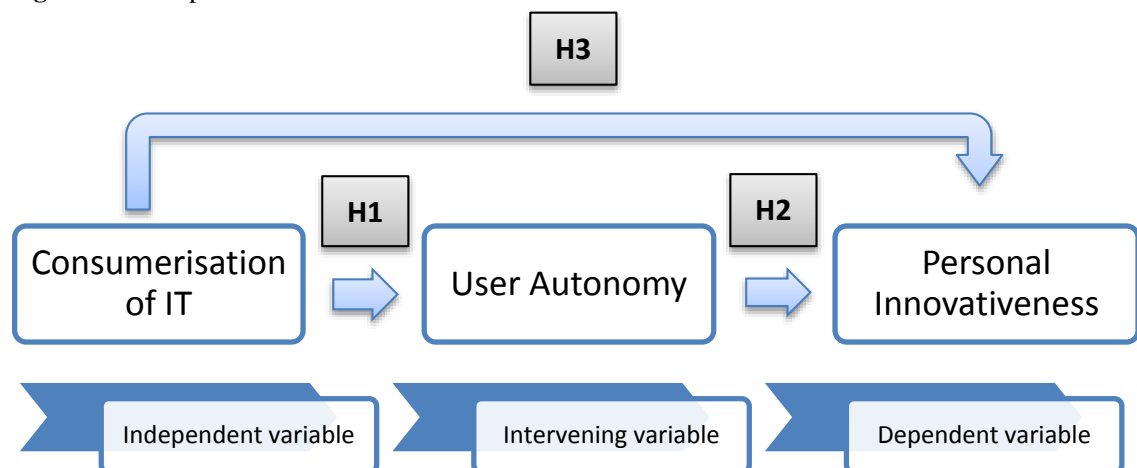
The following alternate hypotheses were tested:

i. $H1_a$ (alternate) hypothesis – Increased consumerisation of IT leads to increased user autonomy.
ii. $H2_a$ (alternate) hypothesis – Increased user autonomy leads to increased personal innovativeness.
iii. $H3_a$ (alternate) hypothesis – Increased consumerisation of IT leads to increased personal innovativeness.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, we lay out the approach that was used to carry out the study and outline the steps that were undertaken to test the hypotheses and address the research objectives. We describe the research design, the target population and the sampling technique that was used to select the respondents. We then explain how data was collected and analysed.

3.2 Research Design

This study was a cross-sectional survey and used descriptive research. In cross-sectional studies, data is gathered just once in order to answer a research question (as opposed to longitudinal studies, where data is usually collected more than once from the study units over a long period of time). The goal of descriptive studies is a comprehensive summarisation, in everyday terms, of specific events experienced by individuals or groups of individuals, and needs to be the design of choice when a straightforward description of a phenomenon is desired (Lambert & Lambert, 2012).

3.3 Population

The population of this study was the self-sponsored students of the Nairobi campus of the University of Nairobi's School of Business, both in the undergraduate and postgraduate sections. The then total student population of the school was slightly over 13,000 students (University of Nairobi, 2014). Students undertaking Bachelor of Commerce (BCom) and Master of Business Administration (MBA) programmes formed about 70% of the student population of the School.

3.4 Sampling Design

The research employed proportionate stratified random sampling (with the strata being the undergraduate and postgraduate categories) to sample self-sponsored students from each category. The sampling frame for the undergraduate category was the Bachelor of Commerce (BCom) students, and Master of Business Administration (MBA) students for postgraduate category, whose combined population was 9,138 students.

The recommended minimum returned sample size for this population size of 9,138 students—at 95% confidence level while accepting a 3% margin of error for continuous data—is 119 students (Bartlett, Kotrlik, & Higgins, 2001). Since these researchers also recommend slight oversampling to cater for non-responses, this minimum figure of 119 was increased by 20% to 143 students. The sample size per category was then distributed proportionally, as shown in Table 1.

Table 1: Sampling Frame and Sample Size

Category	Sampling Frame*	Sample Size
Undergraduate (BCom)	3,875	61
Postgraduate (MBA)	5,263	82
Total	**9,138**	**143**

Source: University of Nairobi.

3.5 Data Collection

Structured questionnaires were used to collect primary data for the study. The questionnaire was divided into sections. The demographics section featured areas that checked the respondent's gender, age, academic programme, and device ownership with a view to establishing the prevalent rate of BYOD. The first substantive section featured questions related to consumerisation of IT. The second section featured questions related to user autonomy, while the third probed into personal innovativeness of the respondent. These major sections addressed corresponding research objectives identified for the study. The researcher arranged with the respective professors to attend and administer the questionnaires in the identified classes. These self-completion questionnaires were issued to the respondents and collected shortly afterwards.

3.6 Data Analysis

Data analysis procedure includes the process of packaging the collected information, putting it in order and structuring its main components in a way that the findings can be easily and effectively communicated. Data analysis was done through quantitative techniques. The returned questionnaires were keyed in with columns of serial number of the questionnaire, gender, age group, academic programme, device ownership, and

the three research variables each with its five individual items. These Likert-style items were assigned indices of $1 - 5$, with two items being reverse-scaled. (These items and the rationale for reverse-scaling are discussed in Subsection 4.3.1, 'Consumerisation of IT Item Statistics' starting from page 26.) Each row represented the record of an individual questionnaire.

In order to comprehensively describe the data, various statistical measures were calculated for the items, using IBM SPSS Statistics application and Microsoft Excel data analysis functions. These included measures of central tendency (mean, median and mode), of dispersion (standard deviation, variance and range), of association (coefficient of correlation), of reliability (Cronbach's alpha), and of determining whether the differences of the means of various groups or categories were statistically significant (t-test and ANOVA).

For the first research objective, descriptive statistics combined with the rate of BYOD identified earlier were used to establish the prevalent level of consumerisation of IT. Coefficient of correlation was used to measure the associations being investigated in the second and third research objectives. These are, respectively, establishing the relationship between level of consumerisation of IT and user autonomy, and establishing of the relationship between the level of user autonomy and personal innovativeness. T-tests and analysis of variance (ANOVA) tests were used to determine whether there were statistically significant differences in the respondent's BYOD status (that is, whether or not they owned a device), single or multiple device ownership, and in the respondent categories of gender, the academic programme (undergraduate or postgraduate), and age groups.

After this analysis, the findings are presented in the following chapter using charts and tables, followed by conclusions drawn based on these findings, and a discussion that positions the research findings in the context of existing literature and similar published research.

CHAPTER FOUR: RESEARCH FINDINGS AND INTERPRETATION

4.1 Introduction

In this chapter, we present the findings of the study as set out in the 'Data Analysis' section of the research methodology (starting from page 19). We report on the overall response rate, and the response by gender, academic programme, and age group. We also report on the rate of BYOD and device ownership. We then review the research variables and items and proceed to evaluate the descriptive statistics for the items in each variable, drawing conclusions.

We then discuss the outcome of the correlation and reliability tests among the variables of the study and evaluate the significance of the variance statistics between the various identified categories in our research sample.

4.2 Demographic Characteristics

4.2.1 Overall Response Rate

The study targeted 143 respondents, of which 141 questionnaires were filled and returned, representing a response rate of 98.6%. The high response rate is due to the use of students in a class environment, essentially constituting a captive audience.

Table 2: Overall Response Rate

Category	Frequency	Proportion
Responded	141	98.6%
Not responded	2	1.4%
Total	**143**	**100.0%**

4.2.2 Responses by Academic Programme

This study was proportionately stratified from the sampling frame into BCom and MBA programmes. Out of the 141 returned questionnaires, 61 were from respondents in the BCom programme (100% response rate within the stratum) while 80 (out of 82

questionnaires) were from respondents in the MBA programme (97.6% response rate within the stratum). Overall, this represents 43.3% and 56.7% proportions between the BCom and MBA programmes respectively, as shown in Table 3.

Table 3: Responses by Academic Programme

Category	Frequency	Proportion
Undergraduate (BCom)	61	43.3%
Postgraduate (MBA)	80	56.7%
Total	**141**	**100.0%**

4.2.3   Responses by Gender

Out of the 141 returned questionnaires, 76 were from male respondents and 65 from female respondents, representing 53.9% and 46.1% respectively, as illustrated in Figure 2. Out of the 76 male respondents, 32 were from the BCom programme while 44 were from the MBA programme while out of the 65 female respondents, 29 were from the BCom programme while 36 were from the MBA programme. The responses by gender and academic programme were as illustrated in Figure 3.

Figure 2: Responses by Gender
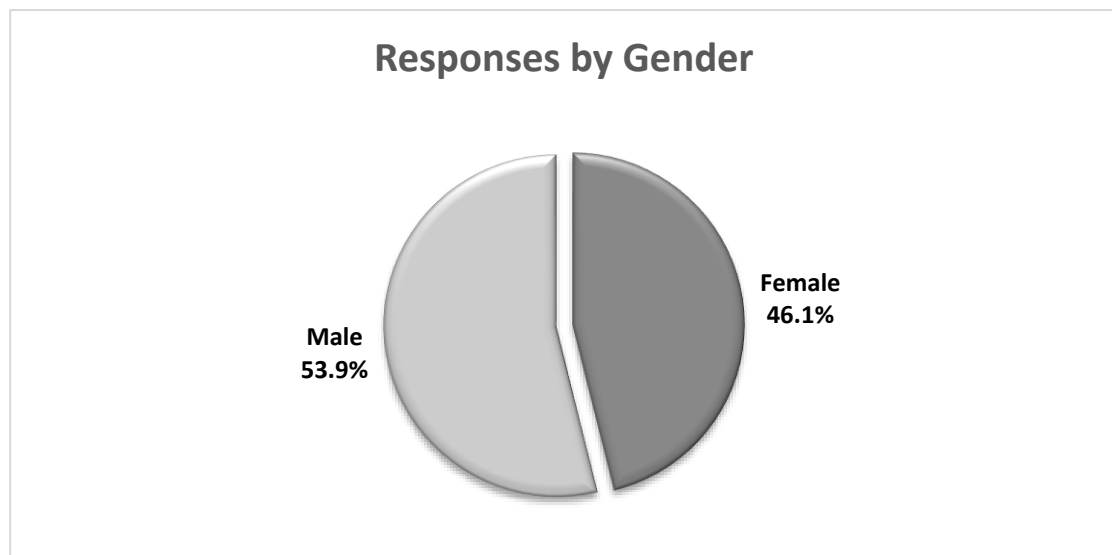
Figure 3: Responses by Gender and Academic Programme
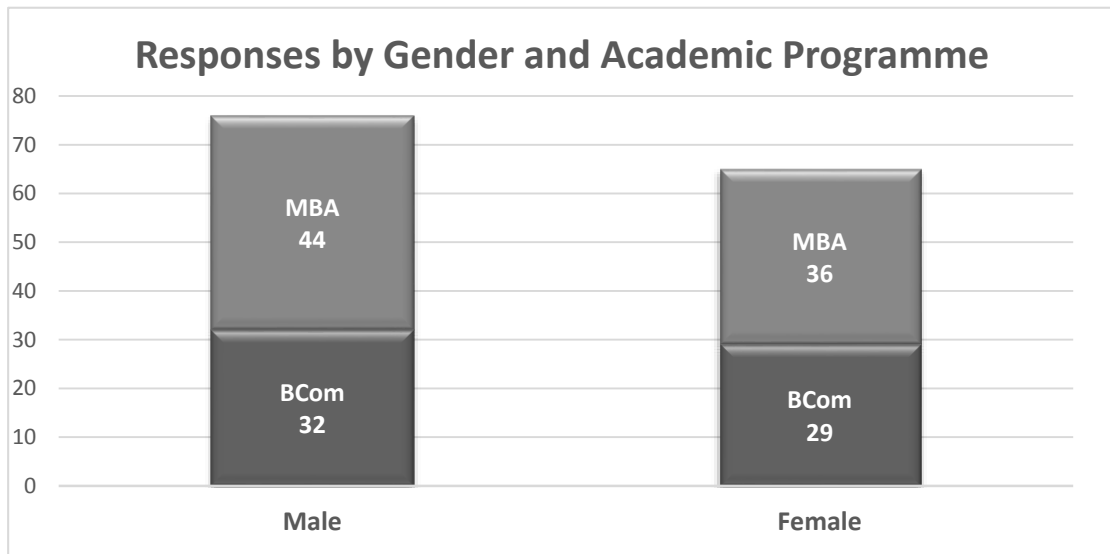
4.2.4   Responses by Age

The age distribution among the respondents was as presented in Table 4 below.

Table 4: Responses by Age

Category	Frequency	Proportion
Below 20	3	2.1%
20 – 29	83	58.9%
30 – 39	42	29.8%
40 and above	13	9.2%
Total	**141**	**100.0%**

The age distribution revealed that a majority of respondents (58.9%, or about six out of every 10 respondents) were aged 20–29, with those aged 30–39 forming a sizeable 29.8% (about three out of every 10). Respondents below the age of 20 and those aged 40 and above formed a minority of 11.3% (about one out of every 10) of the total.

4.2.5   Rate of BYOD and Basic Level of Consumerisation of IT

Among the respondents, 128 indicated that they have a personally-owned internet-capable mobile device that they usually bring along with them to class, while 13 indicated that they did not have one—representing 90.8% and 9.2% respectively.

This rate of BYOD partly fulfils the first objective of the study of establishing the basic level of consumerisation of IT among the respondents, revealing that approximately nine out of every 10 self-sponsored students carry their own devices to class. (The constituent items describing comprehensive consumerisation of IT are discussed in Subsection 4.3.1, 'Consumerisation of IT Item Statistics' starting from page 26.)

Figure 4: Rate of BYOD and Basic Level of Consumerisation of IT
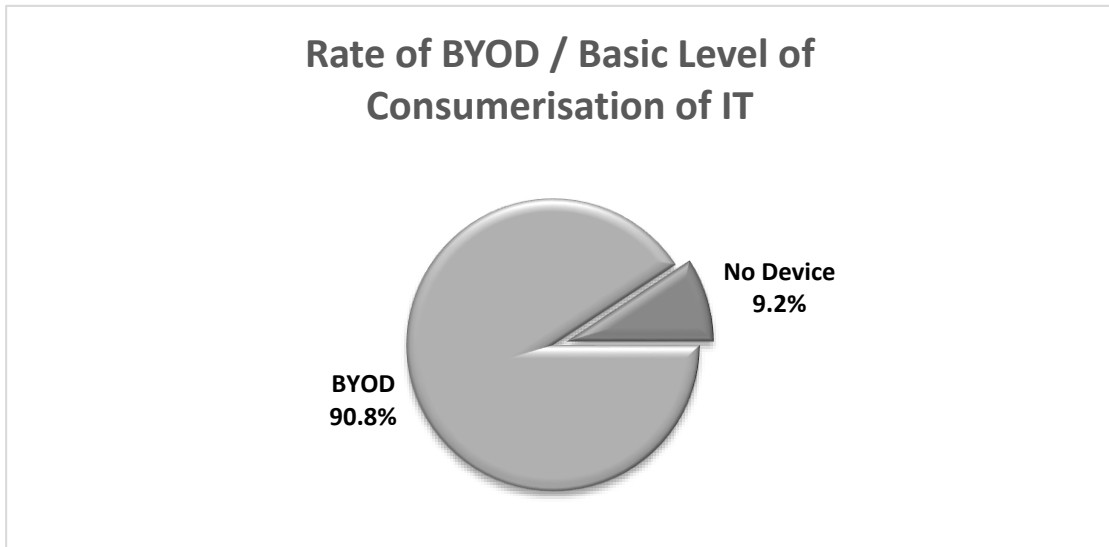
4.2.6   Number of Devices Owned

The respondents indicated the multiple type of devices owned. Out of the 141 respondents, 87 indicated that they own one device (either a laptop, smartphone or tablet), 32 indicated that they own two devices, nine indicated that they own all three, while 13 indicated that they do not own any. This summary is shown in Figure 5 below.

Figure 5: Number of Devices Owned
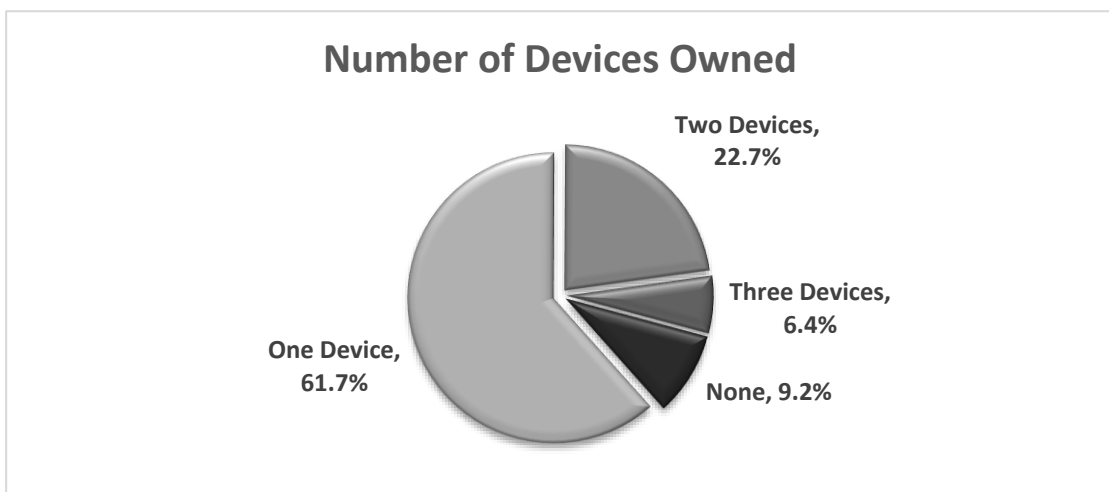
4.3 Research Variables and Items

The research variables and items were as listed in Table 5.

Table 5: Research Variables and Items

Variable	Items
Consumerisation of IT (CoIT)	1. I use the PCs in the university students' computer lab to access educational resources for my course **(CoIT1)***
	2. I use my own device and my own internet resources (mobile data plan) to access educational resources for my course **(CoIT2)**
	3. I use my own device with external internet resources (Wi-Fi in the university library, internet at my workplace, etc.) **(CoIT3)**
	4. I use a work computer and internet resources at my workplace to access educational resources for my course **(CoIT4)***
	5. I also use my device for work-related purposes in addition to access to my educational resources **(CoIT5)**
User Autonomy (UA)	1. I am competent in using the standard operations of my device **(UA1)**
	2. I acquired the device(s) I own after carefully studying device specifications, make and operating system **(UA2)**
	3. I have previously upgraded the device operating system / firmware and/or I am capable of doing it **(UA3)**
	4. When my device has technical issues, I solve them myself rather than referring to a third-party **(UA4)**
	5. I have no difficulty in assisting others to use an information technology I have used before **(UA5)**
Personal Innovativeness (PI)	1. Among my peers, I am usually the first to try out new information technologies **(PI1)**
	2. If I heard about a new information technology, I would look for ways to experiment with it **(PI2)**
	3. I use a personal online location (e.g. Dropbox) to store my educational resources and synchronise them to my device(s) **(PI3)**
	4. During class, I am usually online on my device to fact-check presentations or to clarify concepts **(PI4)**
	5. I use my device to take notes or summaries as the class is going on (as opposed to using a paper notebook) **(PI5)**

* *Reverse-scaled item*

All items were scored on a 1 – 5 Likert-scale with "No extent" and "Very large extent" as the two anchors for the endpoints of the scale, and "Moderate extent" as the mid-point of the scale.

4.3.1 Consumerisation of IT Item Statistics

The first variable gauged the comprehensive consumerisation of IT of the respondent in regard to online access of educational resources and device access. This variable defines further the rate of BYOD and basic level of consumerisation of IT identified in Subsection 4.2.5 on page 23. Table 6 summarises the statistics for the items in the variable.

Table 6: Consumerisation of IT Item Statistics

Item	Mean	Median	Mode	Range	Standard Deviation
CoIT1*	3.851	4	5	4	1.133
CoIT2	4.149	5	5	4	1.102
CoIT3	3.021	3	1	4	1.490
CoIT4*	2.816	3	3	4	1.334
CoIT5	3.369	4	5	4	1.391

* Reverse-scaled item

Item CoIT1 sought to establish the extent to which the respondent uses the PCs in the university students' computer lab to access educational resources for their course. This item was reverse-scaled as it was worded negatively in regard to consumerisation of IT, and would otherwise measure *lack of* consumerisation of IT. The high mean, median and mode for this item thus demonstrates that most students use the university PCs only to a very small extent.

Items CoIT2 and CoIT3 are related. They both sought to establish the extent to which the respondent uses their own device (BYOD)—with their own internet resources, and with external internet resources, respectively. A very high mean and highest possible median and mode for item CoIT2 reveals that the students sampled use their own devices with their own internet resources (mobile data plan). This can be thought of as

Bring Your Own Technology (BYOT) an extension of BYOD. Use of external internet resources such as university Wi-Fi or workplace internet was lower, with a mode of "No extent" revealing that most respondents do not use external resources with their device.

Item CoIT4 sought to establish the extent to which the respondent used a work computer and internet resources at the workplace to access educational resources for their course. Since this indicates *lack of* consumerisation of IT, this item was reverse-scaled for the variable statistics. For this item, the statistics reveal moderate extent, that most respondents do not use a work computer and internet resources at their workplace.

Item CoIT5 sought to establish if the respondent also uses their device for work-related purposes in addition to access to their educational resources. This can be recognised as consumerisation of IT and BYOD from the perspective of the organisation. A high mean, median and mode for this item reveals that the respondents have a high extent of consumerisation of IT from the perspective of the organisations that they work for.

4.3.2   User Autonomy Item Statistics

The second variable of user autonomy sought to determine the extent of independence for the respondents, how they make their own IT decisions in regard to acquisition, use, and provision of technical support for themselves or assistance to others. Table 7 summarises the statistics for the items in the variable.

Table 7: User Autonomy Item Statistics

Item	Mean	Median	Mode	Range	Standard Deviation
UA1	4.199	4	5	4	0.880
UA2	3.475	4	4	4	1.181
UA3	3.142	3	4	4	1.422
UA4	2.716	2	2	4	1.338
UA5	3.766	4	5	4	1.187

Item UA1 sought to establish the extent to which the respondent is competent in using the standard operations of their device. Very high mean score, high median and mode,

with a low standard deviation suggests that respondents are competent in use of their devices.

Item UA2 sought to determine the extent to which the respondent independently made their decision on purchasing of their device. That is, by careful consideration of the device specifications, make and operating system. A high mean, median and mode suggests independence in making IT decisions for the respondents.

Items UA3 and UA4 are related and sought to determine the technical capacity of the respondents in terms of provision of technical support. The task of upgrading the device operating system or firmware (item UA3) actually yielded a higher mean score than respondents solving other technical issues themselves rather than referring them to a third-party. This may be indicative of how easy firmware upgrades have been made by the major device manufacturers, whereas in the past these were highly technical tasks.

Item UA5 sought to establish the ease with which the respondent has in assisting others to use an information technology they have used before. With a high mean and median score and a maximum score for the mode, this suggests that respondents are such confident users of technology that they can comfortably teach others on its use.

4.3.3 Personal Innovativeness Item Statistics

The third variable of personal innovativeness sought to determine the extent to which respondents are willing to try out a new information technology, while also checking the extent of use of new concepts such as cloud storage, backchannel, and paperless office. Table 8 summarises the statistics for the items in the variable.

Table 8: Personal Innovativeness Item Statistics

Item	Mean	Median	Mode	Range	Standard Deviation
PI1	2.851	3	3	4	1.069
PI2	3.440	3	3	4	1.072
PI3	2.979	3	3	4	1.251
PI4	2.461	2	2	4	1.228
PI5	2.014	2	1	4	1.189

Items PI1 and PI2 are related. Item PI1 sought to establish the time of adoption of new information technologies for the respondent, while item PI2 sought to establish the extent to which the respondent experiments with new technology. The data indicates that the time of adoption of new information technologies is moderate, but experimentation with new technologies is higher. This reveals that the respondents likely have ready access to information on new technologies in the market.

Item PI3 sought to establish the extent of use of personal online locations (for example, Dropbox, OneDrive, and Google Drive) for storage and synchronisation of educational resources by the respondents. This is analogous to cloud computing and sought to test the application of this current IT trend. The data indicates moderate use of personal online locations.

Item PI4 sought to determine the extent of the application of backchannel, which generally refers to online conversations about the class topic, or audience members being online to fact-check presentations or to clarify concepts. While data for this item revealed a small extent of application with low median and mode, backchannel as an innovation in class is present and evidently, increasingly a factor in conversations between the presenter and the audience.

Item PI5 sought to determine the extent of the application of the epitome of digital innovativeness—paperless office, that is, taking of class notes and summaries through the respondent's mobile device. This item had the lowest mean of all the 15 items, had low median and had the joint-lowest mode of "very low extent." The data suggests that complete paperlessness is not easy to achieve especially in a class environment, likely due to limitations of the current input methods of onscreen keyboards, and also the fact that typing itself, even on a laptop with a physical keyboard, is quite slow compared to note taking with a pen.

4.3.4   Summary Descriptive Statistics for the Research Variables

For each variable, a score for an individual respondent was calculated by taking the average across all five statements. The summary descriptive statistics for the variables for the 141 respondents are as shown in Table 9.

Table 9: Summary Descriptive Statistics for the Research Variables

Variable	Mean	Median	Mode	Range	Standard Deviation
Cosumerisation of IT	3.441	3.4	3.2	3.2	0.625
User Autonomy	3.460	3.4	3.4	3.4	0.805
Personal Innovativeness	2.749	2.8	3.0	4.0	0.772

The summary descriptive statistics reveal that the consumerisation of IT and user autonomy variables have comparable descriptive statistics, with their means, modes and medians being similar. Consumerisation of IT has a lower standard deviation, suggesting that more respondents have consumerisation levels close to the mean, while user autonomy is more spread out around the mean.

The personal innovativeness variable has the lowest mean among the three; similarly, its median and mode are lower than in the other variables and its range higher. This likely results from the inclusion in this variable of items which sought to determine extent of application of current IT industry trends such as cloud storage, backchannel and paperless office, which are still to gain wide traction among students.

4.3.5   Descriptive Statistics by Device Ownership

Table 10 compares the descriptive statistics by device ownership. These clearly show that the mean, median and mode for all the variables are higher for respondents who own one or more devices than those who do not own any. While consumerisation of IT, user autonomy and personal innovativeness are present even for respondents who do not have personally-owned devices, it is clearly evident that the BYOD phenomenon in educational settings leads to higher levels of these variables.

Table 10: Descriptive Statistics by Device Ownership

No Device Owned (N = 13)	Mean	Median	Mode	Standard Deviation
Consumerisation of IT	2.769	2.8	2.8	0.610
User Autonomy	2.662	3	3	0.665
Personal Innovativeness	2.138	2.2	2.2	0.768
One or More Devices Owned (N = 128)	**Mean**	**Median**	**Mode**	**Standard Deviation**
Consumerisation of IT	3.509	3.6	3.2	0.586
User Autonomy	3.541	3.4	3.4	0.775
Personal Innovativeness	2.811	2.8	3	0.748

4.4 Correlation and Reliability Statistics

4.4.1 Coefficients of Correlation among the Research Variables

Pearson coefficient of correlation is a measure of the degree of linear correlation (dependence) between two variables. The sample Pearson coefficients of correlation matrix for the research variables are as shown in Table 11.

Table 11: Sample Pearson Coefficients of Correlation Matrix

Variable	Consumerisation of IT	User Autonomy	Personal Innovativeness
Consumerisation of IT	1	0.478	0.326
User Autonomy	0.478	1	0.496
Personal Innovativeness	0.326	0.496	1

The data shows that there is a positive correlation between consumerisation of IT and user autonomy variables, with a coefficient of 0.478, thus fulfilling the second objective of the study of establishing the relationship between the level of consumerisation of IT and user autonomy. This positive correlation supports the $H1_a$ (alternate) hypothesis of the study that increased consumerisation of IT leads to increased user autonomy.

The data also shows that there is a positive correlation between user autonomy and personal innovativeness variables, with a coefficient of 0.496, thus fulfilling the third objective of the study of establishing the relationship between user autonomy and personal innovativeness. This positive correlation supports the H2$_a$ (alternate) hypothesis of the study that increased user autonomy leads to increased personal innovativeness.

The data also shows that there is a positive correlation between consumerisation of IT and personal innovativeness variables, with a coefficient of 0.326. This establishes the relationship between consumerisation of IT and personal innovativeness variables and also supports the H3$_a$ (alternate) hypothesis of the study that increased consumerisation of IT leads to increased personal innovativeness.

4.4.2 Reliability Statistics

Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability—a coefficient of reliability (or consistency). Cronbach's alpha is a function of the number of test items and the average inter-correlation among the items. Table 12 shows the Cronbach's alpha for the research variables.

Table 12: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
0.695	0.696	3

Cronbach's (standardised) alpha for the scale was 0.696, a level generally deemed satisfactory for multi-item scales (Nunnally, 1978, cited in Agarwal and Prasad, 1998).

Item-total statistics measure the relationship of individual items to the overall score. Corrected item-total correlation is the correlation between an item and the rest of the items, without that item considered. Squared multiple correlation measures how much of the variability in the responses to this item can be predicted from the other items. 'Alpha if item deleted' is the change in Cronbach's alpha if the particular item is deleted. The item-total statistics for the three variables are as shown in Table 13.

Table 13: Item-Total Statistics

Variable	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Consumerisation of IT	0.467	0.239	0.663
User Autonomy	0.597	0.358	0.484
Personal Innovativeness	0.489	0.256	0.633

The lowest corrected item-total correlation is 0.467. This indicates that the variables relate positively with each other, confirming the interdependence of the chosen variables of the study as depicted in the conceptual framework.

Cronbach's standardised alpha based on all variables, as identified earlier, is 0.696. It drops slightly when recalculated if either consumerisation of IT or personal innovativeness variables are deleted. However, it drops with a higher margin to 0.484 if user autonomy variable is deleted. This suggests that user autonomy was correctly identified as the intervening variable between consumerisation of IT and personal innovativeness.

4.5   Variance Statistics

The t-test and analysis of variance (ANOVA) tests were used to determine variance statistics. A t-test is any statistical hypothesis test in which the test statistic follows a *t* distribution if the null hypothesis is supported. It can be used to determine if two sets of data are significantly different from each other. Analysis of variance (ANOVA) is a collection of statistical models used to analyse the differences between group means and thus provides a statistical test of whether or not the means of several groups are equal. ANOVA generalises the t-test to more than two groups.

4.5.1   T-tests between Respondents without BYOD and Those with Devices

The t-test was used to test the null hypothesis that the means of the two groups comprising respondents who did not own a device and those who own one or more devices are equal for each of the research variables. For each variable, we performed a two-tail test assuming unequal variances at 95% significance level (alpha of 0.05). If *t Stat < -t Critical two-tail* or *t Stat > t Critical two-tail*, we'd reject the null hypothesis.

Table 14: T-tests between Respondents without BYOD and Those with Devices

Consumerisation of IT		No BYOD	BYOD
Mean		2.7692	3.5094
Variance		0.3723	0.3438
Observations		13	128
t Stat	-4.1818		
t Critical two-tail	2.1448		
User Autonomy		**No BYOD**	**BYOD**
Mean		2.6615	3.5406
Variance		0.4426	0.6012
Observations		13	128
t Stat	-4.4663		
t Critical two-tail	2.1199		
Personal Innovativeness		**No BYOD**	**BYOD**
Mean		2.1385	2.8109
Variance		0.5892	0.5589
Observations		13	128
t Stat	-3.0167		
t Critical two-tail	2.1448		

For consumerisation of IT, -4.1818 is less than -2.1448. Therefore, we rejected the null hypothesis for this variable. For user autonomy, -4.4663 is less than -2.1199. We similarly rejected the null hypothesis for this variable. For personal innovativeness, -3.0167 is less than -2.1448. Likewise, we rejected the null hypothesis for this variable.

We can therefore conclude that the observed differences between the sample means for respondents without devices and those with BYOD for each variable differ significantly. In other words, whether a respondent owns a device or not is an important factor that significantly contributes to consumerisation of IT, user autonomy and personal innovativeness.

4.5.2 T-tests between Single Device and Multiple Devices Owners

The t-test was used to test the null hypothesis that the means of the two groups comprising respondents who own a single device and those who own multiple devices are equal for each of the research variables. For each variable, we performed a two-tail test assuming unequal variances at 95% significance level (alpha of 0.05). If *t Stat < -t Critical two-tail* or *t Stat > t Critical two-tail*, we would reject the null hypothesis.

Table 15: T-tests between Single Device and Multiple Devices Owners

Consumerisation of IT		Single Device	Multiple Devices
Mean		3.4851	3.5610
Variance		0.3122	0.4164
Observations		87	41
t Stat	-0.6475		
t Critical two-tail	1.9949		
User Autonomy		**Single Device**	**Multiple Devices**
Mean		3.5885	3.4390
Variance		0.5780	0.6504
Observations		87	41
t Stat	0.9964		
t Critical two-tail	1.9925		
Personal Innovativeness		**Single Device**	**Multiple Devices**
Mean		2.8161	2.8
Variance		0.6049	0.474
Observations		87	41
t Stat	0.1183		
t Critical two-tail	1.9873		

For consumerisation of IT, -0.6475 is not less than -1.9949. Therefore, we did not reject the null hypothesis for this variable. For user autonomy, 0.9964 is not less than -1.9925.

Similarly, we did not reject the null hypothesis for this variable. For personal innovativeness, 0.1183 is not less than -1.9873. Likewise, we did not reject the null hypothesis for this variable.

We can therefore conclude that the observed differences between the sample means for respondents who own a single device and those who own multiple devices do not differ significantly for each variable. In other words, whether a respondent owns a single device or owns multiple devices is not an important factor as it does not lead to more consumerisation of IT, user autonomy and personal innovativeness.

4.5.3 T-tests between Male and Female Respondents

The t-test was used to test the null hypothesis that the means of the two groups comprising male and female respondents are equal for each of the research variables, by performing a two-tail test assuming unequal variances. For each variable, we performed a two-tail test assuming unequal variances at 95% significance level (alpha of 0.05). If *t Stat < -t Critical two-tail* or *t Stat > t Critical two-tail*, we would reject the null hypothesis.

Table 16: T-tests between Male and Female Respondents

Consumerisation of IT		Male	Female
Mean		3.4658	3.4123
Variance		0.3364	0.4573
Observations		76	65
t Stat	**0.4995**		
t Critical two-tail	**1.9788**		
User Autonomy		**Male**	**Female**
Mean		3.4921	3.4215
Variance		0.5434	0.7789
Observations		76	65
t Stat	**0.5102**		
t Critical two-tail	**1.9791**		

Personal Innovativeness		Male	Female
Mean		2.7079	2.7969
Variance		0.5605	0.6419
Observations		76	65
t Stat	**-0.6779**		
t Critical two-tail	**1.9781**		

For consumerisation of IT, 0.4995 is not less than -1.9788. Therefore, we did not reject the null hypothesis for this variable. For user autonomy, 0.5102 is not less than -1.9791. Similarly, we did not reject the null hypothesis for this variable. For personal innovativeness, -0.6779 is not less than -1.9781. Likewise, we did not reject the null hypothesis for this variable.

We can therefore conclude that the observed differences between the sample means for male and female respondents are not convincing enough to say that they differ significantly for each variable. In other words, the respondent's gender does not matter in understanding consumerisation of IT, user autonomy and personal innovativeness.

4.5.4 T-tests between Respondents in BCom and MBA Academic Programmes

The t-test was used to test the null hypothesis that the means of the two groups comprising respondents in the academic programmes of BCom and MBA are equal for each of the research variables, by performing a two-tail test assuming unequal variances. For each variable, we performed a two-tail test assuming unequal variances at 95% significance level (alpha of 0.05). If *t Stat < -t Critical two-tail* or *t Stat > t Critical two-tail*, we would reject the null hypothesis.

For consumerisation of IT, 0.1376 is not less than -1.9772. Therefore, we did not reject the null hypothesis for this variable. For user autonomy, -0.6927 is not less than -1.9776. Similarly, we did not reject the null hypothesis for this variable. For personal innovativeness, 0.8683 is not less than -1.9780. Likewise, we did not reject the null hypothesis for this variable.

Table 17: T-tests between Respondents in BCom and MBA Academic Programmes

Consumerisation of IT		BCom	MBA
Mean		3.4492	3.435
Variance		0.2875	0.4727
Observations		61	80
t Stat	**0.1376**		
t Critical two-tail	**1.9772**		
User Autonomy		**BCom**	**MBA**
Mean		3.4066	3.5
Variance		0.5626	0.7180
Observations		61	80
t Stat	**-0.6927**		
t Critical two-tail	**1.9776**		
Personal Innovativeness		**BCom**	**MBA**
Mean		2.8131	2.7
Variance		0.5572	0.6268
Observations		61	80
t Stat	**0.8683**		
t Critical two-tail	**1.9780**		

We can therefore conclude that the observed differences between the sample means for respondents in BCom and MBA academic programmes are not convincing enough to say that they differ significantly for each variable. In other words, whether the respondent is undertaking BCom or MBA, their consumerisation of IT, user autonomy and personal innovativeness does not show any significant difference.

4.5.5 Analysis of Variance (ANOVA) among Age Groups

A single factor or one-way ANOVA was used to test the null hypothesis that the means of the identified age groups are all equal. For each variable, we performed a single

factor ANOVA at 95% significance level (alpha of 0.05). If *F > F-crit*, we would reject the null hypothesis.

For consumerisation of IT, 1.1012 is not more than 2.6707 and therefore we did not reject the null hypothesis. For user autonomy, 0.2769 is not more than 2.6707 and similarly, we did not reject the null hypothesis. For personal innovativeness, 1.8619 is not more than 2.6707 and likewise, we did not reject the null hypothesis.

Table 18: Analysis of Variance (ANOVA) among Age Groups

Consumerisation of IT	Observations		Mean		Variance	
< 20	3		2.9333		0.0933	
20 – 29	83		3.4940		0.3896	
30 – 39	42		3.3619		0.3770	
40 & >	13		3.4769		0.4769	
Source of variation	SS	df	MS	F	P-value	F-crit
Between groups	1.2856	3	0.4285	**1.1012**	0.3510	**2.6707**
Within groups	53.3158	137	0.3892			
Total	54.6014	140				
User Autonomy	Observations		Mean		Variance	
< 20	3		3.4		0.28	
20 – 29	83		3.5012		0.6579	
30 – 39	42		3.4333		0.7120	
40 & >	13		3.2923		0.5441	
Source of variation	SS	df	MS	F	P-value	F-crit
Between groups	0.5471	3	0.1824	**0.2769**	0.8420	**2.6707**
Within groups	90.2324	137	0.6586			
Total	90.7796	140				

Personal Innovativeness	Observations	Mean	Variance
< 20	3	3	1.48
20 – 29	83	2.8627	0.6214
30 – 39	42	2.5381	0.5414
40 & >	13	2.6462	0.3344

Source of variation	SS	df	MS	F	P-value	F-crit
Between groups	3.2668	3	1.0889	1.8619	0.1390	2.6707
Within groups	80.1256	137	0.5849			
Total	83.3923	140				

We can therefore conclude that the observed differences between the sample means for respondents in the different age groups are not convincing enough to say that they differ significantly for each variable. In other words, the age of the respondent does not matter in understanding consumerisation of IT, user autonomy and personal innovativeness.

4.6 Research Findings Summary

The overall response rate was very high at 98.6% owing to a captive audience. Due to proportionate stratification, BCom respondents constituted 43% of the total while MBA respondents constituted 57%. Male respondents comprised 54% of the total while female respondents comprised 46%. The rate of BYOD and the basic level of consumerisation of IT was about 91%, meaning that approximately nine out of every 10 respondents do carry their personally-owned devices to class. A positive correlation was found between each of the research variables, while variance statistics revealed that the respondent's BYOD status (that is, whether or not they owned a device) is a statistically significant factor in understanding the research variables. Variance statistics further revealed that the respondent's ownership of a single or multiple devices, gender, academic programme and age group are not statistically significant factors. That is, whether the respondent owns a single or multiple devices, their gender, their academic programme, and their age does is not important in their level of consumerisation, user autonomy or personal innovativeness.

CHAPTER FIVE: DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

In this chapter, we position our research findings in the context of existing literature and published works. We restate our key findings within the framework of the research objectives and outline the recommendations of the study. We also discuss the limitations of the current study and make suggestions for further research.

5.2 Discussion

Our research finding that about nine of out every 10 respondents carry a personally-owned internet-capable device to class agrees with Hockly's (2012) assessment that "students are increasingly coming to class with technology in their pockets." From the literature, it is clear that consumerisation of IT has reached the tipping point (Trend Micro, 2011), and that due to the ubiquity of privately owned mobile devices, there is a clear trend of consumers rather than enterprises increasingly diffusing technology innovations into work environments (Dernbecher et al., 2013).

Ahuja and Thatcher (2005) found a significant correlation between user autonomy and innovativeness, and our research findings confirm and further clarify this relationship. Niehaves et al. (2012) suggest that if people feel more self-confident in the use of IT, they will be more innovative and productive. This agrees with our confirmed research hypothesis and relationship between user autonomy and personal innovativeness that increased user autonomy leads to increased personal innovativeness.

Evidently, most available empirical academic research and practitioner literature is focused on consumerisation of IT in the workplace, and virtually none on consumerisation of IT in educational settings. Our research endeavoured to fill this gap by empirically identifying and explaining consumerisation of IT in educational settings, and thus extending the existing body of literature while significantly contributing to the understanding of consumerisation of IT and student innovation in the classroom.

We can thus conclusively answer our research question. The rate of BYOD and level of consumerisation of IT among the self-sponsored students of the University of

Nairobi's School of Business is 90.8%, or that about nine out of every 10 students bring their own device to class. Consumerisation of IT correlates positively with both user autonomy and personal innovativeness, while user autonomy also correlates positively with personal innovativeness.

5.3 Conclusion

The objectives of this study were to establish the level of consumerisation of IT among the self-sponsored students of the University of Nairobi's School of Business, to establish the relationship between the level of consumerisation of IT and user autonomy, and to establish the relationship between user autonomy and personal innovativeness. We found that the rate of BYOD and the basic level of consumerisation of IT is 90.8%, or that approximately nine out of every 10 students do carry their personally-owned devices to class. We identified components of consumerisation of IT as BYOD and "Bring Your Own Technology" (BYOT), which we recognised as personally-owned device complemented with own internet in the form of mobile data plan.

We found a positive correlation between consumerisation of IT and user autonomy, and similarly a positive correlation between user autonomy and personal innovativeness. Reliability statistics suggested that user autonomy had been correctly identified as the intervening variable between consumerisation of IT and personal innovativeness. Variance statistics revealed that BYOD status for a respondent (whether or not they owned a device) is a statistically significant factor in understanding consumerisation of IT, user autonomy and personal innovativeness, but that the respondent's multiple device ownership, gender, academic programme and age group are not statistically significant factors in understanding consumerisation of IT, user autonomy and personal innovativeness.

5.4 Recommendations of the Study

We identified a small extent of use of backchannel, which refers to online conversations about the class topic, or audience members being online to fact-check presentations or to clarify concepts. This is expected to increasingly become a factor in class conversations between the presenter and the audience. This is an area we recommend

that local educators and researchers could explore. Researchers Du, Rosson and Carroll (2012) have explored bringing backchannel up front in classrooms to increase students' participation and promote community building in classrooms.

While our study revealed that only a small extent of respondents use computers in the university students' computer lab, we concur with Vanwelsenaers's (2012) recommendation that educators should look for innovative ways to use mobile technologies in their classrooms. Vanwelsenaers (2012) observes that while many institutions of learning have offered a fixed technology menu of computers in a computer lab or a designated technology area in a classroom, mobile technologies "are not likely to go away and educators should look for ways to use these technologies in their classrooms."

5.5   Limitations of the Study

Time and resources constraints were major limiting factors. The time to collect data, perform comprehensive analysis, draw conclusions and report was short given the due dates for this report. A possible bias existed where respondents potentially withheld information or painted themselves in better light, and this potentially limits the validity of our conclusions. Due to our cross-sectional survey research design, we could not measure change or stability within our sample in regard to our research variables.

5.6   Suggestions for Further Research

In this study, our focus was on consumerisation of IT among self-sponsored students of the University of Nairobi's School of Business. We suggest further research that would sample the wider student population—other schools and colleges of the university, and including government-sponsored students. This may bring out an even clearer picture of consumerisation of IT prevalent in the whole student body in the university. Since there are many public and private universities in the country, further research could possibly include them for a deeper understanding of consumerisation of IT in Kenya's institutions of higher learning and further appreciation of how students are utilising current consumer technologies to innovate in the classroom.

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APPENDIX: RESEARCH QUESTIONNAIRE

I am Bernard Muhia Njenga, an MBA student at the University of Nairobi. I am undertaking research on **"Consumerisation of Information Technology, User Autonomy and Personal Innovativeness among Self-Sponsored Students of the University of Nairobi's School of Business."**

The research has been stratified into undergraduate and postgraduate categories, studying BCom and MBA students respectively. You have been randomly selected in your category. Your responses are confidential and will be used only for academic purposes.

DEMOGRAPHICS AND DEVICE OWNERSHIP

Please select your gender, age, the programme you are undertaking, and your mobile device type.

1. Gender: ☐ Male ☐ Female

2. Age: ☐ Below 20 ☐ 20-29 ☐ 30-39 ☐ 40 and above

3. Academic programme: ☐ BCom ☐ MBA

4. Do you have a personally-owned internet-capable mobile device that you usually bring along with you to class?

☐ Yes ☐ No

5. If you answered "Yes" to Q4 above, kindly select the type of device(s) you own. (Please select as many as necessary.)

☐ Laptop ☐ Tablet ☐ Smartphone ☐ Other (specify) _____

The three sections below have five statements each. For each statement, please choose the range from "No extent" to "Very large extent" to indicate how it applies to you.

SECTION 1: CONSUMERISATION OF I.T. AND BYOD

Consumerisation of IT refers to privately-owned IT resources, such as devices or software that are also used for business purposes. "Bring Your Own Device" (BYOD)

refers to the concepts and policies of permitting employees or students to bring personally-owned mobile devices (e.g., laptops, tablets, smartphones) to the workplace or classroom, and to use those devices to access privileged information.

6. Indicate the extent to which the following statements on online access to educational resources for your course and device usage apply to you.

Statement	No extent	Small extent	Moderate extent	Large extent	Very large
i. I use the PCs in the university students' computer lab to access educational resources for my course	☐	☐	☐	☐	☐
ii. I use my own device and my own internet resources (mobile data plan) to access educational resources for my course	☐	☐	☐	☐	☐
iii. I use my own device with external internet resources (e.g. Wi-Fi in the university library, internet at my workplace, etc.) to access educational resources for my course	☐	☐	☐	☐	☐
iv. I use a work computer and internet resources at my workplace to access educational resources for my course	☐	☐	☐	☐	☐
v. I also use my device for work-related purposes in addition to access to my educational resources	☐	☐	☐	☐	☐

SECTION 2: USER AUTONOMY

User autonomy is the capability to act on the basis of one's own decisions; to be guided by one's own reasons, desires, and goals. In the context of consumerisation of IT and BYOD, user autonomy is often associated with independence for users, as they may make IT decisions on their own or provide technical support for themselves.

7. Indicate the extent to which the following statements related to user autonomy apply to you.

Statement	No extent	Small extent	Moderate extent	Large extent	Very large
i. I am competent in using the standard operations of my device	☐	☐	☐	☐	☐
ii. I acquired the device(s) I own after studying device specifications, make and operating system	☐	☐	☐	☐	☐

Statement	No extent	Small extent	Moderate extent	Large extent	Very large
iii. I have previously upgraded the device operating system/firmware and/or I am capable of doing it	☐	☐	☐	☐	☐
iv. When my device has technical issues, I solve them myself rather than referring to a third-party	☐	☐	☐	☐	☐
v. I have no difficulty in assisting others to use an information technology I have used before	☐	☐	☐	☐	☐

SECTION 3: PERSONAL INNOVATIVENESS

Personal innovativeness in the domain of information technology refers to the willingness of an individual to try out any new information technology.

8. Indicate the extent to which the following statements related to personal innovativeness apply to you.

Statement	No extent	Small extent	Moderate extent	Large extent	Very large
i. Among my peers, I am usually the first to try out new information technologies	☐	☐	☐	☐	☐
ii. If I heard about a new information technology, I would look for ways to experiment with it	☐	☐	☐	☐	☐
iii. In use a personal online location (e.g. Dropbox) to store my resources and synchronise them to my device(s)	☐	☐	☐	☐	☐
iv. During class, I am usually online on my device to fact-check presentations or to clarify concepts	☐	☐	☐	☐	☐
v. I use my device to take notes or summaries as the class is going on (as opposed to using a paper notebook)	☐	☐	☐	☐	☐

Your responses are highly valued and appreciated. Thank you for your time.