

**FOOD SAFETY MANAGEMENT SYSTEMS ORIENTATION AND
HAZARD ANALYSIS CRITICAL CONTROL POINT SYSTEM
UPTAKE BY HOTELS IN NAIROBI CITY COUNTY, KENYA**

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**A RESEARCH THESIS SUBMITTED IN FULFILLMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF
DOCTOR OF PHILOSOPHY (HOSPITALITY MANAGEMENT)
IN THE SCHOOL OF HOSPITALITY, TOURISM AND LEISURE
STUDIES OF KENYATTA UNIVERSITY**

JULY, 2021

DECLARATION

This thesis is my original work and has not been presented for a Degree in any other University or for any other award.

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To my late mother, Virginia Nyambura, for always being a source of inspiration and encouragement and for helping me believe that nothing is impossible when hard work and dedication are called for.

ACKNOWLEDGEMENTS

I wish to express my sincere gratitude to all the people who helped me accomplish this task.

To my Supervisors Dr. Moses Miricho and Dr. Bichage Gesage for their expert advice and encouragement- I cannot thank you enough.

To my family for being a source of needed encouragement and emotional support.

To managers of 4 and 5 star rated hotels in Nairobi City County for allowing me to collect the study data from their hotels.

To all the study respondents, this study would not have been completed were it not for your immeasurable support-this work was successful because of the information you provided. No word can summarize my gratitude to you for your kind support.

To all that all those not mentioned here but who helped me in one way or the other, please know that your support is greatly appreciated.

Lastly, to the Almighty God for truly blessing me in my entire doctoral studies journey. You never turned your face away from my unending requests. All the glory and honor to you.

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ABBREVIATIONS AND ACRONYMS

CAC	Codex Alimentarius Commission
CCP	Critical Control Point
ECDC	European Center for Disease Control
EFSA	European Food Safety Authority
FAO	Food & Agriculture Organization
FSA	Food Service Sector
GoK	Government of Kenya
HACCP	Hazard Analysis Critical Control Point
ISO	International Standards for Organizations
LDCs	Less Developed Countries
NACOSTI	National Commission for Science, Technology and Innovations
NASA	National Aeronautics and Space Administration
SMEs	Small and Medium Enterprises
USA	United States of America
WHO	World Health Organization
WTO	World Trade Organization
UK	United Kingdom

OPERATIONAL DEFINITION OF TERMS

Biological hazards: Contaminants such as bacteria, viruses, parasites, algae, molds and yeasts affecting food safety.

Campylobacteriosis: A food borne illness caused by the *campylobacter* bacterium.

Chemical hazards: Contaminants such as pesticides, fertilizer residues, veterinary medicines, food additives and detergents affecting food safety.

Critical Control Point: A threshold level of food control whose attainment safeguards food safety.

Codex Alimentarius Commission (CAC): The CAC is an intergovernmental body established in 1961 to protect the health of consumers by ensuring fair food handling and production practices globally.

Contextual Factors: These are environmental variables within or outside and area of interest that affect its operational level.

Food Safety: Refers to assurance that food products are not exposed to potential hazards which may end up causing food poisoning to consumers.

Food Safety Management System: An operational framework to identify, evaluate and control hazards that are significant for the entire food chain from initial production through consumer consumption.

HACCP: ‘Hazard Analysis Critical Control Point’ is a food safety system designed for the identification, evaluation and control of food security and safety hazards.

HACCP Certification: An established formal endorsement for food production entities that have fully complied with the seven principles of HACCP system.

HACCP Uptake: The level of adoption of HACCP system by the classified hotels.

Hotels: Businesses that cater primarily for residential customers, with the provision of food and beverage as required.

Microbiological hazards: Microorganisms found in air, food, water, soil, animals and human body that may contaminate food.

Pathogenic hazards: Food illness as a result of disease causing bacteria.

Physical hazards: Contaminants such as glass particles, stone, wood, metal, plastics, hair and nails affecting the safety of food due to its poor handling.

Star rated hotels: Classified hotels based on specified performance standards as set out by regulatory authorities. In the case of Kenya, the rating is conducted by the Tourism Regulatory Authority (TRA). This study focused on four and five star rated hotel in Nairobi City County.

ABSTRACT

Hazard Analysis Critical Control Point (HACCP) system is an important food safety management system that most food production entities across the world endeavor to implement. In spite of this, a review of extant literature on food safety management reveals that the successful adoption of the HACCP system faces a number of challenges regarding its management and implementation. The barriers to effective execution of HACCP system vary from country to country and from one hospitality sector to another. The general objective of this study was to establish the influence of food safety management systems orientation on HACCP system uptake in star rated hotels in Nairobi City County given the moderating effect of a set of contextual factors namely food safety regulations, market forces, size of the hotel, management commitment and funding level. The specific objectives of the study were to assess the following aspects within the four and five star-rated hotels in Nairobi City County: i) the influence of employee behaviors towards HACCP system on HACCP system uptake; ii) the influence of employee attitudes towards HACCP system on HACCP system uptake; iii) the influence of employee knowledge of HACCP system on HACCP system uptake; iv) the moderating effect of contextual factors on the relationship between employee food safety management systems orientation and HACCP system uptake and lastly v) the effect of the contextual factors on HACCP system uptake in the four and five star rated hotels in Nairobi City County. Corresponding null hypotheses were also set for empirical assessment. The study was guided by the logical positivism philosophy of research and adopted a cross-sectional survey research design. Quantitative data was successfully collected from a total of 33 executive chefs and 255 chefs who constituted the study units/respondents of the study from 16 out of the targeted 22 four and five star rated hotels in Nairobi City County. In addition, qualitative data was collected from a total of 16 Food and Beverage Managers through an interview schedule with one manager being interviewed from each of the 16 hotels. Quantitative data was analysed using descriptive statistics, regression analysis and partial correlations while content analysis was used to analyse qualitative data. The study results established a significantly positive relationship between employee behaviors and attitudes towards HACCP system and the star rated hotels' HACCP system uptake. The study further found that that contextual factors direct influence on the hotels' HACCP system uptake was significantly positive for size of the hotel, management commitment and adequacy of HACCP system funding while market forces effect on HACCP system uptake was found to be significantly negative. When the moderating effect of the contextual factors on the relationship between food safety orientation and HACCP system uptake by the star rated hotels in Nairobi City County was assessed, it was established that food safety regulations, market forces, size of the hotel and management commitment had a significantly negative influence on this relationship. Although the study had certain limitations, it nonetheless offers opportunities for future research. In addition, the study provides important recommendations to hotel managers and other food production industry practitioners on requisite considerations when implementing HACCP system in addition to advancing the frontiers of knowledge on the concept of food safety management in general and HACCP system in particular.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Safe and healthy food is needed to support activities of daily living and therefore the quality assurance for food is recognized as a necessary ingredient for developing human capital (Fernando and Ng, 2015). Contaminated food produces considerable social and economic consequences including illness and death (Griffith, 2006). In the same vein, Baser et al (2017) note that unsafe food creates global health threats that endanger everyone as over 30% of the people in developing countries are affected by foodborne diseases every year.

Nyachuba (2010) also observes that foodborne illness is a serious public health threat. For instance, the Centers for Disease Control and Prevention (CDC) estimates that 76 million foodborne illnesses, including 325,000 hospitalizations and 5,000 deaths, occur in the United States each year. Published reports showed that *Salmonella*, *Campylobacter*, *Shigella*, *Cryptosporidium*, and *Shiga toxin Escherichia coli* continue to be leading causes of both the number and incidence of laboratory-confirmed foodborne infections in the United States. Nichols (2015) states that countries such as the United Kingdom (UK) and Canada have reported cases of rising *Cyclospora* which is a main cause of gastrointestinal infections during travels thus indicating the need for improved food production hygiene in holiday resorts. Further, Andrea (2016) notes an increasing number of human cases infected with *campylobacteriosis*, a

frequently reported microbiological hazard associated with the food industry, within the European Union.

Despite great advances in modern technology, producing safe food and keeping it safe remains a worldwide public health problem (Al Yousuf et al, 2015). Safe food is defined as foods that do not contain any physical, chemical, or microbiological contaminants that could cause any health problems after consumption (Barjaktarović-Labović et al., 2018). Food safety risks arising from the production of foods to the consumption include biological, chemical and physical risks (Artik, 2017).

Ignorance of food safety requirements may have dire legal consequences to food establishments. A study by Mahdu (2015) analyzed settled cases databases in the United States court system and established that of the 511 foodborne illnesses cases presented by clients of food establishments in USA between 1979 and 2014, the affected clients won 34.8% of cases and were compensated a total of USD 32,264. This highlights the risks to food companies in regard to possible food poisoning litigations, huge amounts of cash spent on cases as well as a ruined business image. A related study conducted by Dunn (2014) in New Zealand came to the conclusion that regardless of the methodology put in place for its quantification, foodborne disease is the sole cause of health threat to food establishments' clients and incurrence of financial burden by the food establishments whenever litigation issues arise. Consequently, food safety regulators devote considerable amounts of resources tracking and controlling chemical and biological hazards that may cause foodborne diseases.

Illnesses linked to poor hygiene uptake are deemed the center of food safety issues in developing nations. For instance, Desiree (2019) notes that food safety is of great difficulty in Third World Countries and observes that in Cambodia it is a key cause of diarrheal disease among children with noticeable fatalities. Further, a vast number of consumers in Cambodia get their food from open-air markets which do not conform to food safety regulatory guidelines.

Since the hospitality sector mainly deals with offering meals and other services like accommodation, food poisoning may occur whenever there is unhygienic food preparation (Habeeb, 2018). It is critical therefore for the food service sector to adopt suitable control measures against risks of foodborne disease outbreaks (Dunn, 2014). The Hazard Analysis and Critical Control Point (HACCP) is a well-known worldwide program that was proposed as a control measure to food contaminations (Aber, 2018).

HACCP systems evolved from standards established in the 1960s by Pillsbury in cooperation with the National Aeronautics and Space Administration, the US Army and the US Air Force Space Laboratory to provide astronauts with safe food (Wallace and Mortimore, 2016). Sofia and Paulo (2013) note that in September 2005, the International Organization for Standardization (ISO) published the 'ISO 22000: 2005 standard-food safety management systems (FSMS) – requirements that are applicable to any organization in the food chain'. This standard integrates the requirements defined by ISO 9001 and the methodology used by HACCP.

HACCP is the most highly recommended prevailing system to identify, evaluate, and controls hazards that are significant for the entire food chain from initial production

through consumer consumption (FAO and WHO, 2003). It is a food safety management system used throughout food production and preparation, including packaging and distribution where food processors seek to identify and document mistakes as well as also documenting the corrective action taken (Christa and Fergus, 2015.) According to Fotopoulos et al (2011), HACCP is a scientific and systematic manner for assuring food safety (Nguyen et al., 2004), a tool for the development, implementation and management of effective safety assurance procedures (Ropkins and Beck, 2000). This system can be applied to control any stage in the food supply chain and is designed to provide enough feedback to direct corrective activities.

Al Yousuf et al (2015) suggests that execution of HACCP system in a food production enterprise boosts trust in customers. In addition, competences in the execution of HACCP system in hotel kitchens is to a great extent influenced by the ability and awareness of hotel practitioners and management collectively.

1.1.1 State of Food Safety Management in Kenya

The Government of Kenya developed the Kenya National Food Safety Policy in 2013 (Ministry of Health, Republic of Kenya, 2013). The policy cites the several unfortunate events affecting food safety that have occurred in the recent past. These include outbreaks of Rift Valley Fever, cholera, and aflatoxin poisoning and pesticides residues on fruits and vegetables, which have led to loss of lives, adversely affecting trade and general economy. As a result of increased public awareness of such threats, food safety issues have become a growing concern to many people. In the same vein, WHO (2017) note that Foodborne diseases (FBDs) are responsible for

a significant proportion of illness and death worldwide. According to Eric et al (2018), contaminated food is a likely contributor to recent cholera outbreaks in Kenya that killed 76 and sickened 3967 in the first eleven months of 2017.

Through the Kenya National Food Safety Policy (Ministry of Health, Republic of Kenya, 2013), the Government envisaged the establishment of a National Food Safety Authority and an Integrated Control System which would harmonize operations and enhance coordination and guarantee consumer protection. Such a system would enhance the roles of the various ministries, institutions and stakeholders in the food chain. One of the key policy objectives was to update the existing legislations to be in tandem with the current food safety requirements.

A study by KEMRI (2014) revealed that a high percentage of poultry vended in supermarkets and butcheries in Nairobi City County were highly contaminated with *caliform*, *salmonella*, *e.coli* and *pseudomonas* bacteria strains posing serious health threat to consumers. Unfortunately, these food outlets serve as the key suppliers of food inputs to hotels. It is therefore critical for hotels to implement adequate food quality control systems such as HACCP to safeguard against foodborne disease outbreaks.

A further study on food safety carried out by Muinde (2012) among restaurants in Thika town established that while a majority of the restaurants' employees were knowledgeable about food safety matters, very few employees properly applied food safety measures yet if well understood and executed food safety measures could adequately address the hazardous food contaminations like *coliform*, *escherichia coli*

and staphylococcus aureus microbial found in the restaurants. A study by Wandolo (2016) also established that most training institutes and universities in Kenya lacked adequate equipment for ensuring food safety.

1.2 Statement of the Research Problem

According to Sofia and Paulo (2013), the HACCP system has been used as one of the most effective strategies in ensuring high quality and safety of food, from the standpoint of human health. However, its success and effectiveness in disease prevention and health risk reduction in consumers depends on the correct application of its principles.

Food handlers have been responsible for food-borne illnesses outbreaks by various means. Analyses of reported outbreaks indicate that most of foodborne illnesses spread result from improper food handling practices among food handlers (Nik et al, 2016). In the same vein, Stratev et al. (2017) note that food handlers are an essential factor in foodborne illness outbreaks because of improper applications during the preparation, processing, and storage of food. Majority of food borne diseases can be effectively controlled when food handlers follow proper food sanitation practices. This study sought to provide empirical evidence of the role of the chefs' food safety management system orientation in the successful uptake of HACCP system by star rated hotels in Nairobi City County.

Taylor (2008) identified 21 barriers to HACCP and food safety in the hospitality industry and linked them to the knowledge–experience–attitudes–behavior (KEAB)

aspects of food safety culture. However, Manning (2018) recommends the need for further empirical study in the hospitality industry on the KEAB aspects since knowledge does not necessarily lead to behavior that enhances food safety.

A further analysis by Curtis et al (2016) on the behaviors observed in chefs across a wide variety of cooking programs broadcast on television and online suggested the need for improved food safety behaviors among professional chefs. There is therefore need to provide empirical insights on the influence employee food safety management system orientation in terms of their behaviors, attitudes and knowledge on HACCP system within the hospitality industry in Kenya. This study endeavored to provide empirical evidence on the influence of chefs' and food and beverage managers behaviors, attitudes and knowledge towards HACCP system uptake in the star rated hotels in Nairobi City County as a critical food safety management system as it is essential in informing further food safety enhancement processes in Kenya.

Taylor (2008) sought to establish the status of HACCP across the food chain with particular reference to the hospitality industry and found that much as HACCP development was widespread in large food manufacturers, there was slow progress in the hospitality industry and more so in smaller businesses. This study sought to provide empirical insights on the state of HACCP adoption in the Kenyan hospitality industry and the key determinants to its successful implementation.

Success in developing, installing, maintaining and verifying a successful food safety management system (FSMS) is dependent on a complex mix of managerial, organizational and technical hurdles (Al Yousuf et al, 2015). In addition, a study by

Deepananda and Spencer (2010) in food processing firms in Ontario, Canada explored the barriers that impede the adoption of hazard analysis and critical control point (HACCP). The study identified four broad groupings of barriers to HACCP implementation, namely perceptions that HACCP is of “questionable appropriateness” to food production entities, the scale of change required to achieve implementation, low priority given to enhancement of food safety controls, and financial constraints. The severity of these identified barriers differs significantly between firms that have implemented HACCP and those that have not. This study sought to provide further empirical evidence on the facilitators or inhibitors of successful HACCP system implementation by assessing the moderating effect of food safety regulatory framework, market forces, size of the hotel, management commitment and funding level on the relationship between employee food safety management system orientation and HACCP system uptake in star rated hotels in Nairobi City County.

The existing literature enumerates the many benefits of HACCP as an effective food safety control mechanism (Ahmed, 2015; Fernando and Ng, 2015). However, most of these studies were conducted in the developed economies. There is therefore need for research insights in developing and third world countries. This study purposed to address the existing knowledge gap of limited HACCP studies in developing economies by providing empirical evidence of the extent of HACCP system adoption within the star rated hotels in Nairobi City County in Kenya as influenced by employee food safety management orientation within the context of food safety regulatory framework, market forces and size of the hotel as well as management commitment and funding level.

1.3 General Objective

The general objective of the study was to establish the influence of food safety management systems orientation on HACCP system uptake in star rated hotels in Nairobi City County given the moderating effect of a set of contextual factors namely food safety regulations, market forces, size of the hotel, management commitment and funding level.

1.4 Specific Objectives

The specific objectives of the study were to:

- i) Determine the influence of employee behaviors towards HACCP system on HACCP system uptake in four and five star-rated hotels in Nairobi City County.
- ii) Establish the influence of employee attitudes towards HACCP system on HACCP system uptake in four and five star-rated hotels in Nairobi City County.
- iii) Examine the influence of employee knowledge of HACCP system on HACCP system uptake in four and five star-rated hotels in Nairobi City County.
- iv) Establish the moderating effect of contextual factors on the relationship between employee food safety management systems orientation and HACCP system uptake in four and five star rated hotels in Nairobi City County.
- v) Determine the effect of the contextual factors on HACCP system uptake in four and five star rated hotels in Nairobi City County.

1.5 Research Hypotheses

H₀₁: There is no significant relationship between employee behaviors towards HACCP system and HACCP system uptake in four and five star-rated hotels in Nairobi City County.

H₀₂: There is no significant relationship between employee attitudes towards HACCP system and HACCP system uptake in four and five star-rated hotels in Nairobi City County.

H₀₃: There is no significant relationship between employee knowledge of HACCP system and HACCP system uptake in four and five star-rated hotels in Nairobi City County.

H₀₄: Contextual factors do not significantly moderate the relationship between employee food safety management systems orientation and HACCP system uptake in four and five star rated hotels in Nairobi City County.

H₀₅: There is no significant relationship between contextual factors and HACCP system uptake in four and five star rated hotels in Nairobi City County.

1.6 Significance of the Study

The study's findings are relevant to various stakeholders. First and foremost, the research findings provides important policy insights to management of classified

hotels. The findings will be useful in that they will be able to know the extent to which their employees' factors and operational context affects the execution of HACCP system and this will go a long way in equipping the managers with the right interventional strategies to help their hotels HACCP system uptake to be more effective.

Second, the study gives insights on the effect of employees' behavior, attitude and knowledge on the adoption of HCCP system uptake within their hotels which better equips hotel employees with the right understanding of the change required in their level of behavior, attitude and knowledge to help their workplaces to be successful in executing the HACCP system that is crucial to ensuring food safety and thereby safeguarding their own jobs.

Third, study provides useful information to hotel industry associations such as the Kenya Association of Hotelkeepers as it will give them an authoritative reference point for formulating guidelines on ensuring food safety among their hotel members well equipped with insights of how employees' food safety management systems orientation and contextual factors affect the HACCP system uptake in the star rated hotels.

Finally, the findings of the study are of immense value to food safety regulators given the insights on the facilitating or inhibiting role their regulations have in the adoption of HACCP system within the classified hotels in Nairobi City County. This serves as an important guideline when formulating regulatory mechanisms to achieve food safety goals.

1.7 Delimitation of the Study

The boundaries of the study were limited to four and five star rated hotels in Nairobi City County in Kenya with the variables of study constrained with the ones highlighted in the conceptual framework namely employees' behaviors, attitudes and knowledge on food safety management system with particular reference to HACCP as well as the hotels HACCP system uptake and the contextual factors of food safety regulations, market forces, size of the hotel, management commitment and funding level. This therefore calls for caution when it comes to generalizations of the study results beyond this scope.

1.8 Limitations of the Study

This study mainly focused on the influence of employees' behavior, attitude and knowledge of HACCP on HACCP system uptake in star rated hotels in Nairobi City County given the moderating effect contextual factors of food safety regulations, market forces, and size of the hotel, management commitment and funding level. There are, without doubt, a myriad of other dimensions that would influence HACCP system adoption in a food production organizational setup. However, the resource constraints could not permit a much wider consideration and therefore the generalizability of the study is limited to the variables highlighted in the conceptual framework in section 1.10. The conceptual framework may in future studies be broadened to include other critical factors to enhance the generalizability may not be available for the study.

Further, given that the study concentrated on star rated hotels, the research findings are also limited to this sector setting. To enhance the generalizability of the study, future studies may replicate the conceptual framework in different food production settings such as food manufacturing companies, training institutions and other sectors where food safety is of particular concern and HACCP system applications are considered important.

1.9 Assumptions of the Study

First, the study respondents namely the executive chefs, chefs and food and beverage managers were assumed to have given truthful information correctly representing the facts sought on their hotels through the research questions.

Secondly, the study respondents were also assumed to have common characteristics and understanding of issues across the different four and five star hotels in Nairobi City County where they are employed.

Finally, the sample of the study units/ respondents studied from each of the 16 hotels constituting the target population of the study was assumed to be adequately representative of the relevant population in the hotel.

1.10 Conceptual Framework of the Study

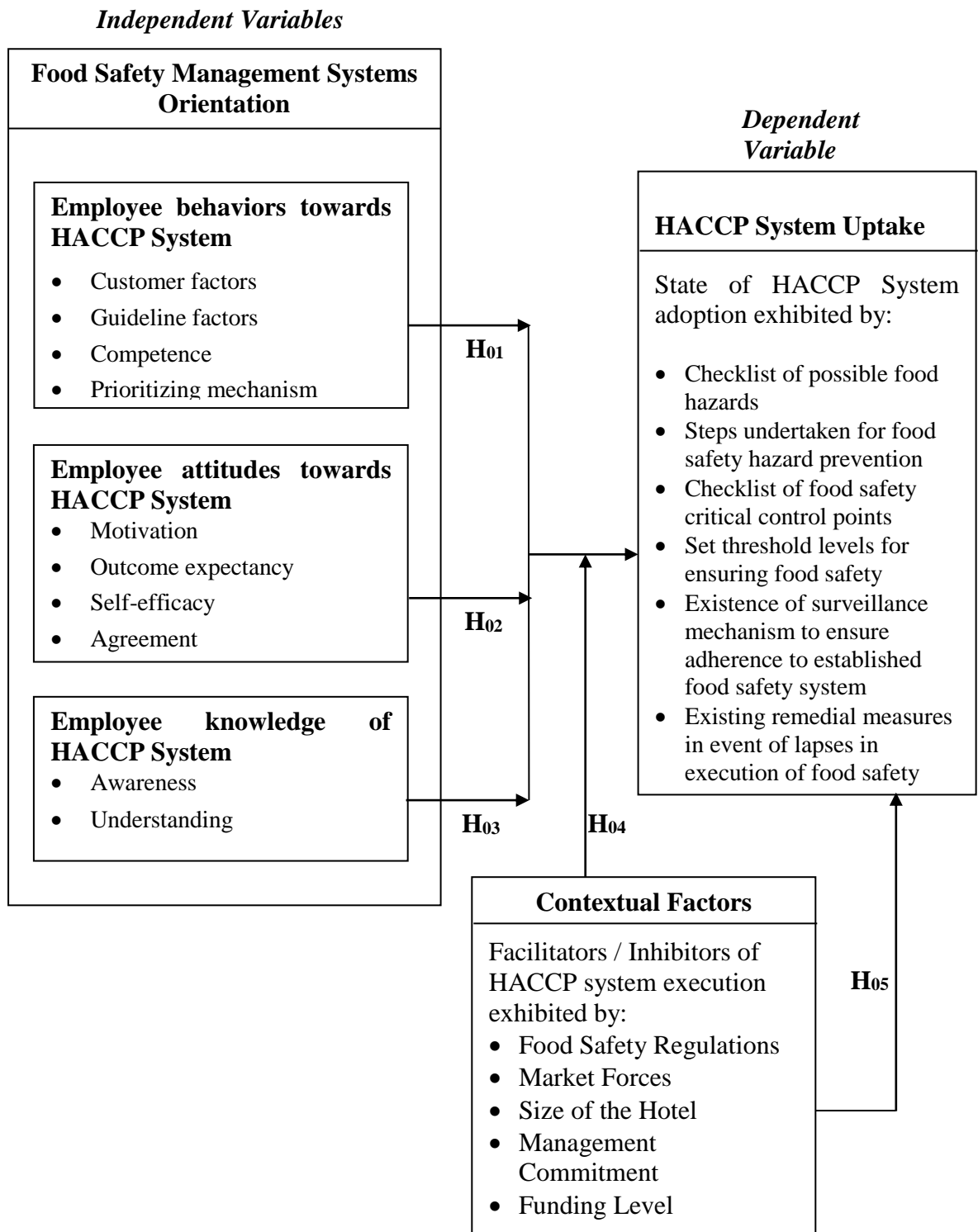


Figure 1.1: Conceptual Framework of Employee Food Safety Management Systems Orientation and HACCP System Uptake

The study's conceptual framework in Figure 1.1 indicates that the employee food safety management system orientation variables of concern to these study namely employee behavior, attitude and knowledge on HACCP system influence HACCP system uptake within a moderating context of food safety regulations, market forces, size of the hotel, management commitment and funding level that either facilitate or inhibit this relationship. The study's setting was the four and five star rated hotels in Nairobi City County, Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

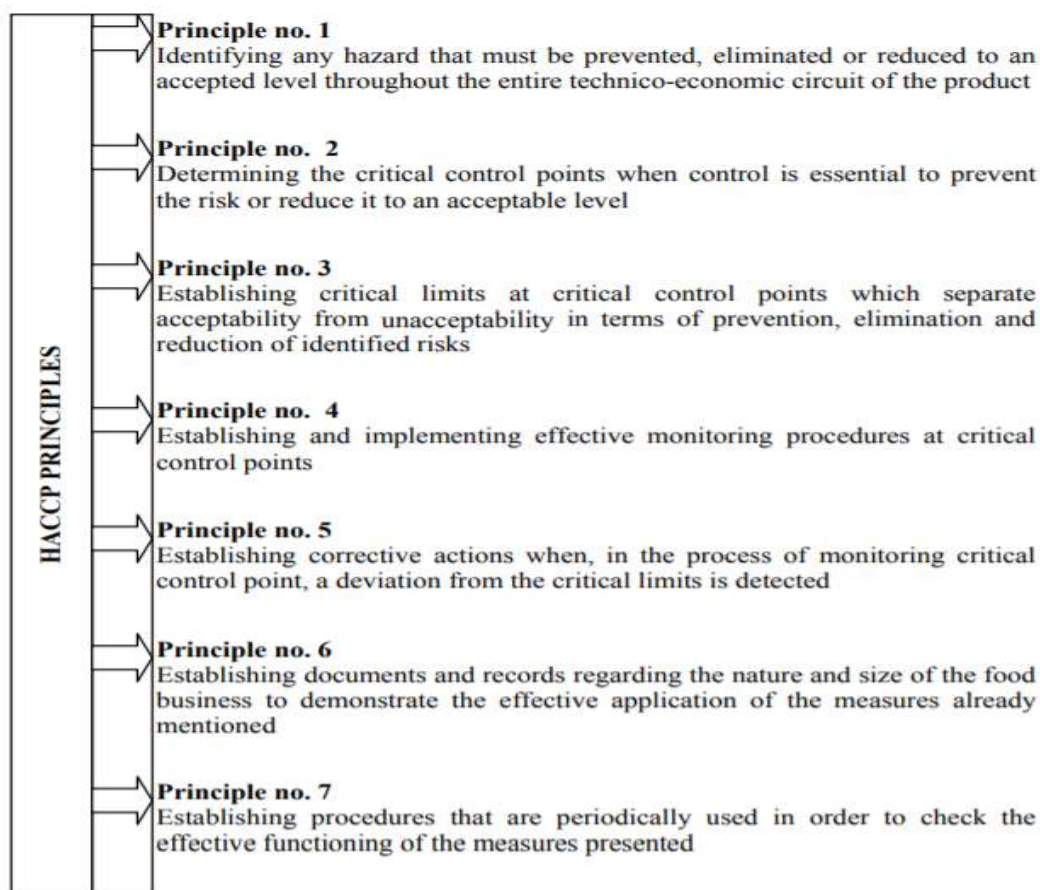
This chapter presents a critical review of existing conceptual and empirical literature on the key variables of the study as highlighted in the conceptual framework. The chapter begins with a review of both empirical and conceptual literature on the concept of HACCP and the HACCP system implementation in the hospitality industry followed by a review of literature on the implications of employee behavior, attitude and knowledge on HACCP system. The chapter then covers a review of how the context of food production entities in terms of the food safety regulations, market forces, size of the hotel, management commitment and funding level influences the implementation of food safety management systems in general and HACCP system in particular. Finally, the chapter ends with a presentation and review of the key theories and models underpinning the conceptual framework of the study as well as a summary of the literature review and arising research gaps.

2.2 Empirical Literature Review

2.2.1 The Concept of HACCP

Hazard Analysis Critical Control Point (HACCP) is the international standard for managing food safety (Codex, 2003) and its use is advocated in the hospitality industry (Taylor, 2008).

According to Criveanu et al (2012), HACCP is a systematic approach to food safety aimed at applying seven basic principles to ensure food hygiene. Figure 2.1 highlights the seven principles of HACCP.



Source: Scheme designed by SR EN ISO 22000/2007

Figure 2.1: HACCP Principles

Semos and Kontogeorgos (2007) identified the key steps required for effective HACCP system implementation as indicated in Table 2.1.

Table 2.1: Steps in HACCP System Implementation

Preliminary Procedures

- 1 Gathering people for HACCP
 - 2 Stating the features of the product
 - 3 Get to discover its purpose
 - 4 Make a diagrammatic representation in form of a flow diagram
 - 5 Carry out a confirmation test on the flow diagram
-

Source: Codex Guidelines, 2008; Semos and Kontogeorgos, 2007

2.2.2 HACCP System Implementation in the Hospitality Industry

According to Al Yousuf et al (2015), the hospitality sector is the largest sector of the food industry, representing over 60 per cent of all food businesses, and includes restaurants, cafes, take-a-ways, hospitals, schools, prisons, residential homes and hotels. Although these businesses range from self-employed street vendors to multi-national chains, the majority are small, owner-managed outlets. In the same vein, Ahmed et al (2015) describe hotels as businesses that cater primarily for residential customers, with the provision of food and beverage as required. This can be on a 24-hour basis with varying levels of night service. According to Taylor (2008), hospitality is a service industry, serving food direct to the end-consumer.

The implementation of a hazard analysis critical control point (HACCP)-based food safety management system (FSMS) is internationally agreed as the most effective business intervention to protect the public from food-borne disease (Al Yousuf et al, 2015). This involves the control of both general and specific hazards through the implementation of food safety practices based on Good Hygiene Practice (GHP) and

HACCP principles. Both of these systems are defined internationally by the Codex Alimentarius Commission (Codex, 2009).

Petruzzelli et al (2014) did a study in Pesaro, a town in Central Italy, to verify the appropriateness of the Hazard Analysis and Critical Control Point (HACCP) plan adopted in a school catering facility. To that end, the microbiological quality of foods, the correct implementation of special diets (lactose- and gluten-free) and the nutritional value of foods were assessed. Thirty-six samples of lactose-free and 87 samples of gluten-free special diet food preparations were subjected to microbiological, chemical, and nutritional analyses. The data collected demonstrate the effectiveness of the HACCP plan in reducing the occurrence of microbial and chemical (lactose and gluten) cross-contamination. The data obtained from the nutritional analyses showed that the dietary intake provided by the meals under study was satisfactory.

Khalid et al (2011) study sought to establish food safety initiatives for hospitality businesses in the Emirate of Dubai, UAE. The research found that many hospitality businesses are not adequately managing food safety despite basic training of employees, which has prompted a move towards management level training. Case study research also demonstrates that innovative “evolving methods” of HACCP can assist in improving food safety management in local hospitality businesses. The Dubai Municipality Food Control Department is, therefore, working on two important strategies: first, the mandatory training of “Persons in Charge” in all food businesses, and subsequently the wider implementation of food safety management systems.

In the UK hospitality industry for instance, a government study in 2001 found low levels of progress with HACCP in the UK hospitality industry (Taylor and Kane, 2005). A wide reaching international study, conducted by the FSA in 2002, concluded that there had been no systematic, effective implementation of HACCP in the hospitality industry anywhere in the world (Airey, 2004). However, in a review of the worldwide approach to the use of HACCP as a food safety control measure, Ropkins and Beck (2000) reported the adoption and implementation of HACCP in Australia as being much more rapid and industry driven than in other countries. The researchers also commented that the Australian food industry approach to food safety was the most practical and readily applicable to HACCP.

Ahmed et al. (2015) conducted a study on the status of food safety management systems in eight types of Abu Dhabi businesses and established that standards varied across the industry, with distinct characteristics and patterns across the eight groups. In the same vein, a qualitative study by Griffith et al (2017) assessed food safety management and culture within a prominent South African entertainment, hotel and food service complex and found that much as a formal system of internal hygiene auditing existed and food safety training was provided to food handlers, this were not integrated into a comprehensive approach to food safety management. Further, food safety leadership, communication and support were not adequate and there was little motivation for staff to practice good hygiene.

Ackah et al. (2018) studied five distinct manufacturing companies at Accra in Ghana producing *shito*, a new pepper sauce created specifically for vegetarians. The HACCP system was designed and verified to ensure that the critical limits established for key

control points were enough to eliminate identified hazards. Findings were confirmed using microbial challenge testing and conclusions were made that if vegetable *shito* makers had a quality control system in place, they could produce *shito* products that were both safe and had a long shelf life.

2.2.3 Employee Behaviors and HACCP System Implementation

Chefs working at hotels, restaurants, and public institutions play a major role in food safety. According to Grujic et al (2010) efficiency of food safety management system application, such as HACCP system, depends on personnel employed in a company. Baser et al. (2017) conducted a study in order to search the food safety attitudes and behaviors of hotel personnel in Turkey. Their study results showed a high correlation between food safety attitudes and behaviors.

Food handlers working at retail and food service are a frequent source of foodborne illness (Greig et al. 2007; Angelo et al. 2017; Ian et al, 2018). For instance, Angelo et al. (2017) note that in the United States (US), food workers were implicated as a source in 24% of foodborne illness outbreaks, resulting in more illnesses cases per outbreak compared to outbreaks not caused by food workers.

2.2.4 Employee Attitudes and HACCP System Implementation

There are many studies in existing literature examining food safety attitudes of food handlers. For instance, Moreaux et al. (2018) did a study examining food safety attitudes of food sellers in Ghana. The study results showed that although sellers' food safety attitudes were high through personal hygiene, environmental hygiene, and food

hygiene, they did not transform their food safety attitude into practice and that personal hygiene was less practiced by the vendors. Another study carried out by Baser et al. (2017) examined attitudes of food handlers in hotel businesses in Turkey. The study results showed that food handlers' food safety attitudes, which are hygiene, purchasing-cooking and preservation, were generally positive and mean scores were above average. Kunadu et al. (2016) study done in Ghana showed that food handlers have generally negative attitudes toward food safety.

A study by Baser et al. (2017) found a moderate correlation between food safety knowledge and attitude in hotel staff but a high correlation between food safety attitude and behavior indicating that knowledge alone without an attitudinal response will not necessarily lead to behavioral response. Further studies have found that food handler attitude mediates the relationship between knowledge and practice in restaurants and hotels (Ko, 2013; Baser et al., 2017). According to Teeping (2015) the right attitude about food safety enhances positive food safety behavior.

2.2.5 Employee Knowledge and HACCP System Implementation

Firms implement HACCP principles to achieve continuous improvement, prevent foodborne illnesses and control food safety risk. Employees with food safety knowledge on food pathogens, chemical hazards and food hygiene would appreciate and effectively execute HACCP system. For instance, Djekic et al. (2014) observes that outbreaks of foodborne illnesses related to restaurants, fast-food joints and takeaway joints are commonly engendered by the heating of food along with

subsequent time–temperature abuse, by cross contamination between raw and cooked ingredients and by defective food preparation and hygiene protocols.

Wallace and Powel (2005) did a study to investigate the impact of training on effective HACCP implementation in a multinational organization and established the likely impact of knowledge levels on effective development, implementation and maintenance of HACCP at site level. According to Oscar (2014), proper training and expertise of employees helps in performance of correct procedures and develops habitual behaviors important in food safety. In the same vein, Peter (2013) asserts that employee education level highly correlates with implementation of HACCP policy and their following the set guidelines on food safety.

Reda and Mostafa (2016) did a study on food handlers of leading hotels in Egypt after a food safety training on concepts relating to ISO 22000 and HACCP system and found that most of the food handlers seemed to be open minded when it came to safe handling of food but there was noticeable connection between the food safety training and knowledge consequently improving food handlers' actions and level of awareness. Nada (2019) also carried out a research on food safety awareness and activities carried out by food practitioners at Al Madinah medical centers in Saudi Arabia and observed a positive correlation between food safety practice and awareness which largely predicted the kind of food safety measures put in place. This study shows why knowledge and continuous training of food practitioners are key factors in enhancing awareness and improving better food handling methods that could improve food safety in the medical centers.

Habeeb (2018) conducted a study at Kwara State in Nigeria and established that lack of understanding of the basis of HACCP could be affecting the general degree of food cleanliness and actions taken by food handlers and therefore recommends adoption of HACCP system to avoid food poisoning pandemics as well as strict monitoring of the hotels by law enforcers. In addition to availing needed resources for HACCP system implementation.

In the same vein, Dawkins (2015) carried out a research in the United Kingdom to understand the key hindrances to HACCP implementation in upcoming food enterprises in the London Borough of Camden and established that the key constraints to food business operators (FBOs) were low ability to comprehend HACCP principles and their lack of willingness to take in an idea they concluded foreign. The research further established that practical assistance and support offered by food authorities as an Intervention Project increased the rate at which people undertook HACCP based food safety management systems.

Similarly, Wei-Ling (2015) sought to establish implementation barriers for HACCP in the hospitality industry in Taiwan and found that employees did not have a positive perception of the HACCP system. Further lack of resources, disagreements and low motivation were found to be of most concern, as was lack of positive reinforcement. The researchers recommend the need to emphasize the understanding of HACCP and knowledge of food safety and hygiene especially to new employees. Employers were also urged to promote rewards rather than punishment with regard to the method by which employees are educated and trained on HACCP.

2.2.6 The Role of Contextual Factors in HACCP System Implementation

According to Taylor (2008), success in developing and maintaining an effective HACCP system is dependent on a combination of managerial, organizational and technical hurdles. As Manning (2018) asserts, the nature and style of firms vary and also the types of food and the knowledge and skill levels of those employed. There is therefore an increasing interest in not only how food safety is managed within an organization but also how the culture of the organization and the external business climate in which the business operates influence the effective implementation of those systems. The present study considered and analyzed the moderating role of food safety regulations, market forces, size of the hotel, management commitment and funding level on the relationship between employee food safety management systems orientation and HACCP system uptake in star rated hotels in Nairobi City County.

Luning et al. (2011) determined four context factor characteristics that impact on the need for, and the depth of, food safety management activities in a given organization as: first, product characteristics, i.e. the intrinsic properties of initial materials and final menu items; second, production characteristics, i.e. the extrinsic conditions utilized during preparation, storage, cooking and service to customers; third, organizational characteristics specific to the organization itself. These are subdivided into individual (people) characteristics, group characteristics (associated with food safety culture), organizational structures (division of tasks, responsibilities, rules, procedures, and information systems), which affect peoples' decision-making behavior. Fourth and final are external chain characteristics, i.e. the conditions during supply, and relationships with other companies and organizations in the supply chain.

2.2.6.1 Food Safety Regulations and HACCP System Implementation

Achieving international food safety management standards across the hospitality industry presents a challenge for governments worldwide (Ahmed et al. 2015). However, meeting this challenge is of great benefit to public health, tourism and the economy, and is facilitated by an effective, comprehensive government strategy (Al Yousuf et al., 2015).

For the consumer, efficient food control means safe, honest and unadulterated foods. For the food business operator (FBO), efficient food control should also ensure fairness in terms of implementation of legislation, foreseeability of food control decisions and level competition with other food businesses. FBOs are responsible for the food safety in their establishments. For national food safety authorities (NFSA), 'effectiveness' is defined as the ability of the NFSA to ensure high quality of official controls (Christian et al, 2019).

According to Bilska and Kowalski (2014), ensuring quality and safety of food are nowadays the most important goals set by companies who produce and distribute it. As a result, regulations have been introduced in the European Union countries concerning the production and distribution of food as well as norms which oblige companies to implement and execute several quality management systems. In the same vein, Bilska and Kowalski (2014) observe that for the consumer, the most important characteristic of food quality is its safety. In Europe, several organs are responsible for food safety, particularly the European Food Safety Authority. Research activity is also an important element of food safety policy.

Ana et al (2016) did a study in Brazil with the purpose of describing the aspects related to safe food production and to discuss the main legislation for food services. The researchers note that until August 2004, food services in Brazil followed the same standards recommended for other industries. However, this changed in September, 2004 when the Brazilian Health Surveillance Agency published RDC 216 that provided information about Technical Regulation of Good Practices specifically for food services. This legislation ensures safe production of the food at Brazilian food service sites through good practices and procedures.

Fernando and Ng (2015) exploratory study in Malaysia sought to investigate the contribution of regulatory incentives offered by regulators as a moderator variable enhancing adoption of Malaysian food safety system (MeSTI). The study results confirmed that organizational factors (top management support and perceived technical competent) and scheme factors (perceived usefulness and perceived ease of use) have significant influence upon MeSTI adoption. Further findings indicated that environment factors (perceived industry pressure and perceived government pressure) and expected factors (expected social legitimacy and expected economic competitiveness) did not have significant impact on MeSTI adoption. Regulatory incentives the government offered had no moderating effect on the relationships of the determinants studied.

According to Eves and Dervisi (2005), HACCP system provides a tool for auditing to the regulatory authorities. Milios (2013) also notes that HACCP can also be a useful tool for internal auditing by food industry itself and that HACCP application at food processing plants could improve food safety and lead to a reduction of food-borne

diseases. A further, study by Patricia et al (2016) in Ashanti Ghana revealed that compulsory prerequisite of Food Laws for individuals in position of supervision wasn't complied with strictly as 31 percent of kitchen instructors were found to lack prerequisite of hygiene while 82 percent of 180 tested employees lacked knowledge on hygiene.

According to Gomes (2014), food businesses are increasingly facing pressure from buyers and governments to execute efficient approaches to attain safety of food. According to Sayed (2015), businesses having certification of HACCP for extended time and particularly those that were certified in line with over one standard had enhanced performance in evaluation of HACCP.

2.2.6.2 Market Forces and HACCP System Implementation

The move toward HACCP implementation in many companies has been customer driven as can be seen in companies that supply large retailers whose contracts require documented evidence of a HACCP system from their suppliers or firms that are involved in export (Taylor, 2008). A study by Yunus and Ray (2007) in the Australian meat industry found that in order to survive the competitive market, export abattoirs and processors adopted HACCP more quickly than domestic operators given that foreign customers were demanding specific quality testing of their products.

Amit et al (2012) research evaluated consumers' perceptions regarding food safety and their attitudes toward willingness to pay more for safer foods among 309 consumers contacted by direct mail in the United States. The study found that

observable concerns and consequences of food safety, and trust toward foodservice establishments, impacts consumers' willingness to pay a higher price for safer foods. The study addressed a critical gap in the financial consequences and economic behavioral discussion of food safety in foodservice establishments. In the same vein, a study by Deepananda and Spencer (2010) in food processing firms in Ontario, Canada exploring the barriers that impede the adoption of hazard analysis and critical control point (HACCP) found that the most important driver promoting implementation is customer requirements for HACCP to be implemented in supplier facilities.

2.2.6.3 Size of the Hotel and HACCP System Implementation

There are many factors that influence the performance of a HACCP system. Lack of awareness of HACCP, no perceived benefits, lack of training, management regressions, variability of the production lines and individuality of each product, variability of the consumers demands and small size of the enterprise have negative effects on the performance of HACCP system (Semios and Kontogeorgos, 2007; Milios, 2013). Further, a cross-sectional study by Fletcher et al (2007) conducted in Jamaican hotels revealed that the majority (75%) of larger hotels used a combination of HACCP and Ministry of Health food safety strategies, offered all-inclusive services, had a better quality team approach as well as a HACCP plan, and that they were also monitoring critical control points (CCPs) and more than two thirds of the hotel staff were knowledgeable of HACCP.

2.2.6.4 Management Commitment and HACCP System Implementation

Caccamo et al (2018) longitudinal study of the tallest hotel in the world, JW Marriott Marquis in Dubai, demonstrates best practice in food safety management and indication of the key role played by management commitment towards attainment of hotels' food safety management. On their part, Criveanu et al (2012) argue that successful implementation of HACCP system requires work and commitment of all employees, including managers of food production units thus indicating the necessity of team work on effective HACCP execution.

A further study by Milios et al (2013) sought to evaluate the food safety management system (HACCP – type system) implemented in Greek food businesses and examine the techno-managerial factors influencing its application and established that the companies identifying the benefits of HACCP implementation as very important have fully understood possible problems and had the best results as regards HACCP evaluation.

Arendt et al (2013) suggests the need to train food handlers on food safety and recognizing those employees who complete such training. In addition, managers need to be available for consultation and there should be comprehensible training material and adequate resources dedicated to ensuring the implementation of food safety system. According to FAO/WHO (2004), for effective execution of HACCP, the concept has to be well grasped by the management of food production businesses. Management understanding and commitment is vital if employees are to operate effectively a system of food safety and in particular HACCP. Therefore, the key responsibility for HACCP success lies with the management of the food entity. This is

could either be the owner or, the person assigned to carry out day-to-day management, when the owner is not in (Al Yousuf, 2015).

2.2.6.5 Funding Level and HACCP System Implementation

According to Amit et al (2012), barriers to implementing food safety practices and programs in retail foodservice have been identified and typically relate to limited resources, such as time and money. In the same vein, a study by Deepananda and Spencer (2010) in food processing firms in Ontario, Canada exploring the barriers that impede the adoption of hazard analysis and critical control point (HACCP) concluded that HACCP implementation is impeded significantly by barriers related to financial constraints. In the same vein, Wengle (2016) argues that the HACCP system typically results in three types of costs for processors: First, the cost of designing a HACCP plan for each product line; second, the lump-sum expenses that the plant may need to make to update existing equipment and methods of record keeping; and third, the ongoing cost of validating product specific HACCP plans. The initial cost of adapting existing scientific studies to a specific plant-level context can be significant. The costs that the HACCP system entails for small producers are a priori significant. Unlike large establishments, plants with smaller output volumes are far less able to absorb the upfront and ongoing per-unit costs that the introduction and continuous validation of the HACCP system requires. Large processors with multiple facilities can spread costs across far larger production runs.

2.3 Theoretical Literature Review

This section reviews the principal theoretical frameworks and models underpinning the study.

2.3.1 The Gilling-Taylor Model of HACCP Barriers

This model was advanced by Gilling and Taylor (2008) and identifies the key barriers inhibiting successful HACCP system adoption in food production entities. The model is presented in Figure 2.2.

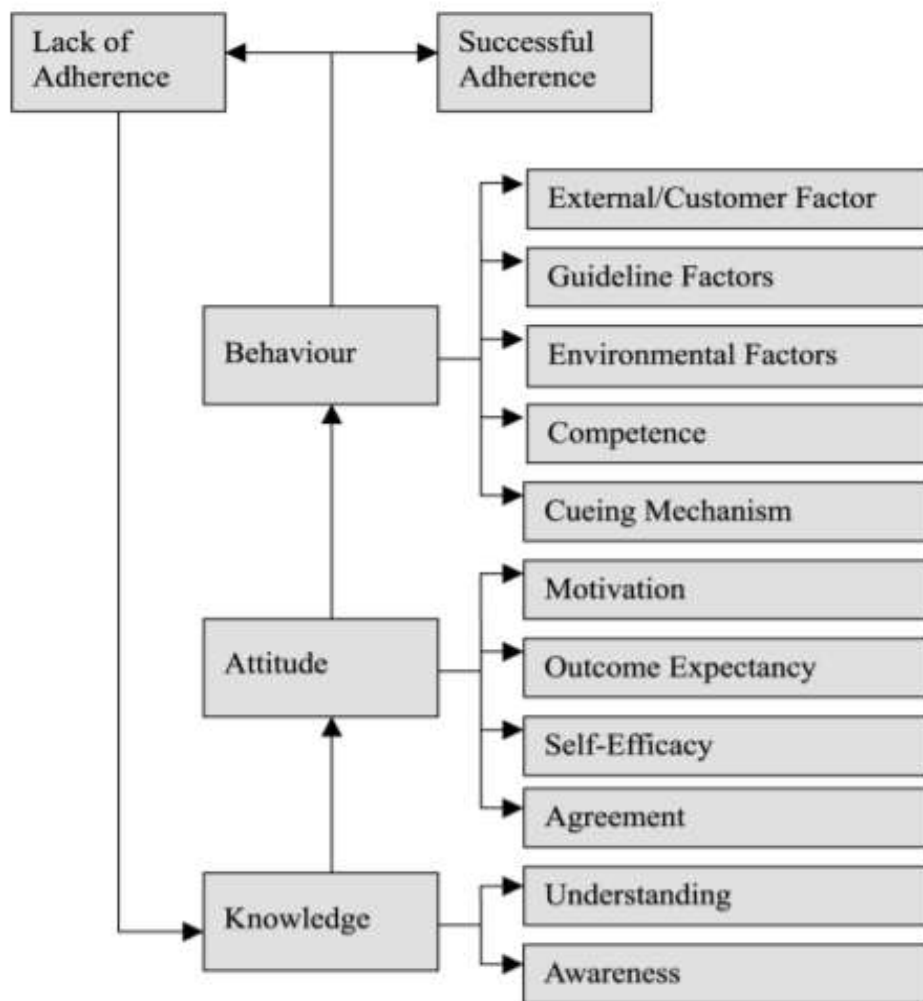


Figure 2.2: Gilling-Taylor Model of HACCP Barriers

Source: Gilling et al (2001)

The model informed the independent variables and measures that were used for this study as they relate to employee dispositions in terms of their behavior, attitudes and knowledge which are critical determinants in the successful adoption of HACCP system.

2.3.2 Food Safety Management System Adoption Model

This model was developed and empirically tested by Arpanutud et al (2009) whose research aimed at investigating issues influencing the adoption of food-safety management systems by Thai food-manufacturing firms found food safety management system adoption could be predicted by seven factors with the most important factor being top management commitment. It could also be predicted by the extent to which the firms had food safety relationships on information and knowledge exchange with other stakeholders. The Food Safety Management System Adoption Model is depicted in Figure 2.3. The model is relevant for the current study as it informed some of the variables that were considered as moderating variables of the study.

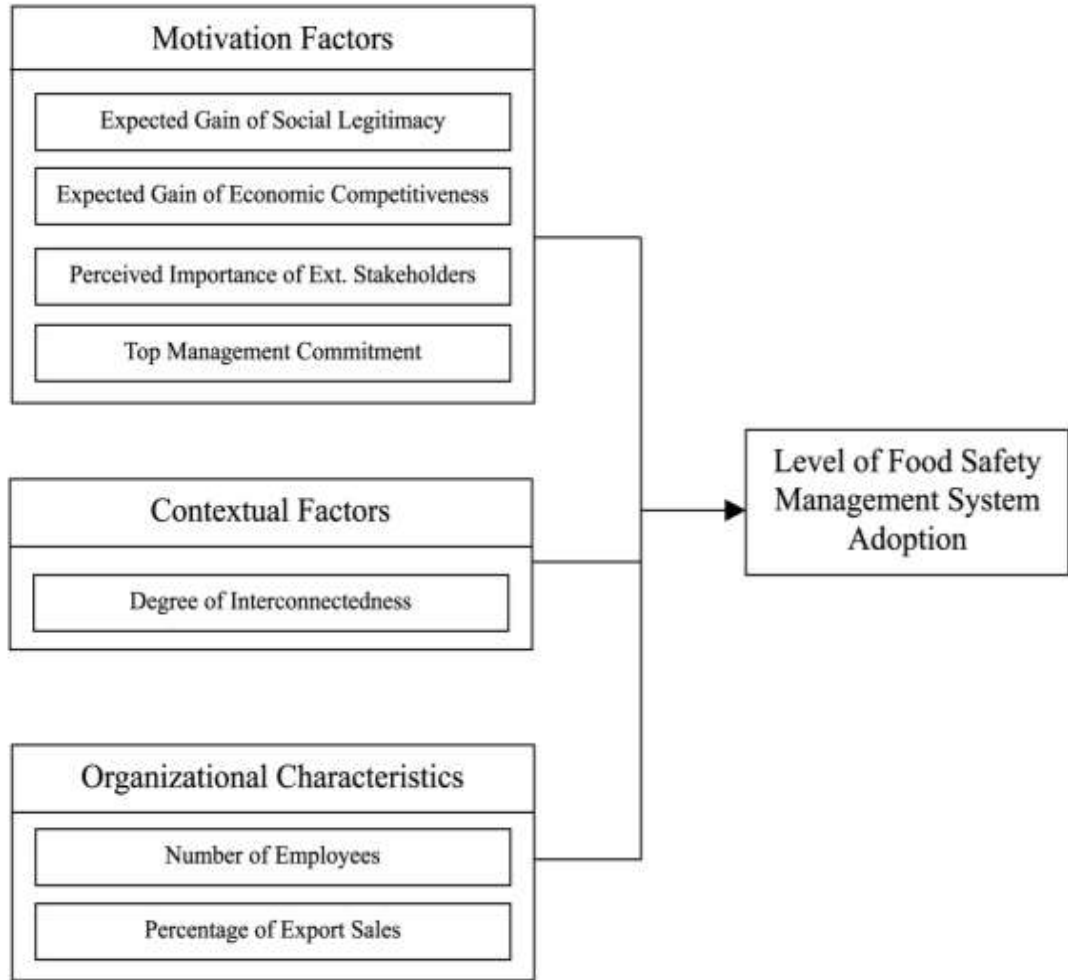


Figure 2.3: Food Safety Management System Adoption Theory

Source: Arpanutud et al (2009)

2.3.3 ILSI Model for Quality Assurance Management in the Food Industry

The ILSI Model for Quality Assurance Management in the Food Industry (Figure 2.4) was developed by the International Life Sciences Institute (ILSI) (Nigel, 2001) to demonstrate quality assurance management levels and scope of application of various quality assurance mechanisms such as total quality management (TQM), ISO 9000 and HACCP in the industry. This model is useful in the present study as it depicts HACCP system as a critical food safety management system whose successful

adoption is influenced by a variety of motivational and contextual factors as well as organizational characteristics.

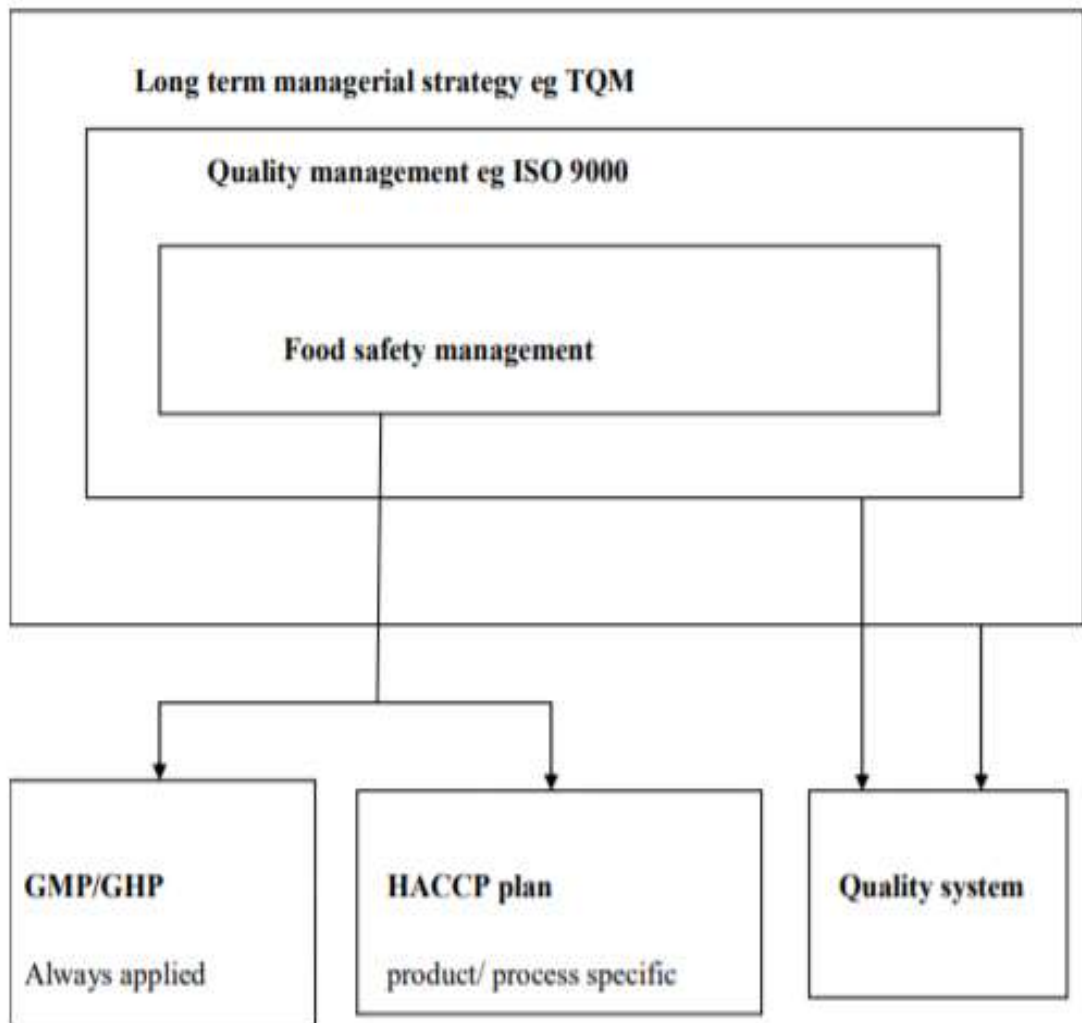


Figure 2.4: ILSI Model for Quality Assurance Management in the Food Industry

Source: Nigel (2001)

The model depicts HACCP as an operational sub-component of the wider food safety management system and quality assurance model within the food production organization entity intended to realize the long term managerial strategy of the organization.

2.4 Summary of the Literature Review and Knowledge Gaps

The extensive review of relevant existing in this chapter has highlighted the importance of HACCP system as a food safety management system and the key influencers of its successful adoption and execution. The reviewed literature however indicates glaring knowledge gaps that call for further study. Table 2.2 shows a summary schedule of the key knowledge gaps as well as how this study sought to address them.

Table 2.2: Summary of Literature Review and Knowledge Gaps

Thematic area	Author (s)	Focus of the study	Key findings	Knowledge gap	Focus of the current study
Employee behaviors towards HACCP system	Teeping (2015)	A structural modeling on food safety knowledge, attitude, and behavior	Right attitude about food safety positively affected the food safety behavior. Food safety knowledge did not contribute to the better food safety behavior.	Did not focus on specifically HACCP system. Focus was also more on effect of attitudes on behavior.	This study focused on the effects of employee behaviors, attitudes and knowledge on HACCP system uptake
Employee behaviors towards HACCP system	Baser et al (2017)	Sought to search the food safety attitudes and behavior of hotel personnel in Turkey	There is a high correlation between food safety attitudes and behaviors	Did not focus on other aspects other than attitudes that influence food safety behaviors	This study included knowledge and contextual factors as aspects affecting HACCP system adoption
Employee behaviors towards HACCP system	Oscar (2014)	Retail food handler certificate and food handler training	Proper training that helps in performance of correct procedures develops habitual behaviors important in food safety.	Focus was limited to training and knowledge effect on food safety	This study went beyond behavior and focused also on attitude knowledge and contextual factors that affect HACCP adoption

Employee attitudes towards HACCP system	Roncesvalles (2010)	Implementation of HACCP system	Attitude barrier due to lack of educative courses are making it more difficult for workers to adhere to HACCP system.	Study limited to determinants of poor attitudes towards HACCP system implementation	Focused on determining whether employees attitude influences HACCP up take
Employee attitudes towards HACCP system	Hootan (2015)	Implementation of HACCP in one of the Iranian flight catering establishments.	Attitude depends on customers' demands which determine behavior towards food safety.	Study limited to attitudes as the only aspect of interest and its effect on HACCP system.	This study focused on additional variables beyond attitudes as affecting HACCP system implementation
Employee attitudes towards HACCP system	Moreaux et al (2018)	Food safety attitudes of food sellers in Ghana	Study showed that although sellers' food safety attitudes were high, this did not translate into positive food safety practice	Focus limited to employees attitudes	This study included additional variables namely behavior sand knowledge as well as contextual factors and their effect on HACCP uptake

Employee knowledge of HACCP system	Roncesvalles (2010)	HACCP implementation.	Stated that only 41.9% of people interviewed were informed and/or trained regarding HACCP, despite the fact that 79% of them considered implementation of this system to be necessary in order to ensure food safety.	Focus was limited on HACCP training.	Focused on whether knowledge factors affect HACCP system uptake within hotels.
Employee knowledge of HACCP system	Reda and Mustafa (2016)	A study of food handlers to observe their conduct following their training on concepts relating to HACCP in Egypt.	Established high connection between food safety training and knowledge consequently affecting food handlers' behaviors towards HACCP system	Focus limited to training and knowledge of HACCP	This study focused on additional dimensions such as behavior, attitude, contextual factors and their influence on HACCP uptake
Employee knowledge of HACCP system	Bright (2016)	Food Safety Management Practices of Small and Medium Sized Food Industry firms	Study carried out in Tanzania indicated that 22.9% of employees in food industry have knowledge in HACCP and that 27.1% are trained in HACCP	Study limited on training and knowledge of HACCP system	This study sought to determine how knowledge of HACCP system affects HACCP system uptake

HACCP uptake	Roncesvalles (2010)	HACCP uptake challenges	Stated that information provided by the person in charge of each kitchen showed that there was HACCP system adoption, but implementation of these systems was found to be incorrect in 70% of the kitchens	Study limited to knowledge and HACCP execution	Focused on more variables affecting HACCP execution including behavior, attitude and contextual factors
HACCP uptake	Petruzzelli et al (2014)	Appropriateness of HACCP plan adopted in a school catering facility in Italy.	Established effectiveness of HACCP plan in reducing occurrences of microbial and chemical cross-contamination	Study was in a school catering facility setting	This study majored on HACCP adoption in a hotel setting
HACCP uptake	Katherine (2012)	Implementing HACCP in small food processing business	The level of uptake by catering and small food processing businesses was only 1% in contrast to the industrial sector that was 31%.	Study focused on food processing businesses	This study focused on hotels and went beyond mere adoption of HACCP to its key influences
Contextual factors	Patricia et al (2016)	Food law compliance in developed and developing countries	Mandatory food laws requirements for persons in supervisory positions were not stringently complied with as 31% of kitchen matrons reported not having hygiene qualification in the Ashanti Region of Ghana and 82% staff sampled had never received hygiene training.	This study was limited to food law compliance status	This sought to determine the moderating effect of food laws compliance on employee food safety systems orientation and HACCP system uptake.
Contextual factors	Ahmed et al (2015); Yousuf et al (2015)	Enforcement of food safety regulations	Food safety management standards across hospitality industry presents a challenge for governments worldwide yet regulations have enormous benefits to the hospitality industry	The studies were limited to challenges facing governments in the	This study went further to provide empirical evidence on how adopted regulations

				execution of food safety regulations and the benefits accruing from the regulations	moderates employees food safety management systems orientation and HACCP system uptake
Contextual factors	Amit et al (2012)	Market forces	HACCP implementation in many companies has been driven by customer demands	The study did not consider additional variables beyond customer aspects in HACCP system implementation	This study incorporated other contextual factors beyond customer demands as moderating employee food safety system orientation and HACCP system uptake.
Contextual factors	Fletcher et al (2007)	Relationship between size of hotel and food safety system adoption in Jamaica	The majority of larger hotels used a combination of HACCP and the Ministry of Healthy food safety strategies	The study was exploratory in nature and did not seek to establish what other variables other than size of the hotel influences HACCP system adoption in hotels	This study provides more robust empirical findings on the effects of size of hotel and other contextual factors such as food safety regulations, management commitment and market forces on HACCP system adoption in hotels

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the study methodology used for the study. The chapter covers the research philosophy and design, study area, target population, sampling techniques and sample size. The chapter further outlines operationalization of study variables, data collection methods as well as the validity and reliability of measurements. The chapter ends with a description of how the research data was analyzed as well as analytical models used, study logistics and ethical considerations.

3.2 Research Philosophy

This study was based on the methodological and philosophical foundations of logical positivism or logical empiricism. According to Uddin and Hamiduzzaman, (2009), logical positivists emphasize for scientific rigor in the advancement of knowledge. A researcher who is a logical positivist presumes as well as devises hypotheses, variables and operational definitions rooted in theories that exist. Logical positivism was used in this study since it permitted utilization of existing theories and variable measures as well as verification of findings obtained.

3.3 Research Design

The study adopted a cross-sectional survey research design. This type of research is frequently used to determine the prevailing characteristics in a population at a certain

point in time (Malhotra, 2008). A cross-sectional study therefore involves single incidence of data collection from study units.

According to Mugenda and Mugenda (2008), participants in a cross sectional study are selected based on particular variables of interest. Cross-sectional surveys allow for researchers to collect data on different variables to see how differences might correlate with the critical variable of interest.

The study was also descriptive and quantitative since analysis of the data utilized both descriptive statistics that provided detailed description of the study variables and quantitative analysis using inferential statistics namely regression and correlation analysis was used to test the study hypotheses. Finally, the study collected qualitative data from the hotels food and beverage managers through in-depth interviews which was analysed using content analysis.

3.4 Study Area

The study was carried out in Nairobi City County (see map in Appendix 6).

3.5 Target Population

This was a census study as it targeted all the 4 and 5 star-rated hotels in Nairobi City County. According to the 2016 TRA classification (Appendix 7) there were 22 classified hotels in Nairobi City County of which ten were 5-star and twelve 4-star. The target study units were the executive chefs, chefs and managers from all the 22 hotels classified as 4 or 5-star in Nairobi City County.

3.6 Sampling Technique and Sample size

Stratified random sampling technique was used to select the study units which constituted the respondents for the study. An inclusion and exclusion criteria guided the process of identifying the study units. Only employees directly involved with food production were considered as relevant respondents. Other staff working in the hotel kitchens such as cleaners and food service employees were excluded as target respondents.

The study units/respondents were classified into three strata namely the executive chefs, chefs and managers.

A sample of three executive chefs were randomly drawn from each of the 22 hotels resulting to a total of 66 executive chefs selected as respondents/study units for the study.

To obtain the sample number for chefs, Cochran formula that allows for the calculation of an ideal sample size given a desired level of precision, desired confidence level, and the estimated proportion of the attribute present in the population (Snedecor and Cochran, 1989) was used.

$$n_o = \frac{z^2 pq}{e^2}$$

Where:

n_o = sample size

Z = the standard normal deviation at the required confidence level

p = the estimated proportion of an attribute that is present in the population

$q = 1-p$

e = the desired level of precision

Consequently, the size of the sample constituting the hotel chefs from the entire study population of 22 hotels was computed as:

$$n_o = \frac{(1.96)^2 (0.50) (.50)}{(0.05)^2} = 384 \text{ chefs}$$

The average number of chefs targeted for interview from each of the 22 hotels was therefore 17 (that is: 384/22) and this number were randomly selected from each of the hotel. The total study units/respondents targeted for the study were therefore 450 (66 executive chefs and 384 chefs).

In addition, the food and beverage manager in each of the 22 hotels was also identified for an in-depth interview thus making a total target of 22 food and beverage managers as additional study units/ respondents targeted for the study.

3.7 Operationalization of Study Variables

The key variables for this study were independent/predictor, dependent/criterion and moderating variables. The independent variables were: employee behaviors, attitudes and knowledge towards HACCP system while HACCP system uptake served as the dependent variable. Finally, contextual factors namely food safety regulations, market forces, size of the hotel, management commitment and funding level constituted the moderating variables for the study. A review of relevant existing literature provided a wide range of valid measures that were used to operationalize the study variables as depicted in Table 3.1. These measures were used to formulate the data collection instrument in appendices 1 and 2.

Table 3. 1: Operationalization of Study Variables

Variables	Type of Variable	Operationalization/ Measures	Indicators/Constructs	Measurement Scale	Question Number
Employee Behaviors towards HACCP System	Independent Variable	Employee behavioral actions towards HACCP System as evidenced by:			
		i) External Customer Factors	Employees perceive customers as preferring a different food safety system other than HACCP	Interval scale (5-point Likert Scale)	Q 1(i)
		ii) Guideline Factors	Employees see HACCP system guidelines as difficult to use	Interval scale (5-point Likert Scale)	Q 1(ii)
		iii) Competence	Employees blame lack of personal capacity for their inability to successfully execute HACCP system	Interval scale (5-point Likert scale)	Q 1(iii)
		iv) Prioritizing mechanism	Employees have other more pressing issues to address than HACCP system execution	Interval scale (5-point Likert scale)	Q 1(iv)
Employee Attitude towards HACCP System	Independent Variable	Employee attitudes portrayed towards HACCP system as evidenced by:			
		i) Motivation	Employees prefer to do what they have always done than adopt requirements of	Interval scale (5-point Likert scale)	Q 2(i)

			HACCP system		
		ii) Outcome Expectancy	Employees think HACCP system won't make any difference to the hotel business prospects	Interval scale (5-point Likert scale)	Q 2(ii)
		iii) Self Efficacy	Employees believe the skill requirement for HACCP system are beyond them	Interval scale (5-point Likert scale)	Q 2(iii)
		iv) Agreement	Employees think HACCP system is a waste of their time	Interval scale (5-point Likert scale)	Q 2(iv)
Employee Knowledge of HACCP System	Independent Variable	Employees knowledge of HACCP system as evidenced by:			
		i) Awareness	Employees awareness of the seven principles of HACCP	Interval scale (5-point Likert scale)	Q 3(ii)
		ii) Understanding	Employees knowledge of what is HACCP	Interval scale (5-point Likert scale)	Q 3(i)
HACCP system practices	Dependent Variable	State of HACCP system adoption exhibited by:			
		i) Identification of hazards	Clear checklist of possible food hazards	Nominal scale	Q 9(i)
		ii) hazard preventive measures	List of steps to be undertaken by the hotel for food safety hazard prevention	Nominal scale	Q 9(ii)

iii) identification of critical control points	Clear checklist of food safety critical control points	Nominal scale	Q 9(iii)
iv) established critical limits	Set threshold levels to be adhered to for ensuring food safety	Nominal scale	Q 9(iv)
v) existing monitoring systems	Existence of a surveillance mechanism to ensure adherence to the established food safety system	Nominal scale	Q 9(v)
vi) created corrective actions	Existing remedial measures in the event of lapses in the implementation of food safety measures	Nominal scale	Q 9(vi)

Contextual factors	Moderating Variables	Facilitators/ inhibitors of HACCP system execution exhibited by:		
		i) Food safety regulations	Types of statutory food safety regulations complied with.	Nominal scale Q4a & b
		ii) Market forces	Dynamics in the market relating to: - Number of customers demanding food - Cost of food raw materials - Number of plates of food sold - Price of food per plate	Interval scale 3 - points Likert Q 5(i) Q 5(ii) Q 5(iii) Q 5(iv)

iii) Size of the Hotel	Size of the hotel as evidenced by: - Number of rooms	Ordinal Scale	Q 6(i) –iv
iv) Management Commitment	Attitude portrayed and level of support offered by top management to HACCP system execution	Interval scale 5 - points Likert	Q 7 (i) Q 7 (ii)
v) Funding level	- Sufficiency of budget allocated to HACCP system implementation	Nominal scale	Q8

3.8 Data Collection Methods

A close ended self-administered questionnaire was used to collect primary data. A structured and closed ended questionnaire was particularly preferred to enable standardization of responses and ease of analysis.

The research instrument was delivered to the respondents through a ‘drop and pick’ method. The researcher approached each of the targeted hotel, introduced herself to the relevant authorities as well as the selected respondents/study units highlighting to them the study’s purpose and left the questionnaires with the respondents to be filled.

The questionnaire was developed using the variables measures indicated in the conceptual framework with independent variables of behavior, attitude and knowledge on HACCP system using scales recommended by the Gilling-Taylor Model of HACCP barriers (Gilling et al, 2001). The dependent variable of HACCP Uptake adopted the indicative measures of the seven principles of HACCP (Codex, 2008). The measures for contextual factors namely food safety regulations in Kenya, market forces, size of the hotel, top management commitment towards HACCP system implementation and finally the adequacy of the funding level allocated to HACCP system implementation were developed from extensive review of previous studies on the specific contextual variable. The questionnaire was organized into the following sections:

Preliminary Information -this section sought responses on the name of the hotel, the respondent’s job title and classification of the hotel.

Part One: Employee behavior towards HACCP system -this section of the questionnaire sought to obtain information on the behavioral actions exhibited by employees towards HACCP uptake.

Part Two: Employee attitude towards HACCP system -under this section, the attitude portrayed by employees towards HACCP uptake was captured.

Part Three: Employee knowledge of HACCP system- This section of questions helped to collect data pertaining to employees' knowledge of HACCP system.

Part Four: Contextual Factors- under this section of the questionnaire, data relating to contextual factors namely food safety regulations in Kenya, market forces, number of lettable rooms in the hotel , extent of top management commitment towards HACCP system practices and finally the adequacy of the funding level allocated to HACCP system implementation was collected.

Part Five: HACCP System Uptake: This section captured the state of HACCP system adoption exhibited by the hotels in terms of the execution level of the seven HACCP principles.

Finally, secondary data on the hotels' operations published in national newspapers, hotel websites, Kenya Tourism Board newsletters as well as hotel brochures that shed light on relevant operational indicators was reviewed and this further enhanced the cross validation of the collected primary data.

3.9 Validity of Measures

An extensive review of relevant existing conceptual and empirical literature on food safety, hotel management, HACCP system and contextual factors was conducted to identify the measures for each of the study variables. These measures were used in the construction of the questionnaire. Hence the variable measures used in the questionnaire were deemed to have face and construct validity as they are measures used to measure similar variables in previous studies and emanating from authoritative researchers as identified from literature review.

To ensure content validity, the preliminary questionnaire was pre-tested on a pilot set of respondents for logic, understanding, as well as significance. Four expert respondents, two each from both the 4 and 5 star rated hotels were selected for pretesting the questionnaire. This category were excluded from the last set of study respondents that the questionnaire was administered to in order to avoid assessment bias. As advised by Malhotra (2008), the pre-tests of the questionnaire were conducted by individual interviews so as to monitor the attitudes and reactions of respondents. Every questionnaire aspect was pre-tested including content of question, sequencing, wording, layout and form, instructions and difficulty of question. The response and feedback obtained during pre-testing was used to revise the questionnaire and enhance instrument validity before its administration to study respondents.

3.10 Reliability of Measures

Although the measures of variables used in this study were obtained from an extensive review of relevant existing literature, it was still necessary to assess the

reliability of the measures by computing the Cronbach's alpha coefficients for variables which had multiple measures before commencement of data analysis. The analysis results are presented in Table 3.2.

Table 3. 2: Results of Reliability Tests of Study Measures

Variable	Measures	Number of Items	Cronbach's Alpha Coefficient
Employee Behaviors towards HACCP system	<ul style="list-style-type: none"> • Perceive customers as preferring alternative food safety system • Guidelines difficult to use • Lack of personal capacity to execute • Not a priority issue for execution 	4	0.727
Employee Attitudes towards HACCP system	<ul style="list-style-type: none"> • Preference to do what they have always done than adopt HACCP • Think HACCP won't make a difference in business prospects • Believe HACCP execution skills is beyond them • Think HACCP system is a waste of time 	4	0.725
Employee Knowledge of HACCP system	<ul style="list-style-type: none"> • Awareness of the 7 HACCP system principles • Understanding of the HACCP system details 	2	0.917
Market Forces	<ul style="list-style-type: none"> • Increase of customer requests over last 3 years • Stable cost of food raw materials over last 3 years • Increase of customers served over last 3 years • Stable food prices charged to customers over last 3 years 	4	0.720
Management Commitment	<ul style="list-style-type: none"> • Positive attitude by top management towards HACCP system • Top management commits resources and time towards 	2	0.807

		HACCP system	
HACCP System Uptake	<ul style="list-style-type: none"> • Checklist of possible food hazards • Steps undertaken for food safety hazard prevention • Checklist of food safety critical control points • Set threshold levels for ensuring food safety • Existence of surveillance mechanism to ensure adherence to established food safety system • Existing remedial measures in event of lapses in execution of food safety 	6	0.820

Source: Research Data

Table 3.2 shows that Cronbach's alpha coefficients for the study variables ranged from 0.725 for employee attitudes towards HACCP system to 0.917 for employee knowledge of HACCP system, which was above the acceptable reliability threshold level of 0.7 (Malhotra, 2008), thus indicating the reliability of the research instruments.

3.11 Statistical Analysis Models

Data collected through the questionnaires was analyzed using inferential and descriptive statistics. Descriptive statistics comprised central tendency measures of mode and mean as well as dispersion measures (standard error mean). These measures were utilized to describe the characteristics of the study variables as explained by the collected study data.

Inferential statistics namely, simple and multiple linear regression as well as partial correlations were used to test the study hypotheses which were tested at 95% level of confidence (significance level, $\alpha = 0.05$).

Finally, content analysis was used for analysis of the qualitative data obtained by in-depth interviews of the food and beverage managers.

Table 3.3 provides the specific two-tail hypotheses tests and statistical models that were used to analyze the respective hypotheses tests.

Table 3. 3: Statistical Analytical Models

Hypothesis Statement	Hypothesis Test and Decision Rule	Hypothesis Testing Statistic
H₀₁ : There is no significant relationship between employee behaviors towards HACCP system and HACCP system uptake in four and five star-rated hotels in Nairobi City County.	$H_0: \beta_1 = 0$ $H_A: \beta_1 \neq 0$ Reject H_0 if p-value $< \alpha$, otherwise fail to reject H_0 if p-value is $> \alpha$	$HSU = \beta_0 + \beta_1 EBHS + \epsilon$ Where HSU = Total mean score of HACCP system uptake β_0 = constant β_1 = Regression coefficient (beta) $EBHS$ = Aggregate mean score of employee behaviors towards HACCP system ϵ = Variation due to unmeasured factors

H₀2: There is no significant relationship between employee attitudes towards HACCP system and HACCP system uptake in four and five star-rated hotels in Nairobi City County.

$H_0: \beta_1 = 0$
 $H_A: \beta_1 \neq 0$

Reject H_0 if p-value $< \alpha$, otherwise fail to reject H_0 if p-value is $> \alpha$

$HSU = \beta_0 + \beta_1 EAHS + \varepsilon$

Where

HSU= Aggregate mean score of HACCP system uptake

β_0 = constant

β_1 =Regression coefficient (beta)

EAHS = Total mean score of employee attitudes towards HACCP system

ε = Variation due to unmeasured factors

H₀3: There is no significant relationship between employee knowledge of HACCP system and HACCP system uptake in four and five star-rated hotels in Nairobi City County.

$H_0: \beta_1 = 0$
 $H_A: \beta_1 \neq 0$

Reject H_0 if p-value $< \alpha$, otherwise fail to reject H_0 if p-value is $> \alpha$

$HSU = \beta_0 + \beta_1 EKHS + \varepsilon$

Where

HSU= Aggregate mean score of HACCP system uptake

β_0 = Constant

β_1 = Regression coefficient (beta)

EKHS= Aggregate mean score of employee knowledge of HACCP system

ε = Variation due to unmeasured factors

<p>H₀4: Contextual factors do not significantly moderate the relationship between employee food safety management systems orientation and HACCP system uptake in four and five star rated hotels in Nairobi City County.</p>	<p>H₀: $r_{xy.z} = 0$ H_A: $r_{xy.z} \neq 0$</p>	$r_{xy.z} = \frac{r_{xy} - (r_{xz})(r_{yz})}{\sqrt{1-r_{xz}} \sqrt{1-r_{yz}}}$
	<p>Reject H₀ if p-value < α, otherwise fail to reject H₀ if p-value is > α</p>	<p>Where</p> <p>$r_{xy.z}$ = Partial correlation coefficient of variable x and y controlling for variable z</p> <p>X= Aggregate of employee food safety management systems orientation variables mean scores</p> <p>Y= Aggregate mean score of HACCP system uptake measures</p> <p>Z= Individual contextual factors</p>

<p>H₀5: There is no significant relationship between contextual factors and HACCP system uptake in four and five star rated hotels in Nairobi City County.</p>	<p>H₀: $\beta_1=\beta_2=.....=\beta_5 = 0$ H_A: At least one of the β_i 's $\neq 0$</p> <p>-Reject H₀ if p-value < α, otherwise fail to reject H₀ if p-value is > α</p>	<p>$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \dots + \beta_5X_5 + \varepsilon$</p> <p>Where</p> <p>Y= Aggregate mean score of HACCP system uptake measures</p> <p>β_0 = Constant</p> <p>$\beta_1- \beta_5$ = Regression coefficients</p> <p>X₁- X₅= Individual contextual factors variables</p> <p>ε= Random variation owing to additional unmeasured factors</p>
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3.12 Diagnostic Tests for Inferential Statistics Assumptions

Since the tests of hypotheses involved use of regression and correlation analysis that assume normality of data as well as other critical assumptions, it was necessary to subject the data to a set of diagnostic tests to assess conformance to the underlying assumptions. This section presents the results of the test of sampling adequacy, normality of variables, test of linearity and independence, homoscedasticity test as well as multicollinearity test.

3.12.1 Test of Sampling Adequacy

To assess the sampling adequacy of the data, a number of the study variables were subjected to Kaiser-Meyer-Olkin (KMO) Test. The results in Table 3.4 show that none of the key study variables' KMO scores were less than 0.05 hence indicating the sample used for the study was adequate in depicting attributes of the study population as suggested by Anderson, Sweeney and Williams (2003) and thus suitable for inferential analysis.

Table 3.4: Results of Kaiser-Meyer-Olkin (KMO) Test

Variable	Kaiser-Meyer-Olkin Measure of Sampling Adequacy Result	Significance Level
Employee behaviors towards HACCP system	0.714	0.000
Employee Attitudes towards HACCP system	0.673	0.000
Employee Knowledge of HACCP system	0.500	0.000
Market Forces	0.728	0.000
Management Commitment	0.500	0.000

Source: Research Data

3.12.2 Test of Normality

In order to establish whether distribution of the study data was normal, Kolmogorov-Smirnov (K-S) one-sample test, a non-parametric goodness-of-fit test that compares the cumulative distribution function for variables within a specified distribution (Malhotra, 2008) was computed. The results of K-S tests for the key study variables, namely employee behaviors, attitudes and knowledge of HACCP system as well as contextual factors established that the data connected to all the study variables was normally distributed.

3.12.3 Test of Linearity

To validate the assumption of linearity, the linear relationship of the independent variables on dependent variable as advised by Dancey and Reidy (2004) was assessed.

Table 3.5: Assessment of Variables Linearity

		Mean score of HACCP System Practices
Mean score of employee behaviors towards HACCP system	Pearson Correlation	.327**
	Sig. (2-tailed)	.000
	N	288
Mean score of employee attitudes towards HACCP system	Pearson Correlation	.259**
	Sig. (2-tailed)	.000
	N	288
Mean score of employee knowledge of HACCP system	Pearson Correlation	-.413**
	Sig. (2-tailed)	.000
	N	288

Source: Research Data

The linearity test results as indicated in Table 3.5 show that all independent variables namely employee behaviors, attitudes and knowledge of HACCP system had linear relationships with the dependent variable namely HACCP system uptake which were all statistically significant. Given the establishment of linearity, the proposed regression models could reliably be used as suggested by Malhotra (2008).

3.12.4 Homoscedasticity Test

The test of homogeneity of variances which assumes the variance of the dependent variable is at par with the independent variable was also conducted. Table 3.6 shows the results of Test of Homogeneity of Variances (that is, Levene's Test of Equality of Variances) for the study.

Table 3.6: Results of Homogeneity of Variances

Variable	Levene's Statistic	Significance
Employee Behaviors toward HACCP system	61.796	0.000
Employee Attitudes towards HACCP system	190.042	0.000
Employee Knowledge of HACCP system	142.210	0.000
Food Safety Regulations	41.846	0.000
Market Forces	19.991	0.000
Size of Hotel	210.316	0.000
Management Commitment	102.022	0.000
Funding Level	126.287	0.000

Source: Research Data

The results in Table 3.6 show computing the Levene's Statistic at a threshold significance level of 0.05 (Malhotra, 2008), all the study variables Levene's test is under 0.05 suggesting equal variances assumption of the independent and dependent variable is violated thus indicating nonexistence of homogeneity of variances amidst the independent and dependent variables.

3.12.5 Multicollinearity Test

In order to determine whether there would be higher inter-correlations among the study's independent variables which would complicate the regression analyses in the test of hypotheses, multicollinearity test was conducted by computing the variance inflation factors (VIF) as highlighted in Table 3.7. As indicated, none of the independent variables had VIF exceeding 10, the threshold beyond which multicollinearity is a problem (Anderson, Sweeney and Williams, 2003) thus indicating the non-existence of multicollinearity challenge.

Table 3.7: Results of Multicollinearity Test

Independent variables	Collinearity Statistics	
	Tolerance	VIF
Mean score of employee behaviors towards HACCP system	.667	1.500
Mean score of employee attitudes towards HACCP system	.536	1.866
Mean score of employee knowledge of HACCP system	.609	1.642
Contextual Factors- Food safety regulations being complied with	.408	2.453
Mean score of contextual factors - Market Forces	.478	2.092
Contextual Factors- Size of Hotel	.232	4.317
Mean score of contextual factors -Management Commitment	.268	3.730
Contextual Factors- Funding Level	.330	3.032

a. Dependent Variable: Mean score of HACCP System Practices

Source: Research Data

The results of the various diagnostic tests outlined in this section demonstrate that the statistical tests and procedures that assume sample adequacy, normality, linearity and independence of data such as correlations and regression analyses can be put under

use. Further, the data analysis results were also valid since it was established that the variables relationships are free from the limiting aspects of homoscedasticity and multicollinearity.

3.13 Qualitative Data Analysis

Qualitative data was collected from 16 hotels' Food and Beverage Managers (one manager from each hotel) using in-depth interviews as guided by the interview schedule in the Appendix 2. The Food and Beverage Managers were considered as key informants for the study as they possess both strategic and oversight role on the execution of HACCP system within the hotels.

The interview schedule contained open ended questions that mainly sought to collect the managers' insights on HACCP system setup, experiences and operational while implementing HACCP system within the hotels. The qualitative data obtained from this study was analyzed using content analysis where responses were grouped into common themes in order to draw inferences as recommended by Hsieh and Shannon (2005).

3.14 Study Logistics and Ethical Considerations

The logistics of the study comprised of pre-field, field work and post-field. Regarding pre-field logistics, the following were conducted by the researcher: 1) Getting a permit of study from National Commission for Science, Technology and Innovation (NACOSTI) and Kenyatta University Post-Graduate Board 2) Looking for official permission to access the study units/respondents from the respective hotels' management 3) Determining a work-plan 4) Study project budgeting 5) Pre-testing of

instruments and 6) Distribution of questionnaires to the respondents/study units. Field work logistics involved familiarization with the study area, hotels and the study units, distributing the questionnaires and follow ups and finally picking up the questionnaires.

Post-field logistics included the cleaning, coding and editing the collected data which was eventually keyed into the statistical package for social sciences (SPSS). The data in the SPSS software was then analyzed and interpreted and final research document was prepared for review and examination. The data collection instruments were subsequently filed for records and future reference.

Ethical considerations are equally important to the success of the research project. In this regard, the researcher ensured integrity while carrying out the survey to avoid having negative effects on the respondents. Information collected was used only for this study. Additionally, respondents were assured of confidentiality. Each research instrument was accompanied with a cover letter that was used to explain to the respondents the intention and expectations of the researcher.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Response Rate, Data Cleaning and Coding

The study units/respondents targeted for the study were 450 (66 executive chefs and 384 chefs) from the study population of 22 hotels. However, data was successfully collected from 16 hotels with 33 executive chefs and 255 chefs from these hotels completing the distributed questionnaires. This totaled to 288 respondents, a response rate of 64%. According to Kothari (2004), a response rate of at least 50% of the targeted respondents is considered statistically representative. In addition, indepth interviews were conducted on a total of 16 food and beverage managers, one each from the 16 hotels, using an interview schedule. The data collected from executive chefs and chefs through the questionnaires was quantitatively analysed as presented in the following sections while the qualitative data obtained from the food and beverage managers was summarized using content analysis as presented in the last section of this chapter. Table 4.1 shows the distribution of respondent executive chefs and chefs across the two hotel classification from whom data was successfully collected.

Table 4. 1: Distribution of Respondents across the Two Levels of Classified Hotels

Hotel Classification by Star Rating	Frequency of Respondents			Percent
	Executive Chefs	Chefs	Totals	
4-star	23	193	216	75.0
5-star	10	62	72	25.0
Total	33	255	288	100.0

Source: Research Data

Data from the 288 respondents that constituted the units of analysis was coded and cleaned through extensive checks for consistency. The coded and cleaned data was later keyed in the Statistical Package for Social Sciences (SPSS) version 20.0 software and analyzed using a set of descriptive and inferential statistics as enumerated in the subsequent sections.

The analysis of the data was done in two parts. The first part dealt with description of the main characteristics of the study variables while the second part sought to test the hypotheses of the study. To describe the key characteristics of the study variables, descriptive statistics were computed while the tests of hypotheses were conducted through simple and multiple linear regressions as well as partial correlations. The following sections present the results of the characteristics of study variables namely employee behaviors, attitudes and knowledge on HACCP system as well as HACCP system uptake and the contextual factors namely food safety regulations, market forces, size of the hotel, management commitment and funding level.

4.2 Descriptive Findings

4.2.1 The Nature of Employee Behaviors towards HACCP System in the Hotels

The respondents were asked to rate the various measures of behavioral actions exhibited by employees towards HACCP system in their hotels on a scale of 1 to 5 (where 5 = all the time and 1= not at all). The percentage responses to the questions as well as computed individual and aggregate means and standard deviations are shown in Table 4.2.

Table 4. 2: Employee Behaviors towards HACCP System in the Hotels

Behavioral actions exhibited by employees towards food safety	5	4	3	2	1	Mean	SD
Employees blame customers for insisting on a different system of food safety other than HACCP	-	-	12.5%	43.8%	43.8%	1.69	.683
Employees see HACCP system guidelines as difficult to use	-	-	6.3%	37.5%	56.3%	1.50	.613
Employees blame lack of personal capacity for their inability to successfully execute HACCP system	-	-	12.5%	50.0%	37.5%	1.75	.663
Employees have more pressing issues to address than HACCP system execution	-	-	12.5%	37.5%	50.0%	1.63	.697
Aggregate Scores for Employee Behaviors towards HACCP System						1.64	0.664

Notes: N = 288, 5 = All the time, 4 = Quite Often, 3 = often, 2 = Sometimes, 1 = Not at all, SD = Standard Deviation

Source: Research Data

The results in Table 4.2 on the specific behavioral actions exhibited by employees towards HACCP system reveal that the majority (43.8%) of the employees do not act indifferently towards customers who insist on a different system of food safety other than HACCP while only 12.5% perceive that customers prefer alternative systems of food safety other than HACCP. The majority of the employees (56.3%) do not at all consider HACCP system guidelines as difficult to use as opposed to a mere 6.3% who regard HACCP system guidelines as difficult to use. The large majority of employees sometimes blame lack of their personal capacity for their inability to successfully execute HACCP system (50%) compared to 37.5% of the employees who don't at all consider it an issue. Finally, most of the employees (50%) regard HACCP system

highly and not as a waste of their time compared to only 12.5 % of the employees who often have more pressing issues to address than HACCP system execution.

The results in Table 4.2 also show that the aggregate mean score for employee behavioral factors is 1.64 which rounds off to 2 on the used scale 1 to 5. This implies that, overall, the employees' behavior towards HACCP system was sometimes unfavorable, with a standard deviation of 0.664. The highest unfavorable employee behavior towards HACCP system was registered where employees blame lack of personal capacity for their inability to successfully execute HACCP system (mean = 1.75; standard deviation = 0.663) while the least was recorded on employees see HACCP system guidelines as difficult to use (mean = 1.50; standard deviation = 0.613).

This finding is similar to the outcome of a research by Casolani and Del Signore (2016) who found that the key factors influencing HACCP implementation in Italian hotels was the inaction of managers blamed owing to their lack of training as well as limited skilled labor in the catering sector and this unfortunately increased food safety risks. The results of the study also support the need to make the guidelines for HACCP implementation more realistic and simple if they are to be adopted by a larger proportion of hospitality practitioners as advocated by Forte (2002) who argues that many caterers are unqualified and therefore ignorant of the numerous dangers present in their activities. The above findings also show the need for guidance that reflects the working conditions of hospitality operations which should be provided by professions with operational experience, not necessarily scientists and enforcers.

Such guidance should handle all the probable dangers involved in producing food from the farm to the customer's plate.

The study findings also collaborate with the recommendation by Tripney (2007) who observed that effective and relevant food hygiene training may affect food handlers' behavior that would make sure proper food safety practices are attained. HACCP system should therefore be viewed as an effective food safety management tool and not a cumbersome blunt instrument designed to give enforcement officers evidence that procedures are not being followed if it has to elicit positive behavior towards its adoption among hotel employees.

4.2.2 Employee Attitudes towards HACCP System in the Hotels

Respondents were asked to rate the various measures of employee attitudes towards HACCP system in their hotels on a scale of 1 to 5 (where 5 = very true 1= not at all true). The percentage responses to the questions as well as computed individual and aggregate means and standard deviations are shown in Table 4.3.

On the actual attitudes portrayed by employees towards HACCP system, the results in Table 4.3 indicate that the majority (56.3%) do not regard as true the statement that employees prefer to do what they have always done than adopt the requirements of HACCP system with 6.3% of the employees regarding this statement as somewhat true of the attitude of employees towards HACCP system. Most of the employees (43.8%) do not regard it as true that their attitude is that of employees who think HACCP system won't make any difference to their hotels' business

prospects while 31.3% of the employees' attitude is one driven by the thinking that HACCP system won't make any difference to their hotels' business prospects. Most of the employees (56.3%) do not regard it at all true that their attitude is one that believes the skills requirements for HACCP system are beyond with none of the employees being of the contrary opinion. In the same vein, the majority of the employees (50%) do not consider it true that their attitude is reflected by thoughts of HACCP system being a waste of their time.

Table 4. 3: Attitudes of Hotel Employees towards HACCP System

Attitude portrayed by employees towards HACCP system	5	4	3	2	1	Mean	SD
Employees prefer to do what they have always done than adopt the ACCP system	-	25.0%	6.3%	56.3%	12.5%	2.44	1.000
Employees think HACCP system won't make any difference to the hotel business prospects	-	-	31.3%	43.8%	25.0%	2.06	.749
Employees believe the skills requirements for HACCP system are beyond them	-	-	-	43.8%	56.3%	1.44	.497
Employees think HACCP system is a waste of their time	-	-	-	50.0%	50.0	1.50	.501
Aggregate Scores for Employee Attitudinal Factors						1.86	0.687
Notes: N = 288, 5 = Very true, 4 = True, 3 = Somewhat true, 2 = Not true, 1 = Not at all True, SD = Standard Deviation							

Source: Research Data

The results in Table 4.3 show that the aggregate mean score for employee attitudes towards HACCP system is 1.86 which approximates 2 on the scale of 1 to 5 thus indicating that the employees rating of their attitudes towards HACCP system as being poor was regarded as generally not true within a standard deviation of 0.687. The disagreement with a statement portraying them as being averse to HACCP

system was registered on the statement that employees prefer to do what they have always done than adopt the requirement of HACCP system (mean = 2.44; standard deviation = 1.000) and the least was observed on the statement that employees believe the skills requirements for HACCP system are beyond them (mean = 1.44; standard deviation = 0.497).

The findings of this study therefore are that most of the employees within the star-rated hotels in Nairobi City County have a very positive attitude towards the HACCP system. This contradicts the findings of a study by Narul (2008) who established a generally negative attitude towards HACCP system by employees working in the food sector and therefore recommended the need for training and motivation to encourage food handlers to practice appropriate attitude and procedures when working in the food arena.

4.2.3 Hotels Employees' Knowledge of HACCP System

Respondents were also asked to rate the various measures of employee knowledge of HACCP system within their hotels on a scale of 1 to 5 (where 5 = extremely high and 1 = very low). The overall response of the questions as well as computed individual and aggregate means and standard deviations are shown in Table 4.4.

The ratings on the specific knowledge measures in Table 4.4 reveal that only 17.8% of the employees rate the hotel employees' awareness of the 7 principles of HACCP system as low with the remainder 82.2% rating it as either average (32.2%), high (25%) or extremely higher (25%). Similarly, a mere 12.5% rated the hotel employees'

understanding of HACCP system as low with the rest 87.5% rating the hotel employees' understanding of HACCP system as either average (43.8%), high (6.3%) or extremely high (37.5%).

Table 4. 4: Knowledge Level of HACCP System by Hotels' Employees

Employee knowledge of HACCP system	Extremely high	High	Average	Low	Very low	Mean	SD
How would you rate the hotel employees' awareness of the 7 principles of HACCP system	25.0%	25.0%	32.2%	17.8%	-	3.56	1.061
How would you rate the hotel employees' understanding of HACCP system details	37.5%	6.3%	43.8%	12.5%	-	3.69	1.104
Aggregate Scores on Employee Knowledge Factors						3.63	1.083
Notes: N = 288, 5 = Extremely high, 4 = High, 3 = Average, 2 = Low, 1 = Very Low, SD = Standard Deviation							

Source: Research Data

The results in Table 4.4 show that the aggregate mean score for employee knowledge factors is 3.63 which approximates 4 on the scale 1 to 5 thus indicating that the employees knowledge towards HACCP system was registered as high with a standard deviation of 1.083. The statement portraying the employees' high knowledge of HACCP system was registered on the statement where employees were asked to rate the hotel employees' understanding of HACCP system details (mean = 3.69; standard deviation = 1.083) and the least was observed on the statement where employees were asked to rate the hotel employees' awareness of the 7 principles of HACCP system (mean = 3.56; standard deviation = 1.061).

The study results contradict the findings by Taylor (2011) who upon interviewing hotel managers and chefs in England concluded that most managers and chefs had not heard of HACCP, lacked awareness of the term and that even those who had heard of HACCP admitted that they did not know much about it. The findings of this study also contrast Habeeb et al (2018) who sought to assess HACCP compliance of standard hotels in Ilorin metropolis at Kwara State in Nigeria and concluded that the concept of HACCP was not understood and this was negatively impacting on the general food hygiene standards and food-handling practices by the hotels personnel. Finally, the findings of this study on the high knowledge level of HACCP practices among the four and five star rated hotels' employees in Nairobi City County also contrasts the results of a study by Dima (2017) who established that food handlers in Lebanon had inadequate food safety knowledge and sanitation practices even among the better trained corporate-managed SMEs.

4.2.4 The Extent of HACCP System Uptake in the Hotels

The extent of HACCP system uptake was assessed using six HACCP system execution measures operationalizing the seven HACCP principles. Respondents were asked to confirm which of the six measures of HACCP system uptake were being executed by their hotels (where 2 = Yes; 1 = No). Table 4.5 indicates the relevant findings.

The detailed results in Table 4.5 show that a large proportion of the respondents indicated a high incidence of existence of HACCP system uptake in the star rated hotels with 93.8% indicating that there is a clear checklist of possible food hazards facing their hotels; 87.5% confirmed that there is a list of steps to be undertaken by

the hotel for food safety hazard prevention with a similar proportion of 87.5% indicating that there is a clear checklist of food safety critical control points within the hotels. A further 81.3% of the hotel employees were of the view that there are set threshold levels to be adhered to for existing food safety while 56.3% indicated that there exists a surveillance mechanism to ensure adherence to the established food safety systems. Finally, 68.8% of the employees confirmed that there are remedial measures in existence in the event of lapses to ensure adherence to food safety within the hotels.

Table 4. 5: HACCP System Uptake in the Hotels

State of HACCP System Practices	Yes	No	Mean	SD
There is a clear checklist of possible food hazards facing the hotel	93.8%	6.3%	1.94	.242
There is a list of steps to be undertaken by the hotel for food safety hazard prevention	87.5%	12.5%	1.88	.331
There is a clear checklist of food safety critical control points	87.5%	12.5%	1.88	.331
There are set threshold levels to be adhered to for existing food safety	81.3%	18.8%	1.81	.391
There exists a surveillance mechanism to ensure adherence to the established food safety systems	56.3%	43.8%	1.56	.497
There are remedial measures in existence in the event of lapses to ensure adherence to food safety	68.8%	31.3%	1.69	.464
Aggregate Scores for HACCP System Practices			1.79	0.376
Notes: N = 288, 2 = Yes, 1 = No, SD = Standard Deviation				

Source: Research Data

The results in Table 4.5 show that the aggregate mean score for the HACCP system practices in hotels was 1.79 which approximates 2 on the used scale of 1 to 2 thus indicating that the employees were generally in agreement that the listed evidence of HACCP system uptake existed in their hotels at a standard deviation of 0.376. The practice of there being a clear checklist of possible food hazards facing the hotel got

the highest rating (mean = 1.94; standard deviation = 0.242) and the least was observed on the statement that there exists a surveillance mechanism to ensure adherence to the established food safety systems (mean = 1.56; standard deviation = .497).

These results concur with Ropkins and Beck (2000) who reported the adoption and implementation of HACCP in Australia as being much more rapid and industry driven than in other countries. The researchers also commented that the Australian food industry approach to food safety was the most practical and readily applicable to HACCP. However, the results of this study contrast the study results by the UK Government in 2001 as reported by (Taylor and Kane, 2005) which found very low levels of HACCP adoption within UK hospitality industry which confirmed anecdotal evidence of extremely low levels of progress with HACCP.

4.2.5 Contextual Factors Influencing HACCP System

The key contextual factors of interest to the study were food safety regulations, market forces, size of the hotels in terms of lettable rooms, management commitment and level of funding towards HACCP system. The following sections highlight the research findings on these set of contextual factors.

4.2.5.1 Food Safety Regulations Complied with by the Hotels

A total of 14 food safety regulations in existence in Kenya as shown in Appendix 7 were reorganized into three categories and the hotels were required to indicate which of the regulatory frameworks they complied with. Table 4.6 highlights the relevant results.

Table 4.6: The Food Safety Regulatory Framework Complied with by the Hotels

Food Regulatory Framework	Frequency	Percent
Liquor, food and health safeguards regulations	234	81.3
Liquor, food, crops & health safeguards regulations	36	12.5
health & food	18	6.3
Total	288	100.0

Source: Research Data

The results in Table 4.6 reveal a greater percent (81.3%) of the hotels complied with the category of food safety regulatory frameworks relating to liquor, food and health safeguards, 12.5% of the hotels complied with the wider category of liquor, food, crops and health safeguards while only 6.3 % of the hotels conformed to the narrow category of the food safety regulatory frameworks consisting of health and food only. It is important to note that hotels in Kenya are required as a matter of operation to comply with food safety regulations without exception and this was established to be the case for the star rated hotels in the study. This contrasts the findings of a study by Patricia et al (2016) in Ashanti Ghana which found that compulsory prerequisite of Food Laws for individuals in position of supervision wasn't complied with strictly as 31 percent of kitchen instructors were found to lack prerequisite of hygiene while 82 percent of 180 tested employees lacked knowledge on hygiene. But the results of this study concur with Gomes (2014) who established that food businesses are increasingly facing pressure from buyers and governments to execute efficient approaches to attain safety of food.

4.2.5.2 Market Forces Affecting the Operations of the Hotels

To establish the extent to which market forces have affected the operations of the hotels over the last 3 years, a total of 4 market dynamics measures were assessed as outlined in Table 4.7.

The detailed findings in Table 4.7 show that all hotel employees felt that their hotel businesses had been affected by the market forces over the last 3 years since none gave the answer for ‘Not at all’ when asked the effects of the market forces on their businesses. The employees (62.5%) approved that a number of customers who demanded their hotels’ services had remained high and stable over the last three years. Likewise, respondents approved slightly that the cost of food raw materials had remained reasonably stable over the three years (87.5%), that the overall number of customers they serve food had continued to grow over the last three years (75%) and that the price they charge for food had remained unchanged over the last three years (75%).

Table 4.7: Market Forces Affecting Hotel Operations

Market Forces	3	2	1	Mean	SD
The number of customers who demand our services has remained high and stable over the last three years	62.5%	37.5%	-	2.63	.485
Cost of food raw materials has remained reasonably stable over the three years	12.5%	87.5%	-	2.13	.331
Overall, the number of customers we serve our food has continued to grow over the last three years	25.0%	75.0%	-	2.25	.434
The price we charge for our food has remained unchanged over the last three years	25.0%	75.0%	-	2.25	.434
Aggregate Scores for Market Forces				2.31	0.421

Notes: N = 288, 3 = To a large extent, 2 = To a small extent, 1 = Not at all, SD = Standard Deviation

Source: Research Data

The results in Table 4.7 show that on a scale of 1 to 3 (where 3 = to a large extent and 1= not at all), the aggregate mean score for the existence of the measured market forces is 2.31 which rounds off to 2 on the scale 1 to 3 thus indicating that the employees rated statements indicating the existence of key marketing forces as affecting their sector to a small extent within a standard deviation of 0.421. The most significant market force affecting the hotels was recorded on the statement that the number of customers who demand their services had remained high and stable over the last three years (mean = 2.63; standard deviation = 0.4851) and the least was observed on the statement that cost of food raw materials had remained reasonably stable over the three years period of assessment (mean = 2.13; standard deviation = 0.331).

This results concur with those of Henson and Holt (2002) who carried out a study to examine food firm's motivation to implement food quality and safety controls and concluded that food firms adopt systems for food safety not just because of external forces such as regulations and market forces but also because of internal requirements to do so. The study results also concur with Amit et al (2012) research which reviewed consumers' perceptions regarding food safety and their attitudes toward willingness to pay more for safer foods among 309 consumers contacted by direct mail in the United States. The study found that observable concerns and consequences of food safety, and trust toward foodservice establishments, impacts consumers' willingness to pay a higher price for safer foods.

4.2.5.3 Size of the Star Rated Hotels

The study also sought to ascertain the size of the hotels as evidenced by the number of lettable rooms. Table 4.8 highlights the results.

Table 4. 8: Size of the Hotels by Number of Lettable Rooms

Lettable Rooms in the Hotel	Frequency of Respondents from Hotels with Different Room Sizes	Percent	Actual Number of Hotels	Cumulative Percent
<100 rooms	72	25.0	4	25.0
>100≤150 rooms	108	37.5	6	62.5
>150≤500rooms	108	37.5	6	100.0
Total	288	100.0	16	

Source: Research Data

The results in Table 4.8 indicate that with regard to number of lettable rooms, 25% of the hotels had less than 100 rooms (this count omitted the number of rooms that were under refurbishment at the time of data collection) representing 4 hotels out of the study population of 16 hotels from which data was collected. The remaining 75% or 12 hotels had rooms ranging from 100 to 500 rooms with 6 hotels having >100≤150rooms while another 6 hotels had >150≤500 rooms. These findings show that star rated hotels in Nairobi City County have sizeable residential clients who would typically take most of their meals within their hotels thus requiring conformance to food safety standards to safeguard clients' wellbeing. As Fletcher et al (2007) study in Jamaican hotels revealed, the larger hotels are more likely to use the HACCP system in addition to the Ministry of Health food safety strategies.

4.2.5.4 Extent of Commitment by the Hotels' Management towards HACCP System

To establish the level of commitment expended towards HACCP System by the hotels' management, management behavioral practices measures were used as highlighted Table 4.9.

Table 4.9: Level of Commitment towards HACCP Systems by Hotel Management

Extent of top management Commitment towards HACCP system practices	5	4	3	2	1	Mean	SD
In our hotel top management has a positive attitude towards HACCP system execution	68.8%	18.8%	12.5%	-	-	4.56	.706
In our hotel top management commits resources and time in support of HACCP system execution	43.8%	50.0%	6.3%	-	-	4.38	.601
Aggregate Scores for Management Commitment						4.47	0.654
Notes: N = 288, 5 = To a very great extent, 4 = To a great extent, 3 = To a Moderate extent, 2 = To a small extent, 1 = Not at all, SD = Standard Deviation							

Source: Research Data

The results in Table 4.9 show that on a scale 1 to 5 (where 5 = to a very great extent and 1= not at all), all respondents indicated that their hotels' top management was committed towards HACCP system practices either moderately, to a great extent or to a very great extent and none of the respondents rated their top management support of HACCP system practices as being to a small extent or not all.

Accordingly, the majority (68.8%) of the respondents agreed to a very great extent that their hotels' top management had a positive attitude towards HACCP system execution while on the dimension of hotel top management committing resources and time in support of HACCP system execution as a demonstration of their commitment, the majority of the respondents (50%) agreed to a great extent that this aspect rightly reflected the behavior of their top management towards HACCP practices while an additional 43.8% indicated that it captures to a very great extent the commitment of their top management towards HACCP system support.

The aggregate mean score for the hotels management commitment towards HACCP practices was rated to be a great extent at a mean score of 4.47 within a standard deviation of 0.6535. The highest level of management commitment was observed on the hotels' top management having a positive attitude towards HACCP system execution (mean = 4.56; standard deviation = 0.7061) and the least was observed on the hotels' top management committing resources and time in support of HACCP system execution (mean = 4.38; standard deviation = 0.601).

The findings of this study on management commitment towards HACCP system collaborate with the findings by CDC (2005) which noted that for the HACCP system programme to succeed, the management team needs to provide commitment, strong leadership and adequate resources. The findings further concur with Criveanu et al (2012) who argue that successful implementation of HACCP system requires work and commitment of all employees, including managers of food production units.

4.2.5.5 Adequacy of Funding of HACCP System by the Star Rated Hotels

The study also assessed the adequacy level of the hotels' funding towards HACCP system, the results of which are shown in Table 4.10.

Table 4.10: The Funding Level Adequacy of Hotels on HACCP System

Level of Funding	Frequency	Percent
Inadequate	108	37.5
Adequate	180	62.5
Total	288	100.0

Source: Research Data

The results in Table 4.10 show most respondents (62.5%) viewed that the funding level expended towards HACCP system execution by their hotels was adequate while the rest of the respondents (37.5%) felt the funding level towards HACCP system execution by their hotels was inadequate. The adequacy of financial support is particularly useful for successful HACCP implementation as suggested by CDC (2005) which notes that lack of financial resources, technical expertise and small staff base hampered HACCP system implementation, both in small and large food outlets. In the same vein, a study by Deepananda and Spencer (2010) in food processing firms in Ontario, Canada exploring the barriers that impede the adoption of hazard analysis and critical control point (HACCP) concluded that HACCP implementation is impeded significantly by barriers related to financial constraints.

Having described the key characteristics of the study variables as explained in the previous sections, the next sections present the results of hypotheses tests.

4.3 Hypotheses Assessment

This study was based on the premise that the three independent variables namely employee behaviors towards HACCP system, employee attitudes towards HACCP system and employee knowledge of HACCP system influence HACCP system uptake by the four and five star-rated hotels in Nairobi City County but that this influence is moderated by the contextual factors of food safety regulations, market forces, size of hotel, management commitment and funding level.

Consequently, five relevant hypotheses were set to guide the study as indicated in the conceptual framework in Chapter One. In order to determine the statistical significance of the respective hypotheses, simple and multiple linear regression analyses as well as partial correlation were done as appropriate at 95 percent confidence level ($\alpha = 0.05$). The following sections highlight the relevant results.

4.3.1 Employee Behaviors towards HACCP System and HACCP System Uptake in the Star Rated Hotels

To assess the effect of the employee behaviors towards HACCP system on the hotels' HACCP system uptake, the null hypothesis was set as shown below:

H₀₁: There is no significant relationship between employee behaviors towards HACCP system and HACCP system uptake in four and five star-rated hotels in Nairobi City County.

The aggregate mean score of the hotels' employee behaviors towards HACCP system measures (independent variable) was regressed against the aggregate mean score of the hotels' HACCP system uptake measures (dependent variable) using simple linear regression. The relevant results are presented in Tables 4.11, 4.12 and 4.13.

Table 4. 11: Results for Regression Model Fit of Employee Behaviors towards HACCP System on HACCP System Uptake

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.327 ^a	.107	.104	.26509

a. Predictors: (Constant), Mean score of employee behaviors towards HACCP system

Source: Research Data

Findings in Table 4.11 show that the employee behaviors towards HACCP system had a moderate explanatory power on HACCP system uptake by the hotels as it accounted for 10.7 percent of its variability (R square= 0.107).

Table 4. 12: Results for ANOVA Test on Relationship between HACCP System Uptake and Employee Behaviors towards HACCP System

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Significance (p-value)
Regression	2.402	1	2.402	34.183	.000 ^b
Residual	20.098	286	.070		
Total	22.500	287			

a. Dependent Variable: Mean score of HACCP System Uptake

b. Predictors: (Constant), Mean score of employee behaviors towards HACCP system

Source: Research Data

The regression results in Table 4.12 outline a statistically significant relationship between employee behaviors towards HACCP system and the hotels' HACCP system uptake since overall significance p-value = 0.000. The null hypothesis of equal population means is thus rejected indicating that the 4 and 5-star categories of classified hotels have different mean values for employee behaviors towards HACCP that differently affect their HACCP system uptake. Alternatively, since the calculated value of F (34.183) is greater than the critical value of $F_{0.05}$ (which is 3.84 from the F Distribution Table with 1 and 286 degrees of freedom), the null hypothesis is rejected.

Table 4.13: Results for Regression of HACCP System Uptake on Employee Behaviors towards HACCP System

Model	Coefficients ^a			T	Significance (p-value)
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta		
(Constant)	1.487	.054		27.339	.000
Mean score of employee behaviors towards HACCP system	.186	.032	.327	5.847	.000

a. Dependent Variable: Mean score of HACCP system uptake

Source: Research Data

Table 4.13 indicates a moderate positive linear relationship between employee behavior towards HACCP system and HACCP system uptake ($\beta = 0.327$, p-value = 0.000). Based on these results, we reject H_0 since p-value < 0.05 and conclude that there exists a statistically significant positive relationship between employee behaviors towards HACCP system and HACCP system uptake in star rated hotels in Nairobi City County.

The implications of these results are that the hotels' employees' need to be encouraged not to blame customers for insisting on a different system other than HACCP and that employees need not see HACCP system guidelines as difficult to use. In addition, there is need for the hotel employees not to blame lack of personal capacity for their inability to successfully execute HACCP system and that they should give HACCP system implementation a priority instead of considering that they have other pressing matters to address than HACCP system execution.

The results of this study collaborate with the findings by Matias (2013) who established the lack of skilled labor in the catering sector as the weak point that leads to increased food safety risks and recommended that managers, supervisors and operators all have important roles to play in HACCP system implementation. The findings of the study also concur with Oscar (2014) who argues that proper training of employees helps in the performance of the correct procedures by developing habitual behavior towards food safety.

As shown in Table 4.13, the following simple regression equation may be put in place to estimate the level of HACCP system uptake in star rated hotels in Nairobi City County for a given level of employee behaviors towards HACCP system:

$$HSU = 1.487 + 0.327EBHS$$

(0.000) (0.000)

Where:

HSU = HACCP System Uptake

EBHS= Employee Behaviors towards HACCP System

1.487 = y-intercept; constant

0.327= an estimate of the expected increase in HACCP system uptake corresponding to an increase in employee behaviors towards HACCP system

0.000 = p-value (a measure of how significant the sample results are; the smallest value of α for which H_0 can be rejected).

4.3.2 Employee Attitudes towards HACCP system and HCCP System Uptake in the Star Rated Hotels

To assess the influence of the employee attitudes towards HCCP system on HACCP system uptake in the star rated hotels, the following null hypothesis was tested:

H₀₂: There is no significant relationship between employee attitudes towards HACCP system and HACCP system uptake in four and five star-rated hotels in Nairobi City County.

The aggregate mean scores of the hotels' employee attitudes towards HACCP system measures (independent variable) were regressed against the aggregate mean scores of the hotels' HACCP system uptake measures (dependent variable) using simple linear regression. Tables 4.14, 4.15 and 4.16 highlights the findings.

Table 4.14: Results for Regression Model Fit of Employee Attitudes towards HACCP System on HACCP System Uptake

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.259 ^a	.067	.064	.27089

a. Predictors: (Constant), Mean score of employee attitudes towards HACCP system

Source: Research Data

Table 4.14 shows that employee attitudes towards HACCP system have a low explanatory power on HACCP system uptake as it accounts for only 6.7 percent of its variability (R square= 0.067).

Table 4.15: Results for ANOVA Test on Relationship between HACCP System Uptake and Employee Attitudes towards HACCP System

ANOVA ^a					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	1.512	1	1.512	20.606	.000 ^b
Residual	20.988	286	.073		
Total	22.500	287			

a. Dependent Variable: Mean score of HACCP System Uptake
b. Predictors: (Constant), Mean score of employee attitudes towards HACCP system

Source: Research Data

The regression results in Table 4.15 show a statistically significant relationship between employee attitudes towards HACCP system and HACCP system uptake since overall significance p-value = 0.000. The null hypothesis of equal population means is thus rejected indicating that 4 and 5-star categories of classified hotels have different mean values for employee attitudes towards HACCP system that differently affect their hotels' HACCP system uptake. Alternatively, since the calculated value of F (20.606) is greater than the critical value of $F_{0.05}$ (which is 3.84 from the F Distribution Table with 1 and 286 degrees of freedom), the null hypothesis is rejected.

Table 4.16: Results for Regression of HACCP System Uptake on Employee Attitudes towards HACCP System

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.538	.058		26.408	.000
Mean score of employee attitudes towards HACCP system	.137	.030	.259	4.539	.000

a. Dependent Variable: Mean score of HACCP System Practices

Source: Research Data

The regression findings in Table 4.16 indicate a moderate positive linear relationship between employee attitudes towards HACCP system and HACCP system uptake ($\beta = 0.259$, $p\text{-value} = 0.000$). Therefore, H_02 is rejected since $p\text{-value} < 0.05$. It is therefore concluded that there exists a positive relationship between employee attitudes towards HACCP system and HACCP system uptake in star rated hotels in Nairobi City County.

The implications of these findings is that hotels should enhance their employees' positive attitudes towards HACCP system by encouraging their preference for HACCP system as a food safety system and making them understand that HACCP system practices would make positive difference to their hotels' business prospects. In addition, employees need to be made to believe that the skills requirements for HACCP system are not beyond them and that engaging the HACCP system by the hotels is not a waste of their time.

The study results concur with the findings of Nurul (2008) who encourages food handlers to put in place proper attitude and procedures when carrying out duties in food premises to enhance food safety standards. The study results are also in agreement with the study by Teeping (2015) who found that right attitudes about food safety positively affected food safety behavior. The findings further support the argument by Roncesvalles (2010) to the effect that attitudinal barriers as a result of inadequate educative courses made it difficult for food production workers to adhere to HACCP system requirements.

The findings of this research also agree with the findings by Reda and Mostafa (2016) whose study on food handlers' beliefs and intended attitudes towards food safety training and knowledge related to ISO 22000 and HACCP systems in star rated hotels in Egypt found that the majority of food handlers declared positive attitudes towards safe food handling.

Given the results in Table 4.16, the following simple regression equation can be used to estimate HACCP system uptake in classified hotels in Nairobi City County for a given level of employee attitudes towards HACCP system:

$$HSU = 1.538 + 0.259EAHS$$

(0.000) (0.000)

Where

HSU = HACCP System Uptake

EAHS= Employees Attitudes towards HACCP System

1.538 = y-intercept; constant

0.259 = an estimate of the expected increase in HACCP system uptake corresponding to an increase in employee attitudes towards HACCP system

0.000 = p-value (a measure of how significant the sample results are; the smallest value of α for which H_0 can be rejected)

4.3.3 Employee Knowledge of HCCP System and HACCP System Uptake in the Star Rated Hotels

To assess the effect of the employee knowledge of HCCP system on HACCP system uptake in the star rated hotels, the null hypothesis hereunder was tested:

H₀₃: There is no significant relationship between employee knowledge of HACCP system and HACCP system uptake in four and five star-rated hotels in Nairobi City County.

The aggregate mean scores of the hotels' employee knowledge of HACCP system measures (independent variable) were regressed against the aggregate mean scores of the hotels' HACCP system uptake measures (dependent variable) using simple linear regression. The relevant findings are indicated in Tables 4.17, 4.18 and 4.19.

Table 4. 17: Results for Regression Model Fit of Knowledge of HACCP System on HACCP System Uptake

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.413 ^a	.170	.167	.25548	

a. Predictors: (Constant), Mean score of employee knowledge of HACCP system

Source: Research Data

Table 4.17 indicates that employee knowledge of HACCP system had a moderate explanatory power on HACCP system uptake as it accounted for 17 percent of its variability (R square= 0.170).

Table 4.18: Results for ANOVA Test on Relationship between HACCP System Uptake and Employee Knowledge of HACCP System

ANOVA ^a					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	3.833	1	3.833	58.732	.000 ^b
Residual	18.667	286	.065		
Total	22.500	287			

a. Dependent Variable: Mean score of HACCP system uptake

b. Predictors: (Constant), Mean score of employee knowledge of HACCP system

Source: Research Data

The regression results in Table 4.18 shows a statistically significant relationship between employee knowledge of HACCP system and HACCP system uptake since overall significance p-value = 0.000. The null hypothesis of equal population means is thus rejected indicating that the 4 and 5-star categories of classified hotels have different mean values for employee knowledge of HACCP system that differently affect their HACCP system uptake. Alternatively, since the calculated value of F (58.732) is greater than the critical value of $F_{0.05}$ (which is 3.84 from the F Distribution Table with 1 and 286 degrees of freedom), the null hypothesis is rejected.

Table 4. 19: Results for Regression of HACCP System Uptake on Employee Knowledge of HACCP System

Model	Coefficients ^a			T	Sig.
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta		
(Constant)	2.194	.055		40.140	.000
Mean score of employee knowledge of HACCP system	-.111	.014	-.413	-7.664	.000

a. Dependent Variable: Mean score of HACCP system uptake

Source: Research Data

The regression findings in Table 4.19 indicate a statistically significant moderate negative linear relationship between employee knowledge of HACCP system and HACCP system uptake ($\beta=-0.413$, p-value = 0.000). We therefore reject H_{03} since p-value < 0.05 and conclude that there exists a negative relationship between employee knowledge of HACCP system and HACCP system uptake in star rated hotels in Nairobi City County.

The implication of this study's findings of the existence of an inverse relationship between the hotels' employee knowledge of HACCP system and the level of the hotels' HACCP system uptake means that the mere existence of awareness and understanding of HACCP system among the employees of the hotels does not necessarily translate into positive HACCP system uptake by the hotels if such knowledge is not fully applied in the execution of HACCP system.

This study's findings concur with Manning (2018) who observes that food safety knowledge does not necessarily lead to behavior that enhances food safety. However, the results of this study are in conflict with the findings Wei-Ling et al (2015) who sought to understand implementation barriers for HACCP in the hospitality industry in Taiwan and found that workers in the hospitality industry in Taiwan do not have a high degree of perception and understanding of the HACCP system and this effectively inhibited the adoption of HACCP practices. The study results also disagree with the research findings of Dawkins (2015) whose study on food business operators (FBOs) at London Borough of Camden (LBC) ascertained that existing constraints hampered with execution of food safety management systems. The constraints highlighted the obvious drawbacks in FBOs in relation to their capacity to comprehend HACCP based concepts and their refusal to put in places a concept they rendered foreign.

In addition, the study findings contradict Roncesvalles (2010) and Bright (2016) who found that varied levels of awareness and knowledge of the HACCP system requirements within hotels and food industry settings affected the adoption of HACCP system practices within these establishments. Finally, the findings of this

study contrast Toh and Birchenough (2000) who noted a strong positive correlation between knowledge and food handling practices.

Given the results in Table 4.19, the following simple regression equation can be used to estimate HACCP system uptake in a classified hotel in Nairobi City County for a given level of employee knowledge of HACCP system:

$$HSU = 2.194 - 0.413EKHS$$

(0.000) (0.000)

Where

HSU= HACCP System Uptake

EKHS= Employee Knowledge of HACCP System

2.194 = y-intercept; constant

-0.413= an estimate of the expected increase in HACCP system uptake corresponding to a decrease in employee knowledge of HACCP system

0.000 = p-value (a measure of how significant the sample results are; the smallest value of α for which H_0 can be rejected).

4.3.4 The Moderating Effect of Contextual Factors on the Relationship between Employee Food Safety Management Systems Orientation and HACCP System Uptake

To determine the moderating effect of contextual factors on the relationship between employee food safety management systems orientation and HACCP system uptake, the relevant null hypothesis was stated as follows:

H04: Contextual factors do not significantly moderate the relationship between employee food safety management systems orientation and HACCP system uptake in four and five star rated hotels in Nairobi City County.

The determination of the moderating effect of the contextual factors involved conducting first order partial correlation analyses of the employee food safety management systems orientation (constituting the aggregate of the means of the three variables namely employee behaviors towards HACCP system, employee attitudes towards HACCP system and employee knowledge of HACCP system) and HACCP system uptake using the respective contextual factors as controlling variables ($r_{xy.z}$).

The first order partial correlation coefficients were then compared with the zero order correlation coefficient generated from the correlation of employee food safety management systems orientation and HACCP system uptake ($r_{xy} = -0.151$) in order to determine the magnitude and direction of the moderating effect of the contextual factors.

Table 4.20 shows a summary of the moderation effect of contextual factors on the relationship between employee food safety management systems orientation and HACCP system uptake in the four and five star rated hotels in Nairobi City County.

The statistical findings on the moderation effect of contextual factors on the relationship between employee food safety management systems orientation and HACCP system uptake in Table 4.20 indicate that the degree of moderation varied from one contextual factor to another. For instance, food safety regulations ($r_{xy.z} = -0.147$, $p\text{-value} = 0.013$) and market forces ($r_{xy.z} = -0.129$, $p\text{-value} = 0.029$) have both a statistically significant and slightly negative moderating effect on the relationship between employee food safety management systems orientation and HACCP system uptake while size of the hotel ($r_{xy.z} = -0.008$, $p\text{-value} = 0.890$) and funding level ($r_{xy.z}$

= -0.039, p-value = 0.515) have a negative moderating effect on the relationship between employee food safety management systems orientation and HACCP system uptake which is not statistically significant.

Table 4.20: Results Indicating the Moderating Effect of Contextual Factors on the Relationship between Food Safety Management Systems Orientation and HACCP System Uptake

Moderator	Moderating Variable Correlation Coefficient	Effect of Contextual Factor	Significance (p-value)
Food Safety Regulations	-0.147	Significant, slightly negative	0.013
Market Forces	-0.129	Significant, slightly negative	0.029
Size of the Hotel	-0.008	Negative but not significant	0.890
Management Commitment	-0.182	Significant, slightly positive	0.002
Funding Level	-0.039	Negative but not significant	0.515
Overall significance mean			0.2898

Source: Research Data

On the other hand, management commitment ($r_{xy.z} = -0.182$, p-value = 0.002) had a statistically significant and slightly positive moderating effect on the relationship between employee food safety management systems orientation and HACCP system uptake.

The results of the study as indicated in Table 4.20 reveal that contextual factors influence the relationship between employee food safety management systems orientation and HACCP system uptake since none of the first-order correlation coefficients was equal to zero, a level that would denote no relationship.

However, the overall moderating effect of the contextual factors on the relationship between employee food safety management systems orientation and HACCP system uptake is not statistically significant since the overall significance of $0.2898 > 0.05$.

Consequently, we fail to reject H_04 since the overall significance p -value > 0.05 and conclude that contextual factors do not affect the relationship between employee food safety management systems orientation and HACCP system uptake.

The implications of the study findings are that management commitment plays a critical role in facilitating employees' behaviour, attitudes and knowledge towards adoption and execution of HACCP systems uptake in the star rated hotels in Nairobi City County. It is also important for hotels to be cognizant that food safety regulations, market forces, size of their hotels as well as funding level inhibits the relationship between their employees' behaviour, attitude on one hand and HACCP system uptake within the hotels on the other hand.

The findings of the study on the role of contextual factors towards implementation of HACCP system among hotels concurs with studies conducted by Kenan (2012) who concluded based on data from Canadian food businesses that implementation of food safety and quality practices were associated with the attributes and practices of exceptional food processing businesses, firm capacity, industry branch, country proprietorship and recentness which all influence the implementation of accelerated food safety practices. The study results also concur with the research findings of Dawkins (2015) whose views were that in a deregulatory climate where legislation is likely to be put in place and lead to the enforcement powers of food authorities being noticeably limited, a cooperative educational approach by the food authority in the achievement of regulatory compliance would be an increasingly viable option as a tool to facilitate the implementation of HACCP based food safety management systems within SME food businesses.

The facilitative role of contextual factors to the implementation of HACCP as established in this study is also collaborated by the findings by a study by Wei-Ling et al (2015) who sought to understand implementation barriers for HACCP in the hospitality industry in Taiwan and found that inadequate resources, disagreements and lack motivation were of most concern as was insufficient risk awareness and low positive reinforcement.

4.3.5 Effect of Contextual Factors on HACCP System uptake in the Star Rated Hotels

To assess the influence of contextual factors on the hotels' HACCP system uptake, the study set the following null hypothesis:

H₀₅: There is no significant relationship between contextual factors and HACCP system uptake in four and five star rated hotels in Nairobi City County.

The five individual contextual factors namely food safety regulations, market forces, size of the hotels, management commitment and funding level (all as independent variables) were regressed against the aggregate mean scores of HACCP system uptake measures (dependent variable) using linear multiple regression. The findings are presented in Tables 4.21, 4.22, and 4.23.

Table 4.21: Results for Regression Model Fit Contextual Factors on HACCP System Uptake

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.831 ^a	.690	.685	.15720

a. Predictors: (Constant), Contextual Factors- funding level, food regulations, mean score of market forces, mean score of management commitment, size of hotel

Source: Research Data

The explanatory power of contextual factors on the variability of HACCP system uptake as indicated in Table 4:21 is a high of 69 percent (R Square = 0.690) indicating that the contextual factors collectively contribute to a great extent on the variability of the HACCP system uptake among star rated hotels in Nairobi City County.

Table 4. 22: Results for ANOVA Test on Relationship between HACCP System Uptake and Contextual Factors

ANOVA ^a					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	15.531	5	3.106	125.701	.000 ^b
Residual	6.969	282	.025		
Total	22.500	287			

a. Dependent Variable: Mean score of HACCP System Uptake

b. Predictors: (Constant), Contextual Factors- funding level, food regulations, mean score of market forces, mean score of management commitment, size of hotel

Source: Research Data

The regression results in Table 4.22 show that the overall effect of contextual factors on HACCP system uptake is statistically significant (overall significance p-value = 0.000). The null hypothesis of equal population means is thus rejected indicating that the 4 and 5-star categories of classified hotels have different mean values for the various categories of contextual factors that differently affect the hotels' HACCP

system uptake. Alternatively, since the calculated value of F (125.701) is larger than the critical value of $F_{0.05}$ (which is 2.21 from the F Distribution Table with 5 and 282 degrees of freedom), the null hypothesis is rejected.

Table 4.23: Results for Regression of HACCP System Uptake on Contextual Factors

Model	Coefficients ^a				
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.709	.220		3.229	.001
Food regulations complied with	.026	.026	.053	1.013	.312
Mean score of market forces	-.165	.043	-.185	-3.851	.000
Size of hotel	.199	.025	.556	8.069	.000
Mean score of management commitment	.080	.030	.170	2.661	.008
Funding Level	.159	.033	.275	4.761	.000

a. Dependent Variable: Mean score of HACCP System Uptake

Source: Research Data

As highlighted in Table 4.23, the five contextual factors have different effects on the hotels' HACCP system uptake at their individual levels. For instance, the size of hotel ($\beta = .556$, p-value = .000), funding level ($\beta = .275$, p-value = .000) and management commitment ($\beta = .170$, p-value = .008) have all a statistically significant positive effect on the hotels' HACCP system uptake while food regulations ($\beta = .053$, p-value = .312) have a slightly positive effect on HACCP system uptake that is not statistically significant. On the other hand, market forces ($\beta = -.185$, p-value = .000) have a statistically significant slightly negative effect on the hotels' HACCP system uptake.

Therefore, since none of the β_i 's = 0 and overall p-value < 0.05, we reject H_0 and conclude that there is a statistically significant relationship between contextual factors and the HACCP system uptake in star rated hotels in Nairobi City County.

The results of the research reveal that the context within which a hotel operates has a significant influence on its adoption and execution of HACCP system. Food safety regulations, size of the hotel, management commitment and funding level have considerable positive influence on HACCP system implementation in the hotels. However, market forces can considerably erode the capability of the hotel to successfully implement HACCP system.

The study results are consistent with findings by Taylor (2003), Henson and Holt (2004) and Ward (2001) who observe a positive influence of environmental factors on HACCP system execution. Further, the findings on the implications of the contextual factors on HACCP food safety systems are collaborated by previous studies on food safety. For instance, Patricia (2016) found that mandatory regulatory requirements by food laws for persons in supervisory positions were not stringently being complied with as 31% of kitchen matrons stated that they lacked hygiene qualifications in the Ashanti region of Ghana and 82% of staff sampled had never acquired hygiene training.

From the study findings in Table 4.23, a multiple regression equation is derived that estimates HACCP system uptake among star rated hotels in Nairobi City County given their statistically significant contextual factors namely size of the hotel, management commitment, funding level and market forces as follows:

$$\text{HSU} = 0.709 + 0.556\text{SIZE} + 0.170\text{MGT} + 0.275\text{FUNDING} - 0.185\text{MKT}$$

(0.001)
(0.000)
(0.008)
(0.000)
(0.000)

Where:

HSU = HACCP System Uptake

SIZE = Size of the Hotel

MGT = Management Commitment

FUNDING = Funding Level

MKT = Market Forces

0.709 = y-intercept; constant

0.556, 0.170 and 0.275 = an estimate of the expected increase in HACCP system uptake corresponding to an increase in size of hotel, management commitment and funding level respectively

-0.185 = an estimate of the expected increase in HACCP system uptake corresponding to a decrease in market forces

0.000 and 0.008 = p-value (a measure of how significant the sample results are; the smallest value of α for which H_0 can be rejected).

The findings of the six hypotheses tests conducted in the research are summarized in Table 4.24.

Table 4.24: Summary of the Hypotheses Tests Results

Hypothesis	Verdict
H₀₁: There is no significant relationship between employee behaviors towards HACCP system and HACCP system uptake in four and five star-rated hotels in Nairobi City County	Rejected H ₀₁
H₀₂: There is no significant relationship between employee attitudes towards HACCP system and HACCP system uptake in four and five star-rated hotels in Nairobi City County.	Rejected H ₀₂
H₀₃: There is no significant relationship between employee knowledge of HACCP system and HACCP system uptake in four and five star-rated hotels in Nairobi City County	Rejected H ₀₃
H₀₄: Contextual factors do not significantly moderate the relationship between employee food safety management systems orientation and HACCP system uptake in four and five star rated hotels in Nairobi City County.	Failed to reject H ₀₄
H₀₅: There is no significant relationship between contextual factors and HACCP system uptake in four and five star rated hotels in Nairobi City County.	Rejected H ₀₅

Source: Research Data

4.4 Analysis of Qualitative Data

The study collected qualitative data from the Food and Beverage Managers using open ended questions in the interview schedule in the Appendices. The data was organized into common themes namely: the initial critical operational HACCP setup configurations undertaken by the hotels; the HACCP setup configurations that were still be undertaken by the hotels at the point of conducting the interviews; the benefits accruing to the hotels as a result of having the HACCP food safety system in place; the challenges arising from employees in the process of executing the HACCP system and finally other critical considerations for the successful execution of HACCP system.

On the initial critical operational HACCP setup configurations undertaken by the hotels, most of the managers depicted a good understanding of the seven HACCP principles as a main guideline considered in putting in place the steps in their food safety management system therefore ensuring a robust HACCP stem was in place.

When it came to the HACCP setup configurations that were still be undertaken by the hotels at the point of conducting the interviews, the level of executing of the key HACCP system differed from one hotel to the other. At least 10 of the hotels executed all the critical HACCP system steps while the remaining six hotels had their level of adoption of the steps varying from a low of two of the seven steps to a high of five of the steps.

On the benefits accruing to the hotels as a result of having the HACCP food safety system in place, almost all the managers were quick to highlight positive aspects of

HACCP implementation ranging from the assurance of non-contaminated food production outputs that not only ensures maintenance of high standards of hygiene by the executive chefs and chefs but also safeguarding contaminations against health threatening microorganisms. The managers also attributed positive feedback on the quality of their food to the implementation of HACCP system.

The Food and Beverage Managers cited the challenges arising from employees in the process of executing the HACCP system as mainly relating to requiring close supervision as not doing so makes some hotel employees take short cuts and not strictly adhere to the key HACCP system requirements as set up. Most of the managers were of the opinion that the apathy witnessed on some their employees towards HACCP system had nothing to do with lack of the requirements and benefits of HACCP system as they had been extensively trained on the same but rather on their negative attitudes.

Finally, the managers also identified other critical considerations for the successful execution of HACCP system as being the allocation of adequate funding to train staff, set up the processes and procure relevant equipment for the implementation of HACCP system as well as the managers continuing devotion to train and supervise the employees to ensure the correct execution of HACCP system.

The content analysis results for the qualitative data are consistent with the findings arising from the analysis of the quantitative data. The qualitative data findings also collaborate with the research findings of Grujic et al (2010); Deepananda and Spencer (2010); Al Yousuf et al (2015); and Caccamo et al (2018).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives a summary of key findings of the study by objectives, the conclusions and contributions of the study to knowledge as well as recommendations for policy, practice and further study.

5.2 Summary of Key Findings of the Study by Objectives

The basic premise of this study was that employee food safety management systems orientation influences HACCP system uptake in star-rated hotels in Nairobi City County and that this relationship is either facilitated or inhibited by a set of selected contextual factors. Consequently, the study developed a comprehensive conceptual framework to capture these aspects and tested it empirically guided by five specific objectives to: 1) determine the influence of employee behavior towards HACCP system on HACCP system uptake in four and five star-rated hotels in Nairobi City County; 2) establish the influence of employee attitude towards HACCP system on HACCP system uptake in four and five star-rated hotels in Nairobi City County; 3) examine the influence of employee knowledge of HACCP system on HACCP system uptake in four and five star-rated hotels in Nairobi City County 4) establish the moderating effect of contextual factors on the relationship between employee food safety management systems orientation and HACCP system uptake in four and five star rated hotels in Nairobi City County, and finally 5) determine the effect of the

contextual factors on HACCP system uptake in four and five star rated hotels in Nairobi City County.

On the first objective, the established the existence of a statistically significant moderate positive linear relationship between employee behaviors towards HACCP system and HACCP system uptake in the 4 and 5 star rated hotels in Nairobi City County. On the second objective the study found that there exists a statistically significant moderate positive linear relationship between employee attitudes towards HACCP system practices and the hotels' HACCP system uptake. On objective three, the study found a statistically significant moderate negative linear relationship between employee knowledge of HACCP system and HACCP system uptake in the 4 and 5 star rated hotels in Nairobi City County.

Concerning objective four, the study established that although all the five contextual factors, namely food safety regulations, market forces, size of hotels, management commitment and funding level, collectively affect the relationship between employee food safety management systems orientation and HACCP system uptake in the 4 and 5 star rated hotels in Nairobi City County, their effect was not statistically significant.

Fifth and final, the research sought to ascertain the effect of contextual factors on HACCP system uptake among the 4 and 5 star rated hotels in Nairobi City County. On this aspect, the study found that the selected contextual factors of interest to the study namely, food safety regulations, market forces, size of hotels, management commitment and funding level affect the HACCP system practices of the hotels and that this effect was statistically significant.

5.3 Conclusions of the Study

Based on the empirical evidence adduced by this study, it is concluded that the successful uptake of HACCP system by the star rated hotels in Nairobi City County is critically determined by the positive behavioral orientation towards HACCP system that is practiced by the executive chefs and chefs in the hotels. In situations where the employees resist the implementation of HACCP system and where this is exhibited with negative conduct and practices among the executive chefs and chefs, then the adoption of HACCP system by the hotel is doomed to fail. In particular, it is important for the executive chefs and chefs to exhibit positive behavior towards customers insistence on the HACCP as the preferred food safety system, not to regard HACCP systems guidelines as difficult to use and to improve on their capabilities to enhance their ability to not only successfully execute HACCP system but also regard it as one of their key duties to do so in order to safeguard food safety standards.

Secondly, positive employee attitudes towards HACCP system greatly influences the successful uptake of HACCP system by the star rated hotels. When the executive chefs' and chefs' mental and emotional orientations towards HACCP system are positive, this make them a useful resource in the execution of the system within the star rated holes. Specifically, positive attitudes reflected by the employees conviction that HACCP is a better food safety system and therefore do not regard it as a waste of their time and when they believe in they have the necessary capacity to effectively execute the HACCP system is a critical determinant to the successful adoption of the system by the star rated hotels in Nairobi City County.

Third, the mere existence of knowledge on HACCP system will not necessary lead to the successful uptake of HACCP system practices by the star rated hotels. Therefore a high awareness and understanding level of HACCP system among the executive chefs and chefs if not coupled with the right behaviors and attitudes towards HACCP system is not supportive of effective HACCP system adoption.

Fourth, although the overall effect of the selected operational context variables selected for the study namely food safety regulations, market forces, size of hotels, management commitment and funding level on the relationship between the employees food safety systems orientation and the adoption of HACCP system within the star rated hotels is not significant, it is worth noting that food safety regulations and market forces were found to have a significant negative effect on the relationship between the employees food safety systems orientation and HACCP system uptake while size of the hotel and funding level effect on the relationship is negative but significant. On the other hand, management commitment effect on the relationship between employee food safety orientation and HACCP system uptake by the hotels is significant and positive.

Finally, it is concluded that the collective effect of food safety regulations, market forces, size of hotels, management commitment and funding level significantly influence the HACCP system uptake in the star rated hotels. In particular, the size of hotel, the funding level expended on HACCP and management commitment towards HACCP implementation had statistically significant positive effect on the hotels' HACCP uptake. This demonstrates that the larger the size of the hotel, more funds allocation and top management commitment towards HACCP system implementation

then the more successful the HACCP uptake in the hotels was established to be. Food safety regulations effect on HACCP system uptake though not significant was also positive. In contrast, market forces were found to have a statistically significant and slightly negative effect on the hotels' HACCP system uptake.

The model in Figure 5.1 summarizes the empirical findings of this study based on the set conceptual framework for the significant findings only.

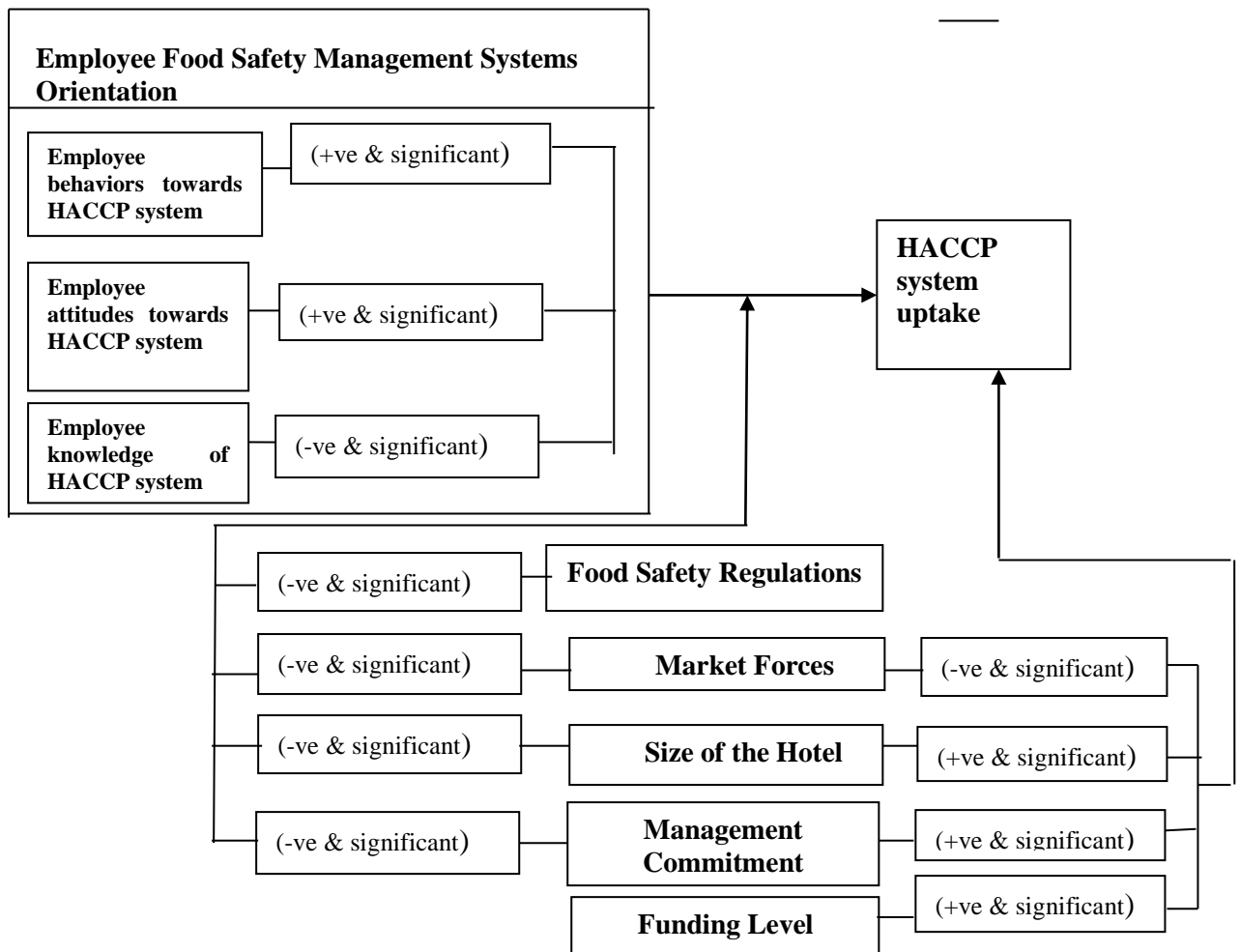


Figure 5.1: Summary Empirical Research Findings Model

5.4 Contributions of the Study to Knowledge

The results of this study address some of the earlier identified knowledge gaps and thus contribute to the frontiers of knowledge. First and foremost, the study has empirically assessed the influence of employee food safety orientation with respect to employees' behaviour and attitudes towards HACCP system on HACCP System uptake in star rated hotels in Kenya. Further, employee knowledge of HACCP system on the hotels HACCP uptake has also been empirically assessed. Given the contradicting existing literature on the role of employee behaviour, attitudes and knowledge on HACCP system uptake, this study sought to add to the frontiers of knowledge by providing further empirical evidence critical in determining the role of these parameters on HACCP system implementation.

Secondly, the extensive literature review highlighted citations indicating the limited studies on HACCP system implementation in the hospitality sector across the world and more so in the hotel sector in developing economies. This study has provided reliable empirical findings within the hospitality sector in Kenya and in particular on star rated hotels which is an important reference for future studies in the developing countries.

Third, this study assessed the moderating effect of a range of environmental variables within the context of hotels operational sphere that could either inhibit or facilitate the relationship between their employee food safety management systems orientation and HACCP system uptake. These variables were the contextual factors namely, food safety regulations, market forces, size of hotels, management commitment and

adequacy of funding level on HACCP system. The findings of the study on these dimensions contribute to a better understanding of the critical moderator roles that they contribute as enablers of the successful implementation of HACCP system within the hospitality industry in general and the hotel sector in particular.

Overall, the study contributes to food safety management literature and HACCP system implementation by providing empirical evidence of the role of employee dispositions towards food safety management systems in particular their behaviours, attitudes and knowledge on HACCP system as well as the influence of the selected contextual factors of food safety regulations, market forces, size of the hotel, management commitment and funding level on successful HACCP system adoption in the hotel sector.

5.5 Recommendations for Policy

- 1) There is need for food safety regulators to incorporate training of hotel industry practitioners on the necessity of food safety systems such as HACCP system within their policy formulations. Training of hotel industry practitioners enhances their knowledge of food safety regulations which improves adherence to the set regulations.
- 2) Further, enforcement of food safety regulations should be a participative process where there is constructive collaboration between the Government Food Safety Regulatory Agencies on one hand and the hospitality industry players on the other hand. When regulatory agencies become aggressive and one sided when enforcing

food safety regulations, then they end up being a hindrance to the successful adoption of the regulations that are critical to ensuring food safety for consumers.

5.6 Recommendations for Practice

The results of this study have significant practical implications to the hospitality industry and in particular the hotel sector as highlighted hereunder:

- 1) Policy makers and management should endeavour to train and instil the right behaviors, attitudes and knowledge on food safety in the hotels' employees in particular the executive chefs and chefs that are in the forefront of the implementing HACCP system of hotels as it was established that a positive orientation on these three dimensions enhances HACCP system uptake in the hotels. Training programs can be developed on food safety management systems in general and HACCP system in particular by policy makers and managers in collaboration food safety regulators and appropriate training workshops conducted on the hotels' staff to help attain positive behaviours, attitudes and knowledge on HACCP system.
- 2) It is important for hotels to allocate sufficient funds for HACCP system implementation as this positively contributes to successful HACCP system uptake.
- 3) Hotel management should dedicate more time and resources on HACCP system as it was demonstrated that top management commitment towards HACCP

system implementation greatly affects the success of HACCP system uptake and managers need to enhance their participation and lead from the front during HACCP system implementation.

- 4) The management of hotels need to be responsive to market forces and in particular customer and competitor demands as these aspects were established to inhibit successful adoption of HACCP system within the hotels.

5.7 Recommendations for Further Research

- 1) The success of HACCP system execution within the hospitality industry is affected by many variables well beyond the ones conceptualized in this study, that is, employee behaviors, attitudes and knowledge on HACCP system as well as the contextual factors of food safety regulations, market forces, size of the hotel, management commitment and funding level. It may be useful to incorporate other variables into the current study's conceptual framework and establish their implications on HACCP system implementation.
- 2) The findings of this study were also limited by reliance on self-reporting by the study respondents namely the executive chefs, chefs and management. Future studies may incorporate perspectives of other stakeholders on HACCP system execution such as food safety regulators and customers.

- 3) In addition, future research may focus on establishing the effectiveness of HACCP system implementation by hotels in controlling the occurrence of microbial and chemical cross-contamination in food preparations in the hotels.
- 4) Future research may also seek to adopt a longitudinal research design as it is more robust in determining causality especially in studies that are dynamic and long term in nature as is the case of food safety strategies under which HACCP system practices fall as opposed to cross-sectional or snapshot studies.
- 5) To enhance generalizability of this study, it may be necessary to replicate the conceptual framework of the study in other industry settings such as catering units of hospitals, schools and higher education institutions as similar findings would entrench the real importance of the variables used in these study in determining the successful execution of HACCP system.

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APPENDICES

Appendix 1: Questionnaire for Chefs and Executive Chefs

PRELIMINARY INFORMATION

1. Name of your Hotel (Optional): _____
2. Job Title (Please tick \surd one): Chef Executive Chef
3. Classification of your Hotel (please tick \surd one): 4-Star 5-Star

PART ONE: EMPLOYEE BEHAVIORS TOWARDS HACCP SYSTEM

4. On a scale of 1 to 5 (where 1 = Not at all, 2 = Sometimes, 3 = Often, 4 = Quite often, and 5 = All the time), please indicate with a tick (\surd) the extent to which the following behavioral actions are exhibited by employees in your hotel towards HACCP system.

Behavioral actions exhibited by employees towards HACCP system.	5	4	3	2	1
Employees perceive customers as preferring a different food safety system other than HACCP					
Employees see HACCP system guidelines as difficult to use					
Employees blame lack of personal capacity for their inability to successfully execute HACCP system					
Employees have more pressing issues to address than HACCP system execution					

PART TWO: EMPLOYEE ATTITUDES TOWARDS HACCP SYSTEM

5. Please indicate with a tick (\surd) the level of attitude portrayed by employees in your hotel towards the following issues on HACCP system on a scale of 1 to 5 (where 1 = Not at all true, 2 = Not true, 3 = Somewhat true, 4 = True, and 5 = Very True).

Attitudes portrayed by employees towards HACCP system	5	4	3	2	1
Employees prefer to do what they have always done then adopt the requirement of HACCP system					
Employees think HACCP system won't make any difference to the hotel business prospects					
Employees believe the skills requirements for HACCP system are beyond them					
Employees think HACCP system is a waste of their time					

PART THREE: EMPLOYEE KNOWLEDGE OF HACCP SYSTEM

6. Please indicate with a tick (√) the level of knowledge about HACCP system exhibited by the employees in your hotel on a scale of 1 to 5 (*where 1 = Very low, 2 = Low, 3 = Average, 4 = High, and 5 = Extremely high*).

Employee knowledge about HACCP system	5	4	3	2	1
How would you rate the hotel employees' awareness of the 7 principles of HACCP system					
How would you rate the hotel employees' understanding of HACCP system details					

PART FOUR: CONTEXTUAL FACTORS (*Please tick all that are applicable*)

7. Tick (√) the statutory food safety regulatory frameworks your hotel is currently complying with from the ones listed below, *if any*.

Food Safety Regulations in Kenya	
Public Health Act Cap 24	
Food Drugs Chemical Substances Act Cap 254	
Radiation Protection Act Cap 243	
Liquor Licensing Act Cap 121	
Traditional Liquor Act Cap 122	
Meat Control Act Cap 356	
Animal Health Act Cap 364	
Dairy Act Cap 336	
Crop Production and Livestock Ordinance Act Cap 321	
Fisheries Act Cap 378	
Control Products Act Cap 346	
Agricultural Produce Act Cap 319	
Coffee Act	
Biosafety Act	

8. Please indicate the extent of your agreement with the following market dynamics affecting the operations of your hotel on a scale of 1 to 3 (*where 1 = Not at all, 2 = To a small extent, and 3 = To a large extent*)

Market Forces	3	2	1
The number of customers who demand our services has remained high and stable over the last three years			
Cost of food raw materials has remained reasonably stable over the three years			
Overall the number of customers we serve our food has continued to grow over the last three years			
The price we charge for our food has remained unchanged over the last three years			

9. Please indicate by a tick (✓) the size of your hotel in terms total number of lettable rooms.

NUMBER OF LETTABLE ROOMS	
Less than 25 rooms	
25 rooms to 90 rooms	
Over 90 rooms to 250 rooms	
Over 250 rooms	

10. Please indicate with a tick (✓) the extent of attitude and support portrayed by the top management in your hotel towards HACCP system execution on a scale of 1 to 5 (where 1 = Not at all, 2 = To a small extent, 3 = To a moderate extent, 4 = To a great extent, and 5 = To a very great extent).

Extent of top management Commitment towards HACCP system uptake	5	4	3	2	1
In our hotel top management positive attitude towards HACCP system execution					
In our hotel top management commit resources and time in support of HACCP system execution					

11. How would you rate the funding level allocated for HACCP system implementation in your hotel? (Please tick one)

- None
 Inadequate
 Adequate

PART FIVE: HAZARD ANALYSIS CRITICAL CONTROL POINT (HACCP) SYSTEM UPTAKE

12. Please indicate with a tick (✓) whether the under listed HACCP Systems Uptake are either implemented or not implemented in your hotel.

State of HACCP System Uptake	Yes (2)	No (1)
There is a clear checklist of possible food hazards facing the hotel		
There is a list of steps to be undertaken by the hotel for food safety hazard prevention		
There is a clear checklist of food safety critical control points		
There are set threshold levels to be adhered to for existing food safety		
There exists a surveillance mechanism to ensure adherence to the established food safety systems		
There are remedial measures in existence in the event of lapses to ensure adherence to food safety		

Appendix 2: Interview Schedule for Food and Beverage Managers

1. What critical operational setups did you have to put in place to ensure proper configuration of the HACCP system in your hotel?

2. Which of the operational HACCP system setups you have just listed would you say you have consistently executed in your hotel?

3. What would you cite as the key benefits accruing to your hotel as a result of adopting the HACCP food safety management system?

4. What particular challenges have you noticed your employees may be experiencing in the process of implementing HACCP system within your hotel and how have you addressed the challenges?

5. In your view, what other factors apart from employee issues do you consider as critical determinants of successful adoption of HACCP system by your hotel?

Appendix 3: Introduction Letter

Dear Respondent,

My name is Peninah W. Chege, a PhD student in the School of Hospitality, Tourism and Leisure Studies at Kenyatta University. I am conducting a doctoral research titled: **Determinants of Hazard Analysis Critical Control Point System Uptake in Star Rated Hotels in Nairobi City County, Kenya.**

I have selected you as one of my study respondents. Please take a few minutes out of your busy schedule to answer the questions in this questionnaire.


I assure you that your answers will be kept completely confidential and will be used for academic purposes only.

Your participation in this study is highly appreciated.

Yours sincerely

Peninah W. Chege - T130/23683/2012

Appendix 4: Graduate School's Approval for Data Collection


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Our Ref: T130/23683/12 **Date:** 4th June, 2018

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P.O. Box 30623-00100,
NAIROBI

Dear Sir/Madam,


RE: RESEARCH AUTHORIZATION FOR MS.PENINAH W. CHEGE - REG. NO. T130/23683/12

I write to introduce Ms. Chege who is a Postgraduate Student of this University. She is registered for a Ph.D. degree programme in the **Department of Hospitality Management in the School of Hospitality & Tourism Management**.

Ms. Chege intends to conduct research for Ph.D. thesis entitled, "Determinants of Hazard Analysis Critical Control Point System Practices Uptake in Star Rated Hotels in Nairobi County, Kenya".


Any assistance given will be highly appreciated.

Yours faithfully,


MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL

RM/cao

Appendix 5: NACOSTI Research Permit

<p>THIS IS TO CERTIFY THAT: MS. PENINAH WANJIKU CHEGE of KENYATTA UNIVERSITY, 12735-400 NAIROBI, has been permitted to conduct research in <i>Nairobi County</i></p>	<p>Permit No : NACOSTI/P/18/57913/24162 Date Of Issue : 18th August, 2018 Fee Received : Ksh 2000</p>
<p>on the topic: DETERMINANTS OF HAZARD ANALYSIS CRITICAL CONTROL POINT SYSTEM PRACTICES IN FOUR AND FIVE STAR RATED HOTELS IN NAIROBI</p>	
<p>for the period ending: 17th August, 2019</p>	 Director General National Commission for Science, Technology & Innovation
<p>..... Applicant's Signature</p>	
<p>CONDITIONS</p>	
<ol style="list-style-type: none">1. The Licence is valid for the proposed research, research site specified period.2. Both the Licence and any rights thereunder are non-transferable.3. Upon request of the Commission, the Licensee shall submit a progress report.4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.5. Excavation, filming and collection of specimens are subject to further permissions from relevant Government agencies.6. This Licence does not give authority to transfer research materials.7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.8. The Commission reserves the right to modify the conditions of this Licence including its cancellation without prior notice.	<p>REPUBLIC OF KENYA</p>
	
	<p>National Commission for Science, Technology and Innovation</p>
	<p>RESEARCH CLEARANCE PERMIT</p>
	<p>Serial No.A 20110</p>
	<p>CONDITIONS: see back page</p>



**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

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Off Wanjiku Way
P.O. Box 30023-00100
NAIROBI-KENYA

Ref. No: **NACOSTI/P/18/57913/24162**

Date: **18th August, 2018**

Peninah Wanjiku Chege
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Determinants of hazard analysis critical control point system practices in four and five star rated hotels in Nairobi.*" I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **17th August, 2019.**

You are advised to report to **the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit a **copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

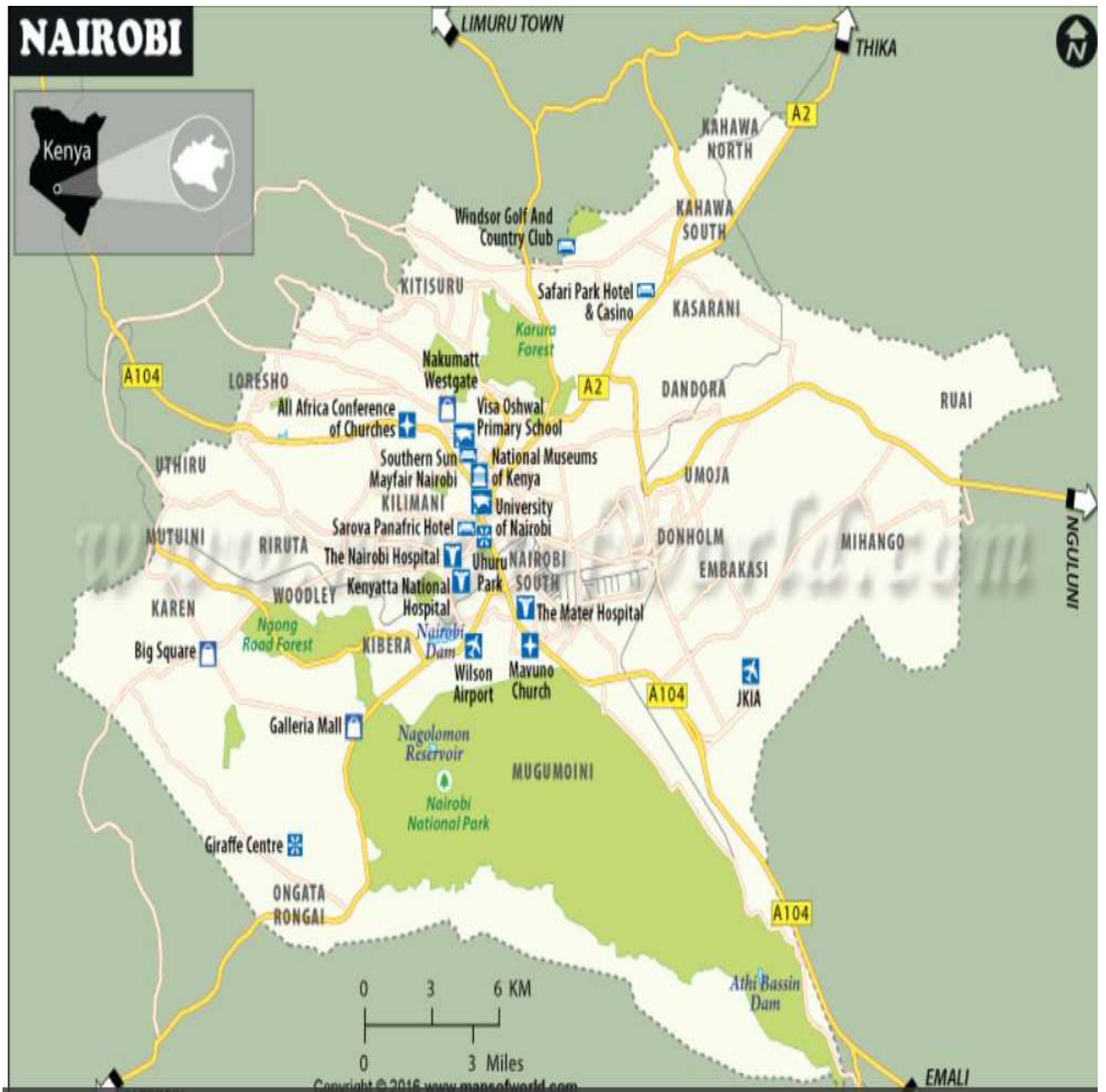

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nairobi County.

The County Director of Education
Nairobi County.

Appendix 6: Study Area



Appendix 7: List of Star-Rated Hotels in Nairobi City County

The Year 2016 list of 4 and 5 star rated hotels in Nairobi City County by the Tourism Regulatory Authority (TRA) is as shown below.



PUBLICATION OF CLASSIFIED TOURISM ENTERPRISES

S/N	HOTEL ESTABLISHMENT	COUNTY	RATING
1	Villa Rosa Kempinski	Nairobi	*****
2	Hemingway's Nairobi	Nairobi	*****
3	Sankara Nairobi	Nairobi	*****
4	Fairmont The Norfolk	Nairobi	*****
5	Tribe Hotel	Nairobi	*****
6	The Sarova Stanley	Nairobi	*****
7	Radisson Blu Hotel Nairobi	Nairobi	*****
8	Dusit D2	Nairobi	*****
9	The Boma Nairobi	Nairobi	*****
10	Intercontinental Nairobi	Nairobi	*****
11	Crowne Plaza Nairobi	Nairobi	****
12	Ole Sereni Hotel	Nairobi	****
13	House of Waine	Nairobi	****
14	Weston Hotel	Nairobi	****
15	Southern Sun Mayfair Nairobi	Nairobi	****
16	Fairview Hotel	Nairobi	****
17	Sarova Panafric Hotel	Nairobi	****
18	Silver Springs Hotel	Nairobi	****
19	Nairobi Safari Club	Nairobi	****
20	Eka Hotel	Nairobi	****
21	Hilton Nairobi Ltd	Nairobi	****
22	Windsor Golf Hotel and Country Club	Nairobi	****

Appendix 8: Food Safety Regulations in Kenya

The schedule below highlights the key food regulations in Kenya and the government agencies in charge of enforcing them.

S/N	AGENCY	LAWS
1.	Department of Public Health	Public Health Act Cap 242(Rev.2002)
		Food Drugs Chemical Substances Act Cap 254(Rev. 2002)
		Radiation Protection Act Cap243
		Liquor Licensing Act Cap 121
		Traditional Liquor Act Cap 122
		Meat Control Act Cap 356(Rev. 1980)
2.	Government Chemists Department	Food Drugs and Chemical substances Act Cap 254
		Liquor licensing Act Cap 121
		Traditional Liquor Act Cap 122
		Pharmacy and Poisons Act Cap 244
3.	National Public Health Laboratories	Food Drugs and Chemical Substances Act cap 254
4.	KEMRI	Science and Technology (Amendment) Act, 1979
5.	Pharmacy and Poisons Board	Pharmacy and Poisons Act Cap 244
6.	Department of Veterinary Services	Meat Control Act Cap 356
		Animal Health Act Cap 364
		Fertilizer and Animal Feedstuff Act Cap 345
		Dairy Act Cap 336
		Crop Production and Livestock Ordinance Act Cap 321
7.	Department of Fisheries	Fisheries Act Cap 378
8.	Pest Control Products Board	Control Products Act Cap 346
9.	Plant Health Inspectorate Services	Agricultural Act Cap 318
		Plant Protection Act Cap 324
		Agricultural Produce Act Cap 319
		Seed and Plant Variety Act Cap 326
		Suppression of Noxious Weeds Act Cap 325
		Fertilizer and Animal Feedstuff Act Cap 345
		Control Products Act Cap 346
10.	Agricultural Research Institute	Legal Notice under Science and Technology Act Cap 256
11.	Horticultural Crops	Legal notice under Cap 318

	Development Authority	
12.	Department of Crop production	Cap 318, Cap 319, Cap 320, Cap 321
13.	Kenya Bureau of Standards (KEBS)	Standards Act Cap 496
14.	National Council for Science and Technology	Science and Technology Act Cap 256
15.	Dairy Board	Dairy Act Cap 336
		Public Health Act Cap 242
16.	Coffee Board of Kenya and Coffee Research Foundation	Coffee Act No. 9 of 2001
17.	The National Biosafety Authority	Biosafety Act 2009

Source: Kilonzo Robert M and Gathura Moses (2013): The Kenya Food Control System. Retrieved from: http://www.fao.org/pre_ccafrika/kenya/en