

Institute for Agricultural Policy and Market Research  
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**Consumers' Perception of and Preferences for Meat Safety and Quality in an Islamic  
LMIC Context: Empirical Evidence from Afghanistan**

DISSERTATION

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# Declaration

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“I declare that the doctoral thesis here submitted is entirely my own work, written without any unauthorised help by a third party and solely with the assistance referred to in the thesis. I have indicated in the text those texts that have been quoted from already published sources, either verbatim or by analogy and all statements based on verbally conveyed information. During the research carried out by me and referred to in the doctoral thesis, I have at all times followed the principles of good scholarly practice as defined in the Statue of Justus Liebig University Giessen for Ensuring of Good Academic Practice.”

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Date

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Mustafa Nasiri

# Dedication

This work is dedicated to my parents, my father, Haji Bostan Ali Nasiri, and my mother, Laylah Nawabi, for their unwavering prayers and emotional support. It is also dedicated to my late elder brother, Haji Attaullah Nasiri, who inspired me at the start of this journey and whose absence I deeply feel since his passing.

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## Zusammenfassung

Die globalen Trends in der Fleischproduktion und im Fleischkonsum verschieben sich deutlich zwischen Ländern mit hohem Einkommen (HIC) und Ländern mit niedrigem und mittlerem Einkommen (LMIC). In den Hoheinkommensländern gibt es einen wachsenden Trend, den Fleischkonsum aufgrund von Gesundheits- und Umweltbedenken, ethischen Erwägungen und Tierschutz einzuschränken oder ganz darauf zu verzichten. Dies hat zu einer verstärkten Erforschung und Produktion von pflanzlichen und im Labor gezüchteten Fleischalternativen geführt. Umgekehrt steigt in den LMICs die Nachfrage nach Fleisch aufgrund des Bevölkerungswachstums, der Urbanisierung und einer wachsenden Mittelschicht. Diese steigende Nachfrage geht jedoch mit zunehmenden Bedenken hinsichtlich der Lebensmittelsicherheit und lebensmittelbedingten Krankheiten einher werden und jährlich etwa 600 Millionen Erkrankungen, 420.000 Todesfälle und 33 Millionen behinderungsbedingte Lebensjahre (DALYs) verursachen. Tiere und Lebensmittel tierischen Ursprungs (ASFs), einschließlich Fleisch, sind ein wichtiger Faktor für lebensmittelbedingte Erkrankungen. Die Kontamination von Fleisch kann auf verschiedenen Stufen der Lieferkette auftreten: Bei der Aufzucht, beim Schlachten, beim Verkauf. Afghanistan, ein Beispiel für eine islamische LMIC, liefert eine überzeugende Fallstudie, in der die rasche Urbanisierung und eine wachsende Mittelschicht die Nachfrage nach hochwertigen Lebensmitteln wie Fleisch erhöht haben, was in den letzten zwei Jahrzehnten zu Modernisierungsmaßnahmen in der Fleischindustrie geführt hat. Traditionelle Metzgereien dominieren jedoch nach wie vor den Markt, neben aufstrebenden Supermärkten, die sowohl frisches Fleisch aus heimischer Produktion als auch gekühltes Importfleisch anbieten.

Vor diesem Hintergrund untersucht diese Forschung die Wahrnehmungen und Präferenzen afghanischer Verbraucher hinsichtlich Fleischqualität und -sicherheit entlang der Lieferkette. Die Studie widmet sich drei Schlüsselfragen: (i) Wie nehmen Verbraucher die Fleischqualität und -sicherheit entlang der gesamten Lieferkette wahr? (ii) Wie können Kaufentscheidungen hin zu sichereren Fleischoptionen beeinflusst werden? (iii) Welche Fleischattribute sind für Verbraucher am wichtigsten, und wie beeinflusst die Bindung an Fleisch diese Präferenzen? Mithilfe eines Mixed-Methods-Ansatzes umfasst die Studie drei Analysen: Wahrnehmungen zur Fleischqualität und -sicherheit, Zahlungsbereitschaft (WTP) für verschiedene Fleischsorten sowie Präferenzen für Fleischattribute und Einstellungen zur Fleischbindung.

Die erste Studie untersucht die Wahrnehmung der Verbraucher in Bezug auf Fleischqualität und -sicherheit. Daten aus sieben Fokusgruppendifkussionen mit 52 Teilnehmern in Kabul und Bamyan wurden analysiert. Das Total Food Quality Model (TFQM) diente als analytischer Rahmen, und

qualitative Daten wurden mit der MAXQDA-Software ausgewertet. Die Ergebnisse zeigen, dass Fleisch von sesshaften und nomadischen Tieren als sicherer wahrgenommen wird als Fleisch von städtisch aufgezogenen Tieren. Supermarktfleisch wird als hygienischer, aber weniger frisch angesehen. Verbraucher äußerten zudem Bedenken hinsichtlich der Halal-Konformität, was zu einem geringeren Vertrauen in Supermarktfleisch führt. Traditionelles Metzgereifleisch wurde hingegen als frisch und natürlich, aber unhygienisch wahrgenommen. Farbe, Frische, Herkunft, Sicherheit und Halal-Zertifizierung sind wichtige Attribute, die die Kaufentscheidung beeinflussen, während Geschmack und Zartheit nach dem Kauf entscheidend waren. Die begrenzte Vertrauenswürdigkeit in Supermärkte unterstrich die Notwendigkeit besserer Transparenz und Kommunikation.

Die zweite Studie untersucht die WTP städtischer Verbraucher für vier Arten von Lammfleisch, unterschieden nach Produktionssystemen (sesshaft versus nomadisch) und Schlacht- sowie Vertriebskanälen (traditionelle Metzgerei versus Supermarkt). Mit einem Zweitpreis-Auktionsmechanismus wurde die Wirkung von schriftlichem Framing, visuellem Framing und psychologischem Priming auf die WTP bewertet. Die Ergebnisse zeigten, dass es auf aggregierter Ebene keinen signifikanten Unterschied in der WTP für sesshaftes im Vergleich zu nomadischem Fleisch gab. Besserverdienende und gebildete Verbraucher bevorzugten jedoch Fleisch aus sesshaften Produktionssystemen. Teilnehmer waren bereit, für Supermarktfleisch im Vergleich zu traditionellem Metzgereifleisch einen Preisaufschlag zu zahlen. Schriftliches und visuelles Framing beeinflusste die Zahlungsbereitschaft, während psychologisches Priming keinen signifikanten Einfluss hatte. Eine positive Beziehung zwischen Risikobereitschaft und WTP für die sicherste Fleischauswahl deutet auf Chancen für gezielte Marketingstrategien hin.

Die dritte Studie analysiert die Verbraucherpräferenzen für Lammfleischmerkmale mittels eines Best-Worst-Scaling-(BWS)-Ansatzes und validiert den Meat Attachment Questionnaire (MAQ) in einem islamischen LMIC-Kontext. Die Ergebnisse heben die Lebensmittelzertifizierung, Frische und Halal-Kennzeichnung als wichtigste Merkmale hervor, was kulturelle und religiöse Prioritäten widerspiegelt. Die Präferenzen für Fleischmerkmale waren insgesamt heterogen. Verbraucher mit hohem Einkommen und höherem Bildungsniveau sowie Gelegenheitskonsumenten legten besonderen Wert auf mehrere Merkmale, darunter Lebensmittelzertifizierung, Sauberkeit, Rasse, Marke und Halal-Kennzeichnung. Darüber hinaus bestätigte die konfirmatorische Faktorenanalyse die Validität des MAQ in einem islamischen LMIC-Kontext und zeigte, dass Unterkategorien wie Hedonismus und Abhängigkeit negativ mit den Präferenzen für die meisten Fleischmerkmale assoziiert waren. Dieses Ergebnis könnte die Rolle kultureller und psychologischer Faktoren bei der Gestaltung von Einstellungen gegenüber Fleisch unterstreichen.

Diese Studien liefern wertvolle Einblicke in die Präferenzen und Wahrnehmungen afghanischer Verbraucher in Bezug auf Fleischsicherheit und -qualität mit breiteren Implikationen für LMICs, die ihre Fleischindustrie modernisieren. Die Ergebnisse heben die Bedeutung hervor, Verbraucher durch verbesserte Kommunikation über Halal-Konformität und Lebensmittelsicherheitsstandards stärker in Supermärkte einzubinden. Investitionen in Infrastruktur und Hygieneschulungen für traditionelle Metzger könnten Kompromisse zwischen Frische und Sicherheit verringern. Marketingstrategien, die schriftliches und visuelles Framing verwenden, können Verbraucher zu sichereren Fleischentscheidungen lenken.

Politische und praktische Implikationen sind ebenfalls bedeutend. Die Anpassung der Fleischproduktion an kulturelle Normen und Halal-Anforderungen ist entscheidend, um die Erwartungen muslimischer Verbraucher zu erfüllen. Zudem können Sicherheitszertifizierungen und Transparenz das öffentliche Vertrauen stärken und Supermärkten Marktchancen eröffnen. Die Studie bietet übertragbare Erkenntnisse für andere islamische LMICs mit ähnlichen Fleischlieferketten. Künftige Forschungen könnten diese Dynamiken auf andere Fleischsorten und Regionen ausweiten und zur Literatur über Verbraucherentscheidungen und die Modernisierung der Fleischindustrie in LMICs beitragen.

## Summary

Global trends in meat production and consumption are shifting significantly between High-Income Countries (HICs) and Low- and Middle-Income Countries (LMICs). In HICs, there is a growing trend of reducing or eliminating meat consumption due to health and environmental concerns, ethical considerations, and animal welfare. This has led to increased research and production of plant-based and lab-grown meat alternatives. Conversely, LMICs are experiencing rising meat demand due to population growth, urbanization, and a growing middle class. However, this rising demand is accompanied by increased food safety concerns and Foodborne Diseases (FBDs) which cause approximately 600 million illnesses, 420,000 deaths, and 33 million disability-adjusted life years (DALYs) annually. Animals and animal-sourced foods (ASFs) including meat are a key contributor to FBDs. Meat contamination can occur at various stages of the supply chain: pre-harvest, harvest, and post-harvest stages. Afghanistan, as an example of an Islamic LMIC, provides a compelling case study where rapid urbanization and a growing middle class have increased demand for high-value foods like meat, prompting modernization efforts in the meat industry in the past two decades. Traditional butcheries, however, continue to dominate the market, alongside emerging supermarkets that offer both fresh domestic sourced meat and refrigerated imported meat.

Motivated by these dynamics, this research investigates Afghan consumers' perceptions and preferences regarding meat quality and safety across the supply chain. It addresses three key questions: (i) How do consumers perceive meat quality and safety from farm to fork? (ii) How can purchases be influenced toward safer meat choices? (iii) What are the most important meat attributes driving consumer choices, and how does meat attachment influence these preferences? Using a mixed-methods approach, the study includes three analyses: perceptions of meat safety and quality, willingness to pay (WTP) for different meats, and preferences for meat attributes and attachment attitudes.

The first study explores consumer perceptions of meat quality and safety at pre-harvest, harvest, and post-harvest stages using data from seven Focus Group Discussions (FGDs) with 52 participants in Kabul and Bamyan. The Total Food Quality Model (TFQM) was employed as the study's analytical framework, and qualitative data were analyzed using MAXQDA software. Results revealed that at the pre-harvest stage, meats originating from the sedentary and nomadic livestock were perceived as safer than that from urban-raised animals. At the harvest stage, supermarket meat was viewed as more hygienic but less fresh. Consumers also raised concerns about its halal compliance, leading to lower trust in supermarket meat. In contrast, traditional butchery meat was deemed fresh and natural but unhygienic. At the post-harvest stage, key

attributes influencing purchase decisions included color, freshness, place of origin, safety, and halal certification, with taste and tenderness being critical after purchase. Limited trust in supermarkets emphasized the need for better transparency and communication.

The second study examines urban consumers' WTP for four types of lamb meat, distinguished by their production systems (sedentary versus nomadic) and slaughtering and retail channels (traditional butchery versus supermarket). Using a second-price experimental auction mechanism, it assessed the impact of written framing, visual framing and psychological priming on WTP. Results showed no significant difference in WTP for sedentary versus nomadic meat at the aggregate level. However, higher-income and educated consumers preferred sedentary over nomadic meats. Participants also submitted higher bids for supermarket meat compared to traditional butchery meats. Moreover, written and visual framing effectively induced safer meat choices, while psychological priming had no significant impact. Findings further showed a positive and significant relationship between risk-taking attitude and WTP for safest meat choice, which may suggest opportunities for targeted marketing to promote food safety.

The third study analyses consumer preferences for lamb meat attributes using a Best-Worst Scaling (BWS) approach and validates the Meat Attachment Questionnaire (MAQ) in an Islamic LMIC context. Results highlighted food safety certification, freshness, and halal labeling as the most important attributes, reflecting cultural and religious priorities. Preferences for meat attributes were generally heterogenous. High-income and educated consumers, as well as occasional consumers emphasized preferences for several attributes including food safety certification, cleanliness, breed, brand, and halal label. Additionally, confirmatory factor analysis validated the MAQ in an Islamic LMIC context, revealing that subscales such as hedonism and dependence were negatively associated with preferences for most meat attributes. This finding may underscore the role of cultural and psychological factors in shaping attitudes towards meat.

Together, these studies provide valuable insights into Afghan consumer preferences and perceptions of meat safety and quality, with broader implications for LMICs undergoing meat industry modernization. Findings emphasize opportunities to build consumer trust in supermarkets by improving communication about halal compliance and food safety standards. Investments in infrastructure and hygiene training for traditional butcheries can address trade-offs between freshness and safety. Marketing strategies using written and visual framing can steer consumers toward safer meat choices.

Policy and practical implications are also significant. Aligning meat production with cultural norms and halal requirements is essential for meeting Muslim consumer expectations, specifically by non-

Muslim countries exporting meat to Muslim countries. Moreover, emphasizing food safety certification and transparency can enhance public health and trust among consumers, allowing supermarket to thrive in the market. The study also highlights the importance of fostering trust in formal institutions like supermarkets and offers transferable insights for other Islamic LMICs with similar dual meat supply chains. Future research could explore these dynamics across different meat types and regions, contributing to the literature on consumer behavior and meat industry modernization in LMICs.

## List of Publications and Conference Papers

### Peer-reviewed Publication

- Nasiri, M., Gassler, B., & Teuber, R. (2023). Consumers' perceptions of meat safety and quality – a qualitative content analysis from Afghanistan. *British Food Journal*, 125(9), 3404–3421. <https://doi.org/10.1108/BFJ-07-2022-0646>.

### Conference Talks and Papers

- Nasiri, M., Gassler, B., & Teuber, R., (2024): Consumers' preferences for meat attributes and their meat attachment attitude in Afghanistan – A Best-Worst Scaling (BWS) approach. 10th EAAE PhD Workshop, 5-7 June, Budapest, Hungary.
- Nasiri, M., Gassler, B., & Teuber, R., (2023): What meat attributes do consumers in Afghanistan value the most? A best-worst scaling approach, Tropentag 2023, 20-22 September 2023, ZALF & Humboldt-Universität zu Berlin, Germany.
- Nasiri, M., Gassler, B., & Teuber, R., (2022): Understanding consumers' perception of meat safety and quality at pre-harvest and harvest stages in Afghanistan: A qualitative content analysis, Tropentag 2022, 14-16 September 2022, Czech University of Life Sciences, Prague, Czech Republic.
- Nasiri, M., Gassler, B., & Teuber, R., (2022): The role of framing effect and priming in shaping demand for safer food choices: Evidence from an experimental auction with four different mutton meat in Afghanistan, 183rd EAAE Seminar, 8-9 September 2022, Zagreb, Croatia.

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## **List of Abbreviations**

Aff:	Affinity
AFN:	Afghani
ASFs:	Animal Source Foods
BA:	Bachelor of Arts
BIBD:	Balanced Incomplete Block Design
BWS:	Best-Worst Scaling
CBA:	Center for Business Administration
CE:	Choice Experiment
CFA:	Confirmatory Factor Analysis
CFI:	Comparative Fit Index
DALYs:	Disability Adjusted Live Years
Dpn:	Dependence
DRC:	Democratic Republic of Congo
Ent:	Entitlement
FAO:	Food and Agriculture Organization
FBDs:	Foodborne Disease
FG:	Focus Group
FGDs:	Focus Group Discussions
FSHs:	Food Safety Hazards
GMO:	Genetically Modified Organisms
Hdn:	Hedonism
HH:	Household
HICs:	High-Income Countries
IID:	Independent and Identically Distributed
LMICs:	Low and Middle-Income Countries
MAIL:	Ministry of Agriculture, Irrigation, and Livestock
MAQ:	Meat Attachment Questionnaire
MBDs:	Meat-Borne Diseases
MEAS:	Meat Attachment Scale

MNL:	Multinomial Logit
MNM:	Meat stemming from Nomadic system, slaughtered & processed at a Supermarket
MNT:	Meat stemming from Nomadic system, slaughtered & processed at a Traditional butchery
MSc:	Master of Science
MSM:	Meat stemming from Sedentary system, slaughtered & processed at a Supermarket
MST:	Meat stemming from Sedentary system, slaughtered & processed at a Traditional butchery
MtA:	Meat Attachment
NFS:	Need for Cognition
NTA:	National Technical Assistance
OCHA:	Office for the Coordination of Humanitarian Affairs
OECD:	Organization for Economic Cooperation and Development
PPE:	Personal Protective Equipment
PPP:	Public Private Partnership
RMSEA:	Root Mean Square Error of Approximation
RoP:	Roots of Peace
RPL:	Random Parameters Logit
SDGs:	Sustainable Development Goals
SHIFT:	Social influence, Habit formation, Individual self, Feelings and cognition, and Tangibility
SPi:	Shares of Preferences
TFQM:	Total Food Quality Model
TLI:	Tucker-Lewis Index
TPB:	Theory of Planned Behavior
WFP:	World Food Program
WHO:	World Health Organization
WTP:	Willingness to Pay

# CHAPTER 1

## INTRODUCTION

### 1.1 Background information

Food safety is a critical component of economic development, as unsafe food can lead to illnesses, chronic health issues, and even fatalities due to microbiological and chemical contaminants, as well as other physical hazards (Jaffee et al., 2019). It plays an integral role in food and nutrition security; hazards such as microbial pathogens, zoonotic diseases, and chemical residues diminish food availability for food-insecure populations, adversely affecting the health and livelihoods of marginalized communities (Jaffee et al., 2019). The implications of food safety extend beyond public health; they negatively impact domestic food markets and employment along the food value chain—spanning production, processing, and distribution—especially in Low- and Middle-Income Countries (LMICs) where urbanization and rising incomes increase demand for safer foods (Lagerkvist et al., 2013; Ortega et al., 2012).

The relationship between food safety and poverty is also significant. Poor individuals are not only consumers but also active participants in agri-food value chains, often employed as small-scale farmers, processors, or workers in commercial enterprises (Jaffee et al., 2019). Unsafe food poses substantial risks to their livelihoods, particularly in informal markets where they primarily source their food. Investments in food safety management capacity can profoundly impact the livelihoods of these vulnerable populations while contributing to the achievement of Sustainable Development Goals (SDGs). Specifically, addressing food safety relates to SDG1 (Eradicating Poverty), as foodborne diseases (FBDs) are a primary contributor to health challenges among impoverished communities. It also intersects with SDG2 (Zero Hunger) due to the complex relationship between food safety and nutritional outcomes, as well as SDG3 (Good Health and Well-being), given that the health burden imposed by FBDs rivals that of diseases such as malaria and HIV/AIDS (Jaffee et al., 2019; Souza Monteiro et al., 2018; Havelaar et al., 2015). Moreover, FBDs are a leading cause of health challenges among impoverished communities, accounting for approximately 33 million disability-adjusted life years (DALYs) lost annually (Souza Monteiro et al., 2018; Havelaar et al., 2015).

Historically, food safety has emerged as a significant global health concern in both High-Income Countries (HICs) and LMICs. In HICs, research has been driven by factors such as food scares and increased consumer awareness (Grunert, 2005). In LMICs, attention to food safety studies have spurred following the World Health Organization's (WHO) 2015 report on the global burden of FBDs (Havelaar et al., 2015; WHO, 2015). FBDs result in an estimated 600 million illnesses and

420,000 deaths each year due to unsafe food consumption (Souza Monteiro et al., 2018; WHO, 2015). The prevalence of FBDs in LMICs is exacerbated further by inadequate infrastructure, poor hygiene practices, and limited regulatory oversight, and lack of food safety control system.

Among the factors contributing to FBDs, animals are key drivers of pathogens such as *Salmonella*, *Campylobacter*, *Shiga toxigenic E. coli*, and *Listeria monocytogenes* (Havelaar et al., 2015; Heredia and García, 2018). Animal Source Foods (ASFs)—including livestock products and aquatic animals—are significant contributors to FBDs, besides other fresh produce like fruits and vegetables (Das et al., 2019; Grace, 2015; Jaffee et al., 2019). Food safety hazards can occur at all stages of production, from farm to fork. Specifically, meat and its derivatives can become contaminated at three distinct stages: the pre-harvest phase, the harvest phase, and the post-harvest phase. At the pre-harvest stage (i.e., production phase) livestock gets infected to certain pathogens and contaminated to hazards like microbes, parasites and drugs during animal breeding, or because of inappropriate use of feedings and feed additives. At the harvest stage (i.e., slaughtering and processing phase) meat can get contaminated to hazards during slaughtering, such as contamination with gut content, animal skins, workers, etc. In addition, occurrence of physical and chemical contaminations, and exposure to bacteria are also common at this stage. Whereas at the post-harvest stage (i.e., retailing phase), meat contamination occurs during transportation, packaging, storage and refrigeration, sales and food services (Grace, 2015; Jaffee et al., 2019; Sofos and Geornaras, 2010; Zhou et al., 2017; Heuvelink et al., 2001).

Moreover, the global meat supply expands to meet rising demand. Projections indicate that global meat production will reach 377 million tons by 2030, with much of this growth occurring in LMICs driven by population growth, urbanization, and the emergence of a middle class (OECD/FAO, 2022). However, this heightened demand for meat is accompanied by an increased risk of contamination and a rise in Meat-Borne Diseases (MBDs) within these regions (Grace, 2015). Contributing factors include substandard hygiene practices among butchers (Haileselassie et al., 2013), insufficient government capacity for inspection and laboratory testing, inadequate supervision regarding hygiene standards at butcherries, legal challenges, and coordination issues among agencies responsible for food safety (Hoffmann et al., 2019; Khalid, 2016; Nandonde et al., 2012).

As demand for meat increases in LMICs like Afghanistan, traditional butcherries face increased competition from supermarkets that also sell fresh and imported meat. This shift toward "supermarketization" is a relatively recent development in these regions, where traditional butcherries still dominate the market (Reardon et al., 2004; Sohaib and Jamil, 2017). On the other hand, consumers tend to trust traditional butcherries more than the newer meat selling outlets – the

supermarkets- when making purchase decisions (Becker et al., 2000; Grunert et al., 2004). Literature suggests that resistance to change is common when new practices challenge long-held beliefs or values (Cummings and Worley, 2009). This is also true when consumers are faced with trade-off between traditional butcheries and supermarkets. Overcoming this resistance requires effective communication about the necessity for change and its potential benefits, given the high-level of food safety risks associated to the traditional butcheries.

In this regard however, a fundamental question arises, regarding how to encourage consumers to make safer meat choices. Behavioral economics suggests that preferences are not fixed but can be influenced by social and economic environments (Cohn et al., 2015; Ogaki and Tanaka, 2017). For instance, prospect theory indicates that the way information is framed, significantly impacts consumer choices (Tversky and Kahneman, 1981). This framing approach has been used in consumer behavior studies to assess the acceptability of new products and technologies (Levin et al., 1998; Levin and Gaeth, 1988; Shan et al., 2020). Additionally, priming—i.e., activating mental concepts through subtle situational cues—can also shape preferences by influencing subsequent judgments and behaviors (Bargh and Chartrand, 2014; Cohn et al., 2015). However, it remains unclear whether framing or priming can effectively shape preferences for safer meat choices in LMICs context.

Additionally, another important aspect of studying meat quality and safety is through the meat attributes. Understanding consumer preferences for meat attributes is essential in the context of a rapidly changing retail landscape. As supermarkets increasingly sell fresh meat alongside traditional butcheries, consumers are faced with new choices that reflect evolving expectations regarding meat quality, safety, and ethical considerations. Attributes such as nutritional value, product value and sensory properties (including color, texture, taste, freshness), and safety are pivotal in influencing purchase decisions (Dagevos and van Ophem, 2013; Lusk and Briggeman, 2009). Recognizing these preferences is crucial for developing effective marketing strategies and public policies that cater to consumer needs while also supporting domestic meat producers and international traders in enhancing their marketing strategies (Bazzani et al., 2018; Lusk & Briggeman, 2009; Cardona et al., 2023; Auger et al., 2007; Dagevos and van Ophem, 2013).

Consumer preferences for meat attributes have evolved over time. In HICs, there is a growing emphasis on attributes related to safety, health concerns, animal welfare, and environmental sustainability (Dransfield, 2005; Eldesouky et al., 2020; Kinsey et al., 1995; Nyberg, 2018; Sánchez et al., 2011; Schnettler et al., 2009; Viegas et al., 2015). Consequently, many consumers are shifting away from meat consumption due to concerns about its implications for health and the environment (Fonseca and Sanchez-Sabate, 2022). In line with this trend, the Meat Attachment Questionnaire

(MAQ) has been developed to explore consumers' emotional connections to meat and its relationship with willingness to reduce consumption (Graça et al., 2015a; Graça et al., 2015b). The MAQ consists of 16 items categorized into four latent factors: hedonism (i.e., the enjoyment derived from consuming meat), affinity (i.e., the level of fondness towards meat consumption, opposite to the feelings of repulsion), dependence (i.e., the perception of meat as an essential component of the diet), and entitlement (i.e., the right to meat consumption) (Graça et al., 2015b). Research has shown that meat attachment significantly influences personal willingness to consume alternative proteins while also affecting perceptions of meat's impacts on health and sustainability (Circus and Robison, 2019; Gradidge et al., 2021).

To date, studies on meat attachment have primarily focused on HICs such as Finland and the Netherlands (van Dijk et al., 2023), and New Zealand (Lentz et al., 2018), but have largely overlooked LMICs where most future demand for meat is expected to grow. Given the projected increase in meat demand in LMICs—including Muslim-majority countries like Afghanistan—there is a need for research into consumer attitudes toward meat attachment within these regions.

## **1.2 Problem statement**

Afghanistan presents a compelling case for understanding the dynamics of meat consumption and production in LMICs undergoing rapid urbanization and meat industry modernization. Over the past two decades, increased urbanization has driven a shift in food demand toward high-value products, particularly meat (RoP, 2008). Afghan diets have traditionally centered around meat, particularly lamb and mutton, which hold cultural and nutritional significance (Brittin, 2011). To put it into perspective, in 2020, the per capita consumption of lamb and goat meat in Afghanistan (4.3 kg/person/year) exceeded the average yearly per capita consumption for several East Asian countries, including Pakistan (2.6 kg), China (4.2 kg), and Bangladesh (1.4 kg). However, when compared to its Central Asian neighbors, Afghanistan's consumption remains lower than that of Tajikistan (7.8 kg), Uzbekistan (6.1 kg), and Turkmenistan (20.8 kg) (FAOSTAT, 2024).

At the pre-harvest stage, meat in Afghanistan is predominantly produced by two livestock systems: the sedentary and the nomadic systems. The sedentary system involves animals grazing in highland pastures, while the nomadic ruminants are raised in lowland areas. The nomads often draw their livestock in proximity to urban centers for sell, where the animals are exposed to a variety of food hazards due to feeding on food wastes and residues (MAIL, 2019; RoP, 2008). These differences in grazing environments lead to varied perceptions of the quality and safety of the meat produced by these systems. Nomadic livestock are more prone to Food Safety Hazards (FSHs) due to exposure to urban waste, leading to higher contamination risks, including biological, chemical, and physical contaminants (Das et al., 2019). Conversely, sedentary livestock graze on natural, high-

land pastures, yet no scientific research has sufficiently captured consumer preferences for meat from these distinct livestock systems.

Existing literature has highlighted the importance of place-of-origin as a significant factor in consumer preferences for meat, with evidence suggesting that consumers prefer meat from animals grazing on highland pastures over those from lowland areas (Font-i-Furnols et al., 2011; Hersleth et al., 2012). However, research on consumer preferences between sedentary and nomadic meat in Afghanistan, as well as in other LMICs remains limited. This gap underscores the need for a detailed investigation into how these production systems influence consumer perceptions of quality and safety, which are pivotal in driving demand for specific types of meat.

At the harvest stage, Afghanistan's meat processing is largely carried out by traditional butcherries, where poor sanitary conditions dominate. Animals are slaughtered in informal settings—such as backyards, streets, or makeshift slaughterhouses—resulting in unhygienic meat-handling practices (MAIL, 2019). These practices contribute not only to environmental pollution but also to the prevalence of MBDs. In response, the Afghan government, with support from international partners over the past two decades, has invested in modernizing the meat industry, establishing modern slaughterhouses in major cities like Kabul, Herat, Mazar, and Kunduz. These facilities aim to ensure safer and more hygienic meat processing through advanced slaughtering technologies and the establishment of cold storage and testing laboratories (MAIL, 2019).

Despite these investments, the demand for meat processed in modern slaughterhouses, retailed through supermarkets, and offered as an alternative to traditional butchery meat remains unclear. Studies have shown mixed consumer preferences for supermarket versus traditional butchery meat. For instance, while in the UK consumers mostly buy meat from supermarkets (McEachern and Seaman, 2005), Muslim consumers in the UK and Belgium prefer traditional butchery meat due to trust in halal practices and the Muslim ownership of butcher shops (Verbeke et al., 2013). Similarly, in Malaysia, consumers favor meat from traditional markets due to perceptions of freshness, halal assurance, and better relationships with vendors (Chamhuri and Batt, 2015). In the context of LMICs like Afghanistan, there is a significant knowledge gap regarding how consumers perceive and choose between supermarket and traditional butchery meat.

Additionally, it is crucial to understand how consumer demand can be shifted toward safer meat choices. Given the assumption that supermarket meat, processed under modern hygienic conditions, is safer, this study explores strategies to influence consumer preferences and willingness to pay (WTP) for these safer alternatives. Non-hypothetical experimental auctions,

incorporating framing effects and psychological priming, are used to assess how message framing and priming can shape consumer demand for safer meat choices.

Furthermore, the informal sector dominates Afghanistan's meat market, making it essential to understand the institutions and consumer perceptions governing quality and safety. Regulatory frameworks are weak, with no formal food quality or safety laws (World Bank, 2014). Consumers in Afghanistan are generally unaware of food safety risks (Khalid, 2016), and self-regulation regarding food safety is lacking. In this context, behavioral economics offers valuable insights. Risk preferences—whether individuals are risk-averse or risk-tolerant—can significantly influence consumer decisions related (Falk et al., 2018). Understanding the risk perceptions and risk preferences is essential for developing effective strategies to encourage safer food choices, especially in contexts where FBDs remain a major concern.

Additionally, research on meat attribute preferences and attachment to meat has been primarily conducted in HICs settings (van Dijk et al., 2023), with little attention paid to LMICs where meat consumption is expected to rise significantly. In Afghanistan, consumers' preferences for meat attributes such as freshness, food safety certification, and halal label have yet to be thoroughly explored. Identifying these preferences will be critical for shaping future market strategies and ensuring that the evolving meat industry meets consumer expectations in the country.

### **1.3 Main research objective**

The primary objective of this research is to explore and understand Afghan consumers' perceptions of and preferences for meat quality and safety across different livestock production systems (sedentary vs. nomadic) and retail formats (traditional butchereries vs. supermarkets). The study aims to fill critical knowledge gaps in the literature on consumer behavior in LMICs, particularly Islamic societies, and provide actionable insights for policy and industry stakeholders. To that end, the study is aimed to answer the following empirical research questions:

### **1.4 Empirical research questions**

1. How do Afghan consumers perceive meat quality and safety from farm to fork?
  - a. How does meat feature in the daily diet of Afghan consumers?
  - b. What are consumer perceptions of meat quality and safety at the harvest stage, comparing sedentary and nomadic systems?
  - c. How do consumers view the quality and safety of meat at the harvest stage, comparing traditional versus modern slaughterhouses, especially in relation to animal welfare, technology use in slaughtering, and its compliance with halal criteria?

- d. How do consumers perceive meat quality and safety at the post-harvest stage; i.e., how is meat quality evaluated pre- and post-purchase?
2. How can purchases be influenced towards safer meat choices?
    - a. What is the WTP for sedentary versus nomadic, and supermarket versus traditional butchery meat?
    - b. To what extent do framing messages and psychological priming affect consumer preferences for safer meat?
    - c. How do socio-economic factors, experience of FBDs, and risk preferences relate to consumer WTP for safer meat in Afghanistan?
  3. What are the most important meat attributes driving consumer choices, and how does meat attachment influence these preferences?
    - a. Which meat attributes are most valued by Afghan consumers?
    - b. How do consumer demographics (e.g., gender, age, income, education) influence preferences for these attributes?
    - c. How are consumers attached to meat, and how do Afghan consumers' attitudes towards meat attachment (hedonism, affinity, entitlement, and dependence) shape their preferences for meat attributes?

This research will contribute to a deeper understanding of consumer behavior in Afghanistan's evolving meat market, providing key insights into food safety, quality, and the role of framing and priming techniques in inducing demand towards safer meat choices in the context of LMICs.

## **1.5 Research design**

According to Grunert (2005), research on food quality and safety has been centred mainly around three streams: (1) consumer demand for quality and safety; (2) provision of quality and safety; and (3) consumer perception of quality and safety. The first stream evaluates the extent of consumers' preferences for certain quality and safety improvement, corresponding to consumer WTP for the added quality or safety aspects of the food. WTP can be studied based on actual consumer demand, measured through scanner data, or for products that are not yet on the market, and in the absence of actual demand data, other methods such as contingent valuation or experimental auctions can be used.

The second stream deals with the supply side; changing food production structure, governance structure of value chains, etc. Issues such as traceability and more linkages among the value chain actors are evaluated by researchers on this stream. While the first and the second stream constitute the conventional economic approach to dealing with food quality and safety, the third stream is mediating between the two and "deals with the question of how quality and safety is perceived by

consumers, and how these perceptions influence consumer decision-making”. Consumer perception is important for industry, for the perception of supply of a product results in demand for that product (Grunert, 2005).

In light of the above framework, this study employs an explanatory sequential design approach within mixed methods research to investigate how consumers in an LMIC context such as Afghanistan, perceive meat quality and safety, and how preferences are shaped towards safer food choices. The research aims to address this question by claiming that food safety is equally important for consumers in LMICs as it is in HICs. Furthermore, it posits that effective framing and priming techniques can induce preferences towards safer food choices.

To substantiate this claim, the study utilizes a mixed methods approach with three distinct analysis conducted in three stages:

- 1- Qualitative Analysis:** The first analysis examines the role of meat in Afghan consumers’ daily diets and their perceptions of meat quality and safety across three stages: pre-harvest (production stage), harvest (slaughtering and processing stage), and post-harvest (retailing stage). This analysis employs qualitative content analysis based on data collected from seven focus group discussions (FGDs) conducted in Kabul and Bamyan. This phase addresses the third stream of Grunert’s framework on food quality and safety. The study utilizes the Total Food Quality Model (TFQM) as its analytical framework. At the pre-harvest stage, participants’ perceptions of meat quality and safety were captured for four distinct livestock systems: sedentary system, nomadic system, “urban-raised” ruminants, and farm/home-reared ruminants. During the harvest stage, participants expressed views on the quality and safety of meat from traditional butchereries versus supermarkets. The study also explored participants’ perspectives on animal welfare and compliance with halal criteria regarding modern slaughtering techniques, given the religious context of Afghan society. At the post-harvest stage, participants discussed how they form quality expectations and quality experience based on the means-end chain dimension of the TFQM. The insights gained from this qualitative analysis informed the design of the quantitative part of the study.
- 2- Quantitative Analysis:** The second analysis employs quantitative methods through a non-hypothetical experimental auction and a choice experiment (CE) utilizing a Best-Worst Scaling (BWS) approach. This phase investigates consumer demand for meat stemming from different animal husbandry systems, and slaughtered & processed by different retailing methods, thereby addressing the first stream of Grunert’s framework. The quantitative analysis consists of two parts:

- a. Experimental Auctions:** Experimental auctions were conducted using a second-price auction mechanism over three rounds. The first round evaluated consumers' WTP for four types of meat distinct by their animal husbandry systems (sedentary vs. nomadic) and slaughtering/processing systems (traditional butchery vs. supermarket). The subsequent two rounds assessed the impact of three treatment strategies—(i) written framing, (ii) visual framing, and (iii) psychological priming—on inducing WTP for safer meat choices. Additionally, this analysis explored relationships between socio-economic characteristics, risk perception, and risk preferences with WTP for the different meat types.
- b. Best-Worst Scaling (BWS):** While the experimental auction assessed WTP for various meat types and the impact of different treatments, it did not capture underlying reasons for higher or lower bids for certain meats. Hence, to explore consumer preferences regarding specific meat attributes, the post-experiment survey uses a BWS approach to identify which meat attributes are the most important to Afghan consumers and which are the least important. By discerning the key meat attributes, agribusinesses can strategically tailor their product offerings to align with these preferences. This phase also examined heterogeneity in consumer preferences for meat attributes. Understanding variations in preferences among different consumer groups allows agribusinesses to implement targeted marketing strategies and product differentiation. Furthermore, this step analyzed consumers' attitudes towards meat attachment as measured by the MAQ, and investigated how different attachment attitudes—hedonism, affinity, entitlement, and dependence—affect preferences for meat attributes. This can offer a valuable framework for cross-cultural comparisons based on MAQ construct.

Figure 1.1 illustrates a diagrammatic representation of the research design.

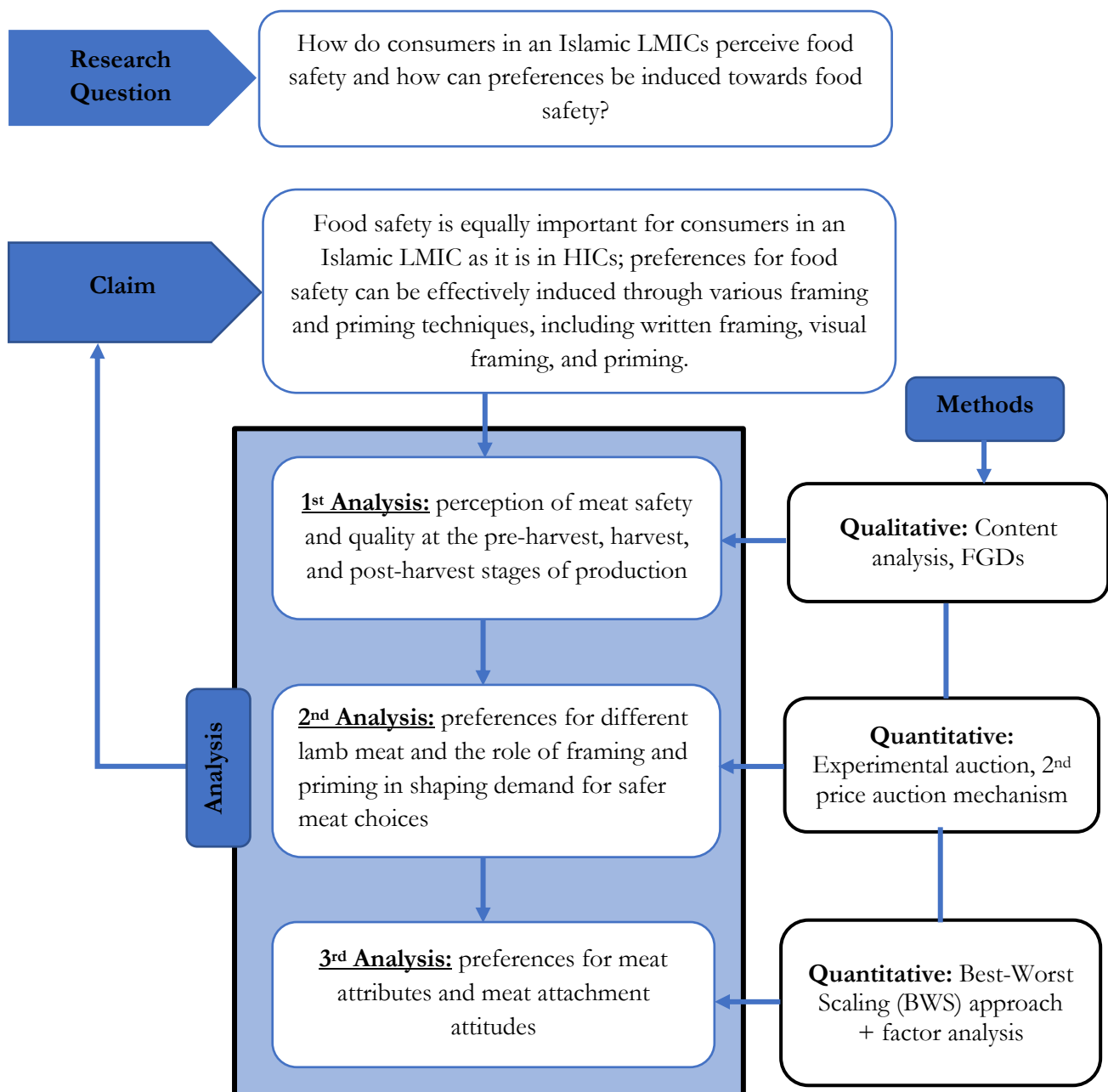


Figure 1.1: Research design

## 1.6 Significance of the study

In Afghanistan, food insecurity remains a critical challenge, and approximately 14.8 million people (about 32 percent of the total population) in urgent need of food and livelihood assistance as of October 2024 (WFP, 2024). Malnutrition rates are escalating at a concerning rate. In 2024, approximately 2.9 million children under the age of five were affected by acute malnutrition (OCHA, 2024). Projections for 2025 indicate a worsening situation, with an estimated 3.5 million children under five and 1.15 million pregnant and breastfeeding women expected to experience acute malnutrition. Additionally, around 2.95 million children are anticipated to face stunting in

2025 (WFP, 2024). Given the high prevalence of foodborne illnesses, ensuring food safety is crucial not only for individual health but also for the broader socio-economic stability of the country.

Urbanization has rapidly accelerated in Afghanistan, leading to a rise in demand for high-quality and safe food products, particularly meat, among an emerging middle class in urban areas. This growing demand for meat presents both opportunities and challenges for the Afghan food system, which remains largely informal. Traditional slaughtering practices are often unhygienic, lacking proper sanitation and refrigeration, making consumers vulnerable to meat-borne diseases (World Bank, 2014). The absence of a robust food safety regulatory framework exacerbates these risks, leaving consumers exposed to health hazards associated with unsafe meat handling and processing.

In this context, investigating food safety issues through the lens of consumer behavior is highly justifiable and timely. Understanding how Afghan consumers perceive and prioritize meat safety and quality is essential for addressing the widespread public health risks associated with MBDs. Insights from behavioral economics, particularly the different framing and priming techniques, risk perception and risk preferences, can inform more effective policy interventions. Moreover, enhancing meat safety in Afghanistan has far-reaching implications, contributing to improved health outcomes, reducing the burden of FBDs, and promoting economic development by fostering a more formalized and sustainable food supply chain.

This research aims to provide a comprehensive understanding of the factors that influence Afghan consumers' perception of and preferences for meat safety and quality, which can help shape future policies and interventions. By examining the role of different message framing and priming treatments as potential marketing and communication strategies in influencing safer meat choices, the study will offer actionable insights into how to enhance food safety practices and encourage food safety demand in the country. Ultimately, improving meat safety will not only protect public health but also contribute to a more resilient and secure food system, benefiting millions of Afghans.

## **1.7 Organization of the thesis**

This thesis is organized into eight chapters. Chapter 1 (Introduction) provides background information on the significance of addressing food safety in the context of LMICs, with a particular focus on how meat contributes to food safety risks. It outlines the relevance of these issues in the Afghan context, presents the problem statement, the overall research objective, and the specific empirical research questions. The chapter also offers an overview of the study design, methodologies employed, and the significance of the research.

Chapter 2 reviews the relevant literature, identifying key gaps in research related to food safety, consumer behavior, and meat preferences in LMICs. This chapter highlights the need for further investigation into the topics addressed in this study, particularly in developing countries like Afghanistan.

Chapter 3 details the mixed-methods approach employed in this research. It begins with an introduction to the study area and provides a comprehensive description of the qualitative content analysis and the framework used for the first part of the study. The chapter then explains the experimental auction mechanism, specifically the second-price auction, which was utilized for the second part of the analysis. It describes the treatment design, auction goods, auction procedures, and the corresponding analytical methods. Finally, the chapter introduces the choice experiment method, including the BWS approach, which was used to assess consumer preferences for meat attributes. The MAQ and its analytical methods are also described in this section.

Chapters 4 through 6 present the results and findings of the three analyses described in Chapter 3. Each chapter focuses on different aspects of the data analysis, providing detailed insights into consumer perceptions of meat quality and safety, willingness to pay for safer meat, and preferences for meat attributes.

Chapter 7 offers a comprehensive discussion of the findings, interpreting the results considering the research questions and the existing literature. And chapter 8 concludes the thesis by offering practical and policy recommendations based on the study's findings. The chapter also highlights the limitations of the study and suggests directions for future research.

## CHAPTER 2

# LITERATURE REVIEW

### 2.1 Chapter overview

Food safety remains a pressing global issue, with the risks associated with FBDs affecting millions annually. Particularly, the safety of meat is of critical importance due to the nutritional, cultural, and religious significance of ASFs, especially in LMICs and Islamic nations. This chapter provides a literature review exploring food safety and how it intersects with meat safety, consumers' perception of and preferences for food and meat safety, the role of framing and psychological priming in inducing demand for food safety, and meat attachment literature. The chapter highlights the importance of addressing meat safety in LMICs and in Islamic contexts, pointing out key gaps in existing literature. In these regions, rising meat consumption and the cultural and religious significance of meat—beyond its nutritional value—make meat safety a particularly relevant issue.

### 2.2 Food safety and its intersection with meat and meat safety

Food safety encompasses a broad spectrum of concerns, from the contamination of food with pathogens to the presence of chemical residues, toxins, and unsafe food handling practices. In both HICs and LMICs, food safety is a major public health concern, though the specific issues that dominate consumer concerns vary by context. HICs tend to focus on long-term health risks such as chemical residues and genetically modified organisms (GMO) (Röhr et al., 2005). In contrast, in LMICs, the immediate risks of microbial contamination and foodborne pathogens are more salient (Grace, 2015).

Meat safety is a crucial aspect of food safety due to its high nutritional value and its susceptibility to contamination. ASFs, including meat, are nutrient-dense, providing essential proteins, vitamins, and minerals necessary for human development and health (Black, 2008; Dror and Allen, 2008). Meat, in particular, is a rich source of iron, vitamin B12, and other key nutrients that are difficult to obtain from plant-based foods alone. Research highlights that meat consumption can significantly improve cognitive development and nutritional outcomes, particularly in children (Whaley et al., 2003).

However, meat is also highly perishable and prone to contamination by foodborne pathogens such as *Salmonella*, *E. coli*, and *Listeria*, as well as by mycotoxins present in animal feed (Havelaar et al., 2015). The perishable nature of meat and the potential for contamination during slaughter, storage, and distribution make meat safety a priority for public health. WHO has identified

contaminated meat as a major contributor to FBDs, particularly in LMICs, where inadequate sanitation, poor hygiene, and weak regulatory frameworks exacerbate these risks (WHO, 2015).

### **2.2.1 Rising demand for meat in LMICs: implications for food safety**

The demand for meat in LMICs has been increasing steadily in recent years, driven by factors such as rising incomes, urbanization, and changing dietary patterns. It is projected that meat production will reach 377 million tons by 2030 (OECD/FAO, 2022), mostly in LMICs. As people in these countries attain higher living standards, their diets shift from predominantly plant-based foods to include more ASFs, particularly meat. This phenomenon, known as the "nutrition transition," is particularly pronounced in emerging economies and LMICs (Popkin, 1999). In these regions, where meat consumption is rising rapidly, ensuring the safety of meat becomes more critical, given the already high burden of FBDs (WHO, 2015).

In many LMICs, including Afghanistan, meat is often sold in informal markets through the traditional butcheries, where regulatory oversight is minimal and food safety practices are inconsistent. Informal markets are widespread, providing an affordable and accessible source of meat for many consumers, especially in urban areas (Ortega and Tschirley, 2017). However, inadequate regulation and poor hygiene standards in these markets pose substantial risks for FBDs.

### **2.2.2 Meat safety in Islamic countries: Religious and cultural significance**

In Islamic countries, meat safety is shaped by an interplay of religious, cultural, and public health considerations. For Muslim communities, meat has both nutritional value and religious importance, especially during events like *Eid al-Adha*, a major festival involving the ritual sacrifice of animals. During *Eid al-Adha*, meat is shared among family, friends, and those in need, underscoring the importance of hygienic meat handling (Bonne and Verbeke, 2008). As a global event, *Eid al-Adha* involves the sacrifice of millions of animals each year. Approximately 50 million animals are sacrificed annually, creating a substantial economic impact—estimated at around \$100 billion globally—while also presenting logistical and public health challenges (Switas, 2024). Consequently, *Eid al-Adha* holds significance not only as a religious occasion but also as an economic event that affects livestock management and stimulates various sectors of the global economy.

The large-scale sacrifices during *Eid al-Adha* present challenges in terms of logistics and safety. Conducting animal slaughter in open spaces and warm climates increases the potential for food- and animal-borne pathogens (Noviyanti, 2017). Research has shown a 20% increase in diarrheal diseases among Muslim children during *Eid al-Adha*, indicating possible health risks from insufficient meat processing and infrastructure (Schwab and Armah, 2016). To mitigate these risks,

experts recommend strategies such as public health campaigns and involving veterinarians in monitoring animal health and slaughtering practices (Adrenalin et al., 2020; Noviyanti, 2017). Such approaches are essential to ensuring the safety of meat distributed during this observance.

Muslims also require that meat consumed during *Eid al-Adha*, and year-round, be halal, meeting religious as well as food safety standards. The concept of halal extends beyond religious requirements to include hygiene and quality standards that align closely with food safety practices (Rezai et al., 2012). Halal regulations require animals to be slaughtered from a healthy stock, in a hygienic and humane manner, which both religiously and practically supports food safety (Alzeer et al., 2018). However, aligning halal standards with food safety regulations in informal markets of LMICs faces several key challenges. These include weak and inadequately enforced food safety regulations, particularly in informal markets (Grace et al., 2014; Seyoum et al., 2024).

As urbanization and income levels rise, demand for meat in Islamic countries and LMICs continues to grow. This trend brings increased risk for FBDs in areas where safety protocols may be under-regulated, especially in informal markets (Oloo et al., 2018; Unnevehr, 2015). Research emphasizes the need to strengthen food safety systems in LMICs, as insufficient oversight of hygiene practices during meat production, processing, and sales contributes to contamination and increased FBDs (Grace, 2015). Moreover, because meat plays a vital role in both cultural and religious practices, any lapse in meat safety not only endangers public health but may also erode trust in halal certification and the broader food system (Ramli et al., 2018; Voak, 2021).

In Islamic and LMICs contexts, ensuring meat safety is vital for multiple reasons:

- **Public Health and Hygiene:** As demand for meat increases, so does the risk of FBDs without strict safety protocols. This issue is particularly concerning in LMICs, where informal markets often operate without formal regulatory oversight, creating contamination risks (Roesel and Grace, 2014).
- **Cultural and Religious Integrity:** Muslim consumers require that meat meet both halal and safety standards to satisfy religious obligations. A failure to uphold these standards could undermine trust in halal certification systems and the credibility of the food supply chain (Bonne and Verbeke, 2008). Research shows that halal certification increasingly serves as an indicator of quality assurance, with food safety considered an integral component of halal compliance (Rezai et al., 2012).
- **Economic Impact:** Strengthening meat safety has public health and economic benefits, reducing healthcare burdens, enhancing productivity, and promoting economic growth (Grace, 2015). Additionally, aligning halal certification with international safety standards

may enable LMICs to access broader markets and participate more competitively in global food trade (Alzeer et al., 2018).

### **2.3 Meat quality and safety in consumer behavior studies**

Meat quality and safety have been extensively explored in HICs, with research focusing primarily on three key areas: demand for quality and safety, provision of these attributes, and consumer perception of them (Grunert, 2005). Meat quality evaluations by consumers are based on various cues, including sensory attributes like tenderness and color, as well as information obtained through experience after purchase and consumption (Banović et al., 2009).

These quality cues can be categorized into three types: search, experience, and credence attributes (Becker et al., 2000; Grunert et al., 2004). Search and experience cues are further divided into intrinsic attributes, such as color, texture, and marbling, and extrinsic attributes, including factors like brand, place of purchase, price, and country of origin (Becker et al., 2000). Credence attributes, which consumers cannot directly evaluate even after purchase, are related to food safety, health implications, and other non-visible factors such as production methods (Becker et al., 2000). Among extrinsic search attributes, country of origin and place of purchase consistently emerge as influential factors in consumers' pre-purchase decisions (Becker et al., 2000; Glitsch, 2000). After purchase, flavor becomes the most significant experience-based quality cue (Glitsch, 2000). Research by Jabbar and (Jabbar and Admassu, 2009) identified freshness as the most important intrinsic cue for meat safety, while country of origin and animal feed type are considered critical indicators of meat safety Becker et al. (2000).

Several studies consistently highlight important intrinsic cues, including tenderness, smell, juiciness, freshness, color, fat content, and hygiene/cleanliness, along with extrinsic cues like price, brand/label, and Halal certification for Muslim consumers (Banović et al., 2009; Chamhuri and Batt, 2015; Jabbar and Admassu, 2009; Udomkun et al., 2018; Van Wezemael et al., 2010). However, the relative importance of these attributes often varies depending on consumers' socio-economic background.

Production systems also play a significant role in shaping consumer preferences. For instance, a review by Stampa et al. (2020) shows that consumers are willing to pay more for pasture-raised animal products, as they associate these with health and environmental benefits. Specific preferences for certain types of meat have also been observed. For example, in Spain, consumers tend to favor suckling lamb over ternasco lamb, despite both types coming from the same region (Bernués et al., 2003).

The significance of meat origin has been further emphasized in various studies. For example, Font-i-Furnols et al. (2011) found that the origin of meat was a key factor in purchase decisions for Spanish, French, and English consumers, with a preference for grass-fed over other feeding systems. Similarly, Hersleth et al. (2012) observed that Italian and Norwegian consumers preferred lamb meat from animals grazed on mountain pastures compared to those grazed on lowland pastures, with a general inclination toward domestic over imported meat.

Additionally, information about animal rearing conditions can influence consumer acceptance of meat products. Napolitano et al. (2010) demonstrated that providing information about rearing conditions significantly shaped consumer attitudes toward lamb meat, highlighting the growing demand for transparency in production processes.

## **2.4 Willingness to pay for meat safety: Literature gaps in LMICs and Islamic Countries**

Food safety is a key concern for consumers globally, especially regarding meat products. Numerous studies show that consumers are willing to pay a premium for meat that is perceived to be safer. For example, Röhr et al. (2005) highlighted the importance of food safety to consumers in Europe, while Van Wezemael et al. (2010) identified food safety as a major factor in how European consumers assess the healthiness of beef. Similarly, in the U.S., Loureiro and Umberger (2007) found that consumers prioritized food safety attributes over other factors, such as country-of-origin labelling, when purchasing beef.

In HICs, the demand for meat safety has been well documented. Lusk et al. (2003) showed that European consumers were willing to pay more for beef from cattle not treated with growth hormones. Similarly, Angulo and Gil (2007) found that Spanish consumers were prepared to pay a premium for beef with food safety assurances. These studies indicate a clear consumer preference for meat safety across different contexts in HICs.

Research on consumers' WTP for meat safety in LMICs reveals varying levels of acceptance and price premiums. In Eastern DRC, consumers' WTP for meat products is influenced by factors such as color, texture, and availability (Udomkun et al., 2018). In Ghana, consumers are willing to pay a premium for upgraded meat standards, with education, income, and household composition as key determinants (Amfo and Ali, 2021). Jabbar and Admassu (2009) found that consumers in Ethiopia were willing to pay more for beef perceived as safer. Across these studies, factors such as income, education, and product attributes consistently influence consumers' WTP for safer meat products.

These studies suggest growing consumer concern for food safety in LMICs, particularly in urban areas. However, most existing studies focus on formal markets, whereas informal markets, which dominate meat sales in many LMICs, are rarely studied despite their importance to local food systems.

A particularly overlooked area is the intersection of meat safety and cultural or religious factors, especially in Islamic countries. In these countries, halal certification is not only a requirement for religious compliance but also a factor in consumer perceptions of meat safety. Halal governs not just the method of slaughter but the entire food production chain, adding complexity to the issue of food safety (Farouk et al., 2014; Martuscelli et al., 2020). During religious events such as *Eid-ul-Adha*, when millions of animals are sacrificed, ensuring meat safety becomes critically important. However, research exploring how halal requirements interact with other safety attributes in these contexts is limited.

Emerging research on the safety and authenticity of halal products offers some insights. For example, a study on broiled chicken sausage found that halal samples were free from contamination by coliforms, *E. coli*, and *Salmonella* compared to non-halal samples (Ibrahim et al., 2014). This suggests potential safety advantages of halal-certified products. Nonetheless, more extensive research, particularly on how Muslim meat consumers relate halal criteria with food safety, is needed to validate these findings across different meat products and production systems. Additionally, concerns about adulteration, contamination, and fraud in halal products underline the need for better traceability systems to ensure food safety (Voak, 2021).

## **2.5 WTP for sedentary versus nomadic meat**

In the meat supply chain, the pre-harvest stage—where animals are raised in varying livestock systems—is fundamental to shaping meat attributes valued by consumers. Much of the literature to date has focused on how factors like the place of origin (e.g., local vs. imported, domestic vs. foreign) and grazing system (lowland vs. highland) influence consumer preferences (Arun and Bhuvanewari, 2019; Font-i-Furnols et al., 2011; Hersleth et al., 2012). Studies predominantly from HICs consistently show that consumers prefer domestically produced meat, favour grass-fed animals, and value lamb reared in highland pastures due to perceived quality and health benefits. Limited research from LMICs, such as Imami et al. (2011), similarly indicates a preference for local and traditional meat sources within these regions.

Additionally, consumer preferences are shaped by attributes like freshness, safety, and livestock rearing practices, with growing interest in animal welfare and environmental impact. For instance, Font-i-Furnols et al. (2011) found that consumers link grass-fed and highland-grazed livestock with

superior health benefits and taste. Likewise, Hersleth et al. (2012) observed that consumers are increasingly concerned with animal welfare and the sustainability of farming practices, factors that influence their meat choices. In LMICs, traditional livestock systems such as nomadic grazing are deeply rooted in cultural practices and local knowledge, further impacting consumer perceptions of quality.

## **2.6 WTP for traditional butchery versus supermarket meat**

At the harvest stage along the supply chain (i.e., slaughtering and processing), studies have focused on preferences for supermarket and butchery meats. Overall, literature suggests preference heterogeneity. While consumers in HICs often prioritize attributes like organic, local origin, and animal welfare when choosing supermarket meat (McEachern and Seaman, 2005; Pirsich and Weinrich, 2019), Muslim consumers tend to favor butchery meat, placing particular emphasis on the Halal qualification/label, the Islamic production system (i.e., halal-slaughter), and Muslim ownership of the shop. This is often accompanied by a high level of trust in butchery meat (Ahmed, 2008; Chamhuri and Batt, 2015; Demont et al., 2013). In LMICs, consumers highly trust local butchers over supermarkets. For instance, in Malaysia a study by Chamhuri and Batt (2015) conclude that preferences are influenced by the perceptions of freshness, Halal assurance, and strong relationships with retailers.

Another dimension of supermarket meat, when slaughtered in modern slaughterhouses, involves the use of modern techniques like various forms of stunning and advanced machinery. However, some Muslim consumers and scholars consider these practices incompatible with Halal-slaughtering criteria (Fuseini et al., 2017).

Despite high-level of trust on traditional butcheries and certain level of doubts about the supermarket meats' compliance with halal criteria, consumers in LMICs are faced with significant FSHs when purchasing meat from traditional butcheries compared to supermarkets. Studies indicate that traditional butcheries frequently lack proper hygiene practices, leading to higher risks of microbial contamination. Workers in butcheries often exhibit poor personal hygiene, irregular handwashing, and inadequate use of protective equipment (Siluma et al., 2023; Asati et al., 2024), which significantly increase the likelihood of cross-contamination and FBDs. In contrast, supermarkets typically adhere to stricter hygiene and sanitation protocols, including regular inspections by health authorities, mandatory staff training on food safety, and the use of Personal Protective Equipment (PPE) during meat handling (Siluma et al., 2023). These practices not only enhance the safety of the meat but also improve consumer confidence in the products offered.

Moreover, supermarkets typically enforce systematic cleaning and sanitation protocols that are often lacking in traditional butcheries. For instance, they adhere to structured cleaning schedules for food preparation areas, and their staff receive training to ensure compliance with strict hygiene standards (Citron Hygiene, 2023). Additionally, the meat processed for supermarkets usually comes from modern slaughterhouses, where workers are mandated to follow stringent sanitation guidelines. This meat undergoes laboratory testing prior to distribution to supermarkets to verify safety and quality (MAIL, 2019). Together, these measures create a safer environment for meat processing and handling in supermarkets compared to traditional butcheries, where inconsistent hygiene practices may pose heightened public health risks.

## **2.7 Framing effect in consumer behavior studies**

### **2.7.1 Overview of the framing effect**

The framing effect, a cognitive bias wherein the way information is presented significantly influences decision-making, originated from Tversky and Kahneman's prospect theory (Tversky and Kahneman, 1981). Prospect theory, a cornerstone in behavioral economics, asserts that individuals exhibit loss aversion, meaning they tend to prefer avoiding losses over acquiring equivalent gains. This foundational insight into human decision-making has informed the understanding of framing effects, demonstrating that the presentation of information in terms of losses (loss framing) or gains (gain framing) can powerfully shape choices. In consumer behavior studies, framing effects have proven instrumental in directing consumer perceptions, preferences, and WTP across diverse products, especially those where safety, health, or sustainability attributes are emphasized (Levin and Gaeth, 1988; Shan et al., 2020).

In consumer behavior research, framing studies have evolved to investigate how different types of framing impact product choices, brand perceptions, and WTP. Early studies, for example, focused on attribute framing (Levin and Gaeth, 1988), which highlights specific positive or negative attributes of a product, such as describing a food item as "95% fat-free" versus "5% fat." This subtle shift in description can meaningfully influence consumer perceptions and choices, as consumers are more likely to prefer a positively framed attribute, considering it a marker of quality and value.

Expanding upon attribute framing, research in consumer behavior has identified two additional types of framing that significantly affect consumer choices: goal framing and risky choice framing (Levin et al., 1998). Goal framing presents the consequences of action or inaction to encourage specific behavior (e.g., focusing on the benefits of buying certified products or the drawbacks of not choosing them). Risky choice framing, often relevant in safety-related decisions, presents choices in terms of potential gains and losses. Studies consistently find that consumers are more

responsive to loss framing, particularly for products that carry implications for health or safety, such as food items (Schroeter et al., 2001; Tversky and Kahneman, 1981). These framing types underscore the importance of framing in consumer behavior, offering marketers a toolkit to nudge consumers toward desired actions by emphasizing different message aspects.

### **2.7.2 Application of framing effect in food marketing**

Research on framing effects in food marketing reveals that consumers' WTP and product evaluations can be significantly influenced by how information is presented. Attribute framing, where product characteristics are described in positive or negative terms, generally shows that gain-framed messages are more effective than loss-framed ones (Dolgoplova et al., 2021). However, the impact of framing may diminish when consumers actually taste the product (Levin and Gaeth, 1988). For sustainable foods, aligning environmental claims with product types (utilitarian or hedonic) can enhance perceived tastiness, quality, and willingness to pay (Weisstein et al., 2024). In the context of new food technologies like active packaging, consumer acceptance depends on the specific product, relative benefits, and how the technology is framed in relation to alternatives. Notably, framing effects are more pronounced among consumers who are initially resistant to the technology (Just and Goddard, 2023).

Further studies reveal that framing strategies can also effectively motivate consumers to make sustainable and health-conscious choices. Positive framing tends to resonate more with environmentally aware consumers. Conversely, negative framing is often more persuasive for those who may not prioritize environmental issues, suggesting that tailoring messages to the audience's level of environmental awareness is crucial for effectiveness (Okada and Mais, 2010). Furthermore, presenting green claims as specific, short-term benefits can enhance their perceived value among consumers (Zandstra et al., 2012).

The impact of framing is also moderated by consumers' concerns about climate change; stronger effects are noted when concern levels are lower (Newman et al., 2012). Different types of message framing can evoke various emotional responses from consumers, and purchasing sustainable products can create a positive feedback loop, encouraging future sustainable choices (Rakib et al., 2022). These studies suggest that to effectively motivate sustainable behavior, it is essential to customize communication strategies based on the target audience's environmental awareness and concerns. These findings underscore the significance of strategic framing in fostering sustainability and promoting health-conscious consumer decisions.

Moreover, when using framing effect in food marketing, it is also important to notice how consumer food choices are influenced by various psychological and contextual factors. Message

framing plays a crucial role in promoting sustainable behaviors, with effectiveness depending on risk level, self-referencing, audience knowledge, and gender (Cheng et al., 2011). In relation with psychological factors, White et al. (2019) developed a framework called "SHIFT" that outlines five key psychological factors (social influence, habit formation, individual self, feelings and cognition, and tangibility) that can be leveraged to encourage sustainable consumer behaviors. Additionally, building upon goal-framing theory, Onwezen (2023) found that moral goal frames are more consistently associated with sustainable food behaviors compared to gain and hedonic goal frames. The author highlights that activating moral goal frames, rather than gain or hedonic frames, is important for promoting sustainable food transitions.

Furthermore, consumer psychology for food choices is also affected by food marketers' actions, environmental influences, and personal factors, with health motivations, food literacy, and customized meals positively impacting healthier choices (Khan and Pandey, 2023). These insights can guide marketers, policymakers, and organizations in promoting healthier and more sustainable food choices through effective messaging and environmental interventions.

### **2.7.3 Framing effect and WTP for food safety**

Research on the framing effect and its influence on consumers' WTP for food safety reveals nuanced consumer responses, especially between gain- and loss-framed messaging. Studies indicate that loss-framed messages generally lead to a higher WTP for food safety interventions compared to gain-framed messages. For instance, Britwum and Yiannaka (2019) and He et al. (2014) found that consumers are more likely to pay for safety interventions when messages emphasize potential risks or losses. However, these findings are not universal, as certain consumer segments, such as those with high existing trust in food safety, may react differently. For example, Gifford and Bernard (2004) observed that loss-framed messages could decrease purchase intent for organic foods among highly trusting consumers, suggesting a potential "backfire effect" with negative framing in these groups.

Further nuances in framing's impact on WTP are evident in studies addressing specific product attributes and new food technologies. Balanced information framing can sometimes reduce WTP for novel safety features, as seen in Tran et al. (2016), where nanotechnology-enhanced packaging safety failed to increase WTP, potentially due to mixed consumer feelings about new technologies. In addition to framing, consumers' WTP and food safety purchase decisions are influenced by their pre-existing risk perceptions, trust in the food industry, and demographic factors such as age and income level (He et al., 2014; Tran et al., 2016). Notably, major food safety incidents have shown to significantly shift consumer behavior and perceptions, with distinct responses based on regional and cultural factors (He et al., 2014).

Health-related framing further supports framing's importance in influencing WTP for food safety attributes. Studies indicate that positively framing health benefits—such as emphasizing the health advantages of organic products—can increase consumer WTP, as demonstrated by Aschemann-Witzel et al. (2013). In contrast, Schroeter et al. (2001) found that loss-framing of food safety information, particularly regarding meat safety, resulted in higher WTP. Likewise, Hayes et al. (2002) documented increased WTP for meat safety when messages were framed negatively.

Together, these findings underscore framing's essential role in shaping consumer behavior concerning food safety. They also highlight the importance of aligning message framing with consumer characteristics—such as risk sensitivity and trust in food safety protocols—to optimize the effectiveness of food safety communications.

#### **2.7.4 Written versus visual framing in consumer behavior studies**

In consumer behavior studies, the framing effect—whether communicated through written or visual means—plays a significant role in shaping consumer perceptions, preferences, and WTP for food products. Both written and visual framing engage consumers differently, leveraging distinct cognitive and emotional responses to drive behavioral outcomes.

Written framing, particularly when emphasizing health and environmental benefits, has been shown to meaningfully influence consumer attitudes and WTP. Studies indicate that consumers' evaluations of food products can vary widely depending on how product information is framed. For instance, framing plant-based products in terms of health benefits versus environmental impact influences consumer attitudes differently, highlighting that personal characteristics can mediate these framing effects (Isham et al., 2022). This aligns with Shan et al. (2020), who found that positively framing the benefits of organic foods enhances consumer attitudes and purchase intentions. However, inconsistencies are also noted, as seen in Yang et al. (2013), who observed that framing could affect WTP but not necessarily willingness to accept alternative product attributes. These studies highlight that while written framing is effective in influencing consumer perceptions, it may not always translate consistently across different behavioral metrics.

Moreover, the impact of written framing on perceived value and product choice can vary by context. Rombach et al. (2023) point out that consumer perceptions of plant-based foods are complex and do not always align with "green and clean" images, indicating that context and individual differences significantly influence framing effectiveness. Weisstein et al. (2024) further emphasizes that environmental claims can initially enhance perceived taste and quality, but this effect often diminishes post-consumption. Thus, while written framing can initially sway consumer attitudes, actual consumption experience is crucial in shaping lasting product evaluations.

Visual framing also plays a powerful role in influencing consumer preferences, particularly by leveraging gaze direction and visual cues that can heighten desirability. Madipakkam et al. (2019) demonstrated that consumers are willing to pay more for food items that capture visual attention, suggesting that visual stimuli can create immediate desirability that translates to higher WTP. Similarly, visual presentation can enhance perceived quality and safety, particularly for locally sourced foods, as shown by Frash et al. (2015).

The impact of visual framing is further amplified when combined with written framing. Shan et al. (2020) found that both written and visual gain-framed messages significantly affected consumers' purchase intentions, with visual gain-framed messages having an even greater impact. Additionally, Lee et al. (2011) noted that consumers exposed to positive visual information about imported traceable beef were willing to pay a 50% premium over domestic market prices, underscoring the potency of visual framing in enhancing perceived product value.

The interaction between visual and written framing can be particularly effective, as illustrated by Lehberger and Gruener (2020), who found that both visual and textual information on food protected by beneficial insects positively influenced consumer perceptions and WTP. This suggests that combining written and visual framing can enhance overall framing effectiveness by appealing to both rational and emotional aspects of decision-making.

### **2.7.5 Gaps in framing research in LMICs and Islamic countries**

While extensive research has explored framing effects in high-income countries, the comparative impact of written versus visual framing in LMICs and Islamic countries remains under-explored. These regions present unique cultural and economic contexts that shape food safety concerns and consumer preferences. For example, consumers in Islamic countries may prioritize halal certifications, which could interact with framing effects in distinct ways. Addressing this research gap is crucial for developing culturally aligned marketing strategies that promote safer food choices and align with rising global demand for food safety. By examining framing's role in LMICs and Islamic countries, researchers and marketers can gain insights into how these strategies influence consumer WTP, ultimately contributing to improved public health and well-being across diverse global contexts.

## **2.8 Psychological priming and consumer behavior**

Psychological priming is based on the idea that exposure to specific stimuli can activate related concepts in memory, influencing subsequent responses and behaviors. Molden (2014) describes priming as either triggered by performing an action or simulating the behavior of others, suggesting that both mechanisms are essential in understanding how consumers respond in social contexts.

Supporting this, Smith and Mackie (2014) emphasize that observing others' reactions can serve as a powerful form of priming, shaping consumer attitudes and behaviors by activating related attitudes or beliefs. Together, these perspectives underline the diverse ways in which priming can operate and highlight its relevance in consumer behavior research.

Priming has been used to influence consumer choices through various techniques, such as prompting certain thoughts (Cohn et al., 2015), recalling past experiences (Callen et al., 2014), and unscrambling sentences to activate specific concepts (Bargh et al., 1996). Research by Farrar et al. (2022) examined priming effects by exposing consumers to food-related logos and found that while priming alone did not significantly impact food choices, "trait mindfulness" could help reduce unhealthy food selections. Fukawa (2016) also demonstrated that priming consumers with healthy product attributes encourages preferences for healthier products, mediated by implicit attitudes influenced by these primes.

The role of repeated exposure in shaping consumer attitudes is illustrated by Shih (2012), who discusses "cognitive lock-in" effects. Through repeated exposure to emotionally driven product information, consumers experience less conflict between cognitive and emotional responses, strengthening purchase intentions. These studies suggest that strategic priming, tailored to influence specific attitudes, can steer consumer preferences effectively.

Research has also explored evolutionary concepts in priming. Zhang and Guo (2015) studied the "ancestor advantage" phenomenon, finding that priming with ancestral cues can improve cognitive performance and influence consumer decisions. This evolutionary approach suggests that deep-rooted psychological mechanisms may affect preferences, particularly in contexts where consumers feel a connection to ancestral or survival-related cues.

Psychological priming also significantly influences consumers' WTP for products. Lehmann and Reimann (2012) found that priming with time-related cues, compared to money-related cues, often leads to a stronger personal connection to products, increasing WTP. Laran et al. (2011) further show that brand exposure can serve as a powerful prime; specific brands evoke associations that either encourage or discourage consumer spending behaviors.

Moreover, Veltkamp et al. (2011) explored subliminal conditioning as a form of priming, finding that it can encourage consumer behaviors, like purchasing, even in the absence of an immediate need. This subliminal priming suggests that cues presented outside of conscious awareness can still shape WTP in subtle but impactful ways. Together, these findings imply that psychological priming can be an effective tool for marketers aiming to increase consumer engagement and WTP by strategically utilizing relevant primes.

## **2.9 Risk perception, risk preference, and preferences for food safety**

The relationship between risk perception, risk preferences, and consumers' WTP for food safety is a critical area of research, particularly in LMICs where food safety hazards are prevalent. Risk perception refers to a consumer's subjective evaluation of the likelihood of encountering a hazard, while risk preference reflects an individual's tolerance for uncertainty (Pennings et al., 2002). Together, these factors shape consumer decisions regarding food safety, particularly in contexts where foodborne illnesses and inconsistent safety practices pose significant threats (Lusk and Coble, 2005; McCarthy and Henson, 2005).

Consumers' risk perceptions often directly influence their purchasing behaviors. For example, individuals accustomed to buying meat from local butchers may view supermarket meat as unfamiliar and therefore risky—a pattern observed with novel food products, which often carry heightened uncertainty (Siegrist, 2008). Generally, higher perceived risks negatively correlate with WTP for food products, including meat. Consumers who associate greater risks with a product are less likely to pay a premium for it unless reassurances about safety are provided (McCarthy and Henson, 2005; Pennings et al., 2002). Moreover, risk-averse individuals, in particular, are more inclined to choose safer options, even at higher costs, reflecting a general preference for reducing uncertainty and potential harm (Petrolia, 2016; Lusk and Coble, 2005).

Trust in food providers and visible safety measures significantly influence consumers' perceptions of risk and their subsequent WTP. When consumers observe transparent safety practices or trust the credibility of food providers, their confidence in product safety increases, reducing perceived risks (Chen, 2013). This is particularly relevant in LMICs, where trust in food safety systems often determines consumer choices. For instance, studies in Accra, Ghana, revealed widespread food safety concerns, with up to 90% of participants expressing anxiety about food-related risks (Afriyie et al., 2022). These findings underscore the importance of visible and trustworthy food safety interventions in mitigating risk perceptions.

Interestingly, research indicates that risk perception often exerts a stronger influence on WTP than benefit perception. Consumers tend to focus more on avoiding potential losses than on gaining equivalent benefits, consistent with prospect theory (Moon and Balasubramanian, 2001). This behavioral asymmetry suggests that addressing perceived risks may be more effective in shaping consumer decisions than emphasizing potential advantages.

These dynamics are consistent across various food categories, including genetically modified foods (Lusk and Coble, 2005), organic produce (Hammit, 1990), and products with potential pesticide

residues (Eom, 1994). This robustness across diverse food types highlights the universal relevance of risk perceptions and preferences in consumer behavior.

Understanding the interplay between risk perceptions, risk preferences, and WTP is essential for designing effective food safety policies and interventions. Policymakers and industry stakeholders can leverage these insights to develop strategies that address consumer concerns and promote safer food choices. Public campaigns emphasizing transparency, credible certifications, and observable safety practices can reduce perceived risks and build consumer trust. By addressing these psychological and behavioral factors, stakeholders can align food safety efforts with consumer needs and preferences, fostering healthier and more sustainable consumption patterns.

## **2.10 Meat attachment: Meat Attachment Questionnaire (MAQ)**

Meat attachment refers to the psychological, emotional, and behavioral bonds people develop with meat consumption, as initially outlined by Graça et al. (2015a; 2015b). This concept captures the various dimensions of attachment to meat as a dietary staple, encompassing enjoyment, necessity, entitlement, and personal identification with meat. The Meat Attachment Questionnaire (MAQ), also developed by Graça et al. (2015a), assesses this attachment through four components: hedonism, which reflects the pleasure and enjoyment derived from eating meat; affinity, indicating an emotional connection to meat; entitlement, a belief in one's right to consume meat; and dependence, representing a feeling of reliance on meat as an essential or irreplaceable part of the diet. Together, these dimensions offer a comprehensive view of the psychological and emotional factors underlying meat attachment.

The significance of meat attachment in consumer behavior has been substantiated across studies. For example, Graça et al. (2015b) and Lentz et al. (2018) showed that meat attachment variables account for additional variance in meat consumption and willingness to adopt plant-based diets, beyond established psychological models like the Theory of Planned Behavior (TPB). This suggests that the MAQ captures unique aspects of consumer resistance to changing dietary patterns, particularly regarding the substitution of meat with plant-based proteins. Additionally, Profeta et al. (2021) found that individuals with strong meat attachment are less likely to accept meat alternatives, emphasizing the need for targeted interventions to promote sustainable diets. In line with this, Kühn et al. (2023) reported that high levels of meat attachment correlate with lower trust in plant-based, insect-based, and cultured meat proteins, indicating a barrier for these consumers in transitioning toward a less meat-centric diet. Importantly, Kühn et al. (2023) found that the Meat Attachment Scale (MEAS) functions as a predictor of trust in alternative protein processing technologies independently of general food-related fears like food neophobia. Wang and Scrimgeour (2021) further reinforced these findings by demonstrating that the four factors of meat

attachment are strongly linked to attitudes toward alternative proteins among consumers in China and New Zealand.

Overall, research consistently shows that high meat attachment levels are associated with resistance to reducing meat intake or shifting toward plant-based diets, suggesting that meat attachment may reflect both a dietary preference and a culturally reinforced behavior, particularly in regions where meat consumption is embedded in social or religious practices (Graça et al., 2015a; Graça et al., 2015b; Kühn et al., 2023).

## **2.11 Chapter Summary: Literature gaps in Islamic LMICs**

This chapter provided a comprehensive literature review on food safety, with a particular focus on meat safety in LMICs and Islamic nations. It explored the intersection of food safety with meat consumption, highlighting the rising demand for meat in LMICs and its implications for public health and addressing food safety concerns. The chapter emphasized the cultural and religious significance of meat in Islamic countries, especially during events like Eid al-Adha, and discussed the challenges of aligning halal standards with food safety regulations and standards.

In LMICs, informal markets are often the primary source of meat, especially in urban areas, but they are characterized by inconsistent hygiene practices and minimal regulatory oversight, posing significant public health risks. While some studies have shown that consumers in urban LMIC settings with higher incomes are willing to pay a premium for safer meat (Lagerkvist et al., 2013), there is limited research on these behaviours in very low-income countries like Afghanistan and sub-Saharan African nations. Furthermore, there is a critical lack of research on consumer preferences for meat safety attributes at different stages of the production chain—pre-harvest, harvest, and post-harvest—in these regions.

Islamic countries face additional complexities due to the cultural and religious significance of meat, particularly during events like Eid al-Adha. Halal certification, which governs the entire food production process, intersects with food safety regulations, especially in informal markets. However, the literature lacks in-depth exploration of how halal requirements influence perceptions of meat safety and consumer behavior. Despite the religious importance of halal meat, there is insufficient research on how these cultural and religious factors intersect with consumer preferences for safer meat in Islamic contexts.

The review delved into consumer behavior studies related to meat quality and safety, examining various attributes that influence consumer perceptions and choices. It also discussed consumers' WTP for safer meat products, noting the substantial research in HICs while highlighting the limited studies in LMICs and Islamic contexts.

The chapter also identified gaps in the literature concerning psychological and behavioral factors influencing meat consumption in Islamic LMICs. Studies in HICs have extensively examined framing effects, psychological priming, and meat attachment, but these areas remain underexplored in LMICs. Framing effects—such as positive or negative message framing—have been shown to shape consumer attitudes and behaviours toward sustainable and health-conscious food choices. However, little is known about the effectiveness of these strategies in LMICs, where cultural and economic contexts differ significantly. Similarly, while psychological priming has been shown to influence consumer behavior in Western settings, its application in food safety contexts in LMICs and Islamic countries is underdeveloped.

The concept of meat attachment, which examines the psychological and emotional factors shaping relationships with meat consumption, is another area requiring further investigation. Existing studies have largely been conducted in HICs, where cultural attitudes and dietary patterns differ markedly from those in LMICs. Validating tools such as the MAQ in LMICs – including Islamic countries – is essential to understanding how urbanization, globalization, and evolving dietary habits influence meat consumption in these regions. In Islamic countries, the psychological dimensions of meat attachment are intertwined with religious practices, yet these aspects remain underexplored.

Overall, the literature review underscored the need for more context-specific research in LMICs and Islamic nations to address these gaps. By exploring consumer perceptions, preferences, and behaviours in these regions, future studies can inform more effective food safety policies and interventions. This is particularly critical in regions with rising meat consumption, where public health, cultural values, and economic development intersect. Strengthening regulatory frameworks, improving hygiene practices, and addressing cultural factors are vital to ensuring safer meat consumption while respecting the cultural and religious expectations of consumers in LMICs and Islamic contexts.

## CHAPTER 3

### METHODOLOGY

#### **3.1 Chapter overview**

As explained in Chapter 1, this study employed an explanatory sequential design approach within mixed methods research. Hence, the study utilized both qualitative and quantitative methods. For the first analysis, the study conducted FGDs and the qualitative data collected through this approach were analysed using qualitative content analysis. The TFQM served as the basis for the analysis of qualitative data collected through FGDs. For the second and third analysis, we employed quantitative methods; non-hypothetical experimental auction, and BWS survey, respectively. Additionally, factor analysis was employed to analyse the meat attachment (MAQ) data, also part of the third analysis. This chapter explains in detail the conceptual framework, the study area, the data collection methods, data analysis, the empirical approaches, descriptive statistics, and the variables and their measurement methods which were used in the respective analysis in subsequent chapters.

#### **3.2 Qualitative method: Qualitative content analysis**

##### **3.2.1 Conceptual Framework**

The TFQM is a well-established framework to analyze how consumers perceive food quality, particularly in the context of meat (Grunert et al., 2004; Sadilek, 2019; Van Wezemael et al., 2010). This model synthesizes other theories related to consumer perception and decision-making, including the means-end theory, multi-attribute theory, and the economics of information approach. In the analysis of how Afghan consumers assessed meat quality and safety, the TFQM (illustrated in Figure 3.1) served as a guiding framework.

The TFQM evaluates consumer perception of food quality across two main dimensions: horizontal and vertical. The horizontal dimension (i.e. time dimension) addresses the time frame of quality evaluation, distinguishing between pre- and post-purchase assessments. In contrast, the vertical dimension (i.e. quality dimension) focuses on quality types, categorized as search, experience, and credence attributes. This dual-layered structure is integral to understanding consumer behavior.

Before purchasing, consumers rely on a combination of personal experience and intrinsic and extrinsic quality cues found in retail settings to form expectations about meat quality (Brunsø et al., 2005; Grunert et al., 2004). The means-end chain theory supports the notion that consumers view quality as a means to fulfill underlying purchase motivations and values. In the TFQM's vertical dimension, the purchase process is driven by three interlinked constructs: cue evaluation, expected quality, and expected purchase motive. Quality expectations stem from four key factors:

sensory properties, health considerations, convenience, and processing methods. Although consumers can readily evaluate cues such as color, odor, and hygiene at the point of sale, credence attributes, such as age and origin of the meat, are less apparent and require additional trust in sources like word-of-mouth or the reputation of the butcher (Becker et al., 2000; Grunert et al., 2004).

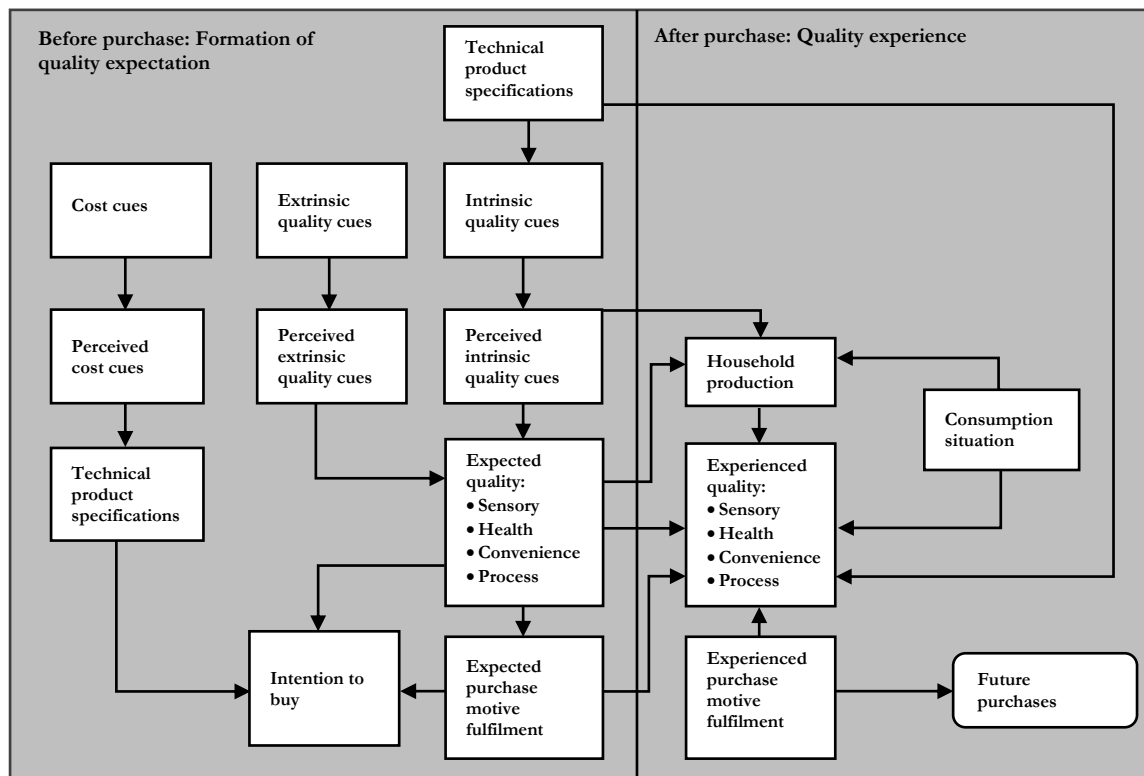


Figure 3.1: Total Food Quality Model (TFQM)

Source: Total Food Quality Model, Grunert, K.G. (2005).

The consumer's expectation of quality and its ability to meet the intended purchase motive result in positive purchase outcomes unless offset by 'negative consequences' such as cost concerns. These expectations, combined with perceived costs, guide pre-purchase intentions. Post-purchase, certain quality characteristics, like taste and tenderness, can only be judged through cooking and consumption. This experience shapes the consumer's perception of quality, influenced further by factors such as sensory responses and situational elements like mood or cooking conditions. Ultimately, whether a consumer feels satisfied or dissatisfied depends on how the experienced quality compares to the anticipated quality, which affects their decision to repurchase (Grunert et al., 2004).

### 3.2.2 Study area

The study was conducted in two cities in Afghanistan: Kabul and Bamyan, between August 2020 and March 2021. Figure 3.2 illustrates the location of the two cities on the country's map. The qualitative data collection involved seven FGDs, with three sessions conducted in Bamyan and four in Kabul.

Both Kabul and Bamyan have meat markets consisting of butcheries and supermarkets, and both cities feature a mix of sedentary and nomadic animal husbandry practices. Kabul, as the country's most populous and polluted urban center, experiences issues related to FSHs that stem from a variety of sources. Traditional butcheries, unregulated mobile meat vendors, and food carts contribute to these challenges, operating primarily within the informal economy (World Bank, 2014). Insufficient resources and limited capacity within public health institutions, coupled with a lack of regulatory oversight, mean these businesses often go unmonitored and unchecked. Despite this, informal meat markets play a critical role in supporting the livelihoods of many residents. Modern supermarkets also exist in Kabul, providing both fresh and refrigerated imported meat options. Additionally, small ruminants are commonly seen roaming the city, feeding on food waste and leftovers. With the approach of religious celebrations like Eid al-Adha and Muharram, nomadic herders bring their livestock into urban centers, creating temporary animal markets at various sites. For this study, these animals are classified under the "city-dwelling" livestock system. Currently, there are no regulations prohibiting the establishment of such animal markets within city boundaries.

Bamyan, located in the central highlands, is known for its small-scale, sedentary livestock practices, which thrive due to the region's extensive pastureland. Livestock farming forms an integral part of the livelihood for most residents, providing both food and income (FAO, 2021). Anecdotal reports suggest that meat from this region is particularly prized for its quality, taste, and safety, attributed to the animals grazing on nutrient-rich, high-altitude pastures.



**Figure 3.2: Study area on the map**

Source: Author's own

### 3.2.3 Participants

Participants for the study were chosen through a convenience sampling approach. Notices were placed on bulletin boards at public universities, mosques, and circulated on social media. Individuals who were interested contacted the research team in Kabul and Bamyan to express their willingness to join. If they met the participation criteria, they were invited to join an FGD session in their city. The selection criteria included: (i) being a meat consumer, (ii) purchasing meat, and (iii) being at least 18 years old. Specific dates and venues for the sessions were communicated later.

In total, three FGDs were held in Kabul and four in Bamyan, involving 52 participants, with group sizes ranging from seven to ten individuals. The age range of participants was between 18 and 45 years, and the sample included 31 men and 21 women (see Table 3.1). Due to cultural sensitivities in Afghanistan that make it uncommon for women to disclose their exact age, age groups were divided into three categories: young (18-30 years), middle-aged (31-45), and older adults (46-60).

**Table 3.1: Sociodemographic characteristic of FGD participants**

Variables	Definitions	No.	Total	Bamyan	Kabul
			(%)	(%)	(%)
Gender	male	31	60	66	52
	female	21	40	34	48
Age	18-30	25	48	38	61
	31-45	25	48	55	39
	46-60	2	4	7	0
	>60	0	0	0	0
Education	primary	1	2	3	0
	middle-school	2	4	3	4
	high-school	1	2	3	0
	14 grade (college level)	3	6	7	4
	bachelor	29	56	52	61
	master	9	17	17	17
	doctorate	4	8	14	0
	religious School	3	6	0	13
Occupation	Unemployed	3	6	7	4
	Laborer	4	8	0	17
	Self-employed	9	17	0	39
	Private Sector employee	6	12	7	17
	Public employee	15	29	45	9
	University Student	4	8	7	9
	University Lecturer	10	19	34	0
	Other	1	2	0	4
Monthly Households	< 5000	9	17	10	26
Income (in Afghani)	5001 – 12,500	21	40	38	43
	12,501 – 30,000	10	19	28	9
	30,001 – 50,000	11	21	24	17
	50,001 – 100,000	1	2	0	4

**Note:** at the time of this study, 1 Euro was equivalent to 88.62 Afghani (Source: <https://www.dab.gov.af/exchange-rates>; (Exchange rate as of August 10, 2020)

Source: Author's own computation based on FGD data

### 3.2.4 Focus Group outline

Each FGD lasted approximately 90 minutes and was audio recorded. The recordings were transcribed in Persian, the local language, and later translated into English. In both Kabul and Bamyan, the research team was composed of a facilitator and an assistant. The facilitator initiated each session with an introduction, a review of the consent form, and a briefing on the discussion guidelines.

The session began with an initial question about participants' occupations and their favorite foods, followed by an introductory question on foodborne illnesses. The conversation then progressed to a transition question aimed at understanding the participants' general perceptions of food safety, leading into the core discussion topics.

The main points covered in the discussions included: (i) Common foods that form the daily diet in Afghanistan, (ii) Views on meat quality and safety before harvest (i.e., meat sourced from nomadic, sedentary, and "urban-raised" livestock systems), (iii) Perceptions of meat quality and safety during the harvest stage (comparing traditional butchery practices with modern slaughterhouses and supermarket meat), and (iv) Perceptions of meat quality and safety after harvest (examining how quality expectations are formed before purchase and experiences after purchase).

### **3.2.5 Data analysis procedure**

To design the specific FGD guide and systematically code and analyze the data, we followed the frameworks established by Krueger and Casey (2015), and Gizzi and Rädiker (2021). We analyzed the transcribed sessions through qualitative content analysis using MAXQDA software. A hybrid approach of deductive and inductive coding was adopted to build our code structure. Initially, an a priori code set was derived from our research questions and relevant literature. This set was later expanded with initial coding methods to capture additional insights. In the third phase, a meticulous line-by-line coding process was employed to fine-tune the code system. Using qualitative content analysis, we then organized the codes into logical categories to identify common themes.

Our analytical framework, the TFQM, was employed for deeper data analysis, specifically incorporating the means-end chain approach within the vertical (quality) dimension of the TFQM to classify attributes. In this framework, attributes serve not as ends but as tools for making quality and safety inferences, signifying that consumers anticipate certain outcomes—either desirable or undesirable—based on these attributes.

For addressing our first research question, we sorted the codes into six categories: pasture type, exposure to food safety risks, quality, taste, price, and animal welfare. This classification enabled an analysis of participants' perceptions regarding the quality and safety of meat from different livestock systems. For example, codes like "mountain pasture" or "green pasture," linked with nomadic and sedentary livestock, inferred high quality or safe meat, whereas codes like "feeding on food waste," associated with urban livestock, indicated poor quality.

In tackling the second research question related to the harvest stage, participants' views on meat quality and safety from traditional butcheries versus modern slaughterhouses (including supermarket-sourced meat) were divided into positive and negative categories. Positive codes for

traditional butcheries included "lower food safety risk," "halal meat," "fresh meat," and "natural meat." On the negative side, codes like "poor hygiene," "unsanitary practices," and "absence of food safety controls" were grouped.

For our third research question concerning post-harvest quality expectations, codes were organized into expected quality cues and further subdivided into intrinsic, extrinsic, cost, and credence cues. These cues helped identify how consumers formed their quality expectations. For example, cues such as "meat color" were used to infer expectations like "freshness," while attributes like "taste," only evaluable post-consumption, were categorized under "experienced quality" for analysis after purchase.

### **3.3 Quantitative method**

#### **3.3.1 Data collection**

The quantitative data collection for this study incorporated non-hypothetical experimental auctions for four types of lamb meat, as well as a survey. These were conducted jointly during sessions held from January to April 2021. The data collection process utilized the Unipark computerized survey platform to facilitate both the auction and survey components. The study sample comprised 230 residents of Kabul, who were recruited via phone with eligibility criteria including being 18 years or older and purchasing meat at least once a month. Thirteen experimental sessions were conducted in total, each held from 13:30 to 15:00 at computer labs at Avicenna University, Gharjistan University, and the Center for Business Administration (CBA) in Kabul.

After data cleaning, three respondents were excluded from the final dataset due to incomplete responses and poor-quality data. Consequently, the dataset used for the analysis of both, the experimental auction and the BWS survey comprised information from 227 respondents.

Prior to participation, individuals were given a consent form outlining the study's details and informing them of their right to withdraw at any stage without repercussions.

#### **3.3.2 Survey and measures**

After the experimental auction, the post-experiment survey collected data on socio-economic factors that could influence participants' WTP for different meats, and meat attribute preferences. These factors included socio-economic characteristics (gender, age, education, household income, and employment status), experience with food-borne diseases (FBDs), attitudes toward food and meat safety, risk perception, and risk preference. The survey also collected data for BWS and MAQ, which constitute the third analysis of this dissertation.

In Afghanistan, women often do not disclose their exact age, so age was categorized into three groups: 18-24 years, 24-34 years, and over 34 years. Household income was categorized according to the National Technical Assistance (NTA) salary scale into low, middle, and high-income groups, and those who preferred not to disclose their income level. Employment status was classified as full-time employed, self-employed, part-time employed, unemployed, student, and others. We also collected data on meat consumption frequency, classified into habitual consumer (consume 1~5 times/week), occasional consumers (consume 1~2 times/month), and those who never consume meat.

Participants reported their FBD experience by selecting "Yes," "No," or "Don't Know." Attitudes toward food safety, butchery meat safety, and supermarket meat safety were measured on a 5-point Likert scale, with 1 indicating "very safe" and 5 indicating "very unsafe." Perceived risk of illness from meat consumption was assessed on a 10-point scale, with 1 being "very low" and 10 "very high." Risk preference was evaluated using an 11-point scale, with 0 indicating "completely unwilling to take risk" and 10 "completely willing to take risk". This self-assessment of risk preference, a widely used and effective measure, is well-suited for various contexts, including food choices (Petrolia, 2016; Falk et al., 2023).

### **3.3.3 Experimental auctions**

#### **3.3.3.1 Experimental Design**

The study utilized a 3 x 2 factorial, within- and between-subject experimental auction design to investigate Afghan consumers' preferences for four types of lamb meat distinguished by production systems (sedentary vs. nomadic) and distribution channels (traditional butchery vs. modern supermarket). Figure 3.3 outlines the auctioned products. Product No.1 is the meat stemming from sedentary system, slaughtered & processed at a traditional butchery, herein after called MST; Product No. 2 is the meat stemming from nomadic system, slaughtered & processed at a traditional butchery, herein after called MNT; Product No. 3 is the meat stemming from sedentary system, slaughtered & processed at a supermarket, herein after called MSM; and Product No. 4 is the meat stemming from nomadic system, slaughtered & processed at a supermarket, herein after called MNM. Thus, MST and MNT share the same retail channel but differ in their production methods. MSM and MNM, on the other hand, are supermarket-sold meats, sourced from sedentary and nomadic livestock systems respectively.

Each auctioned item was uniformly packaged and weighed 500 grams. Figure 3.3 indicates that traditional butchery meats (products 1 and 2) lacked labelling, whereas supermarket meats (products 3 and 4) featured small labels specifying their net weight and sale time. This reflects

common consumer awareness that supermarkets typically label products, while traditional butcheries do not.





		Production Systems	
		Sedentary	Nomadic
Slaughtering and Processing Systems	Traditional butchery		
	Supermarket		
		1 = MST	2 = MNT
		3 = MSM	4 = MNM

Figure 3.3: Auction products

**Note:** MST: Meat stemming from Sedentary system, slaughtered & processed at a Traditional butchery; MNT: Meat stemming from Nomadic system, slaughtered & processed at a Traditional butchery; MSM: Meat stemming from Sedentary system, slaughtered & processed at a Supermarket; MNM: Meat stemming from Nomadic system, slaughtered & processed at a Supermarket.

Source: author’s own, based on the actual auction products, taken during auction sessions (2021)

The factorial design included three distinct participant groups and involved two rounds of information treatments per group: (a) written information framing, (b) visual information framing, and (c) priming (Figure 3.4). Participants were randomly assigned to these groups using a randomization numbering system as described by Canavari et al. (2019). Each session included 20 participants, summing up to 230 total participants before data cleaning. After excluding cases with significant missing data, the final sample was 227 participants: 82 in Group 1, 75 in Group 2, and 70 in Group 3. The auction proceeded over three rounds.

In the second round, each group received the following initial treatments:

Group 1 received written information regarding the sedentary and nomadic livestock systems (Treatment 1.1, Appendix 1). This treatment was hypothesized to increase bids for sedentary meats (MST and MSM) and lower bids for nomadic meats (MNT and MNM), given potential consumer concerns related to nomadic livestock.

Group 2 was exposed to visual framing (Treatment 1.2, Appendix 2), which visually conveyed the same information as in Treatment 1.1 to compare the impact of visual versus textual framing.

Group 3 received a priming statement (Treatment 1.3, Appendix 3) prompting participants to recall their experiences with MBDs, expected to reduce bids for meats perceived as riskier.

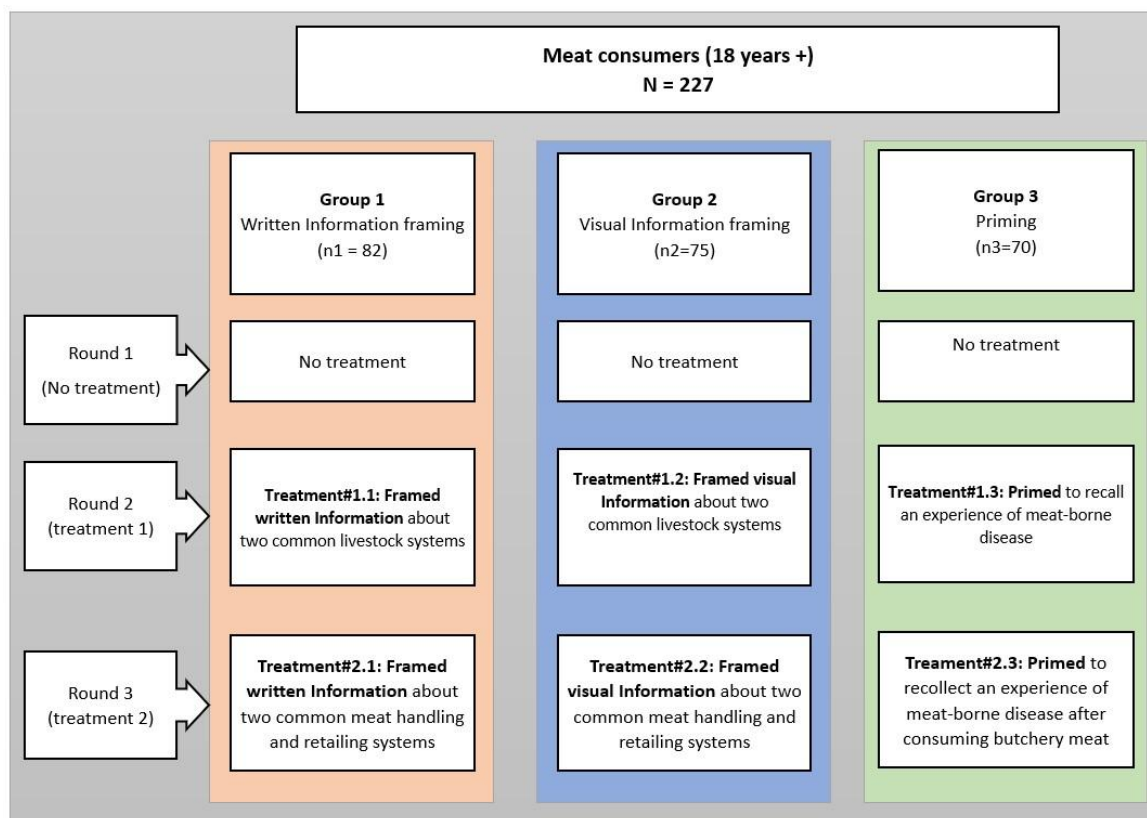
In the third round, participants encountered a second set of treatments:

Group 1 received written information on meat handling practices in traditional butchereries versus modern slaughterhouses, supplied through supermarkets (Treatment 2.1, Appendix 4). This treatment was anticipated to increase bids for supermarket meats (MSM and MNM) while reducing bids for traditional butchery meats (MST and MNT).

Group 2 received visual information on the same topic (Treatment 2.2, Appendix 5), intended to assess the differential impact of visual versus written information.

Group 3 received a priming statement related to MBDs specifically linked to traditional butchery meats (Treatment 2.3, Appendix 6), hypothesized to lower bids for these products and raise them for supermarket meats.

The goal of the third-round treatments was consistent across all groups: to understand how different information delivery methods could influence consumer behavior toward safer meat options.



**Figure 3.4: Experimental treatment design**

Source: Author's own

### 3.3.3.2 *Experimental auction procedure*

Experimental auctions are commonly employed in research to elicit subjects' valuations of goods or services (Lusk and Shogren, 2007; Canavari et al., 2019). For this study, we used a second-price Vickrey auction (SPA) to measure the WTP for four types of lamb meat, illustrated in Figure 3.3. The auction sessions were fully digital, conducted online via Unipark survey software, and organized into three main phases.

**Phase 1:** Upon arrival, participants registered and were assigned a random number to place them into one of three groups. They accessed the experimental interface through a QR code or a URL link. After viewing instructions on their screens and receiving guidance from the lead moderator, participants were shown a consent form and, upon agreeing, proceeded to the training phase. They were encouraged to raise their hands for clarifications if needed. The moderator then elaborated on the experiment's objectives and the SPA bidding mechanism through a PowerPoint presentation, followed by a comprehension quiz and a practice auction to ensure participants fully understood the process.

Step 1	Subjects signed up upon arrival, receiving a unique ID randomly assigning them to one of three groups.
Step 2	Subjects logged into the online survey platform using a QR code or URL link and read a content note.
Step 3	A detailed presentation on the auction mechanism, products, and bidding strategies was provided, with an illustrative example of a 2nd price auction.
Step 4	A brief quiz ensured subjects' understanding of the auction mechanism.
Step 5	A practice auction using a cookie based on SPA mechanism was conducted.
Step 6	Subjects answered socioeconomic questions before the first round.
Step 7	The first auction round conducted. This round featured no treatments; subjects saw auction products labelled with numbers, indicating their production and slaughtering/processing systems (Appendix G), and placed their bids.
Step 8	Subjects provided information on their experience of FBD.
Step 9	The second auction round was conducted. This round introduced treatments: Group 1 received written information about livestock systems, Group 2 received visual information, and Group 3 had a priming statement related to meat-borne disease experiences.
Step 10	Subjects indicated their risk perception of illness after consuming each meat type.
Step 11	The third and final auction round was conducted. This round featured second treatments: Group 1 received written information about meat slaughtering/processing systems, Group 2 received visual information, and Group 3 had a priming statement related to meat-borne disease experiences after consuming butchery meat.
Step 12	Subjects completed remaining survey questions, while SPA mechanisms identified the highest and second highest bids in each group, choosing binding products and rounds.
Step 13	Winners purchased the binding product in the binding round, paying the amount equal to the second highest bid.
Step 14	Subjects received a participation fee (AFN 300) to compensate for their time and transportation cost, and the session was concluded with a thanking remark.

**Figure 3.5: Flow of activities during experimental auctions**

Source: Author's own

**Phase 2:** Participants engaged in three auction rounds. During the initial round, they were able to visually inspect the four types of meat and placed their bids without any informational treatment. Each participant recorded their bids on a physical bidding sheet and submitted them online for each product in every round. Before starting each round, they responded to several socioeconomic questions. In the second and third rounds, subjects were exposed to specific group treatments as detailed in the prior section and illustrated in Figure 3.4.

**Phase 3:** Following the final round, the binding product and round were randomly chosen. Within each group, the participant with the highest bid for the binding product purchased it at the second-highest bid price, consistent with the SPA mechanism. Subsequently, participants completed the remaining survey questions, received their participation fees, and the session ended with a closing statement of appreciation. Figure 3.5 outlines the step-by-step sequence of activities.

### 3.3.3.3 Empirical model for auction data analysis

In an experimental auction involving  $N$  participants who submit bids in  $T$  rounds for  $J$  different goods, a two-way fixed effects panel model is used to describe the bid of the  $i$ th individual in the  $t$ th round for the  $j$ th good (Lusk and Shogren, 2007). The model can be specified as follows:

$$Bid_{it}^j = \alpha + \mu_i + \lambda_j + \beta X_{it} + \varepsilon_{it} \quad (1)$$

where  $Bid_{it}^j$  is the bid submitted by individual  $i$  in round  $t$  for the good  $j$ .  $\mu_i$  represents individual-specific effects,  $\lambda_j$  represents good-specific effects,  $X_{it}$  is a matrix of individual-specific variables influencing bids, and  $\varepsilon_{it}$  is the error term.  $\alpha$  is the overall constant term.

For our data, we assume that there are no good-specific effects for any of the goods (i.e.  $\lambda_j = 0$  for all  $j$ ). Therefore, our simplified panel data model becomes:

$$Bid_{it}^j = \alpha + \mu_i + \beta X_{it} + \varepsilon_{it} \quad (2)$$

If we assume that  $\mu_i = \mu$  for all  $i$ , we can estimate the model parameters using ordinary least squares (OLS). However, individual-specific effects do exist. Therefore, fixed or random effects models are preferred. Since our analysis includes several time-invariant control variables, a fixed effects estimator is not suitable. Instead, we estimated a random effects model using Stata, which can be expressed as:

$$Bid_{it}^j = \alpha + \mu_i + \beta X_{it} + u_{it} + \varepsilon_{it} \quad (3)$$

where  $u_{it}$  represents the individual-specific random effect for individual  $i$  - capturing unobserved heterogeneity - in round  $t$ .

Considering our between- and within-subject experimental design, which includes two sets of treatments provided to each group in Rounds 2 and 3, we further modify equation 3 based on our dataset for assessing the impacts of the two sets of treatments as illustrated in Figure 3.4. To assess the impact of the first set of treatments (illustrated in Figure 3.4, treatments#1.1;

1.2; and 1.3) provided to each group in Round 2 on individual  $i$ 's bid, for auction good  $j$ , we specify bids of Round 1 as baseline and formulate the model as follows:

$$Bid_{i2}^j = \beta_0 + \beta_1 group_g + \beta_2 round_t + \beta_3 (group_g \times round_t) + \gamma X_{it} + u_i + \varepsilon_{it} \quad (4)$$

where:

- $Bid_{i2}^j$  is the dependent variable indicating the bid submitted by individual  $i$ , in round 2 for the auction good  $j$  ( $j$ =MST, MNT, MSM, or MNM).

Independent variables are:

- $i. group_g$  is a categorical variable for treatment group  $g$  ( $g$ =1,2, or 3).
- $i. round_t$  is a categorical variable for round  $t$  (since the treatments are provided in Rounds 2 and 3,  $t$  = 2 or 3).
- $(group_g \times round_t)$  captures the interaction effects between groups and rounds.
- $X_{it}$  is the vector of control variables (including gender, age, income, education, FBD experience, and risk preference), with  $\gamma$ 's capturing the effect of these variables on the dependent variable  $Bid_{it}^j$ .

Moreover, for evaluating the impact of the second set of treatments (illustrated in Figure 3.4, treatments#2.1; 2.2; and 2.3) provided to each group in Round 3 on individual  $i$ 's bid, for auction good  $j$ , we specify bids of Round 2 as baseline and formulate the model as follows:

$$Bid_{i3}^j = \beta_0 + \beta_1 group_g + \beta_2 round_t + \beta_3 (group_g \times round_t) + u_i + \varepsilon_{it} \quad (5)$$

Note that in equation 5, to accurately tease out the impact of the second set of treatments provided to each group in Round 3, we analyzed the bids submitted in Round 3 based on bids submitted in Round 2 (i.e., bids of Round 2 are considered baseline). This approach is followed to avoid any confounding effects from the first set of treatments provided in Round 2. For that purpose, we used the command “ib2.round” in Stata to set Round 2 bids as baseline.

Note also that there are no control variables in equation 5, as they are once and already incorporated into equation 4. Furthermore, we estimated separate models to evaluate the impact of each of the six treatments on subjects' bids for each of the auction goods (MST, MNT, MSM, and MNM).

For robustness, we also present the results of a fixed effects model, which follows the structure of Equation 5 but excludes time-invariant control variables. The fixed effects approach

inherently removes such variables by focusing on within-group variation. In contrast, the random effects model retains and estimates time-invariant variables by using both within- and between-group variation – which is suitable for our experiment design, assuming that unobserved individual effects are uncorrelated with explanatory variables. The results are reported in Appendices 7 and 8.

### **3.3.4 Best-Worst Scaling and MAQ**

As mentioned earlier, the post-experiment survey also included a BWS to assess 13 meat attributes; and the 16-item MAQ developed by Graça et al. (2015) to evaluate consumers' emotional connection to meat. The socio-economic variables and survey measures were already presented earlier in section 3.3.2. In this part, the meat attributes, BWS method, MAQ, and empirical analysis of BWS and MAQ is presented, constituting the third analysis of this dissertation.

#### **3.3.4.1 Selected meat attributes**

Thirteen meat attributes were selected through a comprehensive literature review and Afghan consumers' insights from a prior qualitative study by Nasiri et al. (2023). The selected lamb meat attributes include six intrinsic (color, animal breed, taste, tenderness, freshness, and quality appearance), and seven extrinsic (origin, price, brand, halal label, cleanliness, animal welfare, and food safety certification) attributes.

#### **3.3.4.2 Best-Worst-Scaling (BWS)**

There are three cases of BWS: MaxDiff, profile case, and multi-profile case. In this study, we applied the case 1 BWS method, as outlined Aizaki and Fogarty (2021, 2023). BWS, initially introduced by Finn and Louviere (1992), is a data collection technique where participants select both the most preferred and least preferred item (or attribute, in our case) from a set of options. This method has been widely used for a variety of purposes, such as assessing food values and policies (Yang et al., 2021), consumer preferences for beef (Merlino et al., 2018), and food safety concerns (Erdem et al., 2012).

The BWS method employs a balanced incomplete block design (BIBD) to construct choice sets. The R packages "support.bws" and "crossdes" were utilized to create 13,13,4 BIBD choice sets (Aizaki and Fogarty, 2021; 2023), meaning 13 treatments (choice sets) for 13 attributes, with 4 attributes included in each choice set. Additionally, each attribute was designed to appear in a choice set exactly four times. An example of the first two choice sets used in this study is shown in Figure 3.6, along with instructions on how to select the most and least important attribute from each set.

In this part we would like to ask you to pick **the most and the least important attributes** that guide your meat purchasing decision. While more than one attributes may be important or unimportant at the time of meat purchase, please choose **the Most Important** and **the Least Important** attributes from each of the choice sets. There are 13 choice sets in total.

Choice Set 1		
Attributes	Most Important	Least Important
Place of Origin	<input type="checkbox"/>	<input type="checkbox"/>
Animal breed	<input type="checkbox"/>	<input type="checkbox"/>
Brand	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Food safety certification	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Choice Set 2		
Attributes	Most Important	Least Important
Animal breed	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Color	<input type="checkbox"/>	<input type="checkbox"/>
Animal welfare	<input type="checkbox"/>	<input type="checkbox"/>
Quality appearance	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Figure 3.6: Example of meat attribute subsets used in our study**

Source: author's own based on actual choice experiment survey (2021)

### 3.3.4.3 MAQ construct and measures

The MAQ, based on Graça et al. (2015), includes 16 items that evaluate consumers' positive connection to meat consumption, organized into four latent factors: hedonism, affinity, entitlement, and dependence. The items and their corresponding latent factors are presented in Table 3.2. Participants rated their level of (dis)agreement with each item using a seven-point Likert scale, where 1 indicated "strongly disagree" and 7 indicated "strongly agree."

**Table 3.2: Meat attachment questionnaire constructs**

No.	MAQ items	labels	Factors
1	A good taste is without comparison.	ma1	Hedonism
2	To eat meat is one of the good pleasures in life.	ma2	
3	I love meals with meat.	ma3	
4	I am a big fan of meat.	ma4	
5	I feel bad when I think of eating meat.	ma5	Affinity
6	To eat meat is disrespectful towards life and the environment.	ma6	
7	Meat reminds me of diseases.	ma7	
8	By eating meat, I am reminded of the death and suffering of animals.	ma8	
9	According to our position in the food chain, we have a right to eat meat.	ma9	Entitlement
10	To eat meat is an unquestionable right of every person.	ma10	
11	Eating meat is a natural and indisputable practice.	ma11	
12	Meat is irreplaceable in my diet.	ma12	Dependence
13	I would feel fine with a meatless diet.	ma13	
14	If I couldn't eat meat I would feel weak.	ma14	
15	If I was forced to stop eating meat I would feel sad.	ma15	
16	I can't picture myself not eating meat regularly.	ma16	

Source: adapted from Graça et al. (2015b)

### 3.3.4.4 Analysis of BWS data

The BWS data collected based on the MaxDiff method can be analyzed using either counting or modelling approaches. We used both approaches. The counting approach counts the frequency with which attribute  $i$  is selected as the best ( $Bin$ ) and the worst ( $Win$ ) item in all questions for subject  $n$ , and is formulated as follows:

$$BW_{ni} = B_{ni} - W_{ni}, \quad (1)$$

where  $BW_{ni}$  is subject  $n$ 's best-minus-worst score for meat attribute  $i$ , and  $B_{ni}$  and  $W_{ni}$  correspond to the number of time subject  $n$  selects attribute  $i$  as the best and worst, respectively. The scores obtained through this counting approach can be categorized into disaggregated (individual-level) and aggregated (total-level) scores, as detailed by Aizaki and Fogarty (2021, 2023).

The modeling approach uses discrete choice models, such as the MaxDiff, marginal, and marginal sequential models to analyze responses, depending on the assumptions made during the design of choice sets, the preference parameters, and the research objective (Flynn et al., 2007; Louviere et al., 2015). Discrete choice models are consistent with the Random Utility Model (RUM) (McFadden, 1974). In the RUM, the indirect utility  $U_{nit}$  that individual  $n$  derives from attribute  $i$  in choice set  $t$  can be expressed as:

$$U_{nit} = \beta V_{nit} + \epsilon_{nit}, \quad (2)$$

where  $V_{nit}$  is the systematic (deterministic) component of utility or observed variables,  $\beta$  is a corresponding vector of coefficient of the observed variables, and  $\epsilon_{nit}$  is the idiosyncratic error term capturing the impact of all unobserved factors affecting individual  $n$ 's choice. The systematic utility component,  $V_{nit}$  can be modelled as a linear function of observed attributes. In the context of meat attributes, this can be expressed as:

$$V_{nit} = \beta_1 origin + \beta_2 price + \beta_3 brand + \beta_4 animal\ breed + \beta_5 taste + \beta_6 freshness + \beta_7 cleanliness + \beta_8 halal\ label + \beta_9 food\ safety\ certification + \beta_{10} animal\ welfare + \beta_{11} quality\ appearance + \beta_{12} tenderness, \quad (3)$$

where the attributes (i.e., origin, price, ..., and tenderness) serve as explanatory variables, and  $\beta_s$  are their respective coefficients to be estimated (Aizaki and Fogarty, 2021). To normalize the model, the attribute "color" was omitted as it was the least important attribute based on the counting analysis. The relative importance of other attributes is measured against this normalized attribute.

In general, in equation 2, the individual  $n$  is assumed to behave as utility maximiser, selecting attribute  $i$  which provides the maximum utility in choice set  $t$ . However, in BWS experiments, respondents choose a pair of alternatives (the most and the least important) from a choice set to maximize utility. More specifically, in each BWS choice set  $t$ , individual  $n$  chooses  $i$  as best and  $j$  as worst attribute respectively, when:

$$U_{nit} - U_{njt} > U_{nlt} - U_{nmt} \text{ for all } i \neq l \text{ and } j \neq m. \quad (4)$$

We adopted the MaxDiff method, which assumes that respondents make selections based on the utility difference between attribute  $i$  as best and attribute  $j$  as worst, which represents the greatest utility difference. This utility difference is determined by comparing each attribute with every other attribute in the choice set, resulting in a total of  $J \times (J-1)$  possible utility differences, where  $J \times (J-1)$  denotes the number of possible choice sets in which  $i$  is chosen as the best, and  $j$  as the worst, from  $J$  attributes.

Following this approach and to account for heterogeneity in consumer preferences for meat attributes, as observed in graphical presentations shown in Appendices 9 and 10, we estimated a Random Parameters Logit (RPL) model. The RPL model, an extension of the multinomial logit model (MNL), incorporates continuous heterogeneity allowing the parameters to vary randomly across the sample (Sarrias and Daziano, 2017). It also considers the panel structure of the data (Train, 2003). Hence, considering the RUM framework and following Caputo and Lusk (2020), the indirect utility that individual  $n$  derives from the selected best-worst (BW) pairs of attributes in each

BWS choice set  $t$  is represented as the difference in utility difference between the  $i$  (best) and  $j$  (worst) attribute plus the error term:

$$U_{nit} = \beta_{nit} - \beta_{njt} + \epsilon_{nit}, \quad (5)$$

Where  $\beta_n$  is vector of individual  $n$ 's estimated importance parameters of best ( $i$ ) and worst ( $j$ ) attributes relative to the normalized attribute "color". We further assume  $\epsilon_{nit}$  to follow an independent and identically distributed (i.i.d.) Type I extreme value distribution. The RPL model allows for various distributional assumptions for the random parameters, with the multivariate normal distribution being a common choice. We assume the coefficient  $\beta_n$  to follow a normal distribution.

Moreover, in our analysis, we considered examining the impact of individual-specific characteristics (i.e., gender, age, income, education level, meat consumption frequency, and risk preference) on the mean of random parameters (see Sarrias and Daziano, 2017, and Aizaki and Fogarty, 2021 for detailed explanation). When incorporating such observed heterogeneity (deterministic taste variations), the random coefficient  $\beta_n$  takes a more complex form to account for the influence of these covariates (Sarrias and Daziano, 2017):

$$\beta_n = \beta + \Pi z_n + L\eta_n, \quad (6)$$

where  $z_n$  represents individual characteristics influencing preference parameters,  $\Pi$  is a  $K \times M$  matrix of additional parameters,  $\eta_n \sim N(0, I)$  indicating normal distribution, and  $L$  is the Cholesky factor of the variance-covariance matrix (Sarrias and Daziano, 2017). The inclusion of covariates allows the model to capture how individual characteristics influence the distribution of the coefficients, thereby providing a more comprehensive understanding of preference heterogeneity for meat attributes. When incorporating the individual-specific characteristics, we estimated separate models for each characteristic to examine the relationship between that specific characteristic and meat attributes.

Considering the sequence of best-worst choices over  $T$  choice sets (13 in our case), we express the unconditional probability that individual  $n$  chooses attribute  $i$  as the best and  $j$  as the worst based on the RPL model as follows:

$$P_{ni} = \int_{\beta} \prod_{t=1}^T \frac{e^{[\beta_{nit} - \beta_{njt}]}}{\sum_{l=1}^J \sum_{m=1}^J e^{[\beta_{nlt} - \beta_{nmt}] - J}} f(\beta_n) d\beta_n, \quad (7)$$

In this equation,  $f(\beta_n)$  represents the continuous density of the random parameters  $\beta_n$ , which vary randomly across the population and are assumed to be normally distributed. The parameters of the RPL model are estimated using the simulated maximum likelihood estimation technique based on

500 Halton draws (Train, 2003). Hence, the dependent variable takes the value of 1 for the pair of best-worst alternative chosen by individual  $n$  as best and worst in a given choice set, and 0 otherwise (i.e., the remaining  $J(J-1)-1$  pairs of items in the choice set, not chosen as best or worst (Lusk and Briggeman 2009).

Additionally, similarly to Caputo and Lusk (2020) and Lusk and Briggeman (2009), we computed shares of preferences (SP) for each attribute to facilitate a more intuitive interpretation of the relative importance of the estimated coefficients. As detailed by these authors, calculating SP helps to eliminate any confounding effects between the estimated importance parameters and the scale in the RPL model. The preference shares measure the relative importance of each attribute relative to other attributes and sums to one across all 13 attributes. The share of preference  $S_i$  for attribute  $i$ , which represents the importance of attribute  $i$  over the other  $J$  attributes is calculated as follows:

$$S_i = \frac{e^{\beta_i}}{\sum_{j=1}^J e^{\beta_j}} \quad (8)$$

In the above equation, if the preference share for attribute  $i$  is twice as big as any other attribute, then it can be interpreted that attribute  $i$  is twice as preferred as the other attribute. The total preference share for all the thirteen meat attributes must sum to 1 (Bazzani et al., 2018).

To conduct this analysis, we used the “gmn1” function of the “mlogit” package in R (Croissant, 2020), following guidelines provided by Aizaki and Fogarty (2021).

### 3.3.4.5 Analysis of MAQ

The data analysis of MAQ involved confirmatory factor analysis (CFA) using the Lavaan package in R (Rosseel, 2012). We specified the structure of the model based on the original 16-item MAQ structure, with the four latent factors of hedonism, affinity, entitlement, and dependence (subscales), and a second-order dimension (global scale), namely meat attachment. We used the standardized coefficients approach for factor loadings and negative statements (for affinity) were reverse-coded. To assess the model fit, we used several indices, such as the chi-square value ( $\chi^2/df$ ), the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA). For reliability analysis, we used Cronbach’s alpha. Mean and standard deviations of subscales and global scale are also reported.

Finally, we expanded our analysis by incorporating the mean scores of meat attachment subscales into the RPL model. These subscales include hedonism, affinity, entitlement, and dependence. As shown in Table 3.3, the 16 meat attachment statements are grouped into one of these subscales. We first combined the statements into their respective subscales. Then, we integrated the mean scores

of each of the four subscales into the RPL model of meat attributes to evaluate the relationship between the different dimensions of meat attachment attitudes (i.e., hedonism, affinity, entitlement, and dependence) and their preferences for specific meat attributes, following a procedure similar to Equation (6). This analysis deepens our understanding of the intricate links between meat attachment attitudes and preferences for meat attributes.

### **3.4 Summary statistics**

The section presents the summary statistics of for the qualitative data; collected for both, the experimental auction, and BWS and MAQ survey. We initially examined the socio-demographic profiles of subjects across the three treatment groups. As indicated in Table 3.3, no significant differences were observed among the three groups, affirming the effectiveness of the randomization process in allocating subjects to the three distinct groups.

#### **3.4.1 Summary statistics of sociodemographic variables**

Table 3.3 presents the socioeconomic characteristics of the sample. About 40% of the participants were female. Nearly three quarters were aged between 18 ~ 24, 29% were between 24 ~ 34 years old, and only 3% aged higher than 34 years. Moreover, slightly over three quarters (71%) attended or graduated from university. In terms of household income, majority of the participants came from low-income households (57%) with a monthly income of up to 22,000 AFN. The middle-income group comprised 18% of the sample, high-income comprised 11%, and the remaining 14% preferred not to disclose their income.

Since the study was conducted within educational institutes and demanded some level of computer literacy, students made up about 41% of the sample. The rest were full-time employed (18%), self-employed (10%), part-time employed (11%), unemployed (19%), and others (1%). Moreover, occasional meat consumers comprised 67%, whereas habitual consumers made up 28%, and those who said that they never consume meat, the remaining 5% of the sample.

**Table 3.3: Socio-demographic characteristics of the study sample**

Variables	Definition	Full sample (n = 227)		Group1 (n=82)		Group 2 (n=75)		Group 3 (n=70)		Pearson's Chi-squared	
		Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	X2	P-value
Gender	1 = female	0.39	0.49	0.40	0.49	0.36	0.48	0.40	0.49	0.36	0.83
Age	1 = between 18 ~ 24	0.67	0.47	0.69	0.46	0.64	0.48	0.69	0.47	0.60	0.74
	1 = between 24 ~ 34	0.29	0.46	0.28	0.45	0.32	0.47	0.29	0.45	0.34	0.84
	1 = higher than 34	0.03	0.17	0.02	0.15	0.04	0.20	0.03	0.17	0.34	0.84
Education	1= attended university or graduated	0.71	0.45	0.74	0.44	0.68	0.47	0.70	0.46	0.82	0.66
Household Income											
low income	1 = up to AFN 22,000 (monthly)	0.57	0.50	0.57	0.49	0.59	0.50	0.56	0.50	0.13	0.94
middle income	1 = between AFN 22,000 ~ 38,000 (monthly)	0.18	0.38	0.22	0.42	0.16	0.37	0.16	0.36	1.31	0.52
high income	1 = more than AFN 38,000 (monthly)	0.11	0.31	0.07	0.24	0.13	0.34	0.13	0.34	2.73	0.26
undisclosed	1=prefer not to say	0.14	0.35	0.14	0.35	0.12	0.33	0.15	0.36	0.44	0.80
Employment status											
	1 = full time employed	0.18	0.39	0.19	0.40	0.23	0.42	0.11	0.32	3.27	0.19
	1 = self employed	0.10	0.30	0.11	0.31	0.09	0.29	0.09	0.28	0.26	0.87
	1 = part time employed	0.11	0.31	0.11	0.31	0.11	0.31	0.11	0.32	0.02	0.99
	1 = unemployed	0.19	0.39	0.16	0.37	0.19	0.39	0.21	0.41	0.78	0.68
	1 = student	0.41	0.49	0.43	0.50	0.37	0.49	0.44	0.50	0.81	0.67
	1= other	0.01	0.11	0.00	0.00	0.01	0.11	0.03	0.17	2.36	0.31
Meat Consumption Frequency											
Habitual	1=consume 1~5 times/month	0.28	0.45	0.21	0.41	0.35	0.48	0.30	0.46	3.92	0.14
Occasional	1=consume 1~2 times/month	0.67	0.47	0.76	0.43	0.59	0.50	0.64	0.48	5.27	0.07
Never	1=never consume meat	0.05	0.22	0.04	0.19	0.07	0.25	0.06	0.23	0.74	0.67

Note: \*\*\* indicate statistical significance at  $p \leq 0.05$ ; Std. dev.=standard deviation; AFN=Afghani currency. At the time of this study, 1 Euro corresponded to 93.81 Afghani (dab, 2021)

### 3.4.2 Summary statistics of control variables

Table 3.4 reports summary statistics for subjects' experience of FBDs, risk perception, and risk preference. Most participants (70%) reported having encountered FBDs. On average, participants were neutral regarding their perceptions of the risk of falling ill after consuming meat, with a mean of 4.79 (SD=2.19). However, when it comes to specific types of meat, their risk perceptions varied significantly as shown by Friedman test ( $p\text{-value} \leq 1\%$ ). The Wilcoxon-signed rank test was conducted to test the risk perception differences between each pair of meats, and the results are indicated in the table by superscripts. Among the four auction products, MNT was perceived as the riskiest one with a mean score of 6.39 (SD=2.32), while MSM meat was considered the safest option with a mean score of 3.22 (SD=2.06). MST and MNM fell in between, with mean scores of 4.58 (SD=2.27) and 4.71 (SD=2.35), respectively. Moreover, the subjects' average score of risk preference was 5.20 (SD=2.20). Hence, participants can be categorized roughly as risk neutral.

**Table 3.4: Descriptive statistics of subjects' experience of FBD, risk perception, and risk preference**

(n = 227)			
Variables	Definition	Mean	Std. dev.
FBD experience	Subject's experience of FBD 1 = subject has experienced FBD; 0 = otherwise	0.70	0.46
Risk Perception	1 = very low to 10 = very high		
Risk perception of meat in general	Risk perception of illness from consuming meat in general	4.79	2.19
Risk perception of MST	Risk perception of illness from consuming MST meat	4.58a	2.27
Risk perception of MNT	Risk perception of illness from consuming MNT meat	6.39b	2.32
Risk perception of MSM	Risk perception of illness from consuming MSM meat	3.22c	2.07
Risk perception of MNM	Risk perception of illness from consuming MNM meat	4.71a	2.35
Risk Preference	0 = completely unwilling to take risk; 10 = completely willing to take risk	5.20	2.20

Notes: FBD=Food-borne Disease; RP = Risk Perception, MST=Meat with Sedentary-origin, but slaughtered/processed in Traditional-butcher; MNT=Meat with Nomadic-origin, but slaughtered/processed in Traditional-butcher; MSM=Meat with Sedentary-origin, but slaughtered/processed in a Modern-slaughterhouse distributed via supermarket; MNM= Meat with Nomadic-origin, but slaughtered/processed in a Modern-slaughterhouse distributed via supermarket; Std.dev. = standard deviation; n = number of subjects. Different superscripts indicate a significant difference of risk perceptions for the meats based on Wilcoxon-signed rank test.

### 3.5 Chapter summary

Chapter three provided a comprehensive overview of the methods used to collect both qualitative and quantitative data for this study. It began by introducing the study area selected for the research. The chapter then outlined the qualitative approach, including the framework and analytical techniques used to analyze the FGD data. The TFQM model, which guided the analysis of the qualitative data, was also explained. Additionally, the chapter presented the socio-demographic characteristics of the FGD participants, with these descriptive results forming the foundation for the analysis presented in Chapter Four.

The chapter continued with a detailed description of the quantitative data collection methods, which include non-hypothetical experimental auctions and a BWS survey. It covered the data collection, survey and measures, experimental auction mechanism used—the second-price auction—along with the auction goods, auction design, procedures, and the empirical model employed to analyze the auction data. Following this, the chapter explained the choice experiment method, specifically the BWS technique, used to analyze meat attributes. The selected meat attributes, and the empirical model for analyzing consumer preferences for meat attributes are also discussed in detail. Furthermore, the chapter introduced the MAQ constructs and explained how these constructs were incorporated into the analytical model to examine the relationship between meat attachment attitudes and preferences for meat attributes.

Finally, the chapter presented the summary statistics of sociodemographic and other control variables which will be used in the second and third analysis. The next chapter explores Afghan consumers' perceptions of meat quality and safety across the meat supply chain, drawing on the qualitative findings described in this chapter.

# CHAPTER 4

## CONSUMERS' PERCEPTION OF MEAT SAFETY AND QUALITY

### 4.1 Chapter overview

This chapter presents the analysis and results of the qualitative data collected through FGDs and analysed based on qualitative content analysis – with TFQM as a guiding analytical framework – to provide answers to the first set of empirical research questions posed in Chapter 1 regarding the consumers' perception of meat quality and safety along the meat supply chain in Afghanistan. More specifically, the chapter first determines the role of meat in the Afghan daily diet. The chapter then presents results on consumers' perception of meat safety and quality at the pre-harvest stage (i.e., production stage), where participants' perceptions regarding the quality and safety of meat stemming from four different livestock systems are presented. The chapter proceeds with the analysis of how meat quality and safety perceptions are at the harvest stage (i.e., slaughtering and processing), where participants' views and perceptions are presented about two slaughtering and processing systems, namely traditional butcheries versus supermarket, the status of animal welfare in each system, and the compliance of modern slaughtering techniques with halal criteria. And the final part is the presentation of the results on participants' perception of meat safety and quality at post-harvest stage (i.e., Formation of meat quality expectation and quality experience pre- and post-purchase).

### 4.2 The role of meat in the Afghan daily diet

First, the FGD discussion focused on the most common food in the Afghan daily diet and the importance of meat in the daily diet. FGD participants mentioned eleven food items consumed most frequently as the most common foods (Figure 4.1). Meat was mentioned more than any other food (15 times) as the most preferred and consumed food in the Afghan daily diet, followed by rice, potato, beans, bread, and other vegetables.



**Figure 4.1: Most preferred foods in Afghanistan according to FGD participants**

Source: author’s own based on FGD data

### **4.3 Perception of meat quality and safety at the pre-harvest stage**

The participants expressed their views about perceived meat quality and safety of meat from the four different livestock systems: sedentary system, nomadic system, the “urban-raised ruminants”, and farm/home-reared ruminants. The results are summarized in Table 4.1. Participants discussed meat quality and safety in each system in terms of pasture type, exposure to FSHs, quality (excluding taste), taste, price, and status of animal welfare. We define FSH in meat as the presence of potentially harmful factors consisting of biological, chemical, and physical contaminants as defined by Das et al. (2019). Positive perceptions are indicated with a plus (+) sign, while negative perceptions are marked with a minus (-) sign.

Regarding the pasture system, participants believed that the nomadic and the sedentary livestock have access to natural pasture, are raised in an open environment, and have access to diverse feeding, as evident from the following statements:

*“They have seasonal movements, in each season, they find better places... They continuously move from one environment to another environment... And feed on different pastures. These factors definitely have an impact on the taste of the meat.” (male, young-aged, BSc., FG1-Kabul)*

*“I guess the quality of nomadic mutton is better than other sheep because it feeds on natural food and uses natural fodder. It is always moving, they are always in movement.” (male, old-aged, PhD, FG3-Bamyan)*

Animals within the sedentary livestock system also graze on high-altitude mountain pasture, which consumers associate with lower level of exposure to FSHs. Consumers use this attribute to infer less exposure to FSHs, better meat quality, and taste:

*“...I can confidently say that our sheep, which are taken out to natural pastures outside has better meat quality and is more delicious compared to the meat of sheep, which is bought from the market or raised at home. In our region, in terms of feeding, there are different varieties of fodders. .... and they definitely impact the meat quality.” (male, young-aged, BSc. Degree, FG#1-Bamyan)*

**Table 4.1: Quality and safety perceptions of meat stemming from different animal husbandry systems**

	Sedentary ruminant	Nomadic ruminant	Urban-raised ruminant	Farm/home reared ruminant
<b>Pasture type</b>	+ access to diverse, natural and high-altitude pasture system	+ access to natural pastoral land	- feed on food wastes and residues	+ have controlled & balanced feeding - no access to natural pasture
<b>Exposure to food safety hazards (FSH)</b>	+ Low because of rearing outside - Selling of diseased animals is possible	+ Low because of rearing outside - sometimes sell diseased animals	- High due to feeding on food wastes	- High due to food waste feeding & cross-contamination
<b>Quality</b>	+ very good due to diverse feeding & grazing on high altitude pasture + better than nomadic meat due to diverse feeding	+ high, due to movement & being raised outside	- Very low-quality meat due to unsafe feeding	- Low due to lack of movement and lack of fodder diversity
<b>Taste</b>	+ taste is better than other animals due to access to better pasture	+ delicious due to rearing outside & having access to better pasture	- lower than those reared on mountain pasture	- Tastes bad
<b>Price</b>	- more expensive	no difference with sedentary animal + May be cheaper	+ cheaper than sedentary animals	+ cheaper than other meat
<b>Animal Welfare</b>	+ high due to free movement, and good feeding	+ high due to free movement	- low due to lack of access to open pasture	

**Note:** positive sign (+) before a statement denotes positive perception, and negative sign (-) denotes negative perception.

Source: author’s own based on FGD data

Thus, natural pasture is an attribute that translates into lower perceived level of FSHs, delicious taste, and higher quality (all expected quality) in consumers' mind. However, perceptions about meat stemming from "urban-raised" livestock and farm/home raised ruminants are predominantly negative in terms of pasture type, resulting from higher exposure to FSHs, lower quality and taste due to feeding on food waste. The negative expected quality perceptions eventually result into consumers' dissatisfaction and disliking of such meat.

*"it is obvious that the meat quality of those animals that are roaming on the streets and feed on wastes, plastics, and food leftover is very low. Generally, in Kabul the sheep meats are from those kinds of sheep."* (male, middle-aged, MSc., FG1-Bamyan)

*"... the sheep inside the city of Kabul, which grow up here, because sometimes they eat garbage. There is a big difference."* (female, young-aged, BSc. Student, FG3-Kabul)

One participant also expressed that cross-contamination is possible for the home-raised ruminant, due to potential transfer of diseases like zoonosis from sick humans to animals and vice versa:

*"At home, there is a greater chance for cross-contamination. For example, it is possible that there are too many people in a family. Maybe one of them is sick. And at home, usually the food waste/residue is fed to animals. We have some kind of diseases like zoonosis, which can be transferred from humans to animals and vice versa."* (male, middle-aged, MSc., FG1-Bamyan)

In terms of price, sedentary meat is perceived to be more expensive than nomadic meat. Besides, participants perceive that animal welfare status is high in the sedentary and nomadic systems due to free movement, access to better pasture, good feeding, and good human behaviour in the rural areas. Whereas, in the "urban-raised" system, animal welfare is perceived as low due to a lack of access to pastoral land and keeping small ruminants in closed stables.

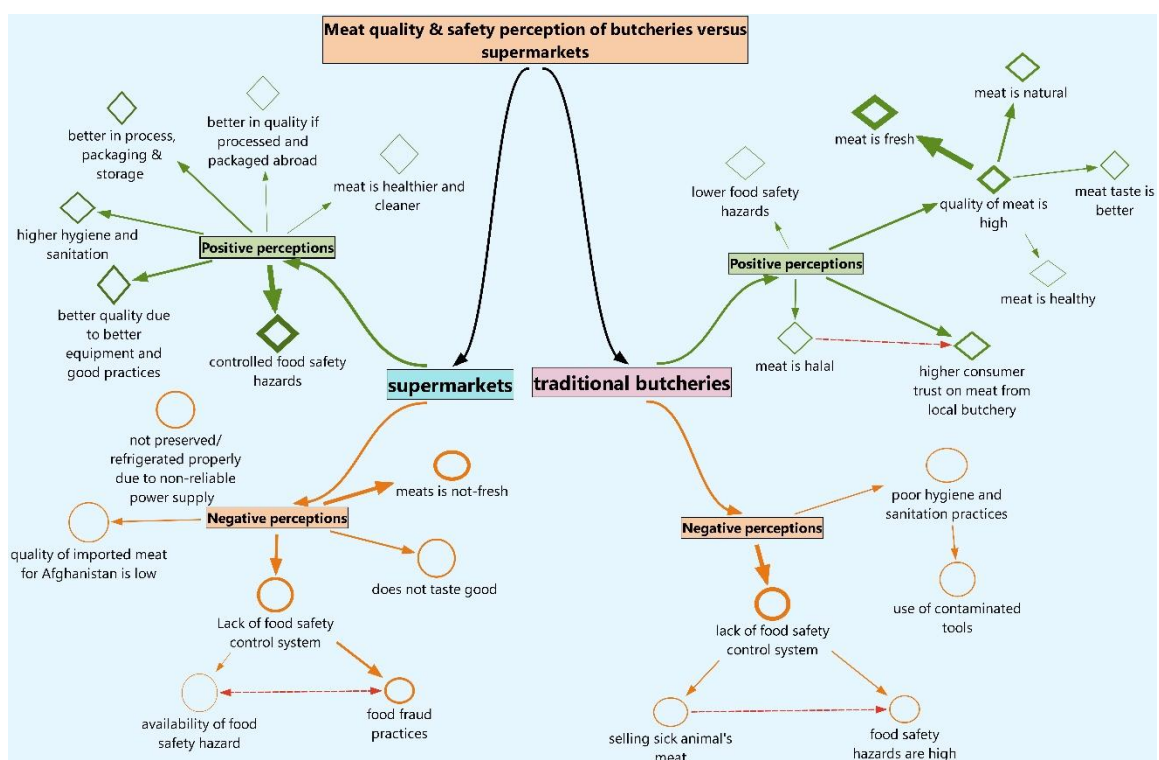
## **4.4 Perception of meat quality and safety at the harvest stage**

### **4.4.1 Quality and safety perception of traditional butcherries versus supermarkets**

Regarding the harvest stage, we analyzed participants' perception of meat safety and quality from traditional butcherries versus supermarkets (Figure 4.2). The perceptions were diverse. Participants believed that FSHs are controlled in supermarkets, and that the meat was of a higher quality due to better equipment and hygienic practices. Hence, in terms of hygiene, process, packaging, and storage, supermarket meat is perceived to be superior. In contrast, butcherries are associated with poor hygiene and sanitation standards, and with the use of contaminated tools. Because of the lack of a food safety control system, FSHs are high in butcherries:

“if the animal is slaughtered in a slaughterhouse with better equipment, it is far better than traditional slaughtering, which take place in rural areas. At traditional slaughtering houses, at any time, the meat may get contaminated.” (male, young-aged, BSc., FGI-Kabul)

“I think the meat in the supermarket is cleaner and better. Since it is slaughtered in a modern way, it is much healthier and may contain preservatives. However, the meat of traditional butchery is not good in terms of health, they cut the meat on a wood, they do not clean it, they don’t sanitize their knives and axes, and everything else they use. They just use these tools regardless of the cleanliness.” (male, young-aged, student, FG2-Bamyan)



**Figure 4.2: Perception of meat quality and safety at the harvest stage: traditional butcheries versus supermarkets**

**Note:** In this figure, consumers’ perceptions towards quality and safety of traditional butcheries and supermarkets are categorized into positive and negative perceptions. All **rhombus shapes** in **green** colour show positive perceptions, while all **circle shapes** in **orange** colour depict negative perceptions. The thickness of the shapes and the lines show the weight or the importance of each factor. The red, dotted lines show the relationship between two factors.

Source: author’s own based on FGD data

Negative perceptions towards supermarket meats arise from them not being fresh and not tasting good. Moreover, due to the lack of a food safety control system, consumers think that food fraud

is practiced in supermarkets, such as relabelling and slaughtering of diseased animals. As a result, supermarket meat is not perceived as being free from FSHs.

*“Meat is a kind of food that is very difficult to preserve. If it is out dated, it will cause health problem. That is why the supermarkets in Bamyan are not of a very good standard. Moreover, we cannot be assured of how they are maintained. As our friend said, in some places from where cows or sheep originate, for example in Panjab district, their animals have brucellosis, which can be transmitted to humans. This cannot be controlled even in the modern slaughterhouses, unless they know that this cow or sheep is contaminated with this disease.” (male, middle-aged, High-school, FG2-Bamyan)*

In addition, participants perceived the quality of imported meat as low due to improper refrigeration of frozen meats due to unreliable power supply.

*“From a health point of view, these meats that are marketed as refrigerated meats are not very healthy as the facilities are not available. Even in Kabul, in many areas, there is no electricity during the day time. Therefore, the probability of spoilage of these meats is very high.” (male, old-aged, PhD, FG3-Bamyan)*

*“In the supermarket, it is possible that the meat is from several days ago.” (female, young-aged, BSc. student, FG3-Kabul)*

In contrast, traditional butchery meat is perceived to be superior in freshness, naturalness, taste, and healthiness. Freshness seems to be a very important attribute for the participants.

*“I think it is better to buy from traditional butchery. Maybe the meat is fresher there. ... The fresher the food, the higher its quality. If the sheep is bought directly from the animal market, that is even better.” (female, middle-aged, MSc., FG1-Bamyan)*

Participants perceive traditional butchery meat as halal, because they highly trust local butchers. Moreover, while consumers face information asymmetry about the origin, feeding type, slaughtering method, and halal qualification of supermarket meat, consumers have more information about butchery meat in those aspects. In particular, if it is imported, consumers cannot be sure that the meat is halal. While for butchery meat, consumers' use the butcher himself as assurance not just for halal qualification, but also for animal healthiness:

*“In our society, people usually prefer to buy from traditional butchers. Now there are both traditional butchers and supermarkets. People usually believe that the meat may have a problem during slaughtering because supermarkets import meat from abroad.” (female, middle-aged, BSc., FG3-Kabul)*

*“One of the factors why people buy more from traditional butchers is that people know the owner of the butchery. ... they are sure about the health of the animal.” (male, middle-aged, BSc., FG3-Bamyan)*

Nonetheless, negative perceptions toward butchery meat are caused by the lack of a food safety control system as traditional butchers sometimes sell diseased-animal meat; thus, butchery meat is perceived as being more prone to higher FSHs:

*“Most of the times they sell sick animals. If an animal gets sick in the village, it is slaughtered and sent to the local butchery to sell the meat.” (male, old-aged, PhD, FG1-Bamyan)*

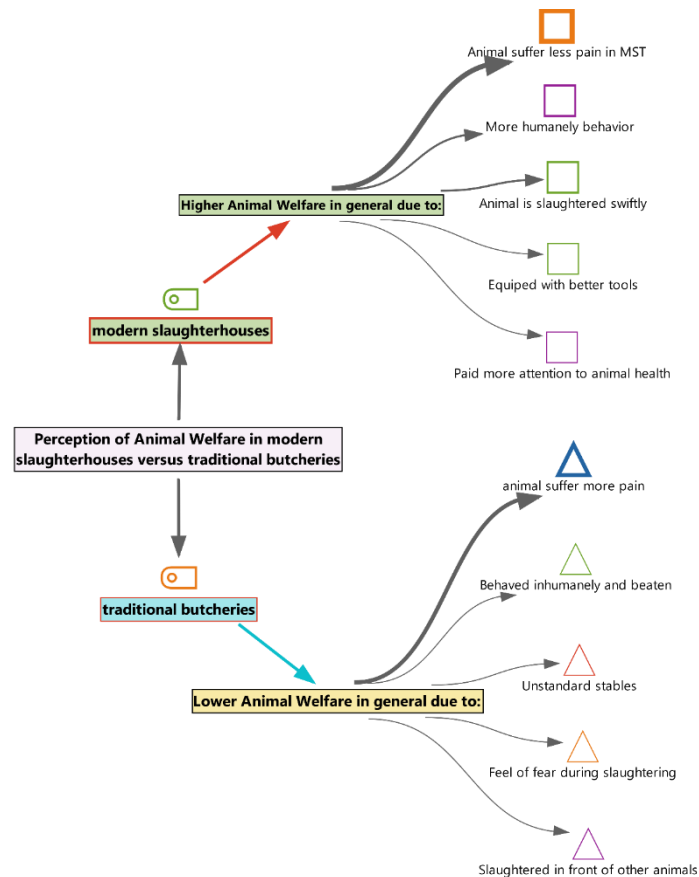
*“traditional butchers suffer from diseases because the space is open to pollution. Some people touch the meat. The butcher himself does not use gloves. ... But this may not be the case in modern supermarkets.” (female, young-aged, BSc., FG3-Kabul)*

#### **4.4.1.1 Animal welfare status**

Participants think of animal welfare as the practice of humane behaviour, and regard for animal health, proper feeding, and vaccination against diseases.

*“The person who keeps the animals or has a farm should [assure that animals] have healthy food, clean water, a clean stable, and the animal should be reared in a healthy manner. ... And also control its diseases.” (female, young-aged, university-student, FG2-Kabul)*

As illustrated in Figure 4.3, participants perceive animal welfare to be higher in modern slaughterhouses and lower in traditional butcheries, as they believe that the animals in modern slaughterhouses suffer less pain, are treated more humanely, slaughtered more swiftly, and food safety aspects are addressed more adequately due to better equipment and advanced tools:



**Figure 4.3: Perception of animal welfare - modern slaughterhouses vs. traditional butcheries**

**Note:** The square shapes show FG participants’ perceptions of animal welfare in modern slaughterhouses, while the rectangle shapes show the perceptions of animal welfare in traditional butcheries. FG participants’ perceptions of animal welfare in general are positive for modern slaughterhouses, but negative for traditional butcheries. The thickness of a line and the shape of a factor depict the weight and importance of that factor.

Source: author’s own based on FGD data

*“Modern slaughterhouses are better in that respect. Because they are equipped with advanced technologies and machines, and animal does not feel much pain. In traditional butchers, the animal dies with difficulty and suffer a lot.” (male, middle-age, MSc., FG3-Bamyan)*

#### **4.4.1.2 Modern slaughtering techniques and its compliance with Halal criteria**

Since modern slaughterhouses use machineries for slaughtering and processing, we also inquired about perceptions on modern slaughtering and its compliance with halal criteria. The perceptions were diverse, some believed that the use of technology for slaughtering has a positive impact on

meat quality, and thought that it is better for food safety hazard mitigation and that swift slaughtering positively affects meat quality:

*“Modern slaughterhouses are better in that respect. Because they are equipped with advanced technologies and machines, and animal does not feel much pain.” (male, middle-age, MSc., FGD3-Bamyan)*

Some other FGD participants had contradictory views due to religious aspects, stating that it is against Sharia (Islamic law):

*“Traditionally we use the knife, the same things that should be considered in the Sunnah (religious institution). Second, in the modern method, slaughtering is done by machine, which according to Islamic law, is not allowed or forbidden for us. We cannot implement that method in our country.” (female, young-aged, university student, FG2-Kabul)*

Meanwhile, some seemed to have strong faith in religious scholars' views on whether or not animals feel pain at the time of slaughtering:

*“... What I have heard from Maulanas [religious scholars] is that the animal does not suffer. God makes this process easy for it, time passes quickly for it by the will of God.” (male, middle-aged, MSc., FG1-Bamyan)*

However, one participant believed that modern techniques do comply with halal criteria if TAKBIR (name of God) is recited at the time of slaughtering:

*“From the religious point of view, in traditional methods, we should recite Allahu Akbar [God is great] when slaughtering. If the method is done by machine, still Allahu Akbar must be recited. If not, I think it is not allowed by religion.” (male, middle-aged, BSc., FG4-Bamyan)*

## **4.5 Perception of meat quality and safety at the post-harvest stage**

### **4.5.1 Expected quality**

Based on the means-end chain dimension of the TFQM, consumers' use quality cues (intrinsic and extrinsic) to form quality expectation. In this study, we found that the most important intrinsic cues according to FGD participants were: color, cleanliness, smell, fat content, texture, and bone proportion. The most important extrinsic quality cues were: age, origin, slaughter-date, quality-certification, and halal-slaughter. Consumers use these cues, for example, color and smell to infer about meat freshness, leanness, healthiness, and safety, thus forming expected quality. Freshness, inferred through other cues like color, seems to be an important element:

*“If we examine the meat in terms of quality... through its color, we can examine at a glance how much time has passed since its slaughter. We can also check by the smell. Fresh meat has a fresh smell. Its color is bright red. Old meat has a black color and a bad smell.” (female, young-aged, university student, FG2-Kabul)*

*“I try to buy from those butchers that sell fresh and good meat. The meat should be red. I try to buy from a butcher who has just slaughtered a cow or a sheep.” (male, middle-aged, BSc., FG2-Bamyan)*

Conversely, among the extrinsic quality cues, halal slaughter was highly important. Participants pay particular attention to halal label, production date, and country-of-origin when buying meat from supermarkets:

*“Well, what is more important for myself, is the meat being halal and of good quality. When we get information that the meat is a refrigerated one, I always see the production date. I see whether it is halal or not [seeing the label]. From where has it come [country of origin]. The place of production is important.” (male, BA., FG1-Kabul)*

*“What I care about is that the meat should be slaughtered in Afghanistan, especially in Bamyan. From a religious point of view, it is obvious that the people here are Muslims, and turn the face of the animal towards Qibla at the time of slaughter.” (female, middle-aged, BA., FG2-Bamyan)*

However, some others did not pay attention to halal labeling because they believed that the local butchers were Muslim, and thus, slaughtering is performed according to Islamic laws:

*“I personally do not pay much attention to the halal label because we are in an Islamic country. All are Muslims, so the meat is Halal. However, I pay much attention to the cleanliness of the meat.” (male, middle-aged, BA., FG1-Kabul)*

Since halal is a credence quality cue, consumers’ use either the label (when shopping from supermarket) or Islamic ownership of the shop (traditional butchery) to infer about the halal status of the meat. Another important credence quality cue FG participants were concerned about was safety. Participants perceived safety as absence of any contaminants in the meat, like dirt, and the use of chemicals for meat preservation as evident in the following statements:

*“I observe the place where the meat is stored; check whether it is free of dirt and contamination or not, stored outside or inside the shop, and stored in a refrigerator or glass container. In that case it does not smell bad and does not lose its quality in terms of being healthy and safe.” (male, middle-aged, BSc., FGD2-Bamyan)*

*“The problem is that some chemicals may be used in the packaged meats to preserve the meat quality for a long time. But those materials may cause health problems.” (male, middle-aged, BSc., FGD3-Bamyan)*

In this study, cost (or price) was also mentioned, but less stressed. Cost cue is considered a ‘negative consequence’ in the TFQM, also influencing consumers’ purchase intention.

#### **4.5.2 Experienced quality**

Some cues like taste and tenderness cannot be ascertained at the time of purchase. These are experienced quality cues formed only after consumption. Consumers make inferences about taste and tenderness based on feeding type and whether the animals are raised on high-altitude pastures and have movement, which results in low fat and tenderness of the meat. Taste and tenderness were the two main attributes after purchase, forming the experienced quality.

*“Another important feature is that the meat must have less fat. And third, the calf or lamb should not be old. If it is young, the meat is both better and easier to cook.” (male, old-aged, PhD, FG3-Bamyan)*

*“Animals that roam in the pastures are mostly low in fat. Their flesh is firm. For this reason, even butchers, when buying sheep for sale, try to buy sheep that have come from Hazarajat and surroundings. The only reason is that it is low in body fat.” (male, middle-aged, BA., FGD2-Kabul)*

Hence, meat originating from the Hazarajat region (central region) is perceived to be of higher quality and better taste. This is due to a suitable climate, free movement of the ruminants, and the availability of diverse pastoral land:

*“We ourselves live in Yakawlang and our area is called Sabz Darreh. The mountains over there have better quality grass than the grass on a lawn, or in deserts. When eating mutton meat originating from that area, the meat is very tasty and firm. The meat here (in the city) has no taste at all.” (female, middle-aged, BSc., FG2-Bamyan)*

After the expected quality and experienced quality are formed, the interaction between these two results in consumers’ (dis)satisfaction, and hence, future meat purchase.

## **4.6 Chapter summary**

This chapter detailed the findings from the qualitative data gathered through FGDs regarding participants' perceptions of meat quality and safety throughout the supply chain. The results indicated that meat is highly favored by participants, with pre-purchase considerations focused on factors such as Halal certification, safety, freshness, origin, and pasture type. Post-purchase, the

most valued attributes included taste, tenderness, and trust in the source, specifically traditional butcheries. Instances of food fraud were noted within the supply chain, stemming from inadequate public health infrastructure and the absence of an effective food safety monitoring and inspection system.

Participants expressed varied opinions about the quality and safety associated with different livestock systems. Perceptions were generally favorable regarding meat from sedentary and nomadic systems but were more critical toward meat from "urban-raised" livestock. Interestingly, despite linking traditional butcheries with a higher incidence of food safety risks and poorer animal welfare standards compared to modern supermarkets and slaughterhouses, participants still displayed a strong preference for and trust in these traditional sources. This behavior could be indicative of an "optimistic bias," where consumers perceive themselves as less susceptible to negative outcomes like foodborne illness compared to others (Weinstein, 1989; Rossi et al., 2017). For example, participants may believe they face a lower risk of contracting foodborne diseases from traditional butchery-sourced meat compared to supermarket meat, even while acknowledging that traditional butcheries may pose greater food safety hazards.

## CHAPTER 5

# PREFERENCES FOR MEAT AND THE ROLE OF FRAMING AND PRIMING IN SHAPING DEMAND TOWARDS SAFER MEAT CHOICES

### 5.1 Chapter overview

This chapter addresses the second set of empirical questions outlined in Chapter 1, focusing on consumers' WTP for various types of lamb meat in Afghanistan. Specifically, it employs a second-price experimental auction mechanism, as detailed in Chapter 3, to examine three key objectives: (i) assessing consumers' WTP for four types of lamb meat distinguished by their production systems (sedentary versus nomadic) and retail channels (traditional butchery versus supermarket); (ii) evaluating the effectiveness of written and visual framing, as well as psychological priming, as potential marketing strategies to promote safer meat choices; and (iii) analysing how subjects' socioeconomic characteristics, experience with FBDs, and risk preferences relate to their WTP for the different meat types.

The experimental design combines within- and between-subject approaches to assess the impact of written framing, visual framing, and psychological priming on WTP. This comprehensive approach allows for a nuanced understanding of how these factors influence consumer preferences.

The analysis presented in this chapter offers valuable insights into consumer behavior in the context of Afghanistan, serving as a case study for Islamic LMICs undergoing modernization in their meat industries. By evaluating the effectiveness of diverse marketing strategies in promoting safer meat consumption, the chapter suggests actionable policy implications for enhancing public health communication and consumer trust. Such strategies may include targeted educational campaigns and clearer labelling to foster consumer awareness and confidence. These findings contribute to the broader understanding of consumer behavior in emerging markets and provide practical guidance for policymakers and industry stakeholders seeking to advance food safety and quality in the meat sector.

## 5.2 Preferences for sedentary and nomadic meats

In the first round, participants were provided with product numbers, accompanied by information about the production and slaughtering processes for each product. This information was visibly displayed on the screen. To assess differences in WTP between sedentary and nomadic meats, we compared MST with MNT, both of which were processed in traditional butcheries. Subsequently, we compared MSM and MNM, representing sedentary and nomadic meats processed in modern slaughterhouses and sold through supermarkets.

Table 5.1 illustrates the findings, with MST showing a mean WTP of AFN 177 and MNT at AFN 168. This suggests a price premium for meat with a sedentary origin, with a mean difference of AFN 9. Similarly, MSM had a mean WTP of AFN 196, while MNM stood at AFN 187, indicating a higher WTP for sedentary meat (MSM) compared to nomadic meat (MNM). However, the Wilcoxon test results do not show a statistically significant difference at the 5% level between MST and MNT and between MSM and MNM. Consequently, it can be inferred that there is no significant difference in the preferences for meats originating from the sedentary and the nomadic livestock systems.

**Table 5.1: Mean WTP for four kinds of lamb meat (in Afghani currency)**

Variable	Mean (in AFN)	Std. dev.	within product differences	Mean difference	P-value	comparison
MST	177	65	MST vs. MNT	9	0.0706	sedentary vs. nomadic meat
MNT	168	72	MSM vs. MNM	9	0.0739	
MSM	196	78	MST vs. MSM	-19	0.0016***	butchery vs. supermarket meat
MNM	187	83	MNT vs. MNM	-19	0.0023***	

**Note:** \*, and \*\*\* indicate significance at 5% and 1% levels, respectively, based on the Wilcoxon Signed-rank Test. At the time of this study, 1 Euro corresponded to 93.81 Afghani (Da Afghanistan Bank, 2021)

## 5.3 Preferences for traditional butchery meat and supermarket meat

In our assessment of the mean WTP for traditional butchery meat versus supermarket meat, we conducted a direct product-to-product comparison. Initially, we compared MST and MSM, both originating from the sedentary livestock system but differing in their slaughtering and processing methods. MST represents traditional butchery meat, while MSM signifies supermarket meat. The results depicted in Table 5.1 exhibit a mean WTP of AFN 177 for MST and AFN 196 for MSM, signalling a notable price premium of AFN 19 for supermarket meat, which is statistically significant at the 1% level, as indicated by the Wilcoxon test.

Subsequently, we compared MNT and MNM, both originated from nomadic systems. However, MNT corresponds to traditional butchery meat, while MNM is supermarket meat. Table 5.1 shows a mean WTP of AFN 168 for traditional butchery meat (MNT) and AFN 187 for supermarket meat (MNM), revealing an analogous price premium of AFN 19 for supermarket meat over its butchery counterpart. The Wilcoxon test likewise confirms a significant difference at the 1% level. Therefore, our findings underscore a prevailing preference for supermarket meat over traditional butchery meat.

#### **5.4 Impact of Treatment 1 on WTP for auction products**

Table 5.2 provides the parameter estimates from the random effects model analysing bids in round 2, with three panels presenting result of within-subject treatment effect, between-subject treatment effects, and impact of control variables on WTP for auction products.

Panel A shows the within-subject effects of treatments. For Group 1, written information framing (Treatment 1.1) led to a significant increase in the mean WTP for MST (AFN 10.83,  $p$ -value  $\leq 0.05$ ). The treatment, however, did not have any significant impact on the WTP for MSM. In contrast, the treatment resulted in a significant price discount for MNM— nomadic meat slaughtered and retailed by a supermarket—leading to a decrease in WTP by AFN 13.76 ( $p$ -value  $\leq 0.05$ ).

In Group 2, the visual framing group (treatment 1.2) led to a significant increase in WTP for MST by AFN 12.40 ( $p$ -value  $\leq 0.05$ ), but did not affect the WTP for MSM. In contrast, the treatment had a statistically significant negative impact on WTP for both the nomadic meats. The mean WTP for MNT decreased by AFN 11.80 ( $p$ -value  $\leq 0.05$ ), and for MNM by AFN 22.63 ( $p$ -value  $\leq 0.01$ ).

In Group 3, the priming group (treatment 1.3), had no significant effect on the mean WTP for any of the auctioned meats.

Panel B in Table 5.2 compares between-subject (group) effects. The results show no significant difference between visual and written framings (Group2 X Group1). This suggests that written framing is as effective as visual framing. However, when comparing priming with written framing (Group3 X Group1), there is a significant difference in the impact on WTP for MST meat, with the difference being negative AFN 15.81. This means that the written framing led to an increase in WTP for MST by AFN 10.83, whereas the priming treatment resulted in a decrease in WTP for MST by AFN 4.98. Results further show significant differences between priming and visual framing (Group3 X Group2) in their impacts on MST and MNM meats. Specifically, there is a negative difference of AFN 17.38 for MST and a positive difference of AFN 20.68 for MNM.

Priming treatment had no significant impact on WTP for the auction products in round 2. Therefore, the differences observed between Group 3 and Group 2 highlight the greater effectiveness of visual framing treatment in influencing subjects' WTP compared to priming treatment.

#### **5.4.1 Impact of control variables on WTP for auction products**

Panel C of Table 5.2 presents the parameter estimates for socioeconomic and other control variables that influence WTP for auction goods. Results in the table reveal that subjects' gender did not significantly impact bids. However, older subjects (aged 34 and over) submitted higher bids for MNT meat by AFN 49.19 ( $p \leq 0.1$ ). Subjects in the higher income group offered significantly higher bids for MST by AFN 26.68 ( $p \leq 0.1$ ), and MSM by AFN 38.83 ( $p \leq 0.05$ ). These are the two sedentary meats. Similarly, higher educated participants demonstrated higher preference for the meats originating from sedentary livestock system, for MST by AFN 18.45 ( $p \leq 0.1$ ) and for MSM by AFN 24.07 ( $p \leq 0.05$ ).

Moreover, experience of FBDs did not affect WTP for the auctioned meats. Risk preference, however, had a positive and significant impact on WTP for MSM by AFN 3.18 ( $p \leq 0.1$ ), the safest meat option. This finding may imply that even the most risk tolerant individuals tend to prefer safety.

**Table 5.2: Parameter estimates of Random Effect Model estimating the determinants of bids (in AFN) for auction products in round 2**

<b>Dependent Variable: WTP for 500 gr of mutton meat</b>					
<b>Explanatory Variables</b>	<b>Definition</b>	<b>MST</b>	<b>MNT</b>	<b>MSM</b>	<b>MNM</b>
<b>Panel A: within-subject (group) treatment effect: impact of treatment 1 based on round 1</b>					
written framing	Treatment 1.1: written framing about livestock systems	10.83** (5.03)	-5.15 (5.33)	-1.43 (5.30)	-13.76** (5.68)
visual framing	Treatment 1.2: visual framing about livestock systems	12.40** (5.26)	-11.80** (5.57)	0.59 (5.55)	-22.63*** (5.94)
priming	Treatment 1.3: priming to recall meat-borne diseases (MBDs)	-4.98 (5.45)	-8.64 (5.77)	1.69 (5.74)	-1.94 (6.15)
<b>Panel B: between-subject (group) comparison: treatment differences among groups</b>					
Group2 X Group1	Visual versus written framing in round 2	1.57 (7.28)	-6.65 (7.71)	2.01 (7.67)	-8.87 (8.22)
Group3 X Group1	priming versus written framing in round 2	-15.81** (7.42)	-3.50 (7.85)	3.11 (7.82)	11.81 (8.38)
Group3 X Group2	Priming versus visual framing in round 2	-17.38** (7.58)	3.16 (8.03)	1.10 (7.98)	20.68** (8.55)
<b>Panel C: Control variables</b>					
Gender	1 = female; 0 = male	6.48 (8.78)	11.70 (9.28)	1.31 (9.59)	8.95 (10.41)
Age	1 = 24 ~ 34; 0 = 18~24	-10.63 (9.84)	-8.54 (10.40)	-5.42 (10.75)	-8.51 (11.66)
	1= more than 34; 0 = 18~24	15.05 (26.16)	49.19* (27.65)	25.31 (28.58)	27.47 (31.01)
High Income	1 = if household income is more than AFN 38,000; 0 = otherwise	26.68* (14.38)	24.00 (15.20)	38.83** (15.71)	26.72 (17.05)
High Education	1= if attended university; 0=otherwise	18.45* (9.85)	15.60 (10.41)	24.07** (10.76)	20.47 (11.67)
Experience of food-borne disease (FBDs)	1= if subject has experienced food-borne disease	-5.63 (9.24)	-12.62 (9.77)	-7.80 (10.10)	-11.25 (10.96)
Risk Preference	Risk preference (0 = completely unwilling to take risk; 10 = completely willing to take risk)	1.83 (1.59)	0.55 (1.68)	3.18* (1.74)	1.54 (1.88)
Constant (in Group1)		153.77*** (15.75)	154.74*** (16.45)	150.41*** (17.18)	161.06*** (18.64)
Constant (in Group2)		147.62*** (15.18)	148.17*** (16.04)	151.96*** (16.56)	162.59*** (17.96)
Constant (in Group3)		155.91*** (15.93)	157.43*** (16.84)	165.93*** (17.38)	160.79*** (18.86)
Sigma_u		60.43	63.84	66.23	71.94
Sigma_e		32.23	34.14	33.97	36.40
Rho		0.78	0.78	0.79	0.80
Number of observations		686.00	681.00	681.00	681.00

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**Note:** All reported coefficients are the difference in mean WTP. \*, \*\*, \*\*\* indicate statistically significant at the 10%, 5% and 1% level, respectively. Numbers in parenthesis indicate standard error. Sigma u refers to the panel-level standard deviation and sigma e to the standard deviation of  $e_{ij}$ . Rho indicates the percent contribution of the panel-level variance component to the total variance. If it is zero, the panel estimator is not different from the pooled estimator. MBDs=Meat-borne Disease; MST=Lamb meat stemming from sedentary system, slaughtered & processed at a traditional butchery; MNT= Lamb meat stemming from nomadic system, slaughtered & processed at a traditional butchery; MSM= Lamb meat stemming from sedentary system, slaughtered & processed at a supermarket; MNM= Lamb meat stemming from nomadic system, slaughtered & processed at a supermarket.

## 5.5 Impact of Treatment 2 on WTP for auction products

Table 5.3 presents the parameter estimates from the random effects model estimating the determinants of bids for the auction products in round 3. As shown in Panel A of Table 5.3, written information about the two slaughtering and retailing systems (i.e. traditional butcheries and supermarkets) significantly reduced the WTP for MST—one of the butchery meats—by AFN 29.04 ( $p$ -value  $\leq 0.01$ ), and had no significant effect on MNT, the other butchery meat. In contrast, written information significantly increased WTP for MNM—one of the supermarket meats—by AFN 10.79 ( $p$ -value  $\leq 0.05$ ). The second supermarket meat, MSM, was not affected by the treatment.

The visual treatment resulted in a significant price discount for MST—one of the butchery meats—by AFN 17.80 ( $p$ -value  $\leq 0.01$ ). However, the treatment did not affect the other auction products, whether butchery meat (MNT) or supermarket meats (MSM and MNM).

Priming to recall any experience of MBDs caused by butcher meat—had no significant impact on any of the auction products. Therefore, priming, in this context, appears to be ineffective in influencing preferences toward safer meat choices.

Panel B of Table 5.3 shows the between-subject (group) differences. Results indicate no significant difference between visual and written information framing, confirming the results from round 2 that visual framing is just as effective as written framing. However, there is a significant difference in the effectiveness of priming (treatment 2.3) compared to written framing (treatment 2.1) on WTP for MST meat. The difference is AFN 23.52 ( $p \leq 0.01$ ), indicating that written framing is more effective than priming. However, results show no significant difference between the impacts of treatments in group 3 (priming treatment, 2.3) and group 2 (visual treatment, 2.2).

**Table 5.3: Parameter estimates of Random Effect Model estimating the determinants of bids (in AFN) for auction products in round 3**

Dependent Variable: WTP for 500 gr of mutton meat					
Explanatory Variables	Definition	MST	MNT	MSM	MNM
<b>Panel A: within-subject (group) treatment effect: impact of treatment 2 based on round 2</b>					
written framing	Treatment 2.1: written framing about slaughtering systems	-29.04*** (5.03)	-3.78 (5.33)	-1.71 (5.30)	10.79** (5.68)
visual framing	Treatment 2.2: visual framing about slaughtering systems	-17.80*** (5.26)	2.15 (5.57)	-4.51 (5.55)	3.71 (5.94)
priming	Treatment 2.3: priming to recall meat-borne diseases (MBDs) caused by butchery meat	-5.51 (5.45)	-7.58 (5.77)	-2.30 (5.74)	-2.07 (6.15)
<b>Panel B: between-subject (group) comparison: treatment differences among groups</b>					
Group2 X Group1	Visual versus written framing in round 3	11.24 (7.28)	5.93 (7.71)	-2.80 (7.67)	-7.09 (8.22)
Group3 X Group1	priming versus written framing in round 3	23.52*** (7.42)	-3.80 (7.86)	-0.60 (7.82)	-12.86 (8.38)
Group3 X Group2	Priming versus visual framing in round 3	12.28 (7.57)	-9.73 (8.02)	2.21 (7.98)	-5.78 (8.55)
Constant (in Group1)		164.38*** (7.61)	188.40*** (8.10)	156.08*** (8.37)	194.01*** (8.95)
Constant (in Group2)		160.14*** (7.96)	183.35*** (8.47)	152.41*** (8.76)	198.19*** (9.36)
Constant (in Group3)		150.92*** (8.24)	176.40*** (8.77)	169.57*** (9.06)	198.67*** (9.69)
Sigma_u		60.93	64.92	67.80	72.42
Sigma_e		32.22	34.15	33.97	36.40
Rho		0.78	0.78	0.80	0.80
Number of observations		686	681	681	681

**Note:** All reported coefficients are the difference in mean WTP. \*, \*\*, \*\*\* indicate statistically significant at the 10%, 5% and 1% level, respectively. Numbers in parenthesis indicate standard error. Sigma u refers to the panel-level standard deviation and sigma e to the standard deviation of  $e_{ij}$ . Rho indicates the percent contribution of the panel-level variance component to the total variance. If it is zero, the panel estimator is not different from the pooled estimator. MBDs=Meat-borne Disease; MST=Lamb meat stemming from sedentary system, slaughtered & processed at a traditional butchery; MNT= Lamb meat stemming from nomadic system, slaughtered & processed at a traditional butchery; MSM= Lamb meat stemming from sedentary system, slaughtered & processed at a supermarket; MNM= Lamb meat stemming from nomadic system, slaughtered & processed at a supermarket.

## 5.6 Robustness check

To ensure the robustness of our empirical findings, we conducted several checks to confirm that the estimated treatment effects are not sensitive to model specification. First, we ran the random

effects models twice: initially without including the socioeconomic and other control variables, and subsequently with these variables integrated. The results of the treatment effect estimates, as presented in Tables 5.2 and 5.3, remained consistent and did not exhibit significant changes across these different model specifications. This consistency suggests that the observed changes in WTP across the treatment groups are not confounded by socioeconomic factors or other controls.

Additionally, we applied a fixed effects model as a further robustness check. The results from the fixed effects model did not differ substantially from the random effects model (Appendices 7 and 8). This alignment across different modelling approaches strengthens the validity of our findings and indicates that the changes in WTP observed in rounds 2 and 3 are indeed reflective of the true impact of the treatments (written framing, visual framing, and priming) across the three groups.

## **5.7 Chapter summary**

This chapter investigated Afghan consumers' preferences and WTP for four types of lamb meat, providing critical insights for policymakers and stakeholders aiming to enhance food safety and ensure access to safer meat options. The results presented in this chapter revealed no significant preference differences at aggregate level between sedentary and nomadic meats. However, the analysis highlighted that consumers with higher education and income levels showed higher preference for sedentary meat, signalling a potentially valuable market segment for the meats stemming from the sedentary livestock system.

The findings revealed that preferences are notably high for supermarket-sourced meats as compared to butchery meats, supporting modernization trends within the meat industry and echoing the "supermarketization" movement seen across many Islamic LMICs. This preference highlights the growing acceptance and potential of modern retail channels to drive industry advancements.

Moreover, the study found that written and visual framings were equally impactful in influencing consumer choices. However, priming strategies aimed at fostering greater demand for meat safety did not yield significant effects in this context. These results contribute to a nuanced understanding of consumer behavior in emerging markets and offer practical implications for the development of targeted marketing and public health strategies in Afghanistan and similar regions. Additionally, risk preference was found to have a positive and significant impact on WTP for MSM meat, recognized as the safest option, while it did not influence bids for other types of meat. This finding suggested that even individuals who exhibit higher levels of risk tolerance tend to favor the safest food choice.

This study faced potential limitations that should be considered when interpreting the empirical findings. The study was conducted with urban consumers in Kabul, a city that blends modernity—

represented by new townships and supermarkets—with tradition, seen in slums with traditional food markets and butcheries. While this setting was appropriate for this investigation, it is recommended that future research include other regions, particularly rural areas where conditions and consumer preferences for the different meat types may vary. Additionally, future researchers are encouraged to explore different types of priming as a strategy to influence bids in experimental auction settings.

While this chapter explored Afghan consumers' WTP for four types of lamb meat and the role of two framing and one priming technique in inducing demand towards safer meat choices, Chapter 6 presents a detailed investigation into consumers preferences for a set of meat attributes and tries to build a 'meat attribute system' for Afghan meat consumers. Chapter 6 also validates the MAQ in an Islamic LMIC context and evaluates the relationship between various meat attachment attitudes and meat attribute preferences.

## CHAPTER 6

# PREFERENCES FOR MEAT ATTRIBUTES AND MEAT ATTACHMENT ATTITUDES IN AFGHANISTAN

### 6.1 Chapter overview

In LMICs, increased urbanization and income have led to a higher demand for meat products; this contrasts with the shift away from meat consumption observed in HICs. Consequently, new suppliers have entered the market, supplying fresh meat through supermarkets, which compete with traditional butcheries. For these new entrants to survive in the evolving market, an improved understanding of consumer preferences for meat attributes must be attained.

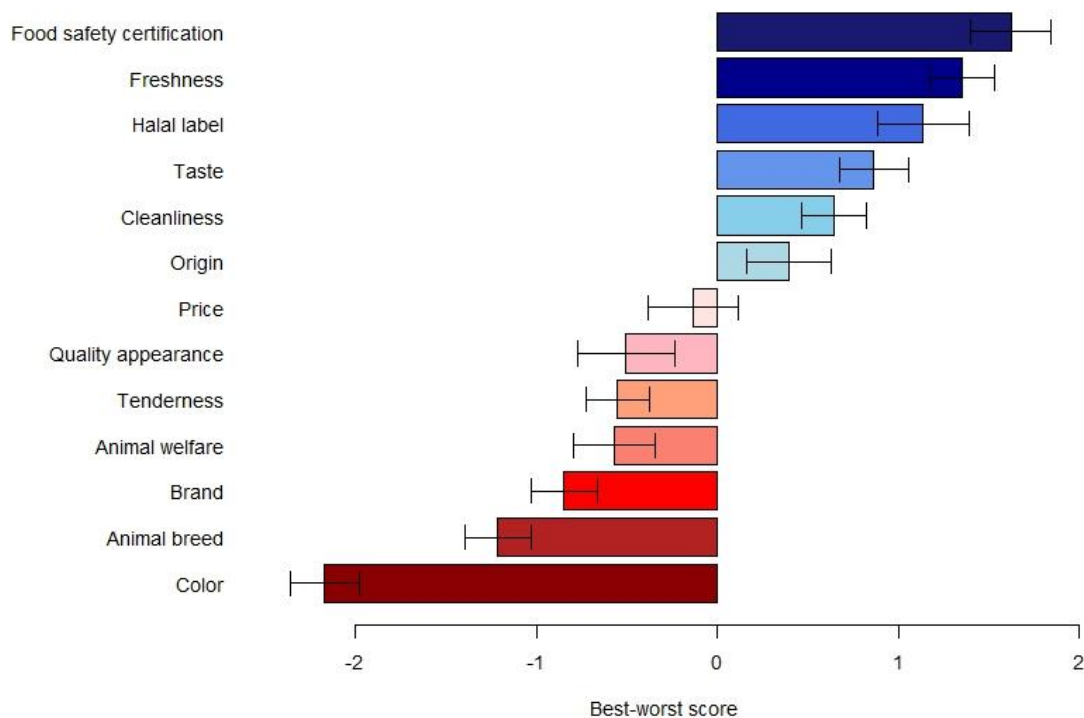
To that end and addressing the third set of research questions posed in Chapter 1, this chapter examines lamb meat attribute preferences among urban consumers in Afghanistan using a BWS approach and evaluates the validity of the MAQ in the context of an Islamic LMICs. The list of the thirteen lamb meat attributes selected for this study are provided and discussed in Chapter 3. Likewise, the 16 MAQ statements and its four sub-factors are also described in Chapter 3. Moreover, the BWS survey through which the data were collected for this study, and the analytical methods are also discussed in detail in Chapter 3.

This study provides valuable insights for stakeholders involved in the ongoing modernization of the meat industry, informing marketing strategies and trade policies. It also highlights the importance of aligning production standards with halal requirements to meet Muslim consumer preferences. These findings contribute to the literature on meat attribute preferences and attachment in LMICs.

### 6.2 Preferences for meat attributes

#### 6.2.1 Relative importance of meat attributes

Figure 6.1 shows a bar plot summarizing the most and least important attributes based on the counting approach of BWS. As shown, the six most important attributes are food-safety certification, freshness, halal label, taste, cleanliness, and origin, respectively, from the most important to the sixth most important. The remaining seven attributes are less important, with color being the least important attribute.



**Figure 6.1: Mean values of best-minus-worst scores for thirteen attributes. Error bars indicate 95% confidence intervals.**

In addition to the counting approach results of meat attribute preferences (shown in Figure 6.1), Table 6.1 reports the RPL model estimates and the share of preferences for each attribute based on the modelling approach. Coefficients reflect the importance of each of the twelve attributes relative to the baseline attribute, color, which was normalized to zero. Since we cannot obtain an intuitive interpretation of this result alone, we calculated the share of preferences for each attribute to assess the relative importance of each attribute relative to others, the results of which are reported in the third column of Table 6.1. Moreover, as shown in the second column of Table 6.1, the standard deviations of each meat attribute are highly significant, except for tenderness. This implies that heterogeneity needs to be considered when interpreting meat attribute preferences.

The third column in Table 6.1 provides a more intuitive interpretation of the RPL results, showing the share of preferences for each of the thirteen attributes from most to least important. Food safety certification is shown to be the top priority, with 18% of subjects selecting it as the most important attribute. This is followed by freshness and halal label, which were each chosen by 14% of the subjects.

**Table 6.1: RPL estimates of meat attributes and share of preferences**

Attributes	Estimates				Shares of Preferences	
	Mean		St. Dev.			
food safety certification	2.462***	(0.087)	0.788***	(0.085)	0.177	18%
freshness	2.244***	(0.087)	-0.332**	(0.103)	0.143	14%
halal label	2.243***	(0.090)	1.170***	(0.091)	0.143	14%
taste	1.893***	(0.086)	0.340**	(0.108)	0.100	10%
cleanliness	1.780***	(0.085)	-0.375***	(0.105)	0.090	9%
place of origin	1.695***	(0.086)	0.981***	(0.092)	0.082	8%
price	1.305***	(0.085)	1.121***	(0.093)	0.056	6%
quality appearance	1.072***	(0.083)	1.107***	(0.084)	0.044	4%
tenderness	1.041***	(0.084)	-0.009	(0.131)	0.043	4%
animal welfare	1.040***	(0.083)	0.684***	(0.079)	0.043	4%
brand	0.859***	(0.078)	0.435***	(0.100)	0.036	4%
animal breed	0.622***	(0.082)	0.343**	(0.107)	0.028	3%
<b>color</b>	<b>Baseline</b>				0.015	2%
Number of individuals	227					
Number of choices	35412					
Log likelihood	-6200					
Adjusted McFadden's R-squared	0.153					

**Note:** (\*\*\*) and (\*\*) imply that the mean importance of the attribute is statistically different from color at the  $p < 0.01$  and  $p < 0.05$  levels, respectively. Numbers in parentheses denote standard errors.

Taste was selected by 10% of subjects, cleanliness by 9%, and 8% of subjects selected origin as their most important attribute. Breed is preferred by 3%, while the least important attribute, color, was selected by only 2% of respondents.

### 6.2.2 Heterogeneity of meat attributes among consumers

Table 6.2 reports the effects of the individual characteristics that influence the mean preference parameter of meat attributes in the RPL model. Our results show that subjects' gender (i.e., being female versus being male) did not have any significant impact on meat attribute preferences. In terms of age, middle-aged respondents placed significantly less importance on freshness and food safety attributes relative to their younger counterparts. Additionally, participants holding bachelor's degrees showed a significantly higher preference for animal breed, brand, and quality appearance compared to those without a degree. Additionally, those with a graduate level of education (master's or PhD) placed a significantly higher importance on cleanliness and food safety certification.

In the household income category, high- and middle-income participants, as well as those who did not disclose their income level, showed a significantly higher importance for halal label compared to low-income participants. Additionally, middle-income subjects also prioritize freshness in addition to halal label, while those who did not disclose their income level, placed significantly higher importance on taste as well.

In terms of meat consumption frequency, occasional meat consumers showed significantly higher preference for origin, brand, and halal label compared to habitual consumers. Furthermore, respondents with higher risk-taking attitude showed a significantly higher preference for freshness. The results of the RPL model do not show any significant preference heterogeneity for price, tenderness, and animal welfare attributes.

**Table 6.2: Effects of individual characteristics on the Random Parameters Logit Model estimates of meat attributes**

	Origin	Price	Animal breed	Brand	Taste	Tenderness	Halal label	Freshness	Cleanliness	Animal welfare	Food safety certification	Quality appearance
<b>Gender (Reference: male)</b>												
Female	0.350 (0.230)	-0.055 (0.244)	0.060 (0.184)	0.093 (0.186)	0.094 (0.191)	-0.165 (0.179)	-0.131 (0.261)	-0.083 (0.196)	0.142 (0.189)	-0.198 (0.217)	-0.231 (0.241)	-0.346 (0.251)
<b>Age (Reference: young age 18–24)</b>												
Middle-aged (24–44)	-0.039 (0.267)	0.095 (0.279)	0.011 (0.212)	-0.237 (0.214)	-0.055 (0.219)	0.099 (0.206)	-0.421 (0.292)	-0.548** (0.226)	-0.121 (0.217)	-0.230 (0.255)	-0.711** (0.289)	-0.398 (0.308)
<b>Education (Reference: no degree)</b>												
College degree	-0.040 (0.394)	-0.258 (0.405)	0.302 (0.320)	0.102 (0.320)	-0.197 (0.331)	0.139 (0.315)	-0.013 (0.454)	0.162 (0.340)	-0.201 (0.325)	-0.272 (0.371)	0.067 (0.425)	0.607 (0.439)
Bachelor's degree	0.390 (0.331)	0.126 (0.347)	0.483* (0.269)	0.500* (0.270)	0.027 (0.280)	-0.222 (0.262)	0.469 (0.391)	0.347 (0.286)	-0.022 (0.273)	-0.109 (0.311)	0.411 (0.370)	0.652* (0.390)
Graduate degree	0.753 (0.568)	-0.143 (0.593)	0.495 (0.450)	0.629 (0.452)	-0.309 (0.463)	-0.341 (0.437)	-0.254 (0.619)	0.582 (0.481)	0.945** (0.467)	0.276 (0.553)	1.601*** (0.611)	0.721 (0.641)
<b>Household Income/month (Reference: Low income)</b>												
High Income	0.267 (0.300)	0.203 (0.301)	-0.004 (0.234)	0.187 (0.237)	0.232 (0.243)	0.280 (0.230)	0.669** (0.323)	0.107 (0.249)	0.297 (0.242)	0.356 (0.276)	0.218 (0.301)	0.496 (0.316)
Middle Income	0.424 (0.364)	-0.053 (0.379)	-0.208 (0.296)	0.043 (0.296)	0.247 (0.306)	0.067 (0.289)	0.979** (0.406)	0.789** (0.328)	-0.080 (0.301)	0.319 (0.585)	0.466 (0.409)	-0.218 (0.397)
Undisclosed	0.129 (0.344)	-0.048 (0.367)	0.411 (0.275)	0.423 (0.277)	0.509* (0.287)	-0.045 (0.265)	1.271*** (0.426)	0.117 (0.294)	0.400 (0.280)	0.271 (0.314)	0.629 (0.385)	0.375 (0.399)
<b>Meat consumption frequency (Reference: Habitual)</b>												
Occasional	0.417* (0.248)	0.028 (0.262)	0.306 (0.198)	0.468** (0.201)	0.049 (0.206)	0.015 (0.193)	0.539* (0.291)	0.154 (0.212)	0.162 (0.203)	-0.042 (0.232)	0.339 (0.268)	-0.218 (0.272)
Never consume	0.609 (0.510)	0.119 (0.552)	0.443 (0.418)	-0.397 (0.418)	0.004 (0.431)	0.362 (0.413)	-0.292 (0.569)	0.560 (0.462)	0.313 (0.427)	0.299 (0.483)	0.229 (0.565)	-0.168 (0.568)
<b>Risk Preferences</b>												
Risk Preferences	0.024 (0.041)	0.025 (0.044)	0.036 (0.033)	0.016 (0.033)	0.007 (0.033)	0.035 (0.032)	-0.046 (0.045)	0.061* (0.035)	0.028 (0.033)	0.024 (0.039)	-0.055 (0.043)	-0.022 (0.045)

**Note:** Dependent variable: the choice made by subject in a BWS choice set – i.e., it is coded as binary, where 1 indicates if an alternative pair of best-worst attributes are chosen as best and worst in a BWS choice set, and 0 otherwise. Numbers in parentheses denote standard errors. \*, \*\*, \*\*\* indicate

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statistically significant at the 10%, 5%, and 1% levels, respectively. College degree = those who studied up to 14th grade; no degree = no college or university degree; graduate degree = those who hold master's or doctoral degree. Low Income = household income up to AFN 22,000; Mid-Income = household income of AFN 22,000–38,000; High Income = household income higher than AFN 38,000; Undisclosed = respondents who chose “prefer not to say”. Habitual consumers = those who consume meat 1–5 times a week; occasional consumers = 1~2 times a month; Never consume = those who chose “never consume meat”.

## 6.3 Meat Attachment

### 6.3.1 Confirmatory Factor Analysis (CFA) of MAQ

An initial assessment to test the adequacy of the MAQ data for CFA was performed for the original 16-item MAQ (Graça et al., 2015b). No missing data were observed. Absolute values of skewness ranged from  $-0.85$  to  $1.03$ , showing no significant departure from a normal distribution. However, the initial CFA analysis with the original 16-item MAQ showed that two items, namely items 1 and 13, exhibited the lowest factor loadings of  $0.34$  and  $-0.30$ , respectively (shown in the path diagram in Appendix 11). Hence, to improve the model fit, we set a criterion to remove all items with factor loadings below  $0.45$ . Thus, we modified the model by removing items 1 and 13; the results of the CFA analysis are shown in Figure 6.2. The modified model shows improvement relative to the

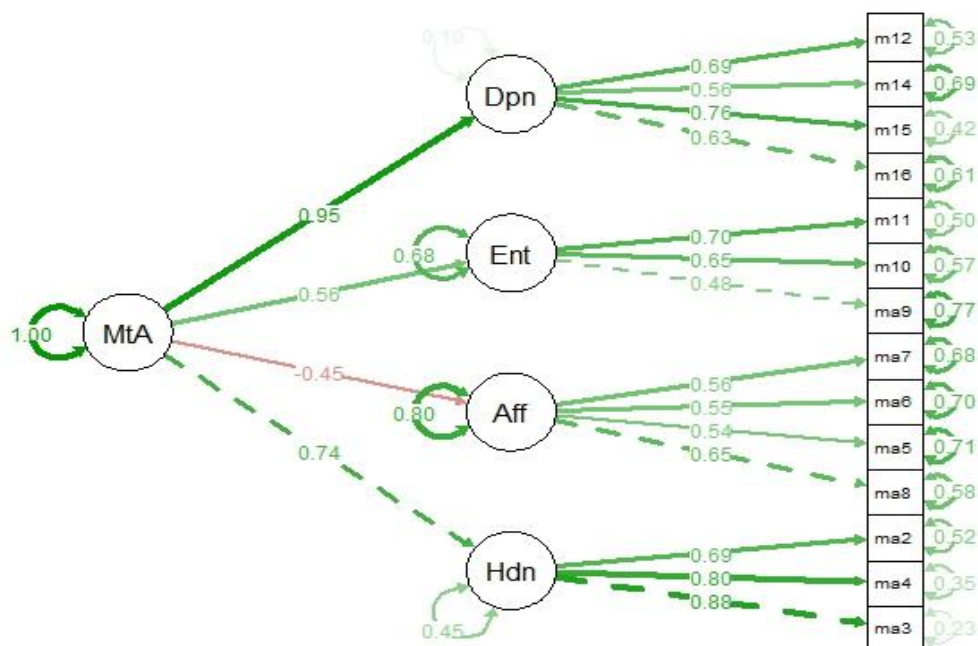


Figure 6.2: Confirmatory factor analysis of the 14-item MAQ, four-factor structure with a second-order dimension. Standardized coefficients for factor loadings (e.g.,  $0.95$  for Dependence and Meat Attachment) and R<sup>2</sup> values (e.g.,  $0.10$  for dependence) are shown. MtA=Meat Attachment; Dpn=Dependence; Ent=Entitlement; Aff=Affinity; and Hdn=Hedonism.

original MAQ, as shown by the ratio of  $\chi^2/df$ , which indicates good model fit with a value of 1.92, compared to 2.03 when using the 16-item model. The CFI (0.92) and TLI (0.90) values also indicate a good fit and improvement relative to the 16-item model, with a CFI value of 0.90 and TLI of 0.87. The RMSEA is 0.063 [0.05, 0.08], which is also within an acceptable range.

The reliability analysis for the modified 14-item MAQ (Table 6.2) shows good overall internal consistency, with a Cronbach's alpha of 0.82 for the global scale (i.e. meat attachment). The subscales show varying levels of reliability in terms of hedonism ( $\alpha = 0.83$ ) and dependence ( $\alpha = 0.75$ ). Affinity ( $\alpha = 0.66$ ) and entitlement ( $\alpha = 0.64$ ) show lower, but still acceptable, reliability.

The highest mean score was obtained for entitlement (5.49), followed by hedonism (4.29), suggesting that these aspects of meat attachment are particularly strong in the sample studied. The overall meat attachment score (4.16) indicates a moderately high attachment to meat.

All subscales show significant positive correlations with the overall meat attachment scale, consistent with expectations. The strongest correlation was observed with dependence (0.82), followed by hedonism (0.76), suggesting that feelings of dependence on meat and the pleasure derived from it are the strongest contributors to overall meat attachment in the studied sample. Hedonism and dependence show the strongest correlation (0.59), suggesting a link between pleasure from eating meat and feeling dependent on it. Affinity and entitlement show the weakest correlation (0.26), indicating these are relatively distinct aspects of meat attachment.

**Table 6.3: Subscale and global scale reliabilities, means, standard deviations, and correlations**

<b>MAQ scale and</b>								
<b>subscales</b>	<b><math>\alpha</math></b>	<b>mean</b>	<b>sd</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
1-Meat Attachment	0.82	4.16	1.07	1				
2-Hedonism	0.83	4.29	1.66	0.76	1			
3-Affinity	0.66	3.25	1.35	0.64	0.28	1		
4-Entitlement	0.64	5.49	1.38	0.61	0.25	0.26	1	
5-Dependence	0.75	3.98	1.60	0.82	0.59	0.25	0.37	1

Source: Author's own calculation based on data (2021)

### **6.3.2 Relationship between meat attachment attitudes and meat attribute preferences**

In the final stage of the analysis, we incorporated the mean scores of the four MAQ subscales into the RPL model to evaluate the relationship between the four distinct dimensions of subjects' meat attachment attitudes – as captured by the four sub-scales of meat attachment – and their preferences for meat attributes. Results reveal that a higher hedonism score is significantly and negatively related to preferences for 6 of the 12 meat attributes shown in Table 6.4, namely origin, price, breed, halal label, freshness, and animal welfare. These negative relationships imply that those who consider meat as a source of pleasure (individuals who score highly for hedonism) tend to place significantly lower importance on most meat attributes.

Within the affinity subscale, participants with higher affinity scores (i.e., those who do not experience feelings of repulsion toward eating meat) placed significantly less importance on price and food safety certification when making meat-purchase choices. However, for the remaining attributes, affinity does not have any significant effect.

Within the entitlement category, individuals with higher entitlement scores (i.e., those with stronger sense of entitlement towards consuming meat) showed significantly higher importance for brand, animal welfare, and food safety certification. Entitlement scores, however, did not have any significant influence on the remaining meat attributes.

Finally, individuals with higher feelings of dependence (i.e., those who feel that they need meat in their diets) showed significantly lower preference for cleanliness, animal welfare, food safety certification, and quality appearance. Dependence scores did not have any significant effect on other meat attributes, however.

**Table 6.4: Random Parameters Logit Model using Subfactors of the Meat Attachment Questionnaire**

	Origin	Price	Breed	Brand	Taste	Tenderness	Halal label	Freshness	Cleanliness	Animal welfare	Food safety	Quality appearance
<b>Hedonism</b>		–										
	–0.208** (0.082)	0.239*** (0.086)	–0.140** (0.068)	–0.057 (0.068)	–0.114 (0.071)	–0.060 (0.064)	–0.317*** (0.093)	–0.158** (0.073)	–0.111 (0.068)	–0.126* (0.076)	–0.116 (0.084)	0.006 (0.090)
<b>Affinity</b>	0.083 (0.087)	–0.245*** (0.087)	0.053 (0.068)	0.062 (0.069)	–0.061 (0.072)	–0.026 (0.065)	–0.081 (0.094)	–0.092 (0.074)	–0.105 (0.069)	0.097 (0.077)	–0.142* (0.086)	–0.057 (0.088)
<b>Entitlement</b>	0.133 (0.087)	0.063 (0.088)	–0.008 (0.070)	0.120* (0.070)	0.103 (0.072)	0.056 (0.066)	0.121 (0.097)	0.061 (0.076)	0.067 (0.071)	0.211*** (0.078)	0.268*** (0.088)	0.054 (0.091)
<b>Dependence</b>											–	
	–0.060 (0.087)	0.021 (0.091)	0.034 (0.072)	–0.087 (0.072)	–0.069 (0.075)	–0.093 (0.068)	–0.046 (0.095)	–0.089 (0.077)	–0.179** (0.072)	–0.190** (0.081)	0.302*** (0.088)	–0.178* (0.092)

**Note:** Dependent variable: the choice made by subject in a BWS choice set – i.e., it is coded as binary, where 1 indicates if an alternative pair of best-worst attributes are chosen as best and worst in a BWS choice set, and 0 otherwise. Numbers in parentheses denote standard errors. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% level, respectively.

## 6.4 Chapter summary

This chapter provided valuable insights for meat producers and policymakers in an Islamic LMIC context undergoing modernization in the meat industry. This chapter investigated Afghan consumers' preferences for the most important meat attributes and found that food safety certification, freshness, halal label, taste, cleanliness, and place of origin are consecutively the six most important attributes, making the meat attribute system for Afghan consumers. The findings highlight that food safety is not just a concern for consumers in HICs, rather a global health concern, ranking higher than halal labelling for consumers in Islamic countries like Afghanistan. The prioritization of food safety certification attribute, along with the freshness and cleanliness by several consumer segments, points to the need for improved cold chain management and better hygiene practices throughout the meat supply chain. The findings further suggest that tailored marketing strategies should focus on these attributes to resonate with Afghan consumers.

Additionally, the significance of halal labelling by middle- and high-income, as well as occasional consumers underscores the necessity of aligning production standards with halal requirements, especially given that major meat exporters to Islamic countries predominantly come from non-Islamic countries.

The chapter also evaluated preference heterogeneity for meat attributes. preferences for meat attributes vary across consumer segments, suggesting opportunities for product differentiation based on specific attributes valued by different groups. For instance, origin, brand, and halal label consideration among occasional consumers; preferences for food safety certification, cleanliness, breed, brand, and quality appearance are important for higher-educated individuals; and halal label and freshness are valued more by high- and middle-income individuals.

The chapter also contributed to the literature on meat attachment and consumption by validating the MAQ constructs in the LMICs and Islamic context and providing detailed insights into how different aspects of MAQ were related to preferences for certain meat attributes. The findings suggested a need for targeted policy interventions, including educational programs on nutrition and the health implications of excessive meat consumption, while respecting cultural norms. For stakeholders promoting sustainable and ethical meat consumption, the results indicated that nuanced approaches were necessary to address the psychological aspects of meat consumption, particularly for consumers with high hedonistic and dependence tendencies.

While the chapter offered important guidance for stakeholders and policymakers, it had limitations. This study focused on urban consumers in Kabul city and on lamb meat attributes. While the results are generalizable in urban context of not just other major cities in Afghanistan, but also for other

Islamic LMICs like Pakistan, Iran, Tajikistan, and Uzbekistan that share similar context with that of Afghanistan, it is however recommendable to conduct similar studies in rural areas which constitute a significant portion of the Afghan demographic. Future research should include rural areas to enable a more comprehensive rural-urban comparison. Additionally, exploring the complex relationships between meat attachment and attribute preferences through behavioral measures and cross-cultural comparisons could further enhance understanding of meat consumption patterns and attitudes across diverse demographic groups.

Chapter 7 discusses the major findings of the three-analysis presented in chapters 4, 5, and 6.

# CHAPTER 7

## DISCUSSION

### 7.1 Chapter overview

This chapter provides an in-depth discussion of the key results in relation to the three sets of research questions presented in the preceding three chapters. The discussion chapter is structured according to the following sections: section 7.2 focuses on the main results with respect to Afghan consumers' perceptions of meat quality and safety. Section 7.3 discusses the findings related to the outcomes of the experimental auctions. Finally, section 7.4 discusses the key outcomes pertaining to the meat attribute preferences and attitudes towards meat attachment. Each section begins by restating the specific research question posed in Chapter 1 (Section 1.4, Empirical Research Questions), followed by a summary of the main findings. This is then complemented by a discussion that connects these findings to the existing literature reviewed in Chapter 2.

### 7.2 Discussion on meat quality and safety perceptions across the supply chain

The first analysis of this dissertation – presented in Chapter 4 – focused on consumers' perceptions of meat quality and safety across the supply chain. The TFQM was used as the guiding analytical framework. To that aim, the first question was as follows:

**Research question 1.1:** *How does meat feature in the daily diet of Afghan consumers?*

With respect to this question, the analysis revealed that meat holds a prominent place in Afghan dietary preferences. In the eleven most commonly consumed foods identified through FGDs, meat was mentioned 15 times as the most preferred food. However, this preference does not equate to meat being the most consumed food overall. According to FAOSTAT (2024), Afghanistan, classified among the lowest-income countries in the LMICs, had an average meat consumption of only 6.77 kg per capita in 2022 across all types of meat. This figure positions Afghanistan among the lowest per capita meat consumers globally (Buchholz, 2023).

Despite this overall low consumption, Afghanistan stands out for its significant consumption of lamb and goat meat. In 2020, the per capita consumption of mutton and goat meat was 4.3 kg, placing Afghanistan among the highest consumers of these meats worldwide (Rao and Wallach, 2023). This preference for lamb and mutton is common in many Central and South Asian countries.

Meat consumption is influenced by a combination of cultural, religious, and socio-economic factors (Sohaib and Jamil, 2017; Godfray et al., 2018). In Islamic countries, meat holds importance beyond its nutritional value, playing a pivotal role in religious celebrations, social events, and cultural

traditions. Islamic festivals such as Eid al-Adha and Muharram highlight the cultural significance of meat. The ritual animal sacrifice and distribution of meat among family, neighbours, and those in need—known as *Qurbani* or *Udhiyah*<sup>1</sup>—are deeply embedded in Islamic teachings and emphasize charity and community solidarity (Rippin and Bernheimer, 2019).

In Afghanistan, as in other Muslim-majority nations, meat is a centrepiece of festive and communal meals. Social gatherings and banquets are integral to Afghan culture, often featuring meat dishes as the highlight. The national dish, Qabuli Palaw, made with lamb, exemplifies the central role of meat in Afghan cuisine. These meat-centric events serve not only as meals but as vital social functions that reinforce community bonds.

In summary, while economic constraints overall classify Afghanistan among least meat consuming nations, meat is still the most favoured food and red meat—especially lamb and mutton—holds a special place in Afghan culinary traditions and is prioritized during celebrations and social occasions.

**Research question 1.2:** *What are consumer perceptions of meat quality and safety at the production stage, comparing sedentary and nomadic systems?*

In response to this question, the study explored respondents' perceptions regarding meat quality and safety originating from different animal husbandry practices. The analysis suggested that sedentary and nomadic livestock systems were perceived as producing superior quality meat due to their access to varied and natural grazing areas and the benefits of open-environment rearing. Participants associated these systems with positive attributes related to health, environmental benefits, and animal welfare. These findings align with the research conducted by Stampa et al. (2020), which demonstrated consumer preferences for products from pasture-raised and grass-fed livestock.

Additionally, the study revealed that respondents showed a marked preference for meat from sedentary livestock, particularly due to grazing on mountainous pastures, as opposed to nomadic livestock that grazes primarily on lowland areas. The importance placed on locally sourced meat

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<sup>1</sup> *Udhiyah* refers to the ritual animal sacrifice performed by Muslims during the Islamic festival of Eid al-Adha, also known as the "Festival of Sacrifice." This practice commemorates the willingness of the Prophet Ibrahim (Abraham) to sacrifice his son as an act of obedience to God, who then provided a ram as a substitute. The meat from the sacrificed animal is traditionally divided into three parts: one part is given to the poor and needy, another part is shared with relatives and friends, and the final part is kept for the household performing the sacrifice. This act of charity and sharing emphasizes community, gratitude, and devotion.

was another key finding, reflecting earlier studies by Hersleth et al. (2012) and Becker et al. (2000). These studies found that European consumers favoured meat from mountain pasture-raised livestock and locally produced meat over imports, prioritizing animal welfare and natural rearing conditions. Similarly, Imami et al. (2011) also observed a preference for domestic high-land lamb over low-land lamb. Our findings contribute to this body of work by indicating that consumers in LMICs, like Afghanistan, also show a preference for mountain pasture livestock meat and locally sourced meat.

When examining perceptions of exposure to FSHs, the results indicated mixed views regarding sedentary and nomadic livestock systems. While some respondents believed FSHs levels to be higher in these systems due to outdoor rearing practices, others expressed concerns over potential food fraud. Specifically, there were reports that livestock holders sometimes sell diseased animals to local butcheries to mitigate losses, suggesting that food fraud occurs at the pre-harvest stage of meat production. This practice is prevalent in many LMICs, where food safety regulatory systems are often weak or absent, as noted by Khalid (2016) and in a World Bank (2014) report.

In contrast, perceptions of meat from “urban-raised” livestock and farm/home-reared ruminants were overwhelmingly negative across all evaluated aspects. These insights underscore the broader challenges in ensuring food safety and consumer trust in environments where institutional oversight is insufficient.

**Research question 1.3:** *How do consumers view the quality and safety of meat from traditional versus modern slaughterhouses, especially in relation to animal welfare, halal compliance, and technological processes?*

With respect to the perceptions of meat quality and safety from traditional butchery versus supermarket sources, the study indicated that while consumers recognized supermarkets for their superior hygiene, sanitation, services, and FSH control, trust in purchasing meat from these outlets remained low. The findings highlighted that this lack of confidence stemmed from perceived deficiencies in quality control and inspection systems. The primary concern identified was related to the halal certification of supermarket meat, reflecting similar issues in other Islamic countries such as Indonesia and Pakistan (Chamhuri and Batt, 2015; Sohaib and Jamil, 2017), as well as among Muslim consumers in developed nations like Belgium and the UK (Verbeke et al., 2013; and Ahmed, 2008). Another contributing factor could be the inability of supermarkets to maintain consistent refrigeration due to unreliable power supplies. Additionally, the relative ‘novelty’ or ‘modernity’ of supermarkets, especially regarding fresh meat sales, led to limited consumer

knowledge about the origin of their products, fuelling more doubts about them complying with halal slaughtering criteria.

Conversely, participants showed a preference for purchasing meat from traditional butcheries, relying on search and credence attributes during purchase, such as freshness, naturalness, healthiness, safety, and assurance of halal slaughter. This aligns with prior research by Ahmed (2008) in the UK, which found that many consumers mistrusted supermarkets for halal meat, and by Kiran et al. (2018) in India, which indicated a preference for small butcher shops over supermarkets. According to Verbeke et al. (2013), the Muslim ownership of a shop significantly enhances trust among Muslim consumers. Moreover, highly educated participants mentioned checking labels and the country of origin when buying meat from supermarkets, similar to findings by Zhllima et al. (2015) in Albania, where wealthier and more educated consumers showed greater confidence in formal institutions through trust in veterinary stamps.

The study also revealed that consumers associated traditional butcheries with poor hygiene and sanitation, and food fraud practices, such as selling diseased livestock. These insights corroborate earlier studies by Haileselassie et al. (2013) and Nandonde et al. (2012) on the substandard conditions of traditional abattoirs in LMICs. Despite acknowledging the higher FSH risks in traditional systems, participants expressed strong trust in these establishments, possibly due to local sourcing or the practice of fresh slaughter. The widespread nature of food fraud at both the production and processing stages underscored the necessity for public and legislative bodies to reinforce food safety control and inspection mechanisms throughout the supply chain. Addressing these issues, Raheem and Demirci (2018) advocated for the integration of the *Tayyib* concept within the halal food sector. This concept combines halal with hygienic production, emphasizing environmental and personal hygiene and measures to prevent cross-contamination, thereby offering a viable approach to improve hygiene and sanitation in both traditional butcheries and modern supermarket settings.

In terms of animal welfare, participants generally viewed modern slaughterhouses positively, attributing better treatment and facilities to these environments. However, they expressed negative views regarding traditional butcheries, citing poor animal treatment, substandard housing, and increased animal suffering, which they believed could impact meat quality. Opinions were divided concerning the compliance of modern slaughtering techniques with halal standards. Many participants perceived such methods as conflicting with traditional Islamic halal practices and even deemed them inhumane, a finding consistent with research by Fuseini et al. (2017).

**Research question 1.4:** *How do consumers perceive meat quality and safety at the post-harvest stage; i.e., how is meat quality evaluated pre- and post-purchase?*

The objective of this question was to investigate how consumers form expectations about meat quality prior to purchase and their experiences regarding quality after purchase, as outlined in the TFQM. Specifically, the aim was to identify the most significant attributes for consumers both before and after the purchase, focusing on the post-harvest stage. The study found that during the purchase, key attributes such as freshness, color, cleanliness, place of origin (search attributes), halal certification, and safety (credence attributes) were highlighted as most important. Notably, both freshness and place of origin were perceived as indicators of both quality and safety, supporting earlier findings by Becker et al. (2000) and Glitsch (2000), which noted that freshness, country of origin, and animal feed are regarded as important meat safety cues.

Additionally, participants placed significant emphasis on halal certification before purchasing meat, alongside safety concerns. This finding aligns with research by Chamhuri and Batt (2015) in Malaysia, another Islamic country, where halal certification was deemed a crucial quality attribute, alongside price, cleanliness, and freshness. Post-purchase, the study confirmed prior research by Banović et al. (2009) and Glitsch (2000), showing that taste and tenderness (experience attributes) were the most valued indicators of meat quality.

Moreover, the results indicated that consumers exhibited a strong level of trust in local butcheries, suggesting that this trust could significantly influence their future purchasing decisions. This bond between consumers and local butcheries may play a critical role in shaping buying behavior.

### **7.3 Discussion on lamb meat preferences and the impact of framing and priming on safer meat demand**

The second analysis of this dissertation focused on consumer preferences for four types of lamb meat, differentiated by their production systems (i.e., sedentary versus nomadic) and slaughter and retailing systems (i.e., traditional butchery versus supermarket). The findings presented in Chapter 5 are derived from a second-price experimental auction mechanism across three rounds, employing a between- and within-treatment experimental design – detailed in Chapter 3. Additionally, the study examined the impact of written framing, visual framing, and priming as potential marketing and communication strategies to influence WTP for safer meat choices. The analysis also explored the relationship between socio-demographic characteristics and risk preferences, and WTP for each type of lamb meat auctioned. To address these aims, three specific research questions were posed, which are revisited and discussed in this section.

**Research question 2.1:** *What is the WTP for sedentary versus nomadic, and supermarket versus traditional butchery meat?*

Regarding this question, the findings indicated that, contrary to previous studies suggesting a higher preference for high-land pasture-raised livestock (Font-i-furnols et al., 2022; Hersleth et al., 2012; Imami et al., 2011), there was no significant difference in the overall mean bids between sedentary and nomadic meats. However, our results did show that meats originating from sedentary systems (MST and MSM) were preferred significantly more by participants with higher education levels and incomes, suggesting a potential market segment for sedentary-sourced meat.

The study also revealed that participants exhibited a notably higher WTP for supermarket-sourced meat. This aligns with prior research indicating that supermarket meat is often seen as superior in terms of hygiene, sanitation, availability of various meat cuts, and consistent quality, whereas butcher-sourced meat is perceived as lower in quality and associated with higher FSHs (Traill, 2006).

Consumer preferences for meat purchasing vary widely across countries and cultural contexts. For instance, in nations like the UK and Germany, supermarket meat is generally preferred (McEachern and Seaman, 2005; Pirsich and Weinrich, 2019). In contrast, many Muslim consumers favor butcher-sourced meat due to its perceived freshness, affordability, and assurance of halal slaughter (Ahmed, 2008; Chamhuri and Batt, 2015; Verbeke et al., 2013). Nonetheless, the higher preference for supermarket meat among more educated participants suggests a shift towards modernizing Afghanistan's meat industry. This outcome has implications for meat regulation and certification. As shown in the first analysis, Afghan consumers exhibit low trust in supermarket meats. To foster trust and support higher WTP for safer meat, regulatory bodies need to enforce certification standards to enhance product safety and ensure adherence to halal slaughter practices in modern slaughterhouses and supermarkets. Such measures could build consumer confidence in supermarket meat. Ultimately, the growing preference for supermarket meats indicates progress for new market entrants and supports efforts to modernize the meat industry and attract investment from public authorities.

**Research question 2.2:** *To what extent do framing messages and psychological priming affect consumer preferences for safer meat?*

With respect to this question, the study investigated the impact of written information framing, visual information framing, and psychological priming on preferences for safer meat choices during the second and third rounds of a second-price experimental auction. Written information about the rearing conditions of ruminants in the sedentary and nomadic livestock systems significantly

boosted WTP for MST (one of the sedentary meats). This suggests that information emphasizing the superior conditions of animal rearing in sedentary systems may have functioned as a gain-framed message, fostering positive consumer perceptions of sedentary meats and ultimately leading to higher WTP. MSM, the other sedentary meat, received the highest bids during the first round, implying that subsequent treatments had less influence on its WTP, potentially due to a saturation effect where consumers were unwilling to bid higher for a product already perceived as the safest option. Conversely, written information depicting poor rearing conditions in the nomadic system appeared to serve as a loss-framed message.

In round 3, written information outlining unsanitary conditions at traditional butcheries in Afghanistan likely acted as a loss-framed or negative framing, resulting in reduced WTP for both butchery-sourced meats. Conversely, information on the animal slaughtering and processing conditions in modern slaughterhouses acted as gain-framed or positive framing, increasing WTP for at least one supermarket meat, specifically MNM. These outcomes align with previous research on the influence of framing on food safety preferences (Britwum and Yiannaka, 2019; Dillaway et al., 2011; Hayes et al., 2002; Schroeter et al., 2001).

Within the visual information group, findings demonstrated that visual treatment significantly impacted bids. The image depicting a sedentary livestock system, showing animals grazing in a natural mountain pasture, appeared to create positive perceptions of sedentary meats (MST and MSM), leading to a price premium for at least MST. The minimal impact of visual treatment on MSM mirrored the effect of written framing, suggesting a saturation point for bids on the meat considered safest. Thus, the sedentary livestock image likely served as a gain-framed or positive message.

On the other hand, the image of nomadic livestock in a residential area, depicted as a small animal market with animals feeding among waste, likely generated negative perceptions of nomadic meats, resulting in significant price discounts for both MNT and MNM. This image likely acted as a loss-framed or negative message. Similarly, the visual depiction of a typical butchery with carcasses exposed to dust and flies on a roadside influenced bid negatively for one of the butchery meats, MST, although visual treatment had no significant effect on supermarket meats. This may again point to a price ceiling effect for the most preferred products in the auction's first round.

No significant differences were found between the effects of written and visual framing, suggesting that both formats effectively influenced WTP for meat, potentially enhancing demand for safer options and food safety overall. The study's results align with Britwum and Yiannaka (2019) regarding written framing and align more closely with Shan et al. (2020) when considering both

written and visual framing formats, which concluded that both types affect consumer purchase intentions.

Regarding priming, results indicated that unlike written and visual framing, priming did not significantly affect WTP. This finding is closer to Farrar et al.'s (2022) result, who concluded in two studies with different conditions that exposing consumers to unhealthy food-related logos in the field and in the lab, didn't have any significant impact on subjects' choices for healthy foods regardless of the different conditions. However, the authors did find that individuals with higher level of "trait mindfulness" chose fewer unhealthy foods. In contrast, Fukawa (2016) exhibited that priming consumers for healthy product attributes over unhealthy ones also demonstrated that priming consumers with healthy product attributes encourages preferences for healthier products, mediated by implicit attitudes influenced by these primes.

Thus, the insignificant impact of priming in this study, and in Farrar et al.'s might be attributed to priming's greater effectiveness among consumers with a high need for cognition (NFC) (Fukawa, 2016). NFC refers to an individual's tendency to engage in and enjoy effortful cognitive activities (Cacioppo and Petty, 1982). People with high NFC are more likely to process information deeply and analytically, while those with low NFC tend to rely more on heuristics and superficial cues (Haugtvedt et al., 1992).

The effectiveness of priming can be influenced by an individual's NFC in several ways: Research has shown that NFC can have opposite effects on priming depending on the prime's blatancy. For subtle primes, high-NFC individuals are more susceptible to priming effects. However, with blatant primes, high-NFC individuals are less influenced by priming, as they are better at identifying and correcting for bias (Petty et al., 2008). Moreover, high-NFC individuals are more likely to engage deeply with the primed information, potentially leading to stronger priming effects when the primes are relevant to meat choices and safety (Cacioppo and Petty, 1982). When the task or decision is perceived as important, high-NFC individuals tend to invest more effort in processing information (Viola et al., 2015). Linking it to safer meat choice, this could lead to stronger priming effects in contexts where meat safety is considered crucial.

Given these insights, the ineffectiveness of priming in influencing WTP for meat types in this study could be due to several factors. For instance, the general population may have had a lower average NFC, reducing the overall impact of priming. Or the priming method used may not have been optimal for engaging high-NFC individuals. Furthermore, the importance of the meat choice decision may not have been sufficiently emphasized to motivate high-NFC individuals to engage deeply with the primed information.

Thus, while priming can have context-specific effects, findings in this study suggest that the priming technique used in the study is not an effective strategy for influencing bidding behavior toward safer meat choices. To improve the effectiveness of priming in influencing demand for safer meat choices, future research could segment participants based on their NFC levels to analyse differential effects of priming. Researchers can investigate the interaction between NFC, priming, and perceived importance of meat safety. Moreover, future experiments could use various priming methods, considering both subtle and blatant approaches. Finally, future studies could also explore how different types of information (e.g., health-related, environmental, ethical) in primes might engage individuals with varying levels of NFC.

**Research question 2.3:** *How do socio-economic factors, experience of FBDs, and risk preferences relate to consumer WTP for safer meat in Afghanistan?*

Regarding the relationship between control variables and WTP for each type of meat auctioned, the results indicated that gender and participants' experiences with FBDs did not significantly impact bidding behavior. However, participants with higher educational attainment showed a tendency to bid more for MSM, the safest meat option, potentially due to their understanding of livestock production systems. Additionally, high-income participants exhibited higher WTP for three products—MST, MSM, and MNM—indicating an upward trend in meat demand correlating with increased income levels.

The positive relationship between risk-taking attitudes and WTP for MSM—the safest meat option—suggests that risk-takers prioritize intrinsic or observable characteristics over external assurances when evaluating products. While existing literature often indicates that risk-averse consumers are more inclined to pay premiums for safety (Petrolia, 2016; Lusk & Coble, 2005), the findings here reveal that even risk-tolerant individuals are willing to invest in products they perceive as inherently safe. MSM, being the safest meat option, may have appealed to this group despite its association with supermarkets, a context marked by low institutional trust in the study. This may align with Chen (2013) who concluded that consumers observe transparent safety practices or trust the credibility of food providers, their confidence in product safety increases, reducing perceived risks.

Moreover, the results highlight that even consumers with higher risk tolerance place importance on food safety when making purchasing decisions. This may support the notion that emphasizing and effectively communicating safety attributes can resonate with a broad consumer base, including those who are typically more risk-tolerant (Figuié, 2019). Such insights underline the complexity

of consumer behavior in food markets, where individual risk preferences play a significant role in shaping purchasing decisions.

## **7.4 Discussion on meat attribute preferences and meat attachment attitude**

The third analysis of this dissertation examined preferences for thirteen lamb meat attributes in Afghanistan utilizing a BWS methodology. The study also assessed the validity and reliability of the MAQ and investigated the relationships between subjects' meat attachment and their preferences for meat attributes. Similar to the previous two sections in the Chapter, the specific research questions are revisited and discussed one by one.

### **Research question 3.1:** *Which meat attributes are most valued by Afghan consumers?*

In relation to the above question, the study's findings identified the six most critical meat attributes for Afghan consumers, ranked by their importance as follows: food safety certification, freshness, halal label, taste, cleanliness of the shop, and place of origin. The emphasis on food safety as the top attribute underscores its significance not only as a health concern in HICs but also for consumers in LMICs. This concern is particularly pronounced among highly educated consumers in these regions. The strong preference for attributes such as food safety certification, freshness, and the halal label is consistent with previous studies conducted in Islamic nations (Toklu et al., 2020; Uchiyama and Mahbubi, 2019). The high importance given to the halal label highlights the impact of cultural and religious factors on consumer choices.

Furthermore, while consumers in HICs often prioritize animal welfare and breed, these attributes are not as significant in Afghanistan. This may stem from limited awareness regarding animal welfare, as noted in the first analysis discussed in section 7.2. The priority placed on freshness and cleanliness aligns with the findings of Verbeke et al. (2013), who reported that hygiene and freshness are among the most valued attributes for halal meat consumers.

### **Research question 3.2:** *How do consumer demographics (e.g., gender, age, income, education) influence preferences for these attributes?*

Regarding this question, Our study from the RPL model revealed significant heterogeneity in attribute preferences across different consumer segments, echoing the findings of Felderhoff et al. (2020) and Mendoza et al. (2014) regarding the influence of socio-demographic factors on meat attribute preferences. More specifically, age significantly influenced preferences, with middle-aged respondents valuing freshness and food safety certification less than their younger counterparts. Education level also shaped meat attribute preferences. Bachelor's degree holders prioritized

animal breed, brand, and quality appearance, while subjects with graduate-level education emphasized cleanliness and food safety certification.

Moreover, household income also significantly affected preferences for halal label, with high- and middle-income participants valuing it more than low-income respondents. This finding aligns with Bonne and Verbeke (2008). Middle-income participants also prioritized freshness, while those who did not disclose income emphasized taste. Meat consumption frequency further contributed to heterogeneity. Specifically, occasional consumers prioritized origin, brand, and halal label more than habitual consumers, aligning with Font-i-Furnols and Guerrero (2014), who found that infrequent consumers rely on extrinsic cues like branding due to limited familiarity with intrinsic attributes. Brand, referring to the specific trademark, may reflect consumer trust after experiencing meat produced by certain stores. For example, Kefayat is a well-known brand in Afghanistan, a chain-store selling both fresh and refrigerated and imported meat. Furthermore, risk preference also mattered, with higher risk-taking individuals valuing freshness more. Risk-takers may value freshness more because it is an observable, immediate indicator of quality that aligns with their preference for direct control and reliance on personal judgment rather than relying on institutional assurances, like food safety certification. Overall, the heterogeneity of preferences for meat attributes among different consumers segments underscore the need for targeted marketing approaches that should be designed to appeal to specific consumer segments, aligning with findings from recent studies by Cardona et al. (2023) and Bazzani et al. (2018).

**Research question 3.3:** *How are consumers attached to meat, and how do Afghan consumers' attitudes towards meat attachment (hedonism, affinity, entitlement, and dependence) shape their preferences for meat attributes?*

To address this question, the study initially evaluated the validity of the MAQ constructs. Findings indicated that the internal consistency of the MAQ in this study aligned reasonably well with previous research, though some differences were noted. Graça et al. (2015b) reported higher alpha coefficients for all subscales (ranging from 0.82 to 0.89) and an overall meat attachment scale of 0.90 in Portugal. Similarly, Lentz et al. (2018) observed comparable alphas for hedonism (0.84) and dependence (0.76), but higher values for affinity (0.79) and entitlement (0.77) in the US. The lower reliability of the affinity and entitlement subscales in this study might indicate subtle differences in how MAQ constructs are interpreted within the Afghan cultural context, as opposed to HICs where dietary shifts away from meat are occurring. This finding adds to the existing literature on cross-cultural applications of food attitude scales (e.g., Steenkamp and Baumgartner, 1998).

Concerning the connection between meat attachment attitudes (measured by MAQ subscales such as hedonism, affinity, entitlement, and dependence) and preferences for meat attributes, the investigation in this study revealed insights that both align with and diverge from existing literature. The strong negative association between highly hedonistic attitudes and most meat attributes partially aligns with Graça et al. (2015b), suggesting that the pleasure derived from meat consumption may override other considerations. However, this finding contrasts with Audebert et al. (2006), who found that hedonism towards red meat was positively correlated with liking of meat pictures and sensory attributes.

The relationship between affinity and preferences for meat attributes in our study differs from previous findings. While we found a negative association with price and food safety certification, Graça et al. (2015b) conceptualized affinity as a natural liking towards meat. This discrepancy suggests that the concept of affinity may be more complex than previously thought and warrants further investigation.

Our analysis revealed positive relationships between high entitlement scores and preferences for brand, animal welfare, and food safety certification. This partially aligns with the concept of entitlement as described by Graça et al. (2015b), which refers to how much people believe they have the right to eat meat. However, our findings may also suggest that entitlement may be associated with a desire for quality assurance – trusting certain brands and safety certifications - rather than merely an unquestioning right to consume meat.

Finally, the negative association between dependence and preferences for key meat attributes including cleanliness, animal welfare and food safety certification, raises important questions about the health and ethical implications of high meat dependence. Future research could explore this relationship further, perhaps drawing on addiction literature to understand the psychological mechanisms at play. Consequently, targeted policies and/or awareness programs may be required to trigger towards high dependent meat consumers regarding the consideration of health and ethical aspects of meat consumption.

Overall, these results highlight the complex nature of meat attachment and its influence on consumer preferences. They also underscore the need for further research to understand the psychological mechanisms underlying these relationships. Future studies could explore how cultural contexts, and individual differences modulate the impact of meat attachment on attribute preferences.

## **7.5 Chapter summary**

This chapter presented a detailed discussion of the key findings based on the three interconnected analysis relating them to the overarching research objective and specific questions for the study. The chapter first discussed the results of the qualitative content analysis in light of the first set of research questions, and the reviewed relevant literature. Next, the chapter presented the discussion on the results of the second study – the experimental auctions – and compared the key findings with the existing literature. This section particularly detailed the discussion on the impact of the three treatments (i.e., written framing, visual framing, and priming) on consumers' WTP for different kinds of auctioned meats. Finally, the chapter discussed the results of meat attribute preferences and attitudes towards meat attachment, and tried to relate the findings with the existing literature.

The subsequent concluding chapter will discuss policy implications drawn from the study, highlight its limitations, and propose directions for future research.

## CHAPTER 8

# CONCLUSIONS; POLICY IMPLICATIONS AND LIMITATIONS

### **8.1 Chapter overview**

This study addressed three interconnected topics: (i) consumers' perceptions of meat quality and safety across the supply chain; (ii) WTP for different types of lamb meat and the impact of framing and priming on safer meat choices; and (iii) preferences for meat attributes and attitudes towards meat attachment. Drawing on the results of these three analyses, as discussed in chapter 7, the current and final chapter provides key policy and practical implications and recommendations, highlights the study's limitations, and outlines directions for future research.

### **8.2 Policy and Practical Implications**

This study provides critical insights into consumer perceptions, preferences, and behaviors regarding meat quality and safety in Afghanistan, with broad implications for policymakers, agribusinesses, and marketers. The findings underscore the need for targeted interventions to enhance food safety, improve supply chain management, and address consumer trust in formal institutions, particularly in LMICs and Islamic contexts.

#### **Strengthening Food Safety Standards and Infrastructure**

Food safety emerged as the most critical attribute for Afghan consumers, ranking above halal certification. This finding highlights an urgent need to establish credible and transparent food safety certification systems that address both health concerns and religious requirements. Policymakers should implement comprehensive regulatory frameworks that integrate good animal husbandry practices (GAHP), HACCP systems, and halal assurance to improve safety and quality across the supply chain. The integration of halal standards with international hygiene protocols such as HACCP, as suggested by Neio Demirci et al. (2016), could enhance consumer confidence but requires further research and guidelines. Additionally, public health interventions, such as improved lairage systems, vaccination programs, and disease prevention measures, should be prioritized to ensure safer meat production.

#### **Building Consumer Trust and Combatting Food Fraud**

The study reveals a negative association between risk tolerance and willingness to pay for food safety certification, suggesting a lack of trust in formal institutions. To address this, policymakers must design public communication campaigns that build confidence in certification standards, prioritize transparency and accountability in certification processes to improve their credibility, and

emphasize the benefits of safe and hygienic practices. Moreover, Independent third-party evaluations or endorsements could add legitimacy and appeal to skeptical consumers, including risk-takers.

The *Tayyib* concept, as proposed by Raheem and Demirci (2018), offers a comprehensive framework for addressing food fraud and hygiene concerns in Islamic contexts, presenting a viable solution for Afghanistan and similar LMICs.

Traceability also emerged as a vital tool for controlling food fraud and ensuring transparency. While implementing traceability systems is challenging in informal sectors like traditional butcheries, it can be effectively introduced in formal sectors such as supermarkets and modern slaughterhouses. This step would improve consumer confidence in the quality and safety of supermarket meats and align with the growing preference for modern retail options, particularly among more educated and higher-income consumers.

### **Addressing Consumer Preferences and Market Differentiation**

The study highlights significant heterogeneity in consumer preferences for meat attributes, suggesting the need for tailored marketing strategies. Agribusinesses should capitalize on consumer concerns about food safety, freshness, and hygiene by aligning their product offerings and branding strategies with these priorities. For instance, refrigerated or freshly sourced meat options can be marketed to appeal to educated and higher-income groups. Trusted brands like *Kefayat* and *Finest* should continue leveraging their reputation to differentiate themselves in a competitive market. Given the positive association between risk-taking attitudes and WTP for MSM, marketing strategies should emphasize tangible, observable attributes of meat safety. For instance, campaigns highlighting the inherent safety features of MSM (e.g., reduced contamination risks, rigorous quality checks) can appeal to both risk-takers and risk-averse consumers by bypassing reliance on institutional trust.

Moreover, variations in preferences among consumer segments point to opportunities for product differentiation. Marketers can offer diverse meat options with varying levels of halal certification, freshness, and branding to cater to occasional and habitual meat consumers. Educational campaigns targeting excessive meat consumption should be culturally sensitive and address psychological attitudes like hedonism and dependence, promoting balanced diets without alienating consumers.

### **Promoting Sustainable and Ethical Consumption**

The study's findings regarding meat attachment attitudes highlight the importance of addressing the psychological dimensions of meat consumption. High hedonistic and dependent attitudes,

which were negatively associated with preferences for essential meat attributes, suggest a need for public health campaigns that promote more informed and sustainable consumption practices. These initiatives should focus on the health and ethical ramifications of excessive meat consumption while respecting cultural and religious norms.

### **Advancing Modernization in the Meat Industry**

The growing preference for supermarket meats among educated consumers indicates a shift towards modernizing Afghanistan's meat industry. To sustain this trend, regulatory authorities must enforce certification standards and ensure halal slaughter practices in modern slaughterhouses and supermarkets. Building trust in supermarket meats requires consistent enforcement of these measures, which will also encourage investment in the formal meat sector.

In summary, implementing these policies and practical measures will not only enhance meat safety and quality but also foster consumer trust and encourage more sustainable and ethical consumption patterns. Tailored interventions that consider consumer preferences and psychological attitudes, alongside structural improvements in the supply chain, are essential for promoting a healthier and more reliable meat industry in Afghanistan and similar contexts.

### **8.3 Limitations**

While this study provides significant insights into consumers' perception of and preferences for lamb meats across the meat supply chain, meat attributes preferences, and attitudes toward meat attachment in an LMIC and Islamic context, it is not without limitations. These limitations, along with proposed directions for future research, offer pathways to refine and expand upon the findings.

Firstly, the research was conducted among urban consumers in Kabul and Bamyan cities, where modernity - such as supermarkets and new townships – and tradition – slums where traditional butcheries dominate the informal markets – coexist. While this setting was well-suited for examining the coexistence of these systems (i.e., traditional butcheries and modern supermarkets) and the consumers' attitude towards the traditional and the modern meat retailing systems, it limits the generalizability of findings to rural populations. Rural areas, which constitute a substantial portion of Afghanistan's demographic, may exhibit distinct socio-cultural dynamics and preferences.

Secondly, the priming technique used in the second study did not influence WTP for any of the auctioned products (i.e., meat types). Literature indicates that the impact of priming is highly context-specific and depends on several factors. In this study, the priming statement—particularly the one presented in Round 2—was not targeted toward any specific auctioned product. Effective

priming typically guides the brain in a particular direction, aligning closely with the desired outcome. Future studies should account for this aspect. Moreover, research suggests that priming is generally more effective when directed toward promoting healthy food choices (Fukawa, 2016) compared to unhealthy options (Farrar et al., 2022). In this study, the second priming statement used in Round 3 for Group 3 aimed to influence WTP against traditional butchery meats (MST and MNT), which were perceived as the two least safe options. A better approach for future studies could be to direct priming stimuli toward encouraging WTP for the safest meat choice, such as MSM in this context. Additionally, the study did not consider factors like familiarity response time or the NFC levels of respondents, both of which can significantly affect priming outcomes. Suggestions for addressing these factors and refining priming techniques are provided in the next section, offering guidance for improving the effectiveness of priming in future research.

Moreover, while the study investigated perceptions of animal welfare—an attribute less familiar in LMICs such as Afghanistan—neither of the three analyses considered the ethical and environmental dimensions of meat production and consumption. These aspects are inextricably linked to meat production but are more widely recognized among consumers in HICs. Given the rising demand for meat consumption in LMICs and Islamic countries, there is a pressing need for studies to explore how ethical and environmental concerns influence consumers' perceptions of meat production and consumption. Incorporating these dimensions into future research would provide a more comprehensive understanding of consumer behavior and preferences for meat.

The following section outlines additional areas for future research, informed by the findings and limitations of the current study.

## **8.4 Directions for future research**

Given the policy implications and limitations explained above, the study suggests the followings recommendations for future research:

- 1. Expanding Geographical Scope:** Future research should extend beyond urban settings to include rural populations, enabling a comprehensive rural–urban comparison. Exploring how cultural, economic, and infrastructural differences shape consumer preferences and attitudes in these regions will provide a holistic understanding of meat consumption behavior.
- 2. Enhancing Psychological Analysis:** Future research should delve further into the psychological mechanisms underlying meat attachment attitudes. For example, examining how emotional and cognitive conflicts influence actual consumption behavior, could reveal

critical drivers of meat choices. Investigating the role of social norms and cultural identity in shaping meat preferences would also enhance understanding in this domain.

3. **Optimizing Priming Strategies:** This study found that priming was ineffective in influencing consumer behavior. Future research should explore alternative priming strategies, such as subtle versus blatant primes, tailored to different cognitive profiles. Segmenting consumers based on their NFC levels could identify subgroups that are more responsive to priming interventions. Additionally, priming tasks emphasizing health, ethical, or environmental messaging could resonate more effectively with specific audiences.
4. **Diversifying Communication Channels:** Given the increased influence of social media and digital marketing in our daily life – including in LMICs –, it is essential to explore their role in shaping meat consumption behaviors, particularly among younger consumers. Investigating how exposure to online content related to food safety and ethical consumption influences preferences, could yield valuable insights for developing effective digital marketing strategies.
5. **Cross-Cultural Comparisons:** Conducting similar studies in other Islamic LMICs with comparable meat consumption patterns and dual formal–informal supply chains would validate the findings of this study and expand their applicability. Cross-cultural comparisons could also reveal unique drivers of meat consumption behaviors across different socio-cultural contexts.
6. **Exploring Environmental Concerns:** The current study did not examine the potential impact of environmental concerns on consumer behavior and preferences for meat. Future research could explore how information about environmental impacts influences meat consumption preferences, particularly among consumers who are increasingly aware of sustainability issues and those concerned about the negative environmental effects of meat production.
7. **Examining Institutional Trust and Certification Credibility:** Given the low level of trust in formal institutions in Afghanistan, it is demanding to investigate factors contributing to low trust in formal institutions and food safety certifications. Research third-party endorsements, public-private partnerships (PPP), and alternative certification models to improve consumer confidence. Comparative and longitudinal studies across diverse contexts could provide insights into enhancing certification credibility. Longitudinal studies tracking changes in trust over time would also be valuable for evaluating the effectiveness of interventions aimed at improving consumer confidence in certification systems and formal institutions.

- 8. Segmenting Consumers by Risk Preferences:** Further research should focus on segmenting consumers based on their risk preferences and trust levels to tailor marketing strategies and policy interventions effectively. Investigating how these groups prioritize safety attributes and certifications across various food products or in different contexts can yield actionable insights.

By addressing the limitations listed and the above recommendations, future research can build upon the foundation established by this study and provide nuanced insights into consumer behavior, supporting the development of strategies to promote safer, more ethical, and sustainable meat consumption patterns in Afghanistan and similar contexts worldwide.

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## **APPENDICES**

### **Appendix 1: Written information framing provided to Group 1 in Round 2 about the rearing of animals in two different livestock systems**

#### **The Sedentary Livestock System**

Product No.01 and product No.03 are stemming from the sedentary livestock system. Place of origin of these products are the central highland and mountainous regions of Afghanistan. The sheep from this region graze on highland, mountain pastures and feed on natural grass for about 9 to 10 months in a year. Between 2 to 3 months during the snowy season in the winter, they feed on alfalfa, clover and other dried fodder mixed with straw. During the winter season, they are kept inside stables at home, hence they mostly don't have free movements during the winter season. The sheep from which products No.01 and No.03 stem, are brought directly from central regions of the country and slaughtered in Kabul. Before slaughter, they have been kept inside stables for a few days and fed safe fodder.

#### **The Nomadic Livestock System**

Products No.02 and 04 are stemming from the nomadic system. The place of origin of these two meat products can be low land and also highlands, scattered around the country. The sheep in the nomadic system do not origin from a specific place, as nomads move their flock from one region to another in search of new pastures. Hence, they mostly have free movements. However, the sheep from which products No.02 and No. 04 stem, are bought from Kabul animal market. Hence, they might have spent few weeks before slaughter at the suburbs of Kabul, or even inside residential areas. While inside residential areas, animals occasionally feed on garbage and food wastes.

## Appendix 2: Visual Information framing provided to group 2 in round 2 about the rearing of animals in the two different livestock systems

### A visual presentation of the Sedentary Livestock System



Source: Screenshot from the YouTube channel Hazara World TV, accessible at: <https://www.youtube.com/watch?v=GiSx2B0CKow>

### A visual presentation of the Nomadic Livestock System



Source: Photograph by the author, taken during field visit, 2021.

## Appendix 3: Priming statement provided to group 3 in round 2

*“Please recall any meat-borne diseases such as E.coli, etc., Salmonella, Campylobacter, etc. that you have experienced and then bid for each of the four products.”*

#### **Appendix 4: Written information framing provided to group 1 in round 3 about the two different slaughtering and processing systems**

##### **Meat handling in traditional butcheries**

In the traditional butcheries, the animal is slaughtered either in front of the shop, or on a vacant plot inside residential areas. Before slaughtering, the animal is not inspected for infectious and parasitic diseases. In addition, butchers do not wear protective cloths. After slaughter, the carcass is hanged in front of or inside the butcher's shop. The meat produced by a traditional butchery does not have labels. Hence, there is no information about the meat safety and quality.

##### **Meat handling in modern slaughterhouses/supermarkets**

In the modern slaughterhouses, animals are slaughtered under strict hygiene and sanitation practices. Modern slaughterhouses are equipped with meat testing laboratories and cold storages. Before slaughtering, animals are inspected for any infectious and parasitic diseases. All workers and butchers are well trained and wear protective cloths while slaughtering the animal. After slaughtering, the meats are cut into small pieces and transported to supermarkets inside refrigerated trucks. Meat produced by the modern slaughterhouses and supplied via supermarkets are labelled. Thus, information about production date is provided.

**Appendix 5: Visual Information framing provided to group 2 in round 3 about the two different slaughtering and processing systems**

**A typical traditional butchery in Kabul city**



Source: Photograph by the author, taken during field visit, 2021.

**Butchery section of a modern supermarket**



Source: Photograph by the author, taken during field visit, 2021.

## **Appendix 6: Priming statement provided to group 3 in round 3**

*“Please try to remember any past experience of buying meat from a traditional butchery and then falling ill after consuming it. Then bid for each of the four products.”*

## Appendix 7: Parameter estimates of Fixed Effect Model estimating the determinants of bids (in AFN) for auction products in round 2

Dependent Variable: WTP for 500 gr of mutton meat					
Explanatory Variables	Definition	MST	MNT	MSM	MNM
Panel A: within-subject (group) treatment effect: impact of treatment 1 based on round 1					
written framing	Treatment 1.1: written framing about livestock systems	10.83** (5.04)	-5.15 (5.33)	-1.43 (5.30)	-13.76** (5.68)
visual framing	Treatment 1.2: visual framing about livestock systems	12.40** (5.26)	-11.80** (5.57)	0.59 (5.55)	-22.63*** (5.94)
priming	Treatment 1.3: priming to recall meat-borne diseases (MBDs)	-4.98 (5.45)	-8.64 (5.77)	1.68 (5.74)	-1.94 (6.15)
Panel B: between-subject (group) comparison: post treatment differences among groups					
Diff: Group2 - Group1	Visual versus written framing in round 2	1.57 (7.28)	-6.65 (7.71)	2.01 (7.67)	-8.87 (8.22)
Diff: Group3 - Group1	priming versus written framing in round 2	-15.81** (7.42)	-3.50 (7.86)	3.11 (7.82)	11.81 (8.38)
Diff: Group3 - Group2	Priming versus visual framing in round 2	-17.38** (7.57)	3.16 (8.02)	1.10 (7.98)	20.68** (8.55)
Constant (in Group1)		176.61*** (2.14)	176.56*** (2.27)	167.45*** (2.25)	196.63*** (2.41)
Constant (in Group2)		176.61*** (2.14)	176.56** (2.27)	167.45*** (2.25)	196.63*** (2.42)
Constant (in Group3)		176.61*** (2.14)	176.56*** (2.26)	167.45*** (2.25)	196.63*** (2.41)
Sigma_u		63.57	67.94	70.27	75.20
Sigma_e		32.22	34.14	33.97	36.40
Rho		0.79	0.80	0.81	0.81
Number of observations		686.00	681.00	681.00	681.00

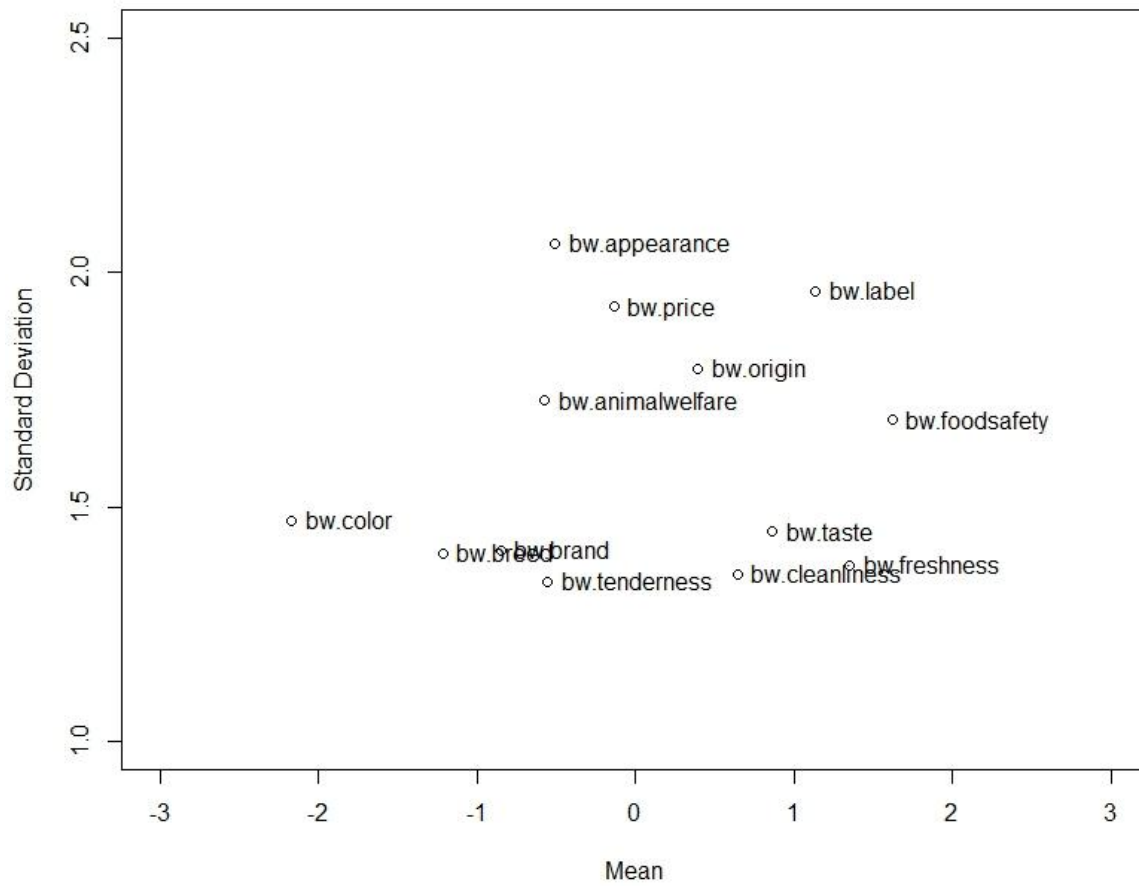
Note: All reported coefficients are the difference in mean WTP. \*, \*\*, \*\*\* indicate statistically significant at the 10%, 5% and 1% level, respectively. Numbers in parenthesis indicate standard error. Sigma u refers to the panel-level standard deviation and sigma e to the standard deviation of e<sub>ij</sub>. Rho indicates the percent contribution of the panel-level variance component to the total variance. If it is zero, the panel estimator is not different from the pooled estimator. MBDs=Meat-borne Disease; MST=Lamb meat stemming from sedentary system, slaughtered & processed at a traditional butchery; MNT= Lamb meat stemming from nomadic system, slaughtered & processed at a traditional butchery; MSM= Lamb meat stemming from sedentary system, slaughtered & processed at a supermarket; MNM= Lamb meat stemming from nomadic system, slaughtered & processed at a supermarket.

## Appendix 8: Parameter estimates of Fixed Effect Model estimating the determinants of bids (in AFN) for auction products in round 3

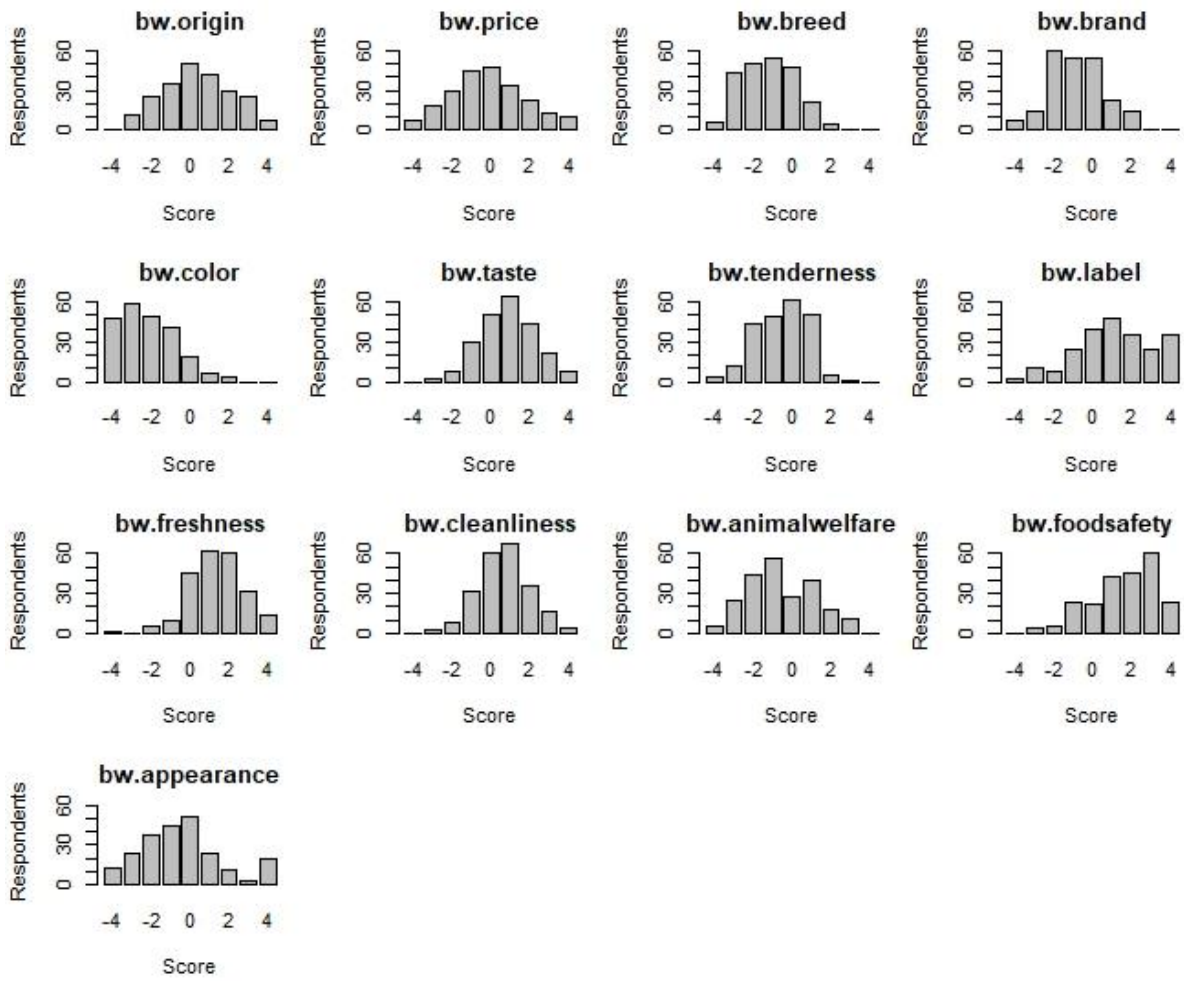
Dependent Variable: WTP for 500 gr of mutton meat					
Explanatory Variables	Definition	MST	MNT	MSM	MNM
<b>Panel A: within-subject (group) treatment effect: impact of treatment 2 based on round 2</b>					
written framing	Treatment 2.1: written framing about slaughtering systems	-29.04*** (5.03)	-3.78 (5.33)	-1.71 (5.30)	10.79** (5.68)
visual framing	Treatment 2.2: visual framing about slaughtering systems	-17.80*** (5.26)	2.15 (5.57)	-4.51 (5.55)	3.71 (5.94)
priming	Treatment 2.3: priming to recall meat-borne diseases (MBDs) caused by butchery meat	-5.51 (5.45)	-7.58 (5.77)	-2.30 (5.74)	-2.07 (6.15)
<b>Panel B: between-subject (group) comparison: post treatment differences among groups</b>					
Diff: Group2 - Group1	Visual versus written framing in round 3	11.24 (7.28)	5.93 (7.71)	-2.80 (7.67)	-7.09 (8.22)
Diff: Group3 - Group1	priming versus written framing in round 3	23.42*** (7.42)	-3.80 (7.86)	-0.60 (7.82)	-12.86 (8.38)
Diff: Group3 - Group2	Priming versus visual framing in round 3	12.28 (7.57)	-9.73 (8.02)	2.21 (7.99)	-5.78 (8.55)
Constant (in Group1)		182.92*** (2.14)	183.03*** (2.26)	159.03*** (2.25)	196.83*** (2.41)
Constant (in Group2)		2.14*** (2.14)	183.03*** (2.26)	159.03*** (2.25)	196.83*** (2.41)
Constant (in Group3)		182.92*** (2.14)	183.03*** (2.26)	159.03*** (2.25)	196.83*** (2.41)
Sigma_u		63.61	67.93	70.30	75.73
Sigma_e		32.22	34.14	33.97	36.40
Rho		0.79	0.80	0.81	0.81
Number of observations		686	681	681	681

Note: All reported coefficients are the difference in mean WTP. \*, \*\*, \*\*\* indicate statistically significant at the 10%, 5% and 1% level, respectively. Numbers in parenthesis indicate standard error. Sigma u refers to the panel-level standard deviation and sigma e to the standard deviation of  $e_{ij}$ . Rho indicates the percent contribution of the panel-level variance component to the total variance. If it is zero, the panel estimator is not different from the pooled estimator. MBDS=Meat-borne Disease; MST=Lamb meat stemming from sedentary system, slaughtered & processed at a traditional butchery; MNT= Lamb meat stemming from nomadic system, slaughtered & processed at a traditional butchery; MSM= Lamb meat stemming from sedentary system, slaughtered & processed at a supermarket; MNM= Lamb meat stemming from nomadic system, slaughtered & processed at a supermarket.

**Appendix 9: Relationship between the mean and standard deviation of best-minus-worst scores for thirteen meat attributes**



**Appendix 10: Heterogeneity bar plots showing the distributions of best-minus-worst scores for thirteen meat attributes.**



**Appendix 11: Confirmatory factor analysis of the original 16-item MAQ structure. The model includes four latent factors (subscales) and one second-order dimension (global scale). Standardized coefficients for both factor loadings (e.g., 0.97 for dependence (Dpn) and meat attachment (MtA)) and R squared values (e.g. 0.68 for Entitlement (Ent)) are presented. MtA = meat attachment; Dpn = Dependence; Ent = Entitlement; Aff = Affinity; and Hdn = Hedonism.**

