Adhvaith Padam Vayalil

OD ZASNOVE DO PRODAJNE POLICE: RAZISKAVA SLEDLJIVOSTI IN POTROŠNIŠKE SPREJEMLJIVOSTI V ETIČNIH OSKRBOVALNIH VERIGAH IZDELKOV ŠIROKE POTROŠNJE - PRIMERJAVA INDIJE IN SLOVENIJE

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Final Master's thesis

Celje, december 2025

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Student: Adhvaith Padam Vayalil

Study programme: Master's degree programme, Systems logistics

Mentor: Assoc. prof. dr. Matevž Obrecht

Proof-reader: dr. Mateja Forte

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Od zasnove do police: pojasnjevanje sledljivosti in potrošnikovega sprejema v etičnih dobavnih verigah FMCG - primerjalna študija v Indiji in Sloveniji

Ključne besede: digitalna sledljivost, dobavne verige FMCG, potrošniško zaupanje, etično pridobivanje, medkulturno vedenje

UDK: 005.51(043.2)

Povzetek:

Industrija hitro premikajočega se potrošnega blaga (angl. Fast-Moving Consumer Goods; v nadaljevanju: FMCG) ima pomembno vlogo v svetovnem gospodarstvu, saj potrošnikom zagotavlja vsakodnevne potrebščine. Njeni učinki presegajo dostopnost in ceno izdelkov ter vključujejo tudi družbeno in okoljsko odgovornost, ki jo oblikujejo mednarodne dobavne verige. Standardi za FMCG podjetja naraščajo, saj se potrošniki vse bolj zavedajo trajnosti, etičnega izvora in transparentnosti proizvodnje. Kljub pobudam za spodbujanje etičnega vedenja pa ostaja pomembna ovira; potrošniki pogosto dvomijo v trajnostne trditve zaradi razširjenega zelenega zavajanja, nejasnega poročanja in pomanjkanja preverljivih podatkov. Zaradi tega, vse večjega razkoraka v zaupanju, narašča zanimanje za tehnološke sisteme, ki lahko potrošnikom zagotovijo zanesljive, na dejstvih temelječe informacije.

Eden najobetavnejših pristopov za izboljšanje transparentnosti v dobavnih verigah FMCG je digitalna sledljivost. Tradicionalna embalaža se s pomočjo digitalnih merilnikov vpliva, sledilnih platform na osnovi veriženja blokov in hitro-odzivno (angl. Quick response; v nadaljevanju: QR) kod spremeni v interaktivni portal do informacij o izdelku. Digitalna

sledljivost zagotavlja novo raven odgovornosti, saj potrošnikom omogoča preverjanje izvora, proizvodnih procesov, okoljskega vpliva in celotne zgodovine dobavne verige. Čeprav teoretične razprave poudarjajo njen potencial, je empiričnih podatkov o dejanskem vedenju potrošnikov in medkulturnih razlikah pri uporabi še vedno malo. Zato ta magistrska naloga raziskuje, kako digitalna sledljivostna orodja vplivajo na potrošniško sprejemanje, zaupanje in nakupno vedenje na dveh kontrastnih trgih – v Sloveniji in v Indiji –, ki predstavljata različne trajnostne, kulturne in gospodarske perspektive.

Indijo zaznamujejo: hitra digitalna osvojitev, visoka cenovna občutljivost, poudarek na pristnosti in varnosti ter neenakomerna, a naraščajoča trajnostna ozaveščenost. Slovenija pa predstavlja razvit evropski trg, kjer so: okoljska odgovornost, etični standardi pridobivanja in postopki sledljivosti trdno zasidrani v potrošniških pričakovanjih in zakonodaji. Primerjava teh dveh okolij omogoča raziskovanje, kako potrošniška ideologija, kulturne vrednote in zrelost trga vplivajo na sprejemanje digitalnih orodij transparentnosti.

Za preučevanje vplivov digitalne sledljivosti na potrošniško zaupanje, sprejemanje in pripravljenost na plačilo so bile oblikovane tri hipoteze:

H1: Izdelki s sledljivostnimi orodji (QR kode in merilniki vpliva) bodo ustvarili bistveno višjo raven potrošniškega zaupanja kot enaki izdelki brez teh orodij.

H2: Sprejemanje izdelkov z izboljšano sledljivostjo bo v obeh državah večje, vendar se obseg učinka med državama ne bo enako odražal, saj nanj vplivajo kultura, ekonomija in zrelost trga.

H3: Razkritje okoljskih in etičnih vplivov bo pozitivno in merljivo vplivalo na pripravljenost potrošnikov, da sprejmejo višjo ceno.

Teoretični okvir raziskave temelji na treh osrednjih teorijah. Teorija signalov pojasnjuje, da digitalne sledljivostne funkcije delujejo kot indikatorji legitimnosti v okoljih, kjer

potrošniki težko samostojno preverijo trajnostne trditve. Teorija prenosa zaupanja predlaga, da se zaupanje v zanesljiv digitalni sistem (npr. verigo blokov ali certificirano sledilno platformo) prenese na izdelek in njegovo blagovno znamko. Modeli potrošniškega odločanja prikazujejo, kako zaznano tveganje, kulturne norme, osebne vrednote in dostop do informacij vplivajo na nakupne odločitve ter, kako se pomen transparentnosti razlikuje med kulturnimi in družbeno-ekonomskimi okolji.

Raziskava uporablja metodologijo mešanih pristopov. V prvi fazi je skozi strukturiran B2B vprašalnik o poslovanju med podjetji (angl. Business-to-business; v nadaljevanju: B2B) na platformi 1KA sodelovalo 60 FMCG podjetij (30 iz Slovenije in 30 iz Indije). Vprašalnik je meril poznavanje digitalne sledljivosti, motive za uvedbo, zaznane ovire, donosnost naložb, zaupanje v verifikacijske sisteme, preferenco sodelovanja in pričakovanja glede prihodnjih investicij.

Druga faza vključuje vedenjski eksperiment o poslovanju med podjetjem in potrošnikom (ang. Business-to-consumer; v nadaljevanju: B2C). V sodelovanju z lokalnim FMCG podjetjem je bil izdelek banana čips dopolnjen s QR kodo, povezano z digitalnim merilnikom vpliva in prilagojenim sledilnim videom. Platforma Hoovercode je zagotovila generiranje QR kode in analitiko, ki je merila dejansko vedenje pri skeniranju. V nadzorovanih scenarijih izbire izdelkov je sodelovalo 200 potrošnikov (100 iz Slovenije in 100 iz Indije). Vsak udeleženec je izbiral med izdelkom s sledljivostnimi funkcijami in običajno različico. Skozi opazovanja, podatke o skeniranju in povratne informacije so bile zbrane informacije o zaupanju, angažiranosti in verjetnosti nakupa.

Rezultati B2B raziskave razkrivajo izrazite razlike med državama. Slovenska podjetja izkazujejo višjo stopnjo poznavanja digitalnih sledilnih tehnologij ter tesno povezujejo sledljivost z regulativno skladnostjo in evropskimi standardi trajnosti. Indijska podjetja pa kljub naraščajoči ozaveščenosti poročajo o realnih izzivih, kot so stroški implementacije, ozaveščenost dobaviteljev, tehnična integracija in dvomi o potrošnikovi pripravljenosti na plačilo. Kljub temu prepoznavajo diferenciacijo, gradnjo zaupanja in optimizacijo procesov kot ključne motivatorje.

B2C eksperiment pokaže še izrazitejše razlike. V Sloveniji je več kot 90 % udeležencev skeniralo QR kodo, 87 % pa je izbralo izdelek s sledljivostjo. QR koda je bila dojeta kot tehnološko priročna in etično zanesljiva, kar odraža visoko trajnostno osveščenost in zaupanje v preverjene informacije. V Indiji je QR kodo skeniralo približno 63 % udeležencev, 70 % pa je izbralo sledljivostno izboljšani izdelek. Interes je bil visok, vendar so na odločitev vplivali cena, navade ter pomen pristnosti in varnosti.

Primerjalni podatki kažejo razmerje sprejemanja približno 1,3:1 v Sloveniji, kar potrjuje moč sledljivosti na zrelih trajnostnih trgih. Analitika Hoovercode potrjuje višje stopnje skeniranja, pogostejše interakcije in daljše trajanje angažiranosti v Sloveniji.

Empirični rezultati potrjujejo vse tri hipoteze. H1 je močno potrjena, saj sledljivost povečuje zaupanje v obeh državah. H2 je potrjena z izrazitimi razlikami v obsegu sprejemanja. H3 je delno potrjena – slovenski potrošniki so pripravljeni plačati več za transparentnost in trajnost, medtem ko indijski potrošniki sledljivost povezujejo predvsem s pristnostjo in zmanjšanjem tveganja.

Študija ponuja pomembne prispevke za akademsko skupnost in industrijo. Teoretično potrjuje vpliv informacijskih sistemov na vedenjske izide ter krepi medkulturne potrošniške raziskave. Industrijsko pa zagotavlja uporabne smernice za FMCG podjetja pri vključevanju sledljivosti v trženjske, komunikacijske in embalažne strategije. Dokazuje, da digitalna sledljivost ni zgolj tehnološki dodatek, temveč strateško orodje za krepitev zaupanja in kredibilnosti dobavne verige.

Prihodnje raziskave bodo osredotočene na razvoj popolnoma sledljive produktne linije »od blata do trga«, ki bo zajemala vsak korak dobavne verige. Cilj je ustvariti komercialni in izobraževalni dokaz koncepta, ki bo prikazal izvedljivost popolne transparentnosti ter spodbudil potrošnike in podjetja k odprtim, odgovornim in trajnostnim ekosistemom FMCG.

From Scratch to Shelf: Exploring Traceability and Consumer Acceptance in Ethical FMCG Supply Chains - A Comparative Study in India and Slovenia

Keywords: Digital traceability, Consumer behavior, FMCG, Food industry, Cross-cultural study

UDC: 005.51(043.2)

Abstract:

The paper examines the connection between the systems of traceability and consumer acceptance in ethical Fast-Moving Consumer Goods (hereafter: FMCG) supply chains, through a comparative study of India and Slovenia. With the growing global demand and expectations on the brands to be transparent, sustainable, and accountable, a trace of products in their supply chains is a significant issue of ethics credibility and market competitiveness. This study explores the impact of traceability on consumer trust, buying decision, and ethical responsibility perception in two different cultural and economic locations. The research methodology is mixed in nature, i.e. quantitative survey and qualitative interview with consumers.

The conceptual framework combines the Theory of Planned Behavior (hereafter: TPB) and Stakeholder Theory giving an opportunity to investigate the connections between ethically produced FMCG goods and consumer acceptance depending on the level of traceability, corporate ethics, and cultural values. The analysis of the data was done by similarity and the comparison of the data through statistical methods and with the help of the thematic analysis to find similarities and differences in consumer attitudes in both

countries. The paper highlights the importance of successful use of digital traceability tools, including blockchain, quick response (hereafter: QR) codes, and internet of things in increasing consumer trust and brand loyalty as long as they are backed by reasonable ethical communication.

Nevertheless, there are still problems regarding the gap in knowledge and the need to maintain global supply chain standards. The study can be added to the body of research on ethical supply chain management and consumer behavior in that it brings to light the cultural differences in attitudes towards traceability and ethical consumption. The implications provided by the findings are practical to the companies dealing in FMCGs that would want to align their sustainability promise and their consumer expectations by promoting the need to be transparent, traceable, and ethically responsible in their business practices within the global market.

Univerza v Mariboru

Fakulteta za logistiko

Mariborska cesta 7
3000 Celje, Slovenija

ANNEX 6 – STATEMENT OF AUTHORSHIP OF THE THESIS

STATEMENT OF AUTHORSHIP OF THE THESIS

Name and surname of the student: **Padam Vayalil Adhvaith**

Study programme: **Master's Programme in System Logistics**

Title of the thesis: **From Scratch to Shelf: Exploring Traceability and Consumer Acceptance in Ethical FMCG Supply Chains: A Comparative Study in India and Slovenia**

Supervisor: **Assoc. Prof. Dr. Matevž Obrecht**

I, **Padam Vayalil Adhvaith**, the undersigned student, hereby

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Student's signature: _____

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B2B – Business-to-Business (slov. poslovanje med podjetji)

B2C – Business-to-Consumer (slov. poslovanje med podjetjem in potrošnikom)

ELM – Elaboration Likehood model

EU – European Union

FMCG – Fast-Moving Consumer Goods

NGO – Non-Governmental Organization

TBL – Triple bottom Theory

TPB – Thoery of planned Behaviour

QR – Quick Response

ROI – Return on Investment

WTP – Willingness to Pay

1 INTRODUCTION

The fast-moving consumer goods (FMCG) sector has a very special niche in the contemporary global setup with financial success coexisting with social responsibility. The industry, which includes the food, beverage, personal care products as well as the household products, not only covers the basic needs of the people in their daily activities but also significantly contributes to the determination of the consumption pattern, and the supply chain of activities and sustainability activities that operate globally. It is one of the most dynamic and challenging industries in the world due to its major peculiarities such as the rapid rotation of products, the competition, and necessity to adapt to the modern customer demands (Cataltepe et al., 2023).

Traditionally, efficiency, affordability, and accessibility have been viewed as the measures of success of FMCG. But, within the past two decades, there has been a rise in consumer consciousness, a rise in activism. and the policy regarding the whole world has shifted and new conditions have been created: now companies must demonstrate ethical responsibility, social accountability and environment sustainability. Specifically, ethical sourcing has been an indispensable element of sustainable procurement with the consumers gaining the confidence that goods are manufactured in a manner that respects people and environment (Bekos et al., 2025).

Research has continually shown that these measures mention above help to earn consumer confidence, boost brand loyalty, and improve corporate reputation and also bring long-term resiliency in the business. However, these developments are associated with continued problems. One of the biggest challenges is consumer distrust towards sustainability assertions and this is motivated by the fact that the issue of greenwashingp has been very high, where companies overstate or misrepresent their efforts at ethical or environmental conduct. As such, the level of trust has increased, which weakens the efficacy of sustainability initiatives. At the same time, the companies that handle FMCGs face the problem of presenting complex details within a supply chain

in a manner that is both believable, verifiable, and simple to comprehend without burdening the consumers with technical jargon.

Considering whole scenario from ethical sourcing to digital traceability, the challenges of credibility and communication have led to an increasing interest in the digital traceability systems. Traceability can be described as the ability to trace a product of the supply chain through which it has been produced which is like: one can have a look at the source of the product, how it was manufactured, and the environmental and social impacts. Tracing a product is a better way of enhancing consumer trust and confidence as opposed to generic sustainability statements that do not offer verifiable facts about a specific product (Hagen et al., 2024). This observe examines traceability and purchaser reputation within ethical rapidly shifting client items (FMCG) delivery chains in India and Slovenia. It explores how open sourcing, digital surveillance technology (such as blockchain and QR scans), and moral certifications influence the decisions of consumers to consider and buy by comparing each country, the analysis brings out cultural and financial differences that impact ethical consumption.

The results support the fact that product traceability will build better emblem credibility and loyalty. The studies give insights for FMCG agencies to beautify deliver chain transparency, sustainability practices, and ethical verbal exchange to fulfil the developing call for accountable client conduct in international markets.

A QR code to information directly on the farm level, or a simplified version of sustainability metrics, like an impact meter, is a trust signal, which helps bridge the credibility divide between the business and consumers. The use of blockchain technology is especially valued because of the peculiarity of this system, its tamper-resistance, so that the information shown is immutable and verifiable (Nwariaku et al., 2024). Theoretically, these tools are in line with the shifting consumer values in terms of authenticity, accountability, and making informed decisions. They also provide businesses with the avenues of strengthening brand credibility, competing in a fierce market, and meeting ever-increasing regulatory demands. However, their potential is

not supported by a lack of empirical evidence regarding the fact whether the characteristics of traceability indeed affect consumer behavior.

1.1 Problem Statment

This study aim to better understands and provide the clarity about global fmcg, increasing demand for transparency and sustainability, with limited access to verifible supply chain info, resulting in a substantial trust gap between what businesses provide and what customers believe. The major area of focus and core problem the reserach is that, does the digital traceabiltiy improve consumer trust and acceptance of fmcg products and how these effects differ between India and Slovenia?

1.2 Final thesis road map for problem solving

Managerially and in the context of the industry, this study provides the FMCG industry with an empirically tested, information-driven structure on how to integrate traceability systems into product design and communication techniques. Comparing the consumer reactions in the online presentation of the reaction to the digital traceability options and lacks thereof, the study proves the methods have the potential to give more credibility to the product, decrease the doubt related to the greenwashing, and incite the more consumer-active reaction (Nguyen Quoc et al., 2025). It is worth noting that the results explain the degree to which the transparency indicators can justify high prices providing the firms with fact-based information regarding the viability of investing in traceability on both financial and strategic fronts. The other valuable argument as evidenced in the research is the need to align transparency design with the domestic consumer priorities like safety and authenticity.

The study applies the comparative cross-country approach, which will focus on two contrasting situations, namely India and Slovenia. India is an emerging market, which is

fast developing and is price-sensitive and uneven but with a growing awareness of sustainability and rapidly moving towards digital adoption. Indian consumers often need affordability in their buying behavior, but an increased number of customers is becoming interested in ethical and sustainable products (Francis & Sarangi., 2022). That is why it is important to explore whether the properties of traceability can influence the choices other than the cost-related ones. On the other hand, the Slovenia situation is a totally different European environment in which sustainability, regulatory landscape and consumer demands have evolved differently; prior studies in emerging markets (Poorani & Banumathi, 2025) illustrates how consumers behaviour varies across developmental contexts, though not specifically for Slovenia. The consumers are already conversant with the product labels, certification and traceability practices, a factor that can also cause them to have a different response to the use of digital traceability tools. In comparison of these two markets, the study provides information on the impacts of cultural values, market development level, and ideologies of the consumers in adoption and effectiveness of digital traceability systems. The need to integrate such a cross-cultural outlook is important because the behavior of consumers is never homogenous of course but rather embedded in the social and institutional context.

Greenwashing and credibility remain weaknesses that undermine consumer confidence and once again, it is important to have more verifiable ways of communicating sustainability. Empirical research on the effects of digital traceability features (QR codes and impact meters) on consumer is not present on trust, acceptance, and willingness to pay (Nisa et al., 2022). Lesser focus has been given to cross-cultural factors since majority of the studies have focused on analysis of single markets without considering the difference between emerging and developed economies. The proposed research will fill these gaps by introducing the traceability features into the packaging of the FMCG products and evaluating the response of the consumers in two different cultural and economic backgrounds. By so doing, it transcends the scope of theoretical exploration into providing the practical evidence of the impact of the traceability tools on the consumer decision-making.

Ultimately, the research offers a roadmap to FMCG industry interested in combining reputation and cost management, and at the same time make their brands reputable ethical sourcing aggressive and responsible leader. This thesis bridges the long-standing divide between intentional sustainability and the ability to provide its practical evidence, Figure 1.1 (Ray, 2022) below makes a visibility of how technologies for product traceability is moving around; a challenge that has often been discussed in the literature on sustainability, but seldom actually investigated

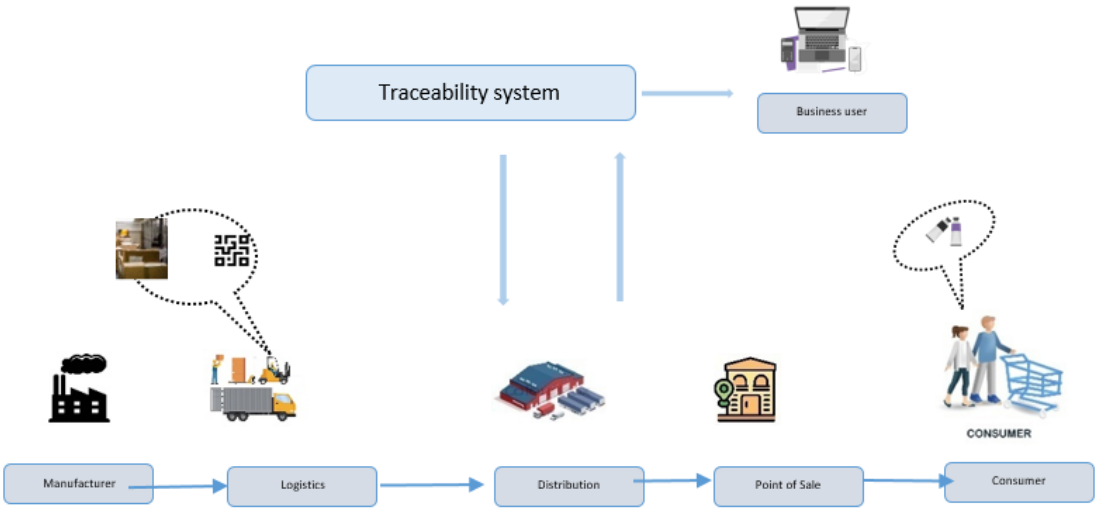

Figure 1.1: Technologies for product traceability

1.2.1 Statement of Objectives and Purpose

This study aims to find out the empirical evidence of the impact of digital traceability features on consumer trust, acceptance and purchasing behavior in FMCG industry, along with exploring the differences in culture between India and Slovenia. Academically, this research builds and expounds the theoretical knowledge regarding the effectiveness of digital traceability in building consumer market trust. Previous studies have continually shown that ethical sourcing leads to increased brand reputation and consumer trust but also points to another serious gap that is lack of transparency that could be verified to enable the consumers to assess the validity of ethical assertions (Zhou et al., 2024). The proposed thesis seeks to address this gap by evaluating the

empirically the digital traceability capabilities, such as QR codes and impact meters, exploring the way the instruments work as tangible indicators of credibility within the FMCG supply chains. The research combines Signaling Theory with Trust-Transfer Theory to determine the way in which transparency at the system level (traceable supply chain information) will be converted into product-level trust and acceptance by consumers (Semianiaka & Silina, 2012). Also, a cross-cultural approach to comparison of India and Slovenia provides some special knowledge related to the dissimilarity in the way consumers in different economic and cultural conditions perceive and respond to the messages of transparency. By doing that, the thesis is not limited to the purely theoretical debates on ethical sourcing and offers empirical evidence of how digital traceability could apply sustainability, increase consumer trust, and influence the willingness to pay. This contribution adds value to theoretical debates regarding consumer trust, transparency and ethical consumption in both developing and developed markets.

Moverover, the below presented are the main research questions carried out in the whole research:

- Impact in Trust and Acceptance - how does adding a digital traceability component (e.g., QR codesand impact meters) to FMCG packaging (in terms of its packaging) influence consumer trust, perceived product authenticity, and general acceptance?;
- Cross-Cultural Reception - Do the consumers in India and Slovenia welcome more transparency in product supply chains in the same way and how do their responses depend on their cultural or contextual background?;
- Key Traceability Characteristics What specific aspects of tray conductivity (such as product beginning, ecological effects, work environment, and shipping routes) have the most substantial influence on customers buying decision-making?;
- Price Premium Justification - Are consumers more prepared to pay a higher price when there is a traceability tool available and how this willingness differs in the two markets?.

1.2.2 Statment of Hypotheses

- H1: The products with traceability tools (QR codes and impact meters) will create much higher results of consumer trust than the same products, which lack these tools;
- H2: The consumer acceptance of the traceability-enhanced products will be much better in both India and Slovenia, but the extent of this effect will not be the same in both markets as it will be influenced by cultural, economic, and maturity aspects on markets;
- H3: Disclosure of environmental and ethical effects will positively and quantitatively affect the willingness to pay a price upcharge among consumers.

1.2.3 Assumptions and Limitation

Geographic scope: The research is limited to India and Slovenia only and this restricts generalizability to other countries across the globe. Product scope: The product scope will be one category of products (probably, Banana chips and packaged snack) and therefore the results cannot be generalized to all FMCG segments. Limitations to design: The study is cross sectional not longitudinal in that it only measures consumer perceptions at one time. Experimental realism: Although packaging mock-ups will be also provided in surveys and focus groups, a difference between actual in-store purchase behaviors and their representation may take place (Ketelsen et al., 2020). Finally, this study does not perceive traceability as a technical quality but as a strategic and cultural phenomenon, the influence of which is conditional upon the ideology of the consumer, cultural environment, and tendencies of behavior. Placing the digital traceability in the frames of theoretical and practical concepts, this research is going to fill the void between the rhetoric of sustainability and the reality of consumers to make the FMCG industry more transparent, more trustworthy, and responsible.

2 THEORETICAL STARTING POINTS

2.1 FMCG and Sustainability

As per Malik et al. (2024), the fast-moving consumer goods (FMCG) industry has its contribution to the global economic system, as it has an impact not only on consumption behavior but also on the outcome of sustainability. The nature of the sector is not only extremely competitive but also socially impactful, due to the high turnover rates and the prevalence of consumption, which forces the companies to constantly change and solve the environmental and ethical problems. Therefore, the FMCG industry is not only a service of indispensable products but a catalyst of massive shifts about sustainability. This transition is an important one where ethical sourcing is developed. Ethical sourcing has to do with the procurement activities that ensure the products are produced in a responsible and sustainable way, which has been found to develop consumer loyalty and trust.

Ethical labeling and sourcing cues have positive impact on consumer preferences, as they indicate responsibility, fairness, and quality. This is an example of increased consumer demand of guarantee on what they are buying, but also how the products they are buying are manufactured, and sourced. An effective conceptual tool to analyze these interactions is the Triple Bottom Line (hereafter: TBL) proposed by Elkington that stressed on the idea that businesses need to strike a balance between three factors, namely, profit, people, and planet by Padovano and Ivanov (2025). Sustainable corporation can be described as those that do not only produce value to the shareholders, but also to the society and environment once said, a sustainable corporation is one that does not only produce value to the shareholders, but also to society and the environment. This implies that sustainability initiatives in the FMCG sector should go beyond compliance and include long-term commitments to fair labor practices, minimized environmental impacts and open supply chains by Hsu (2024). Companies such as Unilever and Nestle have adopted a TBL business approach,

evidencing how companies can incorporate sustainability into the very fabric of their business to enhance their competitiveness and flexibility.

Moreover, the beneficial nature of ethical sourcing on consumer trust has been well understood. This tendency has significantly contributed to the evolution of fair-trade certification, as consumers are willing to purchase products that align with their moral principles. This is an indicator of a more general shift in the relationship between consumers and businesses, where trust will not just depend on quality and price, but also the compatibility of values. Therefore, ethical sourcing is one way of establishing trust in skeptical and information-imbalanced markets. Simultaneously, the inclusion of sustainability in the FMCG supply chains has been recognized as the source of long-term profits. This firms which incorporate the concept of shared value; the integration of social progress to the economic strategy, may acquire a competitive advantage by standing out in marketplaces that focus on transparency and accountability by Limon (2022). This echoes in the FMCG environment where similarity might make it difficult to differentiate products; ethical sourcing and sustainability therefore becomes one of the strategic instruments of building trust and loyalty. The ethical sourcing development in the FMCG industry depicts how consumer trust, brand image, and sustainable procurement are becoming increasingly congruent. Based on the Triple Bottom Line, ethical sourcing practices are the way to balance profitability and accountability, therefore, creating the basis of investigating more advanced tools of transparency like digital traceability.

2.2 Greenwashing and Consumer Skepticism

As per Lai et al. (2025), even though the green FMCG industry has experienced a tremendous growth in sustainability efforts, this has resulted in the increase of greenwashing, which is an exaggeration or distortion of the sustainability practices by businesses. The given practice creates an information asymmetry between consumers and businesses, which negates the trust that is supposed to be built through ethical

sourcing. The concept involves both bad environmental performance and good communication of environmental performance. This is to say that it occurs when businesses understand how to make representations of themselves that convey that they are taking responsibility but in fact they are not making real commitments. It would lead to the skeptical attitude towards the sustainability claims resulting in the consumer questioning whether they are the mere marketing strategies and not becoming genuine efforts.

Credibility needs bridged by greenwashing are very important in consumer decision-making. Misleading sustainability claims have contributed to the rise of discounts or disregard of the environmental information by consumers by Jauhar et al. (2024). This cynicism is also paradoxical: as consumers are demanding an increasing amount of information on sustainability, the excessive number of unprovable statements may erode their faith in even their true efforts. In the case of the FMCG industry, operating in highly competitive, and commoditized markets, this lack of trust may have a direct effect on the brand loyalty and purchase intentions. Moreover, it has also been found that consumers are seeking verifiable authenticity of claims rather than just general claims. The eco-labels and certifications which are considered as third-party confirmed prove to be more effective in restoring trust than the self-declared statements by the businesses. The participants of their experimental study rated third party certifications as much more credible, indicating that independent verification is one of the mechanisms that can be used to increase trust by Bennett (2024).

Another implication of greenwashing on the viability of sustainability action is more general. In cases when businesses get involved in greenwashing, they are prone to a venture of contagion effect where even other genuine firms lose credibility by association. This is particularly important in FMCG markets, which have high rate of competing brands and claims within the short purchase periods. The possible loss of credibility is not the case of single companies, but it can extend to the whole sector, and it becomes difficult because people are not able to distinguish between the real and

fraudulent programs. Also, studies in the field of consumer psychology suggest that the distrust created by greenwashing influences not only trust but also emotional responses.

Greenwashing triggers negative emotions that include irritation and anger, which in turn, reduces the purchase intention and perception of the brand. This highlights the fact that greenwashing compromises rational evaluations of trust and equally elicits emotional reactions, which jeopardize brand equity. An existing body of literature indicates that digital transparency solutions could be useful in counteracting skepticism through allowing verification of sustainability claims. As an example, information-based environment governance, especially when digital monitoring systems are utilized, can increase the credibility of claims because they enable the consumers to have direct access to evidence of practices. This is directly connected with the prospects of QR codes, blockchain, and digital traceability systems that can supply consumers with verifiable data as opposed to unproven marketing.

In the FMCG, where products are normally low involvement with decisions being made quickly, simple trust indicators (certifications, traceability meters) are crucial in setting aside doubt. Misopoulos and Bajiraj (2025), argue that greenwashing is a significant threat to the success of sustainability in the FMCG industry because it is a concise and easy to understand sustainability information which is linked to credible independent sources. It decreases consumer confidence, generates doubt even to the true claims and evokes an emotion towards brands. The necessity of verifiable evidence is also predetermined as among the primary findings of the research, and the importance of digital traceability tools in the process of making the trust gap less significant cannot be overstated. Traceability systems may provide a solution to the adverse effects of greenwashing, and, hence, allow restoring the trust of the consumer markets by ensuring that the claims are transparent, verifiable, and cannot be altered.

2.3 Digital Traceability Tools

2.3.1 Defining Digital Traceability

As per Sparacino et al. (2024), the concept of traceability has gone beyond keeping records to a complicated tech-driven system that enhances visibility across supply chains. In such a way, define traceability as the possibility to obtain any or all data associated with a product in question during its life cycle through recorded identification. This definition shows that traceability has a dual role, both as a supply chain management tool and a consumer source of information, Figure 2.1 (Tagarakis et al., 2021) makes it broader view. Within the framework of a fast-moving consumer goods (FMCG) environment, digital traceability is also considered a solution to consumer distrust and the problem of greenwashing by Karaduman and Gülhas (2025). It can revive confidence in the consumer brand relationship by giving consumers verifiable information on sustainability and product origins. Traceability is not a marketing add-on anymore but a necessity of companies that want to prove their responsibility and sincerity in food and consumer goods markets.

2.3.2 QR Codes and Consumer Engagement

As per Widodo et al. (2025), QR codes are one of the most frequently used tools of communicating traceability among the digital solutions. Their simplicity, the possibility of use via smart phones, and cheapness are the factors that make them highly scaled. As research on QR codes usage in the supply chains of the Greek food industry, the introduction of QR codes to the packaging of their food increased consumer perception of transparency and allowed them to assess the validity of sustainability claims by Kumar and Kumar (2024). This shows that even simple technological solutions can have a massive influence on consumer trust. QR codes have been used as portals to more complex information systems.

By scanning code, consumers are redirected to sites that provide detailed histories of the products such as the farm source, processing processes, certifications, and information about the environmental impact. That consumers emphasize traceability not only in safety issues but in the quality distinction and authenticity guarantee. Recent studies confirm that this distinction is still important in the modern sustainability-focused markets. Also, QR codes enhance consumer empowerment through enhanced informed decision making. The use of QR traceability information resulted in a significant improvement in the perceptions of consumers about food safety and their willingness to pay a premium. This is critical particularly in fast-moving consumer goods (FMCG) food products whereby consumers are mainly concerned with safety and quality.

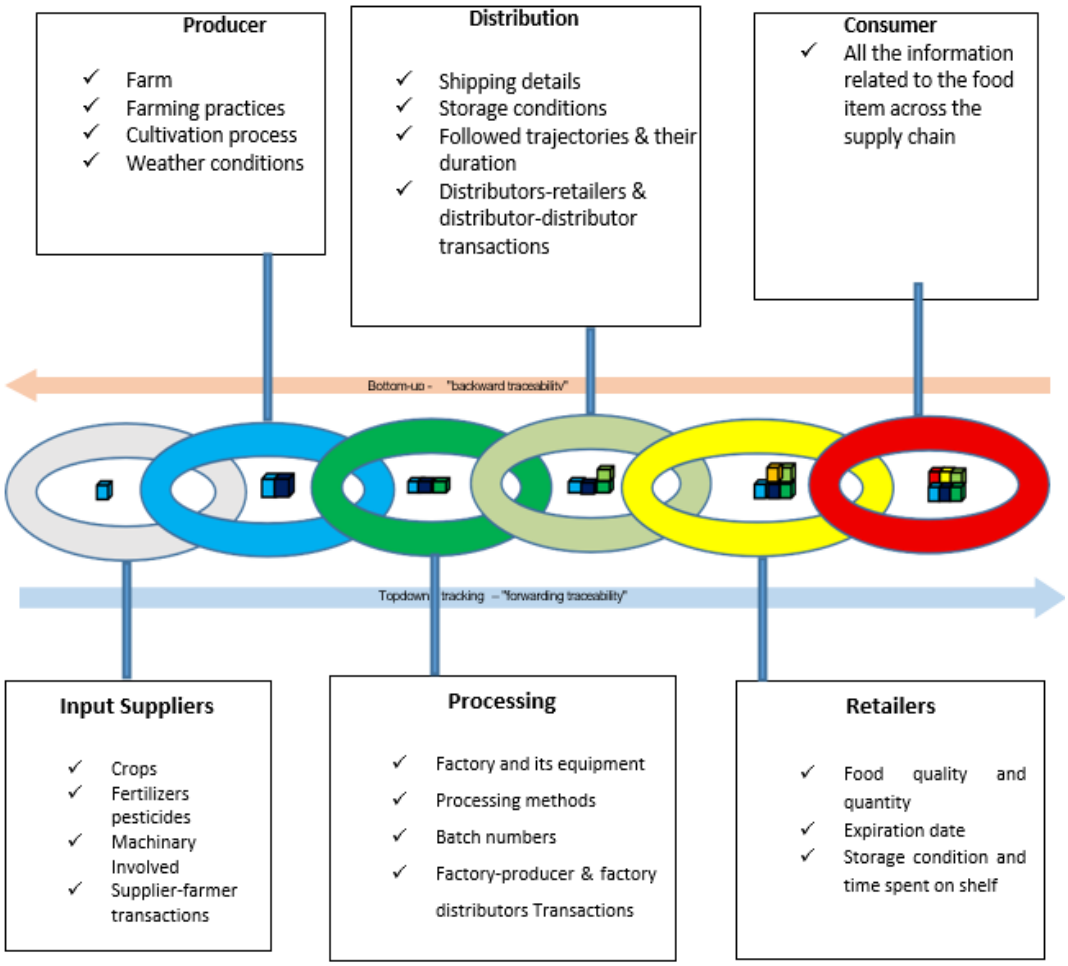

Figure 2.1: Fresh produce supply chain based on Digital Traceability

2.3.3 Blockchain and Immutable Transparency

As per Ahmad Amouei et al. (2024), although QR codes serve as the consumer side, blockchain technology is used to deliver the backbone of the secure and tamper-proof data storage. Blockchain enables creation of distributed records that capture each process in the supply chain so that when the records are filled, they are not removable. The use of blockchain technology can enhance food safety by rendering information transparent, immutable, and easily available to the core business decision makers. The possibility of using blockchain to build trust is empirically supported. The blockchain can provide an incorruptible and publicly accessible list of events in the supply chain, which directly responds to consumer concerns about greenwashing by Paiva (2025). Blockchain is a source of trust infrastructure to supply chains of FMCGs by guaranteeing the legitimacy of claims. The introduction of blockchain into FMCG is not without challenges as well, that blockchain does not guarantee data accuracy upon the time of entry. This highlights a weakness: blockchain prevents tampering, but the reliability of the system finds itself in the quality of data input. This, in practice, implies that the blockchain should be backed by external verification and efficient data management.

2.3.4 Impact Meters and Streamlined Communication

As per Alshahrani (2023), consumers usually make low-involvement decisions on many of the FMCG products. In such cases, it is important to provide sustainability information that is easy to digest. This is the place where impact meters as visual representation of such vital sustainability indicators as carbon footprint, sustainably sourced, or work standards/support farmers come in strongly. Simplified environmental labels benefit consumer understanding and better impact the purchase decisions than the complex and technical disclosure. The intricate traceability data (which can be accessed through the QR codes) and the need to have simple, intuitive cues at the point of sale are bridged by the impact meters. In addition, the use of impact meters and QR codes together leads to a multi-level communication plan: impact meter acts as a fast reference about

sustainability-oriented consumers, whereas the QR code becomes a way of more information to those interested. This two-sided strategy will serve the low elaboration (heuristic-based) and high elaboration (detail-based) consumer decision styles which agrees with the Elaboration Likelihood Model.

2.3.5 Applications in Food Supply Chains

As per Rasel et al. (2022), some of the best examples of traceability in use appear in the food sector. The Figure 2.2 (Tagarakis et al., 2021) below picturizes how a digital traceability system works across the fmcg supply chain and also these systems have been widely promoted as a way of regaining the confidence of consumers in the aftermath of well-publicized outbreaks of food safety issues (such as the 2008 Chinese milk contamination crisis). Traceability systems can reduce the risk of fraud as well as are strategic tools for restoring consumer confidence in a market that has been undermined due to lack of credibility. Studies carried out in Europe and Asia show the same trends: consumers tend to believe and are ready to pay higher prices to buy goods that have traceability aspects, which are verifiable by Zhao et al. (2022). The Canadian consumers were ready to pay a higher price to beef products that had better traceability, the same in pork in China. These observations explain why traceability is universal despite variations in the degree to which consumers respond. In the context of FMCG, in particular, the traceability is changing not only as a tool of food safety but also as a branding tool in consumer goods. This is aligned with the greater mass of literature that states that traceability may be both a risk management tool, and a marketing benefit.

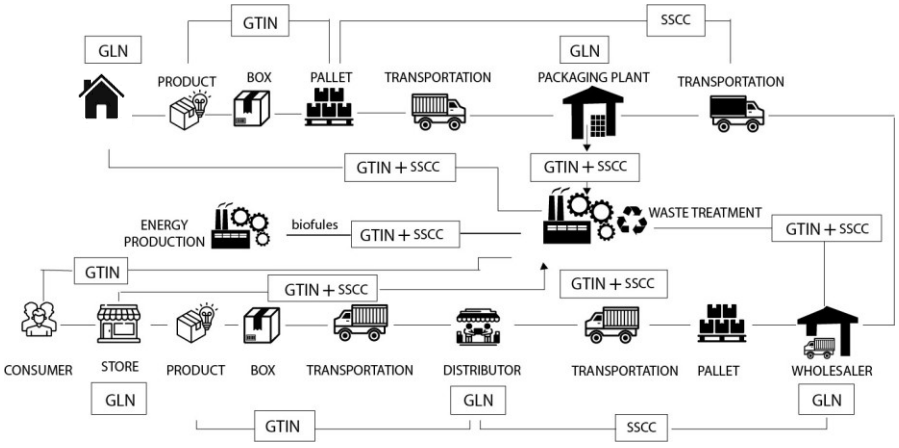

Figure 2.2: TRACE system in FMCG supply chain

2.3.6 Consumer Responses and Trust

As per Pranta et al. (2025), many studies show that traceability increases consumer confidence. The traceability systems are the external signals, which reduce the perceived risk and thus increase consumer trust and their propensity to purchase. Consumers perceive a higher degree of product safety, authenticity as well as reliability in trials where QR-enabled labels were used rather than items that did not have such characteristics. However, cultural and situational factors determine effectiveness of traceability mechanisms. The traceability is mostly considered by the European consumers as a method of obtaining food safety whilst the Asian consumers often associate it with authenticity and origin. These findings suggest that despite the importance accorded to traceability by all cultures of the world, different cultures have different reasons why they embrace it. In addition, trust depends on the origin of the information. The third-party certifications that are included in the traceability systems provide more credibility than the data provided by companies. It means that the cooperation with Non-Governmental Organization (hereafter: NGO)’s or certification bodies is crucial to ensuring that the traceability information is not only available but also plausible.

2.3.7 Challenges and Limitations

Viscardi et al. (2023) explained that even though digital traceability has great potential, it is confronted by obstacles that do not allow its extensive implementation. One of the biggest issues is cost, especially in the Third World market where the profit margins are low and the consumers are highly price sensitive. Teixeira et al. (2025) states that the implementation of blockchain and advanced traceability system is linked to serious technology-related, business-centered and economic challenges.

Consumer involvement is also problematic. Although the QR code provides access to detailed information, not every shopper is willing to scan codes in the process of making regular purchases. Traceability information may not be fully utilized in case the consumers consider it inconvenient or otherwise inapplicable. This highlights the factor that traceability systems need to be developed to be easy to access, simple, and relevant. Also, issues of data privacy exist when it comes to systems where the traceability involves personal data (as in case of a direct farm-to-consumer sharing of personal information), the officials are concerned because of the potential privacy problems or competition.

Addressing these issues requires both technological innovations and creation of control systems as well as consumer education. Digital traceable solutions such as QR codes, blockchain, or impact meters are an indicator of a significant improvement in sustainability communication in the FMCG sector by Briamonte et al. (2024). They make possible verifiable, accessible and credible information that directly overcomes problems of greenwashing and consumer distrust. Food supply chain evidence suggests that traceability provokes confidence, trust, and readiness to pay more however differences in cultures determine the extent and rationale behind consumer responses. Still, the barriers that hinder implementation, the interest of consumers, and the management of information must be tackled so that the concept of traceability can be taken to its full potential. In the case of FMCG companies, the strategic opportunity is in

the fact that traceability can be used not only as the factor of compliance but also as the tool to gain confidence and to occupy the niche in the market.

2.4 Consumer Behavior & Ideology

2.4.1 Trust Formation in Consumer Decision-Making

Consumer decision making is driven by trust especially in markets with credence attributes like sustainability, ethics or origin, which consumers cannot readily verify at point of purchase. The traceability systems are external cues that reduce the perceived risk, which would increase consumer confidence and purchasing intentions. Basically, trust acts as an intermediary between information disclosure and consumer behavior. Traceability works in fast-moving consumer goods (FMCG) markets, where a consumer decides in often a short span of time.as a sign of sincerity and wholeness. There is a validated model of e-commerce that would be applicable in this case, where consumers evaluate their trust based on the factors of competence, benevolence and integrity. This can be applied to the context of traceability where it is suggested that clear disclosures about origin, sustainability metrics, or certification enhance perceptions about the competence (the ability to deliver accurate information) of a company, benevolence (concern with social and environmental impacts), and integrity (honesty in communication). Also, institutional trust plays an essential role. Because of the complex systems of modernity, trust has often been based on trust in institutions, as opposed to the trust an individual has to verify. With the scenario of FMCG traceability, consumer confidence is highly enhanced in respect to trusting the regulators, NGOs, or third-party certification bodies. This corroborates the findings that found out that third party eco-labels are perceived to be much more credible than self-made claims of the company.

2.4.2 Willingness to Pay for Sustainability

Empirical studies are increasingly showing that consumers are willing to spend a bit more on sustainable and traceable products, with the degree of willingness to pay (hereafter: WTP) again depending heavily on the circumstances. As an example, that consumers in Canada were willing to pay a significant WTP premium to beef that had greater traceability and safety guarantees, and the same trends of traceability in the pork of consumers in China (WTP). These results show that the desire to pay goes beyond the rich markets and it is a worldwide trend. Nonetheless, the motivation behind them changes: in the Western part, WTP is more often guided by environmental needs or ethical concerns; in developing countries, it is much more related to safety and genuineness. Interestingly, not all the traceability characteristics can be treated using WTP. The U.S. consumers place more value on the food safety and origin rather than environmental or labor related factors. The traceability as seen by Indian consumers is more likely to be perceived through the lenses of safety and authenticity, as opposed to environmental sustainability. These findings highlight the importance of attribute salience in determining consumer willingness to pay. Figure 2.3 (Patwary et al., 2022) below demonstrates how consumers' willingness to spend extra for ecologically friendly products is reflected in their sustainable behaviours, such as responsible purchasing, use, and disposal.

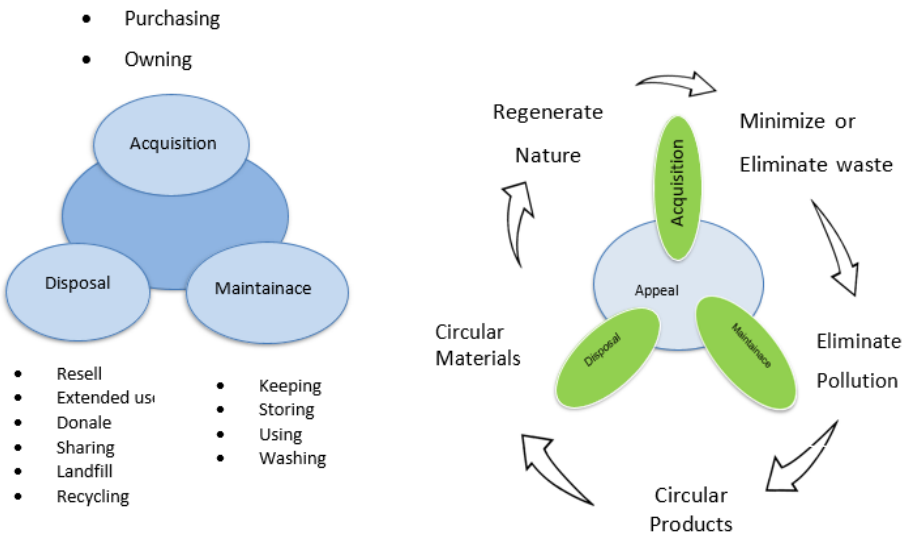

Figure 2.3: Consumer behavior in FMCG supply chain

2.4.3 Cross-Market and Cultural Differences

As per Grabs et al. (2024), the reactions and perception of consumers towards traceability is highly dependent on cultural norms and maturity of markets. The cultural dimensions could provide a useful framework, and in high uncertainty avoidance cultures, consumers might emphasize more on traceability as one of the ways of reducing risk. These arguments are supported by the position who assert that traceability is considered by European consumers as an important food safety instrument, but in the Asian markets, it is an indicator of authenticity and fraud prevention. The case of India, a developing market, is a unique situation. The consumers are highly price-conscious there and although sustainability awareness is also increasing, affordability remains the key factor in buying decisions. However, Indian consumers have started demanding brands to be socially responsible, most noticeably in an urban setting where the level of sustainability is even higher by Haleem et al. (2021). At same time, that traceability in India is primarily valued because of food safety and genuineness, but not because of its environmental consequences. This implies that traceability practices can be embraced better by Indian consumers when introduced as safety and quality assurances. Conversely, Slovenia is a member of the European Union

(hereafter: EU), where traceability and sustainability have played a major role in the regulatory frameworks and consumer demands over an extended time.

The consumers in Europe give big emphasis to the origin and certification labels as a sign of quality and sustainability by Memon et al. (2021). The consumers in Slovenia, which are involved in this wider EU discourse are thus likely to perceive traceability features as the logical extension of the current practices. In their case, sustainability and environmental responsibility can be more important than in India and, therefore, impact meters and environmental disclosures can be more salient. These differences are strengthened through cross-market research. The traceability enhanced trust among European and Asian participants, and that the things that promoted trust differed significantly: European consumers were concerned with safety and environmental sustainability whereas, Asian consumers were concerned with authenticity and fraud prevention. It means that traceability tools are mostly useful, but the value propositions should be adjusted to the cultural expectations.

2.4.4 Ideology and Consumer Segmentation

As per Viscardi et al. (2023), along with the national differences, personal beliefs and ideologies influence an individual consumer perception of traceability information. The pro-environmental values are the ones that show that there is higher acceptance of eco-labels and willingness to pay a higher price of sustainable products. Similarly, the consumers who considered themselves ethical in Belgium were also ready to pay significantly higher prices to fair-trade coffee, but the portion of this group of the population was very low. This means that some individual consumer segments, like those who are more concerned about environmental sustainability or social responsibility, may find traceability more attractive. Segmentation studies conducted in India show that the country has experienced an increasing number of middle-class consumers who are willing to use global standards of consumption such as sustainability and a significant number of price-sensitive consumers where the cost is the main factor

of consideration. On the contrary, ideological segmentation might not be so pronounced in Slovenia where sustainability values are stronger, but the education of the consumer and environmental identity plays a significant role in behavior.

Three factors, namely development of trust, willingness to pay, and cultural background, are interdependent and affect the way consumers act towards traceability. Trust is developed when traceability reduces uncertainty and it is supported with credible, independent validation. The willingness to pay exists in the global markets but varies in the extent depending on the characteristics of the attributes that the consumer considers the most important (safety, authenticity, environmental impact, or labor issues). Lastly, cultural and ideological differences have an influence on both acceptance and interpretation: in India, traceability is associated more with safety and authenticity, and in Slovenia, traceability is more associated with sustainability and ethical concerns. These observations emphasize the need to consider traceability as a tool, the utility of which is strictly dependent on the ideology of the consumer, cultural expectations, and the sophistication of the market.

2.5 Theoretical Framework

2.5.1 Signaling Theory

Originally as a theory applicable to the labor markets, signaling theory can be a useful starting point when it comes to researching the methods of companies that communicate unobservable product characteristics to consumers. Sellers possess a greater understanding of the quality of products or ethical activities than the buyers in markets with unevenly distributed information. In the absence of trustworthy indications, consumers are likely to make such faulty decisions by choosing to buy low-quality or less sustainable products due to the inability to distinguish real products and greenwashing (Al-Okaily et al., 2024). In the framework of FMCG, the example of

sustainability and ethical sourcing is the typical credence attribute: even after buying or using the product, the consumer is not able to verify these qualities. The signals are visible behaviors or characteristics that provide information on intangible quality of the products. QR codes, blockchain records, and impact meters are tools that are used as signs of authenticity and responsibility in terms of traceability.

The effectiveness of signals depends on their credibility and the costs of the signals. Spence (1973) states that a signal becomes credible when it is difficult to be imitated by low-quality firms. In this respect, blockchain traceability systems can be viewed as highly believable cues since once information is stored, it cannot be changed, thereby making the process of greenwashing more challenging by Wang et al. (2025). Similarly, third-party certifications contained on traceability disclosures can also be viewed as costly signals since they introduce the need to have an independent audit. Consumers consider signals more credible when externally validated and hard to fake. The eco labels with third party verifiers were significantly more trustworthy as compared to company self-reported assertions. Thus, FMCG packaging traceability tools can be considered as strategic indicators that reduce the information asymmetry and consumer trust.

2.5.2 Trust Transfer Theory

Although signaling helps in the creation of credibility, Trust Transfer Theory explains how trust to another entity can be transferred to the other. Trust transfers as the movement of trust in a familiar actor onto an indirect, yet unknown target. Trust in the technological structure usually converts to the trust in the vendor by Hashemi Petrudi & Sharifpour Arabi (2025). Translated to traceability in fast-moving consumer goods (FMCG), this is to say that trust in a traceability system (e.g., a blockchain ledger, QR-enabled data platform, or certification body) can be attributed to the product or brand. As an example, the consumers who find the way the QR system is perceived reliable and transparent will be more likely to trust the product, where that QR code is incorporated.

System credibility can act as a trust anchor, which reduces uncertainty and increases the likelihood of users to be more willing to transact.

The concept is particularly relevant when it comes to a cross-market situation. Traceability systems, when they are used in India, where people have a rather low trust towards the regulators in general may resort to technological trust (such as the impossibility of blockchain alteration). As an alternative, trust can be transferred in Slovenia, where institutional credibility (through certifications and EU labels) to the product can exist due to the great regulatory framework of the EU. Trust transfer is the process, in both cases, that links traceability tools and consumer acceptance.

The process of trust transfer, in which trust moves from a reliable system to related entities, is illustrated in Figure 2.4. Customers first trust the platform or system, which then spreads to the actors in the community and, ultimately, to the individual or item. In the context of this study, this illustrates how ethical supply chain players and, eventually, the FMCG product or brand itself can benefit from trust in a digital traceability platform.

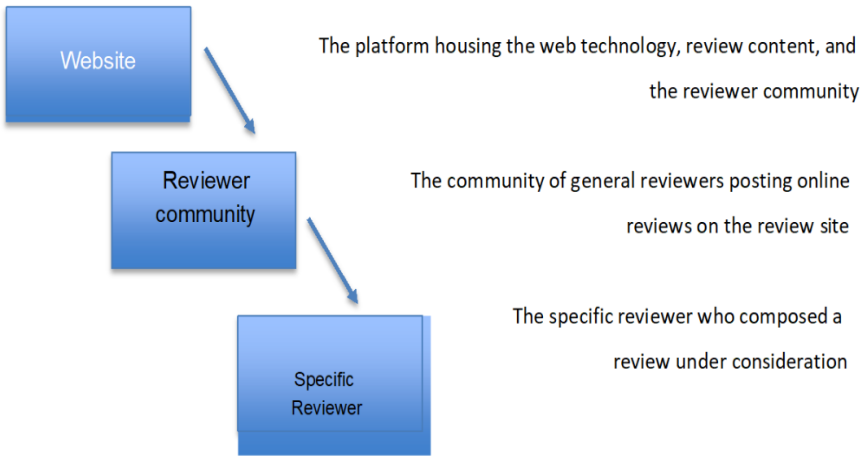

Figure 2.4: Transport behavior in FMCG supply chain

2.5.3 Consumer Decision-Making Frameworks

- Theory of Planned Behavior (TPB);

Attitudes (evaluations of behavior), subjective norms (social influences) and perceived behavioral control (confidence in the ability to perform) are the three key factors affecting consumer behavior. Within the framework of traceability, transparent packaging will enhance the attitudes by providing positive evidence of sustainability, supporting the subjective norms and improving the perceived control by providing consumers with dependable information. The studies confirm this: The elements of the TPB strongly predicted the purchase of organic food, which seems to be the case with traceable fast-moving consumer goods (FMCG).

- Elaboration Likelihood Model (ELM);

As per Dehghan et al. (2025), the Elaboration Likelihood Model which was contrasts between central and peripheral persuasion channels. In consumers of high involvement (central route), information regarding traceability (e.g., farm origins, environmental metrics) is considered in detail, which causes long-term attitudinal changes. In the case of low involvement (peripheral route), simplified indicators of impact or certification logos can be used as mental shortcuts and yet it can influence behavior. This is who discovered that simple environmental labels raised greater awareness and decision-making than the more elaborate disclosures. Collectively, TPB and Elaboration Likehood model (hereafter: ELM) demonstrate the influence of traceability on both cognitive judgments (attitudes, trust) and heuristic strategies (labels, meters), which makes it effective in a number of consumer groups.

2.5.4 Integrated Framework for This Study

Based on these theories, this study will apply a holistic model:

- Signals (traceability tools: QR codes, blockchain, impact meters) provide plausible, hard to fake evidence of product genuineness (Signaling Theory);
- Trust Transfer → the credibility of the traceability system is converted into product/brand credibility;
- Consumer Decision-Making → trust and credibility have an impact on attitudes, norms and perceived control (TPB) and on heuristic and central processing pathways (ELM);
- Behavioral Outcomes The outcomes of higher trust and positive attitudes will be higher acceptance, purchase intentions, and willingness to pay premiums.

The proposed relationship between tracebility attributes and consumer acceptance aligns with hypotheses H2 and H3, which propose that the acceptance and perceived value of various traits differs across markets. This study employs a comprehensive conceptual framework grounded in these theoretical foundations, as shown in Figure 2.5. Inspired by signaling theory (Spence, 1973), true-based theory (Mcknight et al., 2002), the theory of planned behavior (Ajzen, 1991), and the elaboration likelihood model (Petty & Cacioppo. 1986), the model represents a unique synthesis by the author.

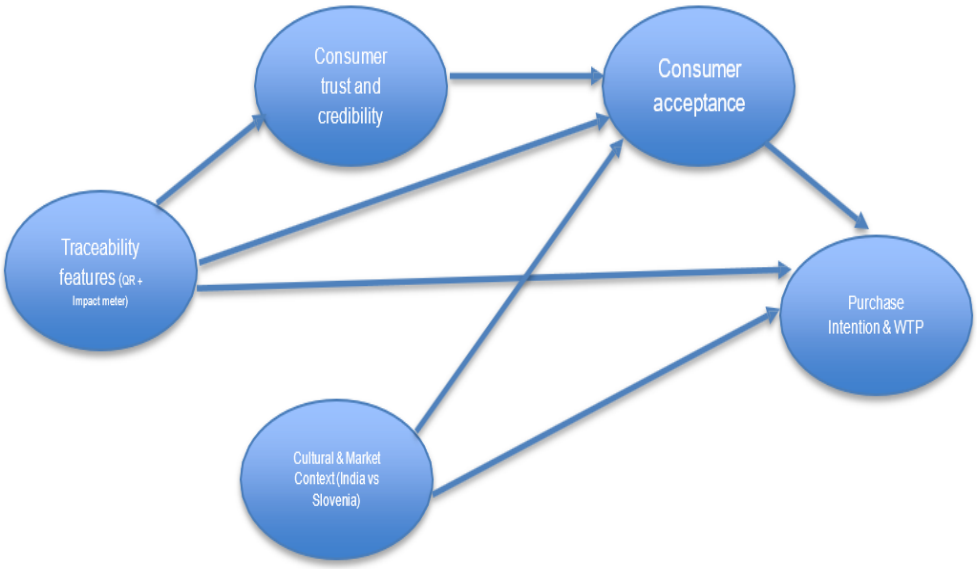

Figure 2.5: Conceptual Framework for Digital Traceability in FMCG

2.6 Research Gap & Hypotheses

2.6.1 Research Gap

A review of the existing literature points out that there have been remarkable achievements in the knowledge about sustainability in the FMCG industry, but a few gaps still remain. To begin with, whereas the ethical sourcing and the Triple Bottom Line have received significant analysis much of the research has focused on concept analysis or poll-based perceptions as opposed to actual evaluated digital traceability tools (Rutitis et al., 2022). It is shown that ethical sourcing leads to the increase of trust and loyalty, but little work has been done on how digital technologies such as QR code, blockchain, and impact meters can have any impact on consumer attitudes or behavior at the point of sale. Secondly, despite the documented presence of the issue of greenwashing there is very little empirical research on how traceability systems can contribute to overcoming this credibility gap.

Although certification labels and third-party verification have proven that they can rebuild trust, packaging-included traceability features are explored in very few studies as a possible solution to the issue of greenwashing. This establishes a gap between theory (sustainability communication) and practice (digital implementation). Thirdly, the research on digital traceability is disjointed. The research shows that blockchain increases the level of auditability, QR codes spread transparency, and impact meters enhance communication. Nevertheless, such studies often emphasize the effectiveness of supply chains or technological feasibility, not paying much attention to consumer perceptions. No comparison analysis is made on the effect of different traceability features (e.g., product origin versus environmental impact) on trust, acceptance and willingness to pay. Fourthly, which is the most important, there is a significant lack of comparative cross-market analyses. The current results indicate that the cultural background influences the consumer response to sustainability indicators: consumers in Europe are more likely to value environmental stewardship, whereas in the Asian and

emerging markets, consumers are more likely to value authenticity and safety. However, the empirical comparison of different markets like India and Slovenia is not evaluated so far although the price sensitivity, institutional trust, and sustainability awareness are very different. This constrains our understanding of the efficacy of digital traceability programs to be transmitted on a universal scale.

2.6.2 Hypotheses

To address these gaps, this paper proposes an in-depth research design, which can investigate the digital traceability tools in the FMCG sector, with a focus on a comparative study of India and Slovenia. Based on the literature review and theoretical framework, the next hypotheses are created:

H1 (Signal-to-Trust): It is assumed that products that include the use of traceability tools (such as QR codes and impact meters) will produce significantly higher rates of consumer trust than the same products without such tools. This highlights the role played by traceability as a proven indicator.

H2 (Acceptance Market-Moderated): The acceptance of products with traceability will be much more pronounced in India and Slovenia, but the level of such impact will differ with cultural, economic and institutional peculiarities. It conforms to the studies that have shown that European consumers are more environmentally aware and care about sustainability, and Indian consumers are more preoccupied with safety and authenticity.

H3 (Transparency to WTP): The willingness to pay will be positively influenced by clear information about environmental and ethical impact in line with meta-analyses that reveal consumers are ready to pay an additional sum of money to buy sustainable products. Overall, the research gap does not lie in the acknowledgment of the importance of sustainability but in the empirical analysis of digital traceability as tool of trust-building in the diverse cultural contexts. This study provides a valuable gap in the

literature by directly comparing consumer responses in India and Slovenia to answer the question whether traceability is a global strategy or one that is context specific. The hypotheses suggested lead to the actual research, relating theory (signaling, transfer of trust, TPB/ELM) and practice (QR code, blockchain, impact meters). By so doing, the research contributes to the academic discussion, through integrating theoretical knowledge in a cross-country experiment and industry practice through offering practical solutions on how the FMCG industry can strike a balance between minimizing transparency and satisfaction of consumers.

3 METHODOLOGY

The methodology in this study will explore the effects of digital traceability attributes, including QR codes and impact meters on trust, buying intentions, and readiness to pay in the FMCG industry. A mixed methods approach is used to obtain insights into not only the industry view but also the consumer response. A structured survey of industries is conducted with a controlled experiment on the consumers with focus groups as an extra focus. In this chapter, the research structure, comparative situation, sampling method, experimental resources, data collection procedures, statistical analyses, and ethical issues are described and give the chapter integrity to the research as methodologically accurate and practical.

3.1 Research Design

This study utilized a blended-methods framework proposed by Razak et al. (2021), this study combined quantitative and qualitative approaches to assess the effect of digital traceability on the FMCG industry. The quantitative element measured the effect of traceability functions on patron conduct, while the qualitative factor examined the underlying motivations and perceptions that power those behaviors. Merging both methodologies presented a greater thorough and reliable insight into the phenomenon.

The study consisted of two related components:

- **Industry Survey (B2B):** An online questionnaire directed at FMCG related people and organizations in India and Slovenia collected information on familiarity with digital traceability technology, motivations at the back of adoption, and limitations to implementation, predicted purchaser reactions, return on investment (hereafter: ROI) evaluation, and willingness to collaborate on industry requirements. This method ensured that the deliver-side perspectives and operational realities were integrated along client insights;

- **Consumer Experiment (B2C):** Similarly to the commercial enterprise-centered survey, a patron experiment was done to discover how digital traceability influences shopping for behaviour and believe in actual-world fast-transferring patron goods (FMCG) environments. This test becomes created in collaboration with a local FMCG organisation in India and replicated underneath similar conditions in Slovenia, facilitating an assessment primarily based on cultural and marketplace differences.

3.1.1 Research strategy

The product chosen in this experiment was a well-known FMCG snack; Banana chips, which was chosen due to its availability, ease and commonality by the various consumer groups. In both countries, the subjects were shown two kinds of products: A control item is a snack that is already in the market (a popular brand of Banana chips normally found in the shelves of local stores). An exclusive product that was redesigned Banana chip pack that was developed in cooperation with the partner FMCG company. This one involved a QR code and an impact meter that was to deliver the traceability and sustainability information. At the agreement and input of the partnering FMCG company, a short traceability video was created to visually illustrate the path that the product followed since its origin, and the little moves that the product underwent during production. The Hoover code platform was employed in creating a working QR code that was printed on the treatment packaging. Upon being scanned, this QR redirected the consumers to a social media site with the traceability video, demonstrating how Banana chips and ingredients used are made.

3.1.2 Participants of study

In every session, the respondents were presented with the control item (a local market brand) and the traceability-enhanced Banana chip item product simultaneously. They were advised to sample the two products, scan where necessary and then proceed to

make a purchase choice. Brief feedback and observation were used in recording their behavioral actions and self-reported perceptions. The sample size of the experiment was 100 in India and 100 in Slovenia to have uniform conditions and demographic variation. Comparing the responses of both settings the research attempted to discover the extent to which cultural, economic and ideological aspects affect consumer acceptance of traceable FMCG products.

3.1.3 Research approach

This experimental methodology provided a unique opportunity to see actual data of behavior rather than the imaginary intentions. It also enabled a triangulation with the findings of the surveys giving an association between industry expectations of B2B data and consumer realities of B2C behavior (Bilro et al., 2023). Combining the live QR technology and traceability media allowed ensuring that the experiment was a valid reflection of the real market experience of using the tools to achieve digital transparency.

3.2 Methodological Approach and Comparative Setting

The study adopted experimental survey study, supplemented with follow up focus groups discussion.

- Experimental design: The sample was randomly selected to test the standard Banana chip offerings (control) or the modified QR-enhanced version offering (treatment) of this product (Cui et al., 2024). This design helped to do statistical analysis on the variations in trust, purchase intention, and willingness to pay;
- Qualitative depth: The transparency/ pricing perceived compromise and consumer reasoning and interpretations of the impact meter were discussed in focus groups after the test. The analysis has been conducted in two different markets;

India is a rapidly developing, price-conscious market which is showing a growing interest in digitalization but rather uneven awareness of the issue of sustainability. Traceability was evaluated in this respect as a possible tool to create trust in the environment of affordability where it is dominant.

Slovenia a smaller yet older European market that has increased regulatory and consumer pressure in regard to sustainability. Traceability in such an environment was expected to be perceived through the prism of environmental and ethical considerations. This design of comparison increased the external validity of the results and emphasized the impact of cultural and market factors.

3.3 Sample

Company survey (B2B): The survey was done on sixty FMCG related companies (30 India and 30 Slovenia). The participants had been in associated within procurement, supply chain management, sustainability or marketing roles, so that they had relevant practical knowledge and decision-making experience.

Consumer experiment (B2C): Two hundred consumers were involved (100 in India, 100 in Slovenia). The sample was diverse in terms of gender, age, education, and income with the corresponding reflection of the FMCG consumer audience at large. All the respondents were previously experienced in purchasing packaged foods.

3.4 Experiment Material

To begin with, this consumer experiment was conducted in collaboration with a local company in India in the FMCG industry. One of the existing products of the company, Banana chips, was selected to be redesigned with the approval of the firm.

Control condition: Some of the Banana chip products available in the market were used as it is.

Status of treatment: In cooperation with the design department of the company, the same product was repackaged, with the new features of traceability added:

A QR code, developed with the help of the Hoover Code platform, which allows tracking and collecting data on consumer interest (e.g., scans, period, places...). Upon scanning the QR code, the consumer was redirected to a video page of the product providing information on the source, a short brief description of the making process and ingredients involved. A visual indicator of the sustainability (visually representing sustainably sourced, support to the farmers, sustainable packaging). Consumers got exposed to the current Banana chip products and the redefined version (Kechagias et al., 2024). This arrangement allowed the research to record not only proclaimed inclinations of trust, willingness to purchase, and willingness to pay but also observed actions, whether the consumer scanned the QR code, whether the scan was instant and the degree of disclosure to the digital content (Cruz & Varzakas, 2023).

Figure 3.1 below illustrates the revamped FMCG product utilized in the B2C consumer study. The packaging of the banana chips was altered in partnership with a local FMCG company to feature a functional QR code at the back of the product created with normal camera, along with an impact meter that highlights sustainability information. When consumers scanned the QR code, they were directed to a traceability video available on a social media platform, showcasing the product's manufacturing process and ethical sourcing journey. This customized product was used as the treatment condition in the experiment, as opposed to the standard product available in the market, which served as the control.

Figure 3.1: Customized Banana Chips Product with QR Code and Impact Meter Used in the Consumer Experiment

The company survey constituted the second strand of material. Administered via the 1KA online platform, it included ten structured questions covering:

- Familiarity with traceability technologies;
- Primary drivers of adoption (trust, competitiveness, regulation);

- Main obstacles (cost, supplier readiness, technological complexity);
- Practices for evaluating ROI;
- Willingness to collaborate with industry peers, non-governmental organizations, and regulators;
- The online format facilitated efficient distribution across professional networks while ensuring that responses were structured and analyzable.

3.5 Data Collection

Data collection was done in the period of July to October 2025. The survey of B2B companies was distributed with the help of professional networks and social media, and a snowball sampling approach was used to expand the area. A detailed version of survey can be found in Appendix A. The B2C consumer experiment was conducted under controlled conditions whereby the subjects were randomly assigned to either control or treatment product. After this, focus groups were carried out to enable a further analysis of consumer perceptions.

3.6 Statistical Analysis

- Company survey (B2B): The analysis was done on multiple-choice and ranking questions to determine the most common adoption drivers and barriers. The cross-country tests were conducted to measure the differences between Slovenia and India;
- Consumer experiment (B2C): The t-tests were independent samples to compare consumer responses to control and treatment products. Dependent variables were trust, purchase intention, product acceptance and willingness to pay. Descriptive analyses of behavior outcomes (QR scanning frequency, immediacy of scan, time on

page) were compared to reported results to investigate the connections between the observed behavior and self-reported attitude.

3.7 Ethical Considerations

The purpose of the study was explained to all the participants, and they were assured that their confidentiality would be taken care of. The process was voluntary, and informed consent was obtained prior to the beginning of data collection. No personal data was gathered, and the answers were kept anonymous. The research was conducted in accordance with the ethical standards of research with human subjects, such as the requirement to comply with GDPR regarding data protection.

4 RESULTS

This chapter aims at giving a clear picture and discussing the empirical results of the study. The findings are based on two complementary sources of information, i.e., the industry survey (B2B perspective) with finally 62 FMCG-oriented organization and related field of people in India and Slovenia and the consumer experiment (B2C perspective) that should be conducted using a real FMCG product (Banana chips) enhanced with the option of digital traceability. Combined, these data sources offer information on the factors that drive the organization to implement traceability systems and the impediments to their use, the consumer attitudes and actions when presented with traceability-enabled packaging.

The values used in this section are all premised on the results of the 1 KA ares platform and Own Source. The outcomes are grouped into four major sections. The first type of statistics is a description of certain trends related to familiarity, drivers, barriers, trust levels, and future expectation in both countries. Second, the results will be compared to the hypothesis (H1-H3) and the influence of traceability on trust, acceptance, and willingness to pay. Third, a cross-country comparison shows the differences and similarities in the two countries discussed here. Finally, the qualitative information obtained because of the consumer experiment and observational feedback is discussed, which helps to see the underlying cultural and behavioral problems behind traceability adoption.

4.1 Descriptive Statistics

This part is a descriptive statistical analysis of the collected survey and experimental study data. To achieve a holistic interpretation of the results, the findings are organized into two major subsections. The first subsection, Industry Survey (B2B Perspective), presents the results of business to business (B2B) survey that has ten basic questions that are focused on identifying the insights, perception and practices of the industry

professionals in relation to the research aim. The second sub-heading, Consumer Experiment Findings (B2C Perspective) contains the findings of the consumer-based (B2C) experimental study. This part focuses on consumer response, behavior and attitude analysis to further authenticate and improve the results of the fact experiment.

4.2 B2B Oriented Survey Findings

The results of ten survey questions, each examined using the 1KA survey platform, are shown in this section. The results are arranged into subsections following a thorough analysis of each question's answers. A self-made graph that illustrates and clarifies the results' interpretation is included with each segment. In order to make the presentation of findings clearer and more understandable for readers, these statistics are intended to highlight the major trends and insights discovered from the survey feedback.

4.2.1 Familiarity with Digital Traceability (Q1)

The first question in the survey aimed at determining how familiar the company was with various digital traceability solutions, such as QR codes on packaging, blockchain-based supply chain solutions, impact meters (summarizing environmental or social metrics), and certification-linked traceability solutions. The answers show that there has been a similar trend of increased familiarity and adoption in Slovenia than India. The easiest and most used tool is the QR code, which represents the smallest gap: 81% of Slovenia people claimed to know or be aware of QR codes, which points to the wide use and usage. In India, 49% of companies indicated the same whereas the rest had partial and low awareness. This brings out the fact that although QR technology is just coming to India, it has already become a normal practice in Slovenia.

When resorting to blockchain-based traceability, it becomes clear that the two markets are different. In Slovenia, 60 % of the respondents responded that they are highly

familiar and this demonstrates that firms do not just know about blockchain but are considering the potential of its use. Only 24% of the respondents in India said they were aware, and a due share acknowledged that they knew nothing, as a conciseness measure, it is described in Figure 4.1 below. Blockchain is, therefore, the most disparate area in both countries and this highlights how Slovenia businesses are more technologically advanced compared to India that is still at the nascent stages of exposure.

The same situation is witnessed with impact meters. In Slovenia, 62% of firms said that they were aware or very aware of these tools, which are indicators of environmental and social performance. Only 30 % of India reported the same indicating that most of them were at low levels of awareness. This shows the enhanced, more developed incorporation of sustainability measure into business in Slovenia as opposed to the current transition of India. Lastly, certification-based traceability solutions were not an exception: 60% of the Slovenia companies talked about high familiarity as opposed to 30% in India. It is interesting to note that almost every Indian company reported that they were unfamiliar with it, but on the other hand, Slovenia respondents showed a significant degree of familiarity. This is the way certification andccompliance systems are more internalized in the European situation and Indian companies are yet to adjust to international standards.

All in all, these results show that there is a stable cross-country trend: the Slovenia firms are more familiar with all digital traceability tools, but the difference in blockchain and impact meters is the most significant, and QR codes is the least. This indicates that Slovenia is at the stage of active experimentation and adoption whereas India is in early transition where awareness is high but institutional and technical adoption is lesser. This Figure 4.1 below illustrates survey results level of familiarity among FMCG companies with digital traceability systems such as QR codes, block chain, and impact meters of India and Slovenia responses presented as each separately into segments.

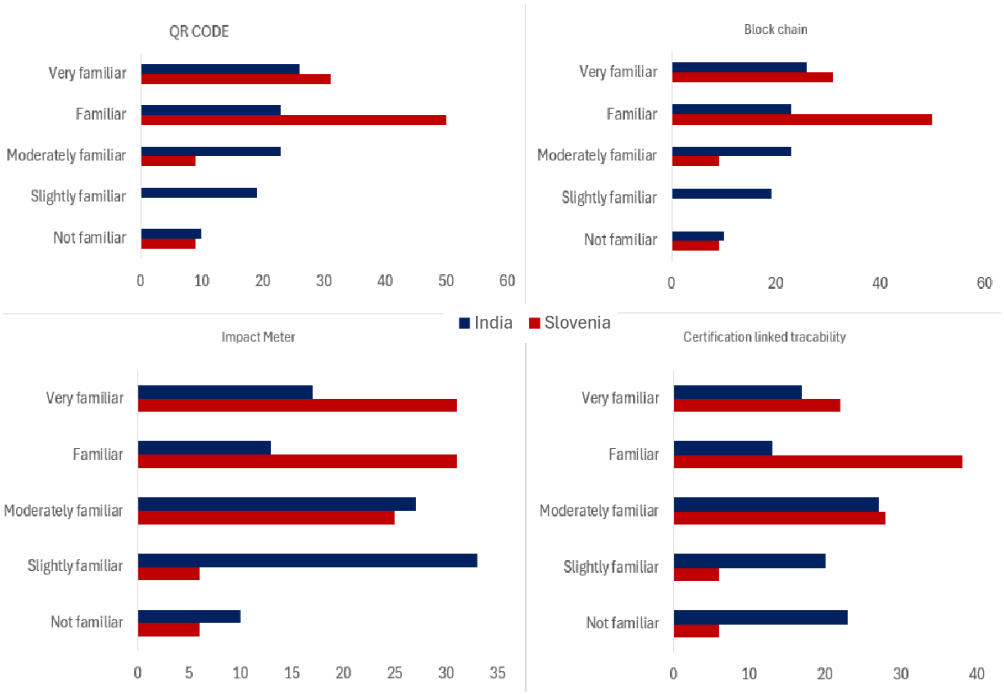

Figure 4.1: Result table of Familiarity; Digital traceability tools from 1kas platform (India vs. Slovenia)

4.2.2 Adoption Drivers (Q2)

The survey has then focused on the reason why companies are keen on using digital traceability systems. Reactions to emphasize common interests and unique market-specific peculiarities. In India, the main force is evidently to improve the consumer belief and brand recognition. Indian companies identified this as their primary reason of embarking on traceability to the tune of 73%. It means that traceability is perceived by Indian companies as a means of consumer-facing communication, as a way of enhancing company reputation and forming loyalty in the market, the credibility of brand claims is still low. Trust and credibility are also considered to be very crucial in Slovenia but a little less prevailing with 63%. In this case, although trust is a powerful incentive, it is opposed to other operational and strategic factors. Internal supply chain visibility is one such element, which is more accentuated in Slovenia (56 vs. 47) compared to India. Slovenia

companies seem to consider traceability as a consumer trust system as well as an efficiency improvement system, risk mitigation system, and internal control system. Conversely, internal visibility is not a major factor in India, but consumer trust is in the center stage. The opposite trend is observed with regulatory and compliance considerations. Slovenia (13) are less likely to emphasize that they are compelled to meet regulatory or certification requirements which is more likely to be emphasized by Indian firms (23). This is a reality that exporters in India are exposed to intense external compliance press, unlike the Slovenian firms, which are already integrated in the EU systems, as the compliance is viewed as an extension of regular operations, rather than a force. It becomes strong that competitive advantage seems to have equal weight in both countries (India 27%, Slovenia 28%), meaning that both countries consider traceability as a possible differentiator, yet not a dominant factor in businesses yet.

Lastly, the level of investor and stakeholder expectations is low in both cases with India having 13% and Slovenia having only 3% which is yet another confirmation that external financial stakeholders are still not a good influence in the uptake of traceability. These results indicate that consumer trust and compliance is the driver of Indian firms whereas Slovenia firms emphasize more on operational advantages like supply chain transparency. The two, however, view traceability as helpful, but not yet a necessary and competitive advantage. The Figure 4.2 below presents the primary motivations driving FMCG firms in India and Slovenia to consider or implement digital traceability solutions.

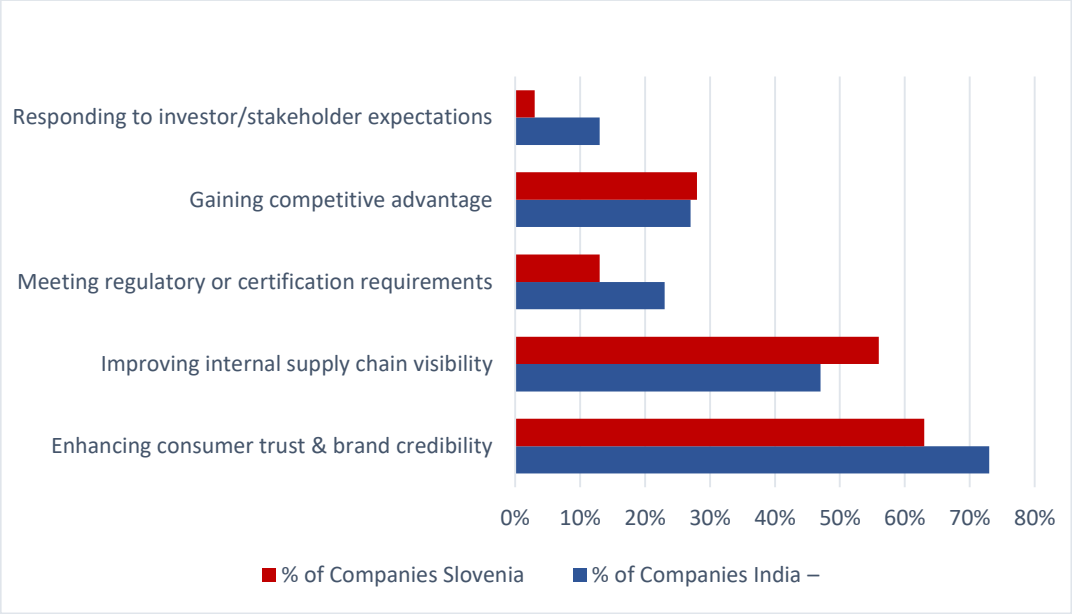

Figure 4.2: Key Drivers for Adopting Digital Traceability Systems

4.2.3 Implementations Barriers (Q3)

Although traceability, in the case, had solid ground in both countries in the category of adoption, the survey showed that there were also some barriers which slowed down or made implementation difficult. In this case, the outcomes demonstrate that there is significant dissimilarity in the character of the problems which are met by companies in India and Slovenia. High implementation costs are the most significant challenge facing Indian firms with 39 percent of the respondents citing it as their greatest challenge. This is an economical reality of a growing market where the resources distribution is required to be in terms of costs, effectiveness, and innovation. A good number of Indian firms particularly smaller ones are still skeptical about investing in technologies whose consumer value is yet to be determined. Conversely, Slovenia companies identified cost as an obstacle too (34%), although it was not so prevalent as in India, indicating that financial constraints do not play as much of a role in making decisions in the European environment.

Conversely, data integration and technological complexity became an even more imperative issue in Slovenia (34%) than in India (26%). This probably indicates that Slovenia is at a more developed level ofadoption, and the companies are faced with the practical issues of interoperability of the system and data handling. The Indian companies are still at the lower levels and they might not yet embrace these complexities in a full sense since they are yet to be embraced.

One of the most remarkable results is the sensitivity of data protection and vulnerability to exposures in Slovenia. Slovenian companies participating in survey half of them (50%), said that they feared the risk of exposing sensitive data in their supply chain, and is the only major barrier in that market. This speaks of the increased level of awareness regarding cybersecurity, privacy, and the dangers of placing proprietary business information in an online setting. This problem was also identified by Indian firms (35%). The difference implies that this challenge is being faced and emphasized more by Slovenia companies, which are more advanced in implementation.

The problem of the supplier preparedness and cooperation expressed a reverse tendency. This was noted to be a hindrance in 32% of the firms in India versus 22% in Slovenia. This indicates that the supply chain partners in India might not have the infrastructure or intention to engage in digital traceability systems, while this constitutes a bottleneck in the wider adoption. Slovenia supply chains are more involved in European structures, and seems to be more oriented towards this kind of collaboration.

Lastly, the uncertainty over consumer demand or consumer value was experienced more in India (19) as compared to Slovenia (6). This points out to a greater suspicion in India that consumers actually perceive or compensate traceability attributes. Slovenia companies, in their turn, seem to have a greater confidence in consumer demand, which could be explained by longer period of sustainability discourse and more consumer awareness.

Overall, these results indicate that cost is the greatest barrier in India, whereas in Slovenia, the greatest barriers are the data security and complexity. This is not only an

economic variation, but also the varied levels of adoption in the two markets: Indian companies find it difficult to reward the financial risk in an unpredictable environment, and Slovenia companies can face the high-tech challenges of integration and trust on digital information. This Figure 4.3 below, highlights the main challenges identified by FMCG companies that hinder the adoption of traceability technologies across both markets.

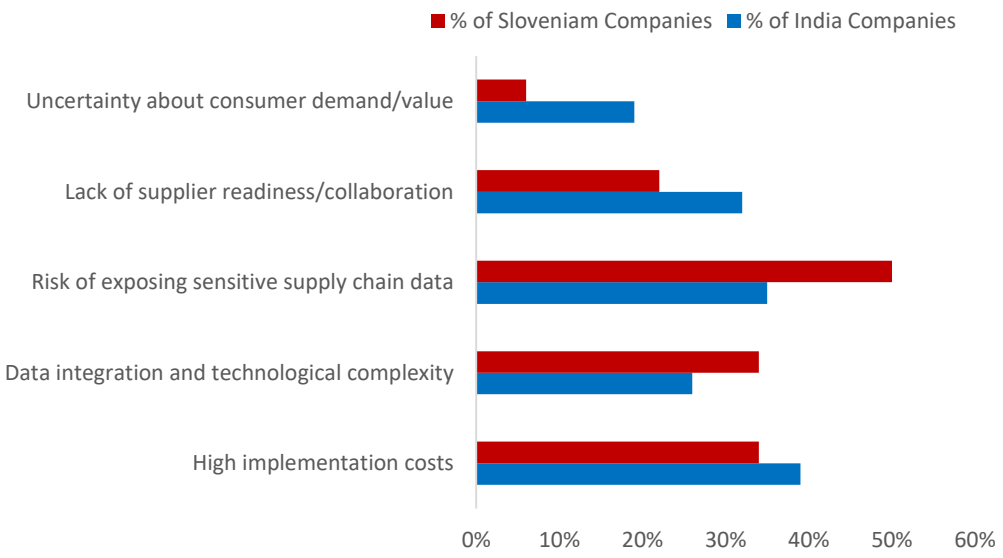

Figure 4.3: Major Barriers to Implementing Digital Traceability in FMCG

4.2.4 Value of Traceability Information (Q4)

The survey also required the respondents to give answers to what they believed were the most valuable supply chain information to share with consumers. The results show the similar focus on the product origin in the two markets, yet the differences in prioritization of the environmental and certification information. Product origin (farm/factory location) was considered as the most significant type of information by both Indian and Slovenian companies.

In Slovenia, it was rated as the most important by 55% of firms, and in India, the percentage was a bit small and stood at 50. In both countries, the lower ratings were insignificant which proved the fact that product origin is universal as a building block of consumer trust. This is because the information on product provenance is amongst the simplest and most persuasive types of traceability data and it provides an assurance of authenticity and quality.

In Slovenia, environmental metrics (carbon footprint, water usage, and packaging impact) were also rated higher because more than half of the respondents, 55% responded that they were most important, unlike 40% of the respondents in India. This indicates that the Slovenian firms better resonate with the European sustainability theme in which environmental responsibility has taken the centre stage in the consumer demands and regulatory framework.

A much more ambivalent response was observed in Indian firms where the majority of the responses tend to cluster around the moderate level of importance. This is an indication that although consciousness is rising, it is still not all over as a leading consumer requirement. The gap is even more apparent when comparing the certifications and audit results. In Slovenia, 52 percent of the firms ranked this as most important whereas only 37 percent of the firms in India ranked this as most important with 30 percent of the firms ranking this as being in the middle category. This is an indication of the higher institutionalization of the role of the certification in European markets where third-party validation is generally accepted as a key signal of trust.

In India, certification has a lower turnout of reliability which may be due to less institutional trust or less consumer awareness of certification logos. The question also contained social compliance (labor rights, fair wages) and logistics transparency (transportation routes), but both of the factors were evaluated as less significant than origin, environmental, and certification information. These dimensions were considered helpful but less important by Indian and Slovenia firms. Combined, these results show that a common priority on product origin exists globally, but with divergent priorities in

other areas. Slovenia firms place more emphasis on environmental measures and certifications as an indication of the alignment with the EU sustainability frameworks. Indian firms, in their turn, put a little less stress on these dimensions, which means that they are still in the process of the fragmented but steady shift towards institutionalized sustainability practices.

The value of various supply chain data provided via digital traceability systems is rated by survey participants from Slovenia and India, as shown in this Figure 4.4 below. A five-point Likert scale, with 1 denoting least important and 5 denoting most significant, was used to gauge the replies. The Figure 4.4 below contrasts Slovenian and Indian companies' priorities for these components. A higher concentration toward scores of 4 and 5 shows that respondents perceive these kinds of information as highly valuable for strengthening consumer trust and facilitating transparent company communication.

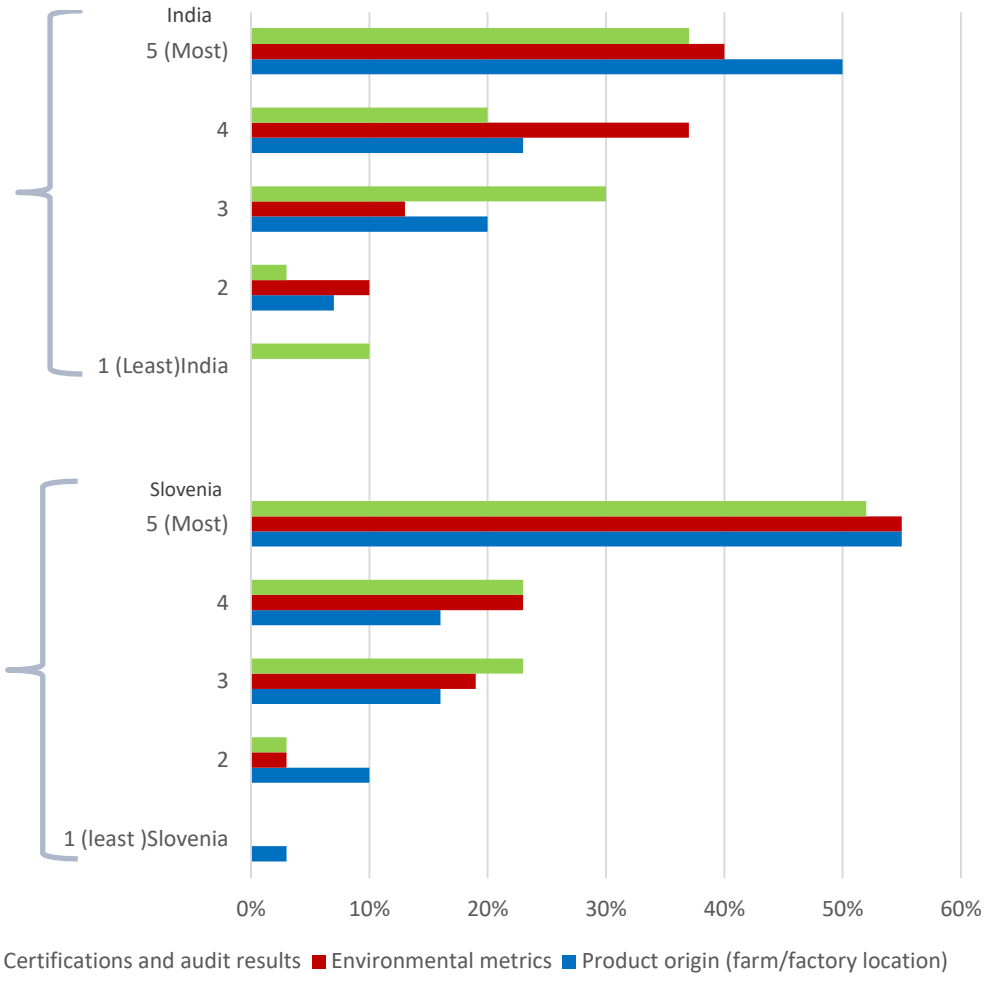

Figure 4.4: Perceived Value of Traceability Information Shared with Consumers, result of both countries (Slovenia and India)

4.2.5 Consumer Impact (Q5)

Among the most important goals of the survey was the need to learn the strength with which the digital presence of traceability features can affect the level of consumer trust and their readiness to pay a premium. The question directly relates to the main research objective of the study since it will answer whether traceability tools are effective trust signals and whether they generate a quantifiable economic value among the consumers. The findings show that both Indian and Slovenia companies perceive traceability to impact consumer trust positively and significantly with the Figure 4.5 below serving as a handsome basis of the assessment of the survey study.

Most of the respondents in Slovenia indicated very great belief in the effects of traceability. Particularly, 42 % gave it the highest rating of having the most influence (5 on the scale) and 35% of the respondents gave it a high rating of influence (4). Combined, over three-quarters (77%) of Slovenian companies said that traceability is an important source of consumer trust. This massive concurrence points out the extent to which transparency has been integrated in the minds of Slovenia consumers and that brands are not only evaluated according to the quality of their products but also the transparency of their supply chain. The Indian answers give the same though a bit more subtle account. Indian companies also were high in terms of trust impact with a strong two-thirds (66) of companies reporting the highest and 33 high rating with 33 rating 5 or the highest and another 33 rating 4. But India recorded a greater proportion of mid-level answers than Slovenia with 27 % rating it as a medium factor (3). This implies that although traceability is perceived as a significant source of trust building by Indian companies, there is more variation in the perceptions such that not all companies are convinced of its criticality.

The first reason could be that the Indian customers, despite their growing consciousness of sustainability, are a more price-conscious group and do not necessarily need complete transparency in their purchases across the board. A more distinct difference between the two countries appears when it comes to the willingness to pay a premium. In Slovenia, rating consumer willingness to pay extra, 30% of companies rated most influence (5), and 40% rated it highly (4). This implies that 70 % of the Slovenia companies think their consumers would pay higher on traceable products which gives them a good business case to invest. Indian companies on the contrary were not so optimistic.

Consumer willingness to pay was rated high at 5 by only 17% and 4 by 40% and a significant 37% rated as 3. This indicates more of the uncertainty about whether consumers in India would be able to convert the interest in traceability into the spending behavior in India. In general, the results of this question are strongly indicative that traceability tools have a common perception of improving consumer trust in both of the markets, but they have a stronger impact on the willingness to pay in Slovenia when compared to India.

Pragmatically, it means that whereas the Slovenia firms can count on the traceability as a way to not only make their credibility stronger but also to help them make a better case as to why they should charge premium prices, the Indian firms would face a greater challenge in convincing the consumers to pay higher prices despite the trust advantage. The findings of these studies give first-hand support to the first hypothesis (H1) that products, which have traceability capabilities, lead to greater levels of consumer trust. They too partially confirm the third hypothesis (H3) of indicating that the transparency on environmental and ethical effects has a positive impact on willingness to pay, although it is important to note that willingness in cultural and market backgrounds differ to a great extent. This Figure 4.5 below summarizes business perceptions of how traceability features influence consumer trust and their readiness to pay a price premium for transparent products.

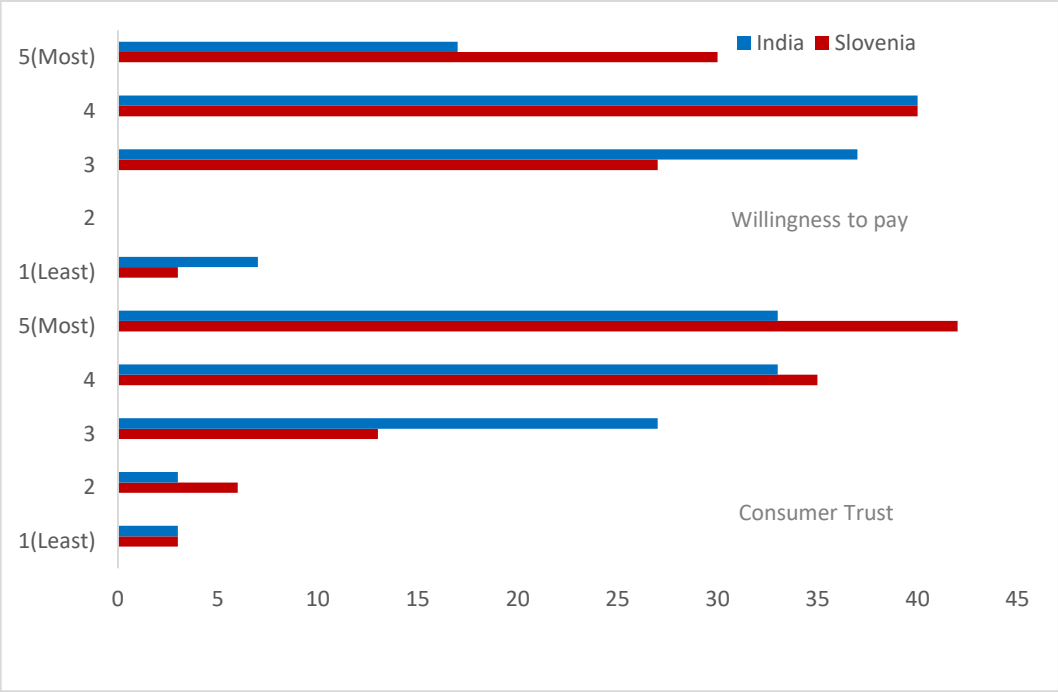

Figure 4.5: Influence of Traceability on Consumer Trust and Willingness to Pay a Premium

4.2.6 Market Differences (Q6)

Another question incorporated in the survey was the reflection of the participants as to whether there was a significant difference in consumer acceptance of traceability across different markets especially between the developed and the emerging economies. The answers showed that there were very bright trends in the way the companies respond to the drivers of acceptance, and that there were clear differences in the responses of the Indian and Slovenia firm. In the case of Indian respondent, increase in consumer awareness and expectations in the developed markets was most commonly cited as a factor why acceptance varied in 53% of respondents. This means that the traceability acceptance among Indian companies is linked with the increased awareness among the people in Europe and other developed economies that have all the time talked of sustainability and transparency. Comparatively, Slovenia firms have only chosen this factor (26%), which implies that in Slovenia, awareness is regarded a key factor but not the major cause of cross market diversification.

The tighter regulation and legal requirements were also more prominent in India (43%) compared to Slovenia (32%). This result also displays the viewpoint of India as a nation that tends to export to the developed markets, where the strict adherence to high standards is required to gain access. Slovenia firms that are already members of the harmonized regulatory regime of the EU seem to think that regulation is not as a distinguishing feature because regulation is part of their minimum operations. Conversely, Slovenia (55%) proved to be more price sensitive in the emerging economies than India (33%). Although Indian firms, which are active in such an environment, perhaps under the influence of price sensitivity, somewhat underrate such factor, Slovenia firms view that less affluent market consumers hesitate to pay any additional for having traceability features.

Other new knowledge was poor digital tools accessibility in emerging markets, regardless of being more applicable in Slovenia (23%) than in India (7%). This implies that Slovenia companies are more concerned about the technological gaps between consumers in cheaper areas, whereas Indian ones are not as concerned with the effects of digital disconnection, possibly due to the fact that their domestic customers are quickly moving towards smartphones and mobile applications. Combined, both types of findings signify that acceptance differences among Indian companies are influenced by external elements such as regulation and consumer awareness in the developed market, and that Slovenia companies emphasize internal market limitations such as price sensitivity and access to digital. This will be a useful background in understanding how companies within each of the countries align their plans with by tracing them. The Figure 4.6 below compares company perspectives on how consumer acceptance of traceability differs between emerging and developed markets.

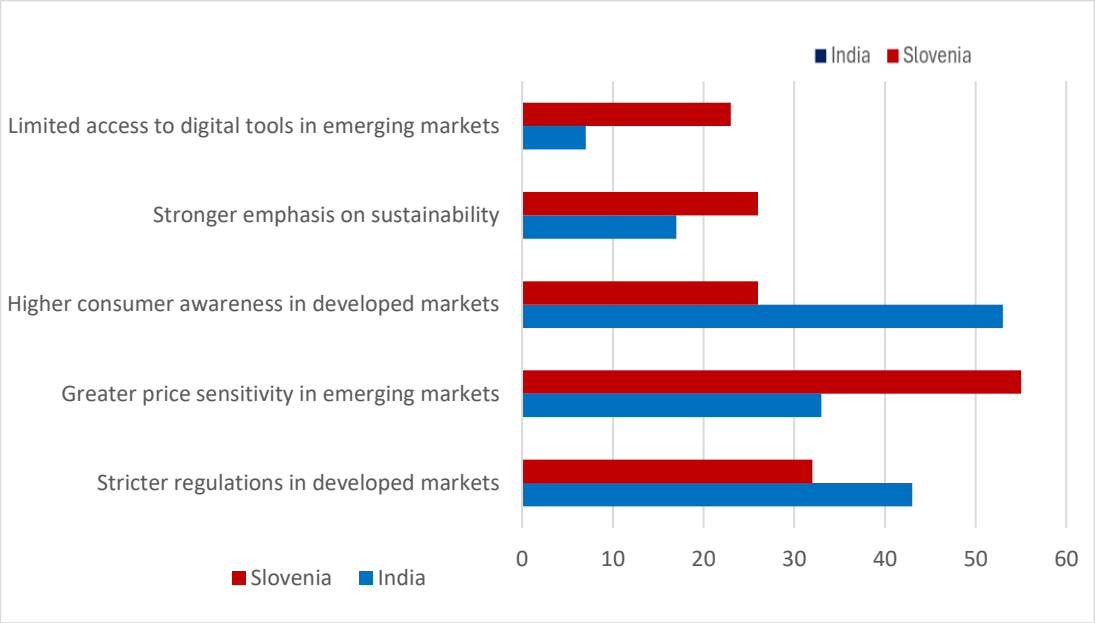

Figure 4.6: Perceived Market Differences in Consumer Acceptance of Traceability

4.2.7 Business ROI of Traceability (Q7)

The findings indicate that the sales growth is regarded by both firms in the two nations as the most evident consequence, but they vary regarding the relative weight given to compliance, reputation, and efficiency. Top ROI indicator in the case of Indian firms is more sales and market share and 48% of companies choosing this as the main return. It is an indication of the market-oriented nature of the Indian companies, as the effectiveness of traceability investments is directly measured by the increase of revenue and competitiveness. On the same note 32 percent of Indian companies valued stronger brand image and loyalty as a payback that they have a possibility to view traceability as a differentiator within a saturated market. Slovenian companies, although sales growth is highly ranked as well (45%), give more

consideration to risk management and compliance, as 39% identify this as one of the crucial ROI. This implies that Slovenia companies attach importance to traceability as a means to secure a competitive advantage in the market, rather than simply due to the

commercial prospects it offers, but because it can be used to mitigate regulatory risks, reputational risks, or supply chain risks.

The reputation of the brand was also valuable, but a bit lower than in India (29%). Interestingly, in the two countries, a significant percentage of firms acknowledged not to measure ROI in order to trace it out 23 in India and 19 in Slovenia. This observation underscores the fact that although businesses are aware of the possible advantages associated with traceability, most are yet to have formal structures of assessing the financial consequences of the practice.

Lastly, operational efficiency and cost savings were the lowest in both situations with percentages being very low that mentioned it as a main return. These findings imply that sales and branding are the most common metrics of Indian companies of ROI whereas Slovenia companies focus on the commercial and risk management returns. Combined, this points out that the perceived value of traceability is a variable that depends on the business environment and maturity level of the market. This Figure 4.7 below outlines how FMCG companies currently evaluate the return on investment of implementing digital traceability systems.

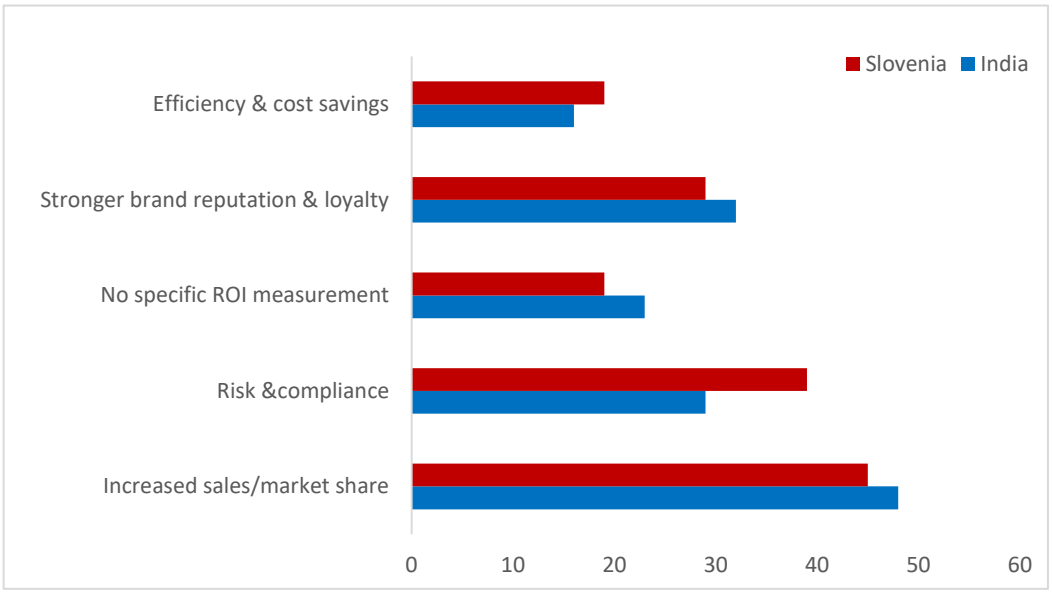

Figure 4.7: Measures Used to Evaluate the ROI of Traceability Systems

4.2.8 Trust in Verification Mechanisms (Q8)

A significant aspect of the adoption of digital traceability is the way in which companies evaluate the validity of various verification mechanisms. Unless businesses themselves put their trust in the sources of traceability data, they are not likely to trust consumers. According to the survey findings, there is convergence in this aspect as well as divergence between the Indian and Slovenia firms. The most convincing result is the overall overwhelming prevalence of independent certification bodies as the most reliable verification channel. In India and Slovenia, the majority of firms (60 and 61 % respectively) chose the option (In both countries). This demonstrates that despite different settings, businesses still believe that the best way to establish a system of authenticity is through the recognized certification bodies like Fair Trade or Rainforest Alliance. This outcome can be attributed to the international acceptance of third-party certifications and the belief that external audit is more significant than internal assertions.

The place where divergence arises is the place of block chain and other non-tamper digital systems. Firms in India were much more confident about them with 33% indicating trust in blockchain in comparison with Slovenia which is 26%. This can be a sign that India is more familiar with the digital solutions at large as it is an industry with a high IT industry and high rates of digital adoption, which means that companies are more likely to entrust technological validation. Being used to blockchain, Slovenia companies seem to be more conservative concerning their trust in new digital systems to be trusted in comparison with traditional ones.

Independent media and watchdog organizations, on the other hand, were more believed in Slovenia (32%) than in India (30%). This result indicates that Slovenia companies, where the culture of a strong civil society and active organizations of the watchdog is present in Europe, are more willing to turn to external inspection. The Indian companies, in their turn, seem to focus more on technological solutions and certifications rather than on the media regulation.

Lastly, the reports and auditing of the company was constantly rated as the least credible mechanism, and the number of people trusting it was only 20 % in India and 16 per cent in Slovenia. This points to the fact that self-reporting is widely regarded as inadequate to build credibility, which supports the necessity to confirm it independently. Overall, the findings can be summarized as having a twofold nature in that, although third-party certifications are still the benchmark of trust, Indian companies are more receptive to blockchain, whereas Slovenia companies are somewhat more prone to independent societal regulation. In both markets, though, self-reporting is regarded as inefficient, and verifiable and independent traceability credibility mechanisms are important. The Figure below 4.8 illustrates which verification methods elements like blockchain, certifying bodies, or corporate audits are thought to be the most reliable for guaranteeing accurate traceability data.

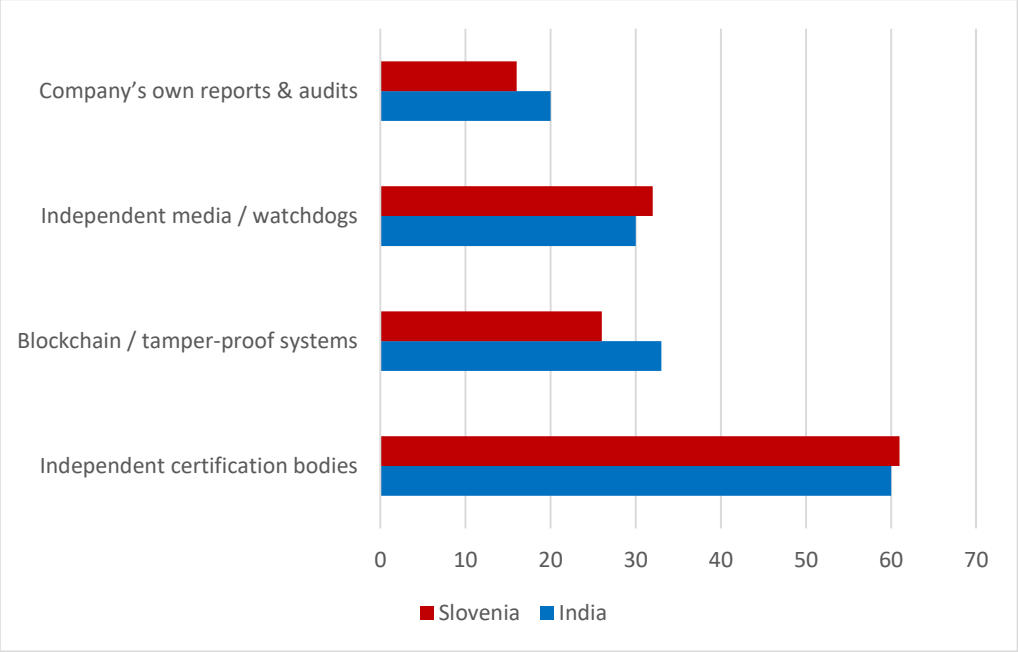

Figure 4.8: Trusted Sources for Verifying Traceability Information

4.2.9 Willingness to Collaborate (Q9)

The key to the effective application of traceability is collaboration because no company can obtain full transparency without involving peers, regulators, and non-governmental organizations. The questionnaire discussed the readiness of the firms to cooperate with various actors, and the findings revealed that there are positive indicators as well as disparities between the two markets. Slovenian companies were more than willing to cooperate with regulators, 76 % of companies rated their willingness with the scale of 4 or 5. This is indicative of the relevance of regulatory agencies in the European setting where state regulation and legal frameworks are put at the centre of defining supply chain practices. Slovenia companies seem to understand that their compliance with regulators is not only efficient to conform to certain standards, but it also helps to create some standardized traceability systems within the industry. The Indian firms were also willing to cooperate with regulators, albeit on lower levels (56% rated 4 or 5), with a majority of the responses concentrated in the neutral mid position (40%). It indicates a more conservative or ambivalent approach to government intervention, perhaps because of the view of the complexity of regulation or incompetence.

Slovenian firms were more eager to collaborate with peer companies in the industry, as 61 % acted the willingness with high levels of willingness. The Indian companies were more reserved as a large number (45 %) were neutral (rating 3). This shows that, Slovenia firms consider collaboration with their peers as a way of standardizing their practice, but Indian firms might still consider competitors as their rivals and not as partners in ensuring traceability.

The same trend was observed in the case of NGOs. The level of willingness to cooperate with NGOs was high in Slovenia with 45 % of companies indicating that they were willing to cooperate with the organizations, but a significant minority (38 percent) also showed neutrality. In India, the attitudes were even more reserved with 54 percent of the neutrality and only 35% of high willingness. This implies that NGOs are not universally

regarded yet, as important traceability partners in India where business-civil society relations are not so advanced as in the European context.

In general, the findings indicate that Slovenia firms are more collaboratively oriented through all the actors, particularly the regulators and peers whereas, Indian firms are more reserved and neutral. This disparity points to the role played by institutional environments: in Europe, collaboration is considered as a precondition to successful traceability whereas in India it is still an emerging cultural and strategic practice. The readiness of FMCG firms in Slovenia and India to work with various stakeholders, including regulators, NGOs, and industry peers, to adopt standardized digital traceability standards is seen in this Figure 4.9 below.

A five-point Likert scale, with 1 denoting the least willing and 5 denoting the most willing, was used to gauge responses. With the Figure 4.9 below which represent on the scale of 1 from the least towards 5 as the most willingness levels in the two nations are shown in the chart. Stronger openness to cooperate is indicated by higher scores towards 4 and 5. Due to their more sophisticated sustainability infrastructure, Slovenian businesses typically exhibit higher levels of involvement with all three stakeholder groups, especially with regulators. Indian firms demonstrate moderate willingness, with stronger collaboration interest seen toward industry peers and NGOs, aligning with an emerging market adapting to traceability integration.

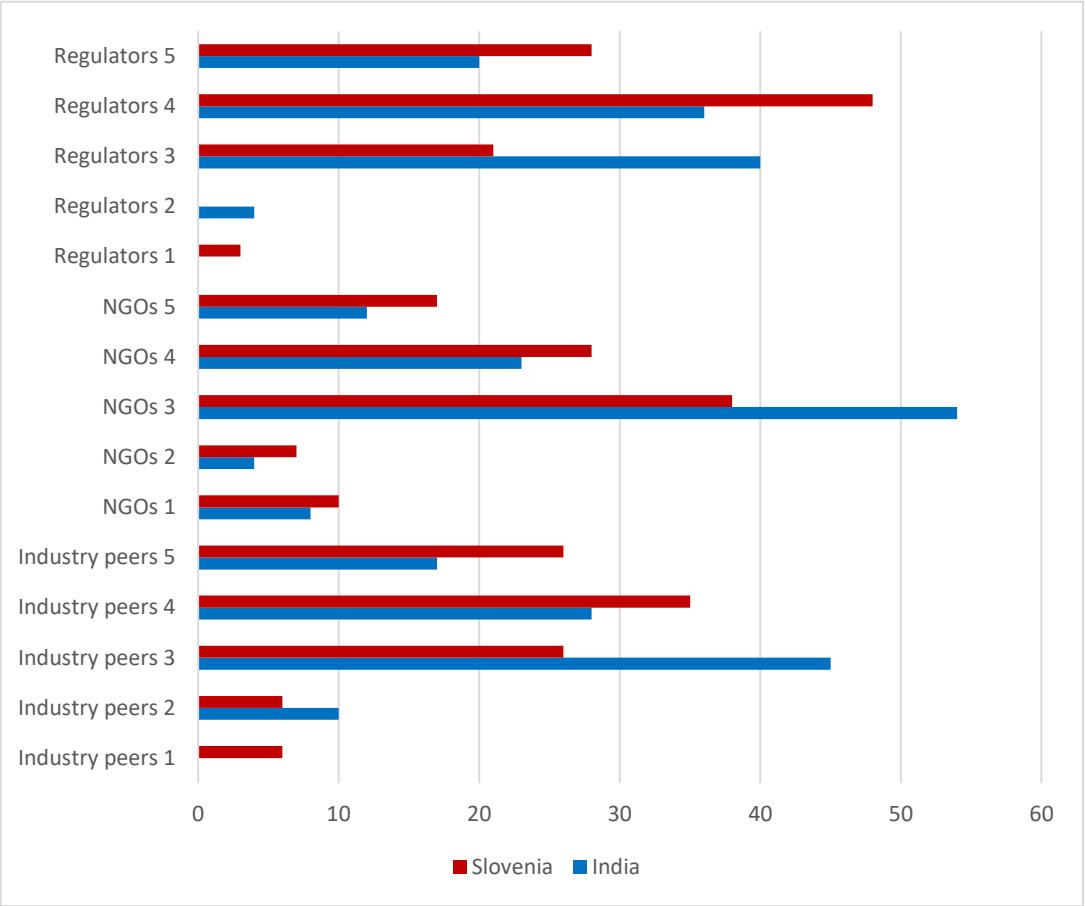

Figure 4.9: Willingness to Collaborate with Stakeholders on Standardizing

4.2.10 Future Outlook (Q10)

The last survey question involved future prospects of investment in digital traceability where companies were requested to give their visibility of how they were willing to invest in various time-horizons. The findings indicate that there is a distinct dissimilarity in the pace and the urgency of adoption between the two nations. Slovenian firms showed more willingness to invest on short term basis. 38 percent said that they intend to invest in the next 12-24 months, which is half of that in India. This indicates that Slovenia companies are setting up almost imminent implementation, which is indicative of the maturity of their regulatory and consumer environments, which need sifters' comparison, Indian businesses had a higher confidence in the medium-term horizon.

Approximately 31 % indicated probability of investment in 3-5 years, and 22% in Slovenia. This means that Indian companies are keen on slow adoption route whichcould be attributed to cost factor, the necessity to develop consumer awareness, and time to integrate technology.

Taking a longer-term perspective (5+ years), it was indicated that long-term adoption is more prevalent in Slovenia (28% and India 16%). This implies that Slovenia companies are actively looking to start fast but also large proportions are looking to scale longer term to match investments with the strategic business cycles. Interestingly, traceability had already been invested by a small percentage of firms in both countries. India disclosed even a little greater current adoption of 13% as opposed to Slovenia at 9%. This indicates the existence of early adopters in India especially bigger or export-based firms which are subjected to international compliance pressures. Combined these results suggest that Slovenia firms are more urgent in shifting towards traceability in the short term whereas Indian firms are go-slow and approach traceability in the medium term. The findings indicate the situation where cultural and financial backgrounds may have a significant influence on the pace of investment: in Slovenia, regulatory congruency and customer demands stimulate faster development, whereas in India, the cost factor and the step-by-step process of awareness make the process slower. This Figure 4.10 below represents the company expectation and plans for upcoming investments in scalable digital traceability technology over the next three to five years.

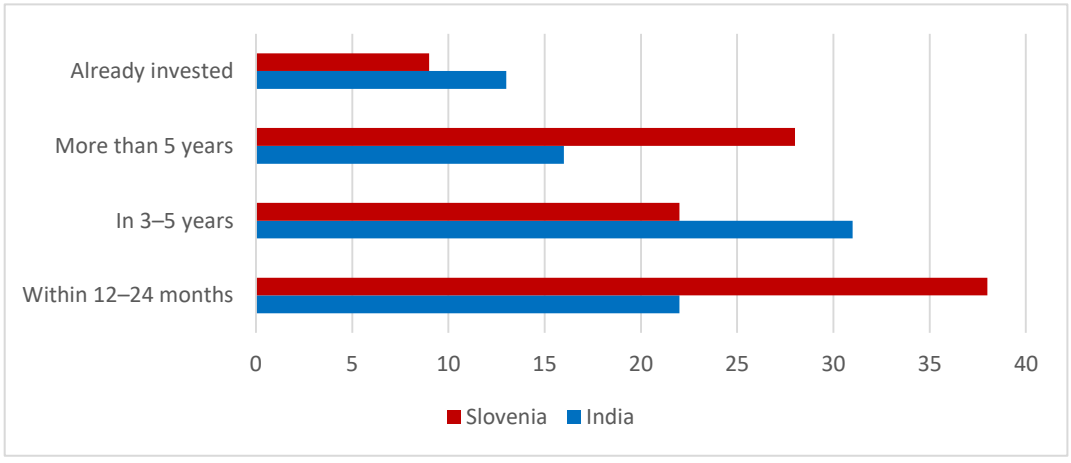

Figure 4.10: Future Investment Intentions in Digital Traceability Solutions

4.3 B2C Consumer Experiment Findings

To supplement the industry survey, a consumer-oriented experiment was conducted in partnership with an FMCG company. The experiment entailed a modification of their current product Banana chips by changing the packaging to include a QR code and digital impact meter to the banana chips. Consumers were then introduced to two different versions of the product, the standard packaging and enhanced traceability packaging. The participants were requested to make realistic purchases decisions simulating a retail purchase decision.

There was a total of 200 consumers (100 in India and 100 in Slovenia). The findings are well-founded regarding the responsiveness of the consumers to the traceability characteristics in practice. The image below (Figure 4.11) is analysis dashboard generated by the hoover code platform , which was used to host and trace the QR-based traceability video in the consumer experiment.

The line graph represents the trends of Banana chip product sales as well as the corresponding scans of QR that were registered during the experimental period. The high points in the timeline represent the instances of high levels of consumer activity in the QR-enabled packaging and indicate that more people are interacting with it after in-store promotion. The dashboard also displays overall scan counts and regional breakdowns in that there are 97 scans in Slovenia and 72 scans in India.

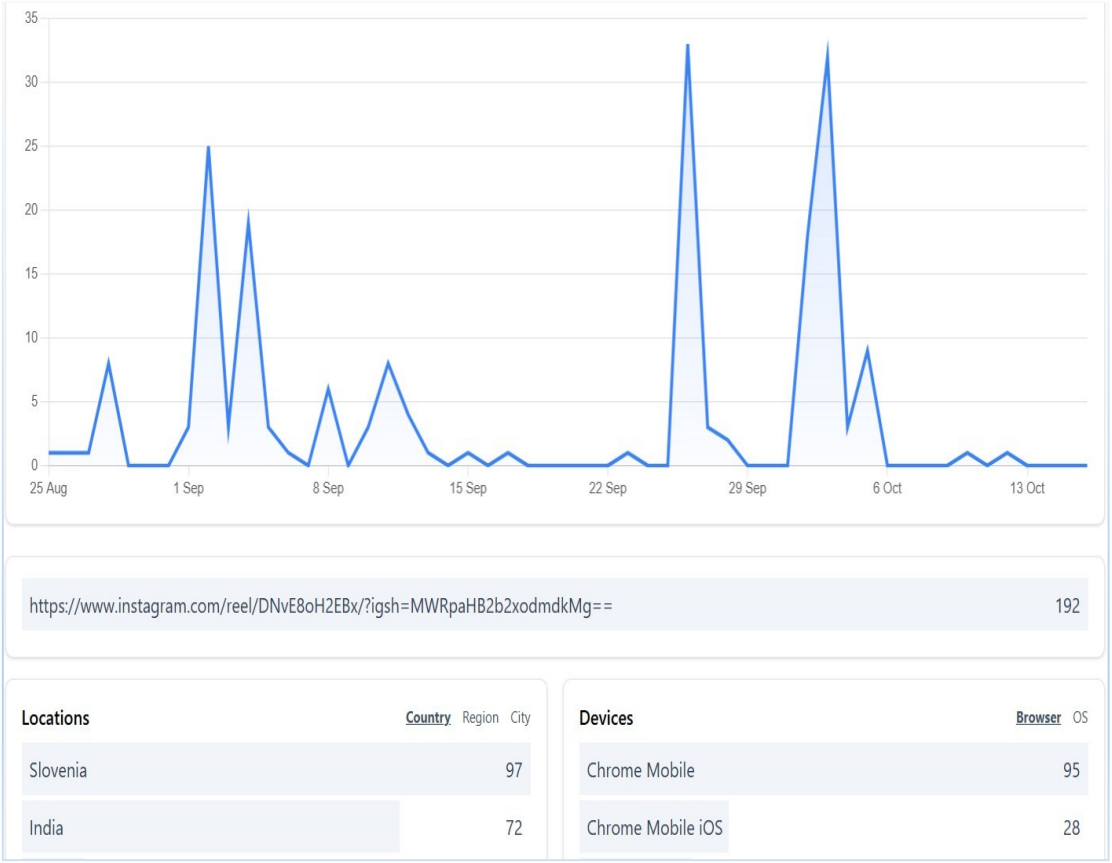

Figure 4.11: Hoovercode Analytics Dashboard Showcasing QR Scan Activity (India vs. Slovenia)

These Figures are very similar to the trends in purchases, with the observation of Slovenia consumer engaging and accepting the traceability-augmented product more. The link that can be seen in the console is to a short social media video that was made during the experiment and that highlighted the mode of making the banana chips and source ethicality of the chips. Overall, this picture serves as an online record of actual consumer behavior, which confirms that participants used QR functionality and proves the behavioral results mentioned above. The outcomes in Slovenia were dramatic. The respondents out of 100, 87 chose the QR-enabled product and individuals preferred the QR-enabled product to the standard product. Besides, over 90 percent of the respondents scanned the QR code on the spot, either to preview the information about the products or to preview the traceability functionality after making a purchase. Such

an action proves to be highly accepted as well as highly engaged because consumers did not hesitate to interact with the digital tool. The results indicate that Slovenia consumers consider traceability as an important indicator of reliability and sustainability and that they will be ready to repay such transparency through their buying behavior.

The results were also favorable but less accentuated in India. Among 100 respondents, 70 people bought the QR-product version, and 30%. bought the standard version. Out of the people who came across the traceable packaging, more than 63 percent scanned the QR code immediately indicating curiosity and interest. Nevertheless, a more significant percentage of Indian consumers chose the standard product when in comparison with Slovenia, which indicates that traceability was a beneficial factor, but price- sensitivity and purchasing behavior remained influential in decision-making. In making a comparison between the two nations, it is seen that the adoption ratio is about 1.3:1 in Slovenia favoring it. In other words, 10 buyers in India who purchased the traceability-enhanced Banana chips meant that 13 people in Slovenia did the same. This means that the demand in Slovenia was 27-30 % more than in India. The experiment provided not only numerical results but also some significant behavioral discoveries.

Consumers in both markets were curious in that they scanned the QR codes virtually instantly. But in Slovenia, scanning behavior was more closely related to purchase decisions whereas in India, a subset of consumers scanned because they were interested but chose the lower-priced standard product. This insight underscores one of the main cultural distinctions crucial to note: the Slovenian consumer is more trust-oriented and sustainability-minded whereas the Indian consumer is more economically minded and tends to weigh the indicators of trust against price. These are very crucial findings to the research objectives. They show that digital traceability features may have a direct effect on the consumer behavior, which confirms the survey findings and offers the behavioral evidence. Meanwhile, they affirm that the effect is moderated by the cultural and market environment, and Slovenia consumers are more accepting and willing to adopt new transparency tools than their Indian counterparts.

4.4 Cross-Country Comparison

The comparison of the two countries, India and Slovenia, provides notable information on the impact of the cultural, economic, and regulatory landscapes on the adoption and perception of digital traceability in the FMCG sector. Although both markets believe in the necessity of transparency, they differ in terms of the focus, barriers, and consumer behavior.

4.4.1 Acquainted with Digital Traceability

The initial source of difference is the knowledge of organizations on traceability systems. Slovenia enterprises reported a significant awareness of QR codes, blockchain, and impact meters than Indian companies. As an example, Slovenia respondents were found to be 81%.knowledgeable with QR code (49% in India). Equally, 6 out of ten Slovenia enterprises noted that they were conversant with traceability blockchain, unlike 24 out of ten Indian respondents. This indicates that the Slovenia business environment is more advanced with regards to regulatory and market environments where such technologies are already widespread whereas India is in the initial stages of technology adoption.

4.4.2 Adoption Motivating Factors and Adoption Hurdles

Consumer trust and brand credibility were the main drivers to adoption (73% among Indian businesses, 56% among Slovenia firms), and internal supply chain efficiency was also seen by the latter as a key driver (56%). This implies that, traceability in India, is more perceived as a tool to promote the external legitimacy, and in Slovenia, it is also an internal management and compliance tool. In terms of barriers, the aspect of implementation costs (39% and the willingness of suppliers (32%)) was raised more by Indian companies, indicating the presence of structural and financial challenges that are inherent in the emerging market. On the contrary, Slovenia companies were more

concerned with the data sensitivity (50%), and technological integration (34%), which is indicative of them being more developed in their adoption process and therefore facing more complex issues. It means that the first stage of adoption in India is hindered whereas in Slovenia it is hindered by the same optimization and data governance concerns.

4.4.3 Perceived Importance of Traceability Information and Its Effect Consumer's Willingness to Pay

The most important information was found to be product origin when both markets were evaluating the information that will have the greatest weight to consumers. Nevertheless, in Slovenia, more than half of the firms rated environmental metrics and certifications to be the most important, which is much more than the 40 and 37 % ratings of the environmental metrics and certifications in India, respectively. This indicates that the Slovenia companies and consumers are more concerned with sustainability and verification, whereas Indian businesses are more concerned with the traceability of the essential products (where the product originated).

The two countries acknowledged that traceability features would improve the level of consumer trust, though at varying levels. Over 77 % of the companies in Slovenia valued the contribution to the trust very highly and in India the Figure was about 66%. Interestingly, the amount of a premium that would be paid was quite different: 70 % of Slovenia firms thought that people would pay an extra in order to have traceable products, and in India only 57% of the respondents agreed with this idea. This difference can be characterized by more sophisticated and sustainable orientation of consumers in Slovenia, in comparison with a more price-sensitive Indian market.

4.4.4 Factors market-specific and trust in the mechanisms of verification

As Indian respondents were asked about the differences in consumer acceptance between markets, they observed that the developed countries are more aware and have stricter regulations compared to Slovenia respondents who identified the effect of the price sensitivity in the emerging markets. This highlights the approach to care about the fact that Indian companies seek the more developed markets to follow suit, and the Slovenia companies perceive the obstacles to adoptability primarily in the perspective of less developed market affordability. The two countries specified that they trusted independent certification organizations most, and some 60 percent of them felt confident. However, Indian companies were more willing to use the blockchain-based solutions with 33 % believing in these systems than Slovenia with 26%. This may reflect on the strong IT orientation in India and its readiness to adopt digital innovation. Slovenia companies, on the other hand, had a relative high confidence in independent media, or watchdog bodies, at 32, which is a key feature of their institutional structure.

5 DISCUSSION

5.1 Analysis of Findings

The findings of this research clearly indicate that digital traceability elements like QR codes and impact meters significantly influence consumer perceptions, trust levels, and purchasing choices within the FMCG industry. By merging survey data from companies with consumer experiments and qualitative observations, the study offers strong evidence that traceability is not merely an optional technical feature but a critical factor that affects consumer behavior and business strategies.

5.1.1 Traceability and Trust Development

One notable finding made in India and Slovenia is that the traceability tools build consumer confidence. The results of the survey showed that companies have a strong belief in the connection between QR codes and traceability platforms with increased credibility and reliability. This assumption was observed to hold in the consumer experiment, in which a significant portion of the Slovenia participants preferred the product with traceability capabilities, as well as a substantial percentage of the Indian participants showing a definite preference to the same. This recommends that transparency breeds trust, which reinforces the vitality of traceability in sealing the credibility gap as a result of greenwashing. To the consumers in Slovenia, this trust was associated with sustainability and ethical principles, whereas Indian consumers were more associated with authenticity and product safety. This distinction highlights the cultural setting of trust which is influenced by the local consumer problems and expectations.

5.1.2 Consumer Acceptance and Market Context

The study shows that the acceptance of products that are added with traceability is generally high but the acceptance depends on the extent. The acceptance was almost universal in Slovenia and 87 % of the consumers choose the traceability-enhanced Banana chips. In India, acceptance remained high at 70, but a higher level of consumers chose the ordinary product with affordability being one of the most important reasons. This justifies the fact that although consumers appreciate the value of traceability, their buying behavior is influenced by economic and cultural aspects. Traceability fits consumer expectations easily in the developed markets such as Slovenia where sustainability talks are widely incorporated. In emerging economies, however, such as India, where price sensitivity is the common denominator, traceability has to compete with cost issues, which constrain its general impact. The findings about the disposition to pay also depict this cultural difference. Slovenia companies and consumers mostly said traceability should be associated with a higher price, but the Indian actors were not so convinced. Even though interest and involvement in the use of QR code in India was high, it did not necessarily translate to a readiness to pay more. This implies that traceability can be an important tool of fostering trust in price sensitive markets and is not necessarily to bring higher revenue. Nevertheless, with the increase of awareness and traceability, which becomes more familiar with time, the willingness to pay can be increased.

5.1.3 Business Perspectives on Adoption

The drivers and barriers to adoption were different in diverse settings as viewed through the business perspective. According to the Indian businesses, consumer trust and brand reputation became the driving force, and supply chain effectiveness and regulatory compliance were the priorities of Slovenia companies. Similarly, Indian companies were more prone to the issues of costs and the willingness of suppliers, unlike Slovenia companies, which cared about the privacy of data and integration complications. It

means that the adoption in emerging markets is slowed down by the underlying issues (costs, infrastructure), whereas the mature markets struggle with the issues concerning the optimization of the system (data governance, interoperability).

5.1.4 Behavioral Engagement with QR Codes

The major finding was that the degree of interaction with QR codes was substantial in both settings. Over 63% of the participants did not delay scanning the QR code even in India, as there is high price sensitivity. This means that consumers are willing to use digital tools, which would mean that engagement is not a challenge in itself. The actual problem is how to convert the interest into loyalty and the purchase behavior. This has already been evident in Slovenia where scanning behavior is directly connected to purchases. Thus, the results have shown that traceability leads to trust (H1 supported), increased acceptance in both regions, albeit at different levels (H2 supported) and a positive effect on willingness to pay, but with a greater influence in Slovenia than in India (H3 partially supported). Besides, the findings highlight the mediating role of cultural and economic systems: traceability in Slovenia means sustainability and ethical consumption, whereas in India, it is perceived in terms of safety, genuineness, and affordability. Digital traceability is, therefore, not just a technological change, but a cultural signifier, the effectiveness of which depends on the correspondence to the beliefs of consumers and market forces.

5.2 Hypothesis Testing

(H1-H3) Hypotheses dealing with the effects of digital traceability feature on consumer trust, acceptance, and purchasing behavior in India and Slovenia, this study presented three hypotheses (H1-H3). The results of hypothesis testing are provided in the next section based on the data of the survey (B2B) and consumer experiment (B2C).

H1: There will be marked high levels of consumer trust of products with traceability tools (QR codes and impact meters) than the same products without the traceability tools.

Based on the survey results, both India and Slovenia companies had a consistent report to the effect that the traceability attributes had a positive impact on consumer trust. At the place of Slovenia 77 % of the respondents rated the impact of traceability on trust at level 4 or 5 (out of 5), and in India, 66 % of the respondents rated it with the same level. This shows that there is widespread awareness amongst businesses that traceability is a tool of instilling trust by the consumer.

Additional behavioral support is found in the consumer experiment. The traceability-enhanced Banana chips were bought by 87% of respondents in Slovenia, and more than 90% of the respondents scanned the QR code at the moment. In India, 7 out of 10 people preferred the product with the traceability and 63 out of 10 scanned the code. This shows that consumers not only voiced but also took action on greater trust on products which were transparent.

Based on research results, we can that traceability features enhance consumer trust and increase credibility perception that traceability features enhance consumer trust and increase credibility perception.

H2: The level of consumer acceptance on the traceability enhanced products will be very high in both India and Slovenia but the level of the same will vary in the two markets because of the differences in the cultural, economic and market maturity.

The findings also back H2.It was found in the survey and the experiment that consumers in the two markets were interested and willing to accept products that had enhanced traceability, but the levels of acceptance varied considerably. The Slovenia companies in the survey were more confident in the consumer willing to pay a premium price on traceable products (70% high ratings) when compared to 57% in India. On the same note, the experiment recorded more acceptance in Slovenia (87% buy rate) compared to India (70%).

The difference is in the cultural and market-specific factors. The embedded Slovenia consumers, who reside in a European landscape with a more discourse of sustainability emphasized traceability more. Indian consumers, on the contrary, were more price sensitive, as some of them would scan QR codes out of curiosity but would still purchase the lower priced standard product.

This goes in line with the second section of H2: as traceability enhances acceptance in both countries, the effect is greater in Slovenia than in India.

H3: Transparency on environmental and ethical effects will positively and significantly affect customer willingness to pay more.

The H3 evidence is partially supported. Slovenia companies in the survey expressed more confidence that consumers are willing to pay more based on the feature of traceability in their products with 70 percent of the respondents rating high (4 or 5). In India, on the other hand, only 57 % said they had such expectations, and a large percentage (37) said they were neutral.

This difference was also manifested in the consumer experiment. Although a significant portion of Indian customers scanned QR codes, not every one of them was turning this action into readiness to pay more, frequently referring to the affordability as the variable. On the contrary, Slovenia consumers were willing to scan as well as to be willing to justify higher perception of value of the traceable product.

Therefore, H3 is accepted in Slovenia, but with a certain degree of indeterminacy in India, which makes it apparent that readiness to pay is a culturally in-between concept: European clients are more inclined to be compensated through transparency with a larger budget, whereas Indian clients still balance sustainability with price insensitivity.

5.3 Comparison with Existing Literature

The findings of the present study are consistent and even extend the existing body of knowledge on ethical sourcing, consumer trust, and digital traceability. The study sheds light on both universal and context- specific factors of traceability implementation in the FMCG industry by comparing the information on India and Slovenia.

5.3.1 Ethical Sourcing and Consumer Trust

Previous studies have repeatedly emphasized the importance of ethical sourcing as one of the ways to improve consumer trust and strengthen brand reputation. This investigation helps justify those results, as well as add a new twist to the issue as the example of digital traceability tools as an effective means of proving ethical sourcing arguments. As per Triple Bottom Line (TBL) framework developed by Elkington (1997), which emphasizes the need to have a balance of economic, social, and environmental accountability, the findings suggest that traceability systems render the sustainability assertions more tangible and understandable by consumers. The consumers in Slovenia equated trust with the environment and ethical issues whereas in India the equated trust with safety and authenticity (Tran and Khoa, 2025). This fact is reminiscent of the results which pointed to the cultural contextualization of trust as an issue that defines how consumers interpret sustainability information.

5.3.2 Greenwashing and Credibility Gaps

The study also supports the earlier findings of greenwashing and consumer cynicism. The exaggerated or unconfirmed sustainability arguments decrease consumer confidence which leads to a call of credible verification of such claims. The results of the present study verify that businesses and consumers are distrustful of self-reported company information and show a more positive attitude to the third-party certifications

or blockchain-underlying systems. This is in line with the knowledge, who highlighted that consumers require verifiable evidence to combat skepticism. This research provides empirical data that QR codes and impact meters can be scanned and trusted by consumers and therefore can reduce the fear of greenwashing and thus restoring some trust to corporate sustainability messages.

5.3.3 Digital Traceability in Supply Chains

The previous studies have researched the importance of traceability in food supply chain, particularly on safety and authenticity. These functional aspects proven to be valid in the findings here, but the discussion is extended to include consumer trust and their readiness to be supportive to sustainability. The consumers in Slovenia linked traceability with sustainability practices including carbon emissions and labor rights, which illustrates, who pointed out that there is growing concern with eco-labels and measures of impact in European markets. On the other hand, consumers in India were more focused on the origin and authenticity of the products, which corresponds to the findings of the emerging market research that focus on basic traceability, rather than advanced sustainability communication. It means that even though digital tools are appreciated everywhere, their value depends on the local priorities.

5.3.4 Consumer Behavior and Ideology

The results also confirm the theories of the development of trust in consumer decision-making. The credibility in the system is translated to credibility in the product, which then is translated into purchase intention, in this case, QR code is used to signify credibility. In Slovenia, scanning directly resulted in purchases, but in India, scanning was in most cases a form of curiosity as opposed to purchase (Nguyen & Alang, 2024). This difference is based on the findings stated that cultural factors determine the willingness to pay for sustainability. The willingness to pay more in Slovenia and less in India is in

line which showed that in the emerging markets, consumers are still extremely price-sensitive, despite the increasing awareness of sustainability. In such a way, the present study confirms the fact that sustainability values have gained an important role throughout the world, but the role of the latter remains to be limited in developing countries due to the economic constraints.

5.3.5 Theoretical Alignment

Results are a strong support of Signaling Theory and those were QR codes and impact meters which were visible trust signals that reduced the information asymmetry between consumers and producers. They also concur with the Trust Transfer Theory, in which the credibility in the digital model (e.g., certification, blockchain) led to enhanced trust in the product and the company. Besides, the results supplement the consumer decision-making theories that predict that the intention to purchase is determined not only by the product features but also by the perceived risk, cultural values, and social aspects.

The study can be considered in the light of the literature contribution because it offers empirical evidence in various countries. Most of the earlier literature on traceability has been based in single markets, either in Europe or North America. Comparing India and Slovenia, the given investigation shows that context has a role in adoption, as the identical tool (QR code) was considered a sustainability facilitator in Slovenia but a safety indicator in India. In summary, this study confirms a lot of extant literature and in three meaningful ways:

As an example, to demonstrate that the features of digital traceability can help dispel skepticism of greenwashing by making sustainability statements verifiable.

Suggesting that culture mediates between consumer trust and willingness to pay and Slovenia and India are oriented towards sustainability and authenticity and affordability respectively.

Providing one of the earliest empirical cross-country comparisons of digital traceability in the fast-moving consumer goods industry, thereby filling an important literature gap.

5.4 Cross-Cultural Implications

The comparative results of India and Slovenia show that although the idea of digital traceability tends to be valued, its adoption, the trust that it builds, and the role of the economic impact are also culturally, economically, and regulation based. Understanding these cross-cultural differences is important to both researchers and practitioners since they determine how traceability programs must be differentiated and communicated in diverse markets.

5.4.1 Consumer Priorities and Value Perceptions

In Slovenia, the traceability was mostly associated with sustainability and ethical responsibility. Consumers linked QR codes and impact meters to such values as the minimization of environmental harm, ensuring a fair working environment, and responsible consumerism. This is according to the wider European context where sustainability has been incorporated in policy programs, learning agendas and consumer demands.

Indian consumers, on the other hand, placed a higher value on product origin and authenticity as traceability is one of the metrics against counterfeit or unsafe products. This emphasis reflects the realities of the Indian market, in which such issues as food adulteration, safety of products, and price matters are more critical to clients. Thus, both groups believe in the traceability, however, the notion of trust is culturally established: in Slovenia, it is connected with values, but in India, it is connected with safety.

5.4.2 Willingness to Pay and Economic Context

The variations in the willingness to pay a premium indicate the effect of the economic conditions. The Slovenia consumers were far more willing to spend more on traceable products as they had more disposable incomes and consumption was much more consistent with their internal values. Indian consumers on the contrary were reluctant to pay extra even when using QR codes (Hong and Xiao, 2024). India is also price sensitive, according to the earlier studies of emerging markets.

It means that the rate of consumer behavior directly depends on the level of economic development: in the developed economies, the element of sustainability may serve as the justification of increasing the price, in the emerging economies, it is mainly used to create the sense of fundamental trust and credibility without any direct financial rewards.

5.4.3 Institutional and Regulatory Influence

Institutions can also be used to explain the disparity. The key emphasis of fmcg field in Slovenia was collaboration with regulators and peers in the industry as one of the primary strategies, which evidences a stronger instance of institutional trust and well-developed EU regulatory frameworks and implementations of sustainability reporting and traceability requirements. On the other hand, Indian firms expressed more concerns about the cost of implementation and readiness of suppliers, which means less enforcement and more fragmented supply chains.

This institutional environment dissimilarity depicts the influence of confidence in the formations of governance in the process of adoption. In Slovenia, a feeling of collective responsibility is accepted, but in India, adoption is considered as a way of gaining cost leadership or as a marketing, differentiator.

5.4.4 Technology Engagement and Digital Culture

Indian firms were more confident in blockchain-based verification than the Slovenia ones. This could be a sign of the dynamic IT culture and rapid digitalization of India which makes blockchain a stable choice in technology. Conversely, Slovenia firms made more use of certification organizations and oversight bodies,

which is characteristic of an institutional environment in which third-party supervision represents an even more important role. This difference highlights the fact that both cultures use digital traceability, but their credibility sources are different: India uses technology, whereas Slovenia uses institutional credibility.

5.4.5 Collective vs. Individual Orientation

The focus group discussions also indicated a difference in cultural orientation. The phrases of collective language were frequently used by Slovenia consumers such as raising the standard, benefiting the environment, or all companies should do the same. Instead, Indian consumers were willing to talk about things on personal or family level using such phrases as to guarantee the safety of my family or in case I can afford it. This indicates a more general cultural difference: Slovenia is oriented towards the values of collectivist sustainability, and India is oriented towards the welfare of individuals and families.

5.4.6 Implications for Global FMCG Strategy

The differences in the culture in India and Slovenia underscore the fact that traceability cannot be used homogenously across markets. In the developed areas, the companies are to pay attention to sustainability certificates and moral principles, placing the traceability into larger cultural framework. Organizations need to focus on safety,

authenticity, and trust first in the developing markets, and then add these aspects to greater sustainability goals, as more people become aware of these advantages (Xiao & Khan, 2024). This understanding is informed by the current studies in cross-cultural consumerism behavior, which indicate that the usefulness of digital traceability as a source of trust depends on the beliefs of different cultures, economic status, and the degree of institutionalization

Slovenia and India are the opposite ends of the traceability adoption spectrum. Slovenia is a clear illustration of a values-based market in which traceability is aligned to the collective sustainability objectives and warrants a premium price. India on the other hand is a cost conscious, safe market with traceability creating trust and has not yet had a huge impact on readiness to pay. All these cultural differences highlight the fact that country-specific traceability plans should be developed to be adapted to the local consumer value and structural conditions.

5.5 Practical Implications for the FMCG Sector

The results of the study have great practical importance to the FMCG companies that strive to increase consumer trust, keep pace with the sustainability trends and compete with other companies. The study will provide practical recommendations on the way companies should adopt, communicate and extend their digital traceability programs by analyzing the perceptions of the businesses (B2B) and the consumer behavior (B2C).

5.5.1 Highlight Local Consumer Concerns

One of the lessons to learn is that consumer expectations are different depending on the situation. Slovenia consumers require extensive sustainability information (carbon footprint, labour standards, and certificates). Companies who intend to enter the European markets are thus advised to focus on ethical sourcing, environmental

measurements and certifications approved on the packaging and using QR- enabled applications. Conversely, the Indian consumers focus on genuineness and security. Within this context, companies ought to target product origin, food safety assurances, and trust-building messages prior to engaging in sophisticated metrics of sustainability. This shows that traceability messaging needs to be tailored according to the local cultural priorities rather than using a one-style-fits-all approach.

5.5.2 Present Traceability as a Trust Indicator, Not Merely a Technology

Both the consumers and businesses have shown clearly that the benefits of traceability are in its ability to provide credibility, and not necessarily the technology. Therefore, QR codes and impact meters are to be designed in a way that is easily readable, visually pleasing, and at the same time, easily accessible. As an example, companies would be able to use simple impact meters (such as This product has decreased carbon emission by 20 % than that in the market) and links with independent certifications. This will improve consumer confidence and usability and connect complicated supply chain data to purchase decision-making.

5.5.3 Openness with Cost Considerations

The study shows that consumers in Slovenia are willing to pay an extra in terms of traceability, whereas consumers in India are yet to be willing to pay extensively. This implies that traceability must first be taken by businesses in growing markets as an investment in establishing trust, and not necessarily as a tool to directly raise pricing. But, with increased knowledge over the long run, traceability may become a major competitive point in favor of a higher price. Thus, a gradual approach must be adopted by the companies:

- Phase 1: Roll out of the QR codes with a focus on safety and authenticity under a minimum incremental cost;
- Phase 2: Gradually expand attention to sustainability and ethical concern with changing consumer demands.

5.5.4 Utilize Collaborations for Credibility and Scalability

Teamwork was found to be an important aspect in the two markets. Slovenia companies were very willing to collaborate with regulators, and Indian companies indicated the significance of suppliers and cost issues. FMCG businesses should:

- In Europe: Collaborate with regulatory authorities, non-governmental organizations and certifiers to establish consistency in traceability and increase reliability;
- In India: Focus on cooperating with suppliers and hold awareness campaigns to make fragmented supply chains ready and educate consumers about the benefits of traceability. These alliances will also contribute to the minimization of greenwashing risks by introducing transparency to common industry standards instead of basing claims on corporate ones.

5.5.5 Position Traceability as a Unique Selling Proposition in Branding and Marketing

The consumer research found that the QR-coded packaging has a strong effect on purchasing behavior, particularly in Slovenia where scanning was related to higher sales. This shows that traceability is not only a compliance or functional tool but it is also a major branding asset.

Companies need to incorporate the concept of traceability in their brand narratives and initiate marketing campaigns that display the farm-to-shelf process (Ardolino et al., 2025). The idea of origin stories, life of farmers, and environmental consequences can

be used to create an emotional bond that facilitates the brands to distinguish themselves in the saturated FMCG industries.

5.5.6 Getting Ready for Long-Term Returns on Investment beyond Sales

Findings of the survey showed that the businesses often measure ROI in terms of sales and market presence. However, the study also suggests that long-term benefits of traceability are also the company/brand image and customer loyalty especially in the market that is sustainability-oriented. Risk and compliance can also be mentioned: compliance is becoming more and more important in international business, and traceability is a crucial feature. Operation effectiveness, traceability solutions provide better internal visibility in the supply chains (Zareh et al., 2024). Therefore, businesses ought to adopt a holistic perspective of ROI as they realize that the advantages of traceability are not only short-term consumer willingness to pay.

In the case of FMCG companies, the message is quite obvious: digital traceability is not only a risk management tool, but also a strategic potential (Leal Filho et al., 2025). In the emerging markets like India, it should be said as a tool to develop trust and authenticity at low cost where in the mature markets such as Slovenia, it can be used to promote price advantages, sustainability and regulatory compliance. Finally, the effectiveness of traceability depends on the ability of companies to align the strategies effectively with the expectations of the culture, values of the customers, and the market environment.

5.6 Theoretical Contributions

Besides the practical implication, this research has valuable theoretical implications about consumer trust, sustainability communication, and the importance of digital traceability in the FMCG industry. After synthesizing survey data, behavioral experimentation, and cross-national comparisons, the researched study contributes to

the current theoretical frameworks and reveals new forces behind consumer decision-making.

5.6.1 Expansion of Signaling Theory

Companies send signals as suggested by Signaling Theory to reduce information asymmetry between consumers and the companies. This study demonstrates that digital traceability systems such as QR codes and impact meters are powerful credibility indicators in the FMCG markets (Fatorachian et al., 2025). QR and sustainability metrics have served as a marker of ethical and environmental dedication in Slovenia, which appeals to the values of the consumers. QR codes in India served as an indicator of integrity and trustworthiness, as they answered the worries about counterfeiting or unsafe items. This implies that perception of signals is different with cultural settings: the same tool (QR code) has different perceptions with respect to the beliefs of consumers and the maturity of the market. Thus, the article contributes to the existing signaling theory by showing that the success of messages depends on cultural and economic environments.

5.6.2 Application for Trust Transfer Theory

Trust Transfer Theory assumes that trust in a system (a verification process) can be transferred to another system (a product or a brand). This was well observed in the experiment: In Slovenia, the process of scanning a QR code with the purpose of retrieving sustainability information directly correlated to trust in the product, which led to higher purchase rates. In India scanning had an initiating effect on trust but this did not translate to purchases because of the issue of cost thus partial but not full transfer of trust. It depicts the fact that transfer of trust is not absolute, as it does not depend on the system reliability alone but also depends on external factors, including price sensitivity and expectations of the local market. The results in this case therefore narrow

down the theory of transfer of trust because it stresses that economic and cultural considerations can shape the intensity of trust transfer.

5.6.3 Insights into Consumer Decision-Making Models

A traditional consumer decision-making model which purchases intentions depend on the product characteristics, perceived value, and mitigating risks. The results of the current research expand those models since digital traceability is another parameter of decision-making that has been added (Raman et al., 2023). Traceability was an added attribute to consumers in Slovenia, and it enhanced their willingness to pay. Traceability was mainly a risk mitigation tool to Indian consumers, and it guaranteed them of safety and authenticity. Such dual role implies that traceability is capable of fulfilling both value creation and risk mitigation requirements, based on the market environment. In that way, the study considers traceability as a variable of consumer choice determinant that is context-dependent and influences both rational (safety, cost) and emotional (sustainability, ethics) dimensions of consumption.

5.6.4 Contribution to Research on Greenwashing and Credibility

A major part of the research related to sustainability communication has been focused on the problem of greenwashing. This research contributes to this discussion by showing that digital traceability is a structural response to greenwashing skepticism. The trust that businesses have lost can be restored since they can be verified by their claims using QR codes and certifications. It is also important to note that the findings revealed that the effectiveness of traceability indicators depends on third-party certification: both Indian and Slovenia consumers did not trust any disclosure performed by companies but rather preferred certifications and independent audits.

5.6.5 Cross-Cultural Theory Regarding Traceability Adoption

Finally, the study can be added to the cross-cultural theory of implementing sustainable practices because it empirically depicts the impact of cultural and market differences on the efficiency of traceability: Traceability is viewed as part of collective responsibility and warrants more price in Slovenia with strong cultural values of sustainability and well-developed regulatory mechanisms (Khan & Bisaria, 2025). In India where cost and safety are the ultimate considerations, traceability is considered a competitive advantage that generates trust but is not yet sufficiently important to warrant a premium. This highlights the importance of theoretical models of traceability considering the cultural impact instead of homogenous consumer responses.

Overall, the study conveys the theoretical input such as the extension of the Signaling Theory by suggesting that the meaning of traceability signals is situational. Study improves the Trust Transfer Theory by demonstrating that economic and cultural variables influence the transfer of trust. The Consumer Decision-Making Models are also improved by research, which describes traceability as a dual attribute that boosts the value and reduces risk. This project contributes to the body of literature on the notion of greenwashing because it conceptualizes traceability as a credibility-building structural mechanism. It creates a cross-cultural context and interpretation of the differences in adoption of traceability in emerging markets and developed economies. The combined contributions lead to the position of digital traceability as a theoretical framework, as well as a practical tool, that can bridge the gap between the sustainability claims and consumer perceptions

6 CONCLUSIONS

The study sought to examine the possibility of digital traceability technologies, specifically, QR codes and impact meters on the packaging of FMCGs, to increase consumer trust, acceptance, and willingness to pay, and the research question of how the effects of these technologies differ across various cultural settings and markets. The mixed-methods approach with the use of an industry survey (B2B) and a consumer experiment and focus groups (B2C) allows the research to have a strong quantitative analysis supported by qualitative information. The comparative study of India and Slovenia provides important insights into the meaning of traceability and its perception, appreciation and behaviors in the developing and the established markets.

6.1 Summary of Key Findings

- Traceability enhances trust: Traceability features were also viewed universally in both markets as adding credibility and trustworthiness. And in Slovenia, this trust related to principles of sustainability, but in India, this trust related to the principles of authenticity and safety;
- Consumer acceptance varies by context: Survey and experiment data showed that there was an overall positive reception of enhanced products with traceability. However, there were more people who accepted in Slovenia (87% purchase rate in the experiment) than in India (70%) which indicated cultural and economic differences;
- Willingness to pay a premium differs between markets: The consumers/organizations in Slovenia were more confident in paying premium price on products that are traceable. On the other hand, in India, there was a lot of interest and interaction, but unwillingness to pay a higher price because it is price sensitive;
- Drivers and obstacles vary by context: Slovenia consumers and businesses were more comfortable paying higher prices for traceable goods. However, because it is

price sensitive, there was a lot of curiosity and contact in India, but no desire to pay a higher price;

- Trust in verification is highest for independent mechanisms: In India, the main motivators were customer trust and brand credibility, but supplier preparedness and cost were significant challenges. The main obstacles include Slovenia, organizations devoted to supply chain efficiency;
- and regulatory legislation, as well as issues with data sensitivity and integration. Both markets exhibited a high degree of trust in the certifying authority, with independent observers in Slovenia and blockchain being seen as more reliable in India;
- Cultural factors influence outcomes: This is due to the fact that whereas traceability is viewed as an indication of safety by Indian customers, it is a sign of values by Slovenia consumers. These differences affect how traceability affects behavior and willingness to pay.

6.2 Contributions of the Study

6.2.1 Academic Contributions

- Expanded Signaling Theory through demonstration of how importance of traceability signals, and their influence, vary across cultural settings;
- Enhanced Trust Transfer Theory through proving that the trust in digital technologies is transferred to trust in products but the extent of this transfer depends on economic and cultural factors;
- Integrated traceability in consumer decision-making models, which have dual roles of minimizing risk and value addition;
- Contributed to the greenwashing discussion by positing traceability as a structural strategy of addressing the gaps in credibility that could be filled by the skeptical consumers with some verifiable evidence;

- Developed a cross-cultural model that examines differences in adoption of traceability between emerging and developed markets such as India and Slovenia respectively.

6.2.2 Practical Contributions

- Provided real-world advice to the FMCG companies regarding how to build and communicate traceability functionality that is adjusted to the local context (with an emphasis on safety in India and sustainability in Slovenia);
- Stated the necessity of collaboration with regulators, NGOs, and suppliers to increase credibility and overcome obstacles to implementation;
- It demonstrated that traceability may be more than a mere compliance instrument but may be a branding and marketing differentiator that can influence available buying choices in the real market scenario;
- Gave an idea on how companies can consider the ROI in its entirety taking into consideration benefits that are not directly tied to sales but platforms like brand image, regulatory compliance and efficiency.

6.3 Limitations of the Study

- Sampling scope: The company survey covered 62 companies (32 Indian and 30 Slovenia) which, despite being helpful, might not allow to represent the entire range of FMCG companies in the two countries;
- Experimental condition: The consumer experiment had been conducted under controlled conditions in a group of consumers but not in real retail circumstances. Although suitable in exploratory research, this limits the capacity to extrapolate the research into larger samples;

- Product focus: The test involving consumers was limited to a single category of products (Banana chips). There is a chance that consumer responses will vary to other types of FMCG like beverages, dairy products or cosmetics;
- Short term analysis: The research was on the immediate consumer response; no long-term outcome of the repeated exposure to traceability was considered.

6.4 Recommendations for Future Research

- Expand the analysis to cover different product categories and FMCGs to establish whether benefits of traceability are universal in both food and beverages and non-food products;
- Conduct retail field tests within the supermarkets to study behavior within the realistic shopping environments;
- Research longitudinal surveys to determine whether consumer interest in traceability evolves with time and creates a more loyal perception;
- Include other nations to expand the cross-cultural model especially in drawing comparisons between other regions beyond Europe and Asia;
- Research the effectiveness of the emerging technologies: traceability dashboards powered by artificial intelligence and broad blockchain adoption in raising consumer trust even further.

6.5 Final statement

This study demonstrates that the concept of digital traceability is more than a simple technical fix; it represents a strategic and cultural development that shapes the way consumers view, believe, and react to corporate sustainability claims. The theoretical frameworks are linked to practical applications as the study is based on the understanding of business as well as consumer behavior in two culturally different settings.

The findings show that traceability improves trust across the board; nevertheless, its economic impact (including readiness to pay) depends on culture and market. In fast-moving consumer goods (FMCG) companies, that means that their success does not depend on the process of implementing traceability itself but rather depends on how they do and how they present it. Through matching the transparency efforts with the local consumer ideologies and global accountability value standards, companies can earn greater confidence, reduce the distrust to greenwashing, and encourage a healthier and more sustainable and responsible FMCG industry.

Essentially, digital traceability is a crucial step in the evolution of global supply chains that no longer rely on opaque systems that are characterized by mistrust to transparent and verifiable, as well as consumer- empowered, systems. This paper highlights the possibilities and the paths towards achieving that change.

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APPENDIX A: QUESTIONNAIRE

Source: Personal source

Q1.How familiar is your company with digital traceability solutions (e.g., QR codes, blockchain, impact meters) for supply chain transparency?

	1 (Not familiar)	2 (Slightly)	3(Moderately)	4(Familiar)	5(Very Familiar)
QR codes on product packaging	o	o	o	o	o
Blockchain-based traceability	o	o	o	o	o
Digital "impact meters	o	o	o	o	o
Certification-linked traceability platforms	o	o	o	o	o

Q2. What are the main reasons your company would consider adopting digital traceability systems? Multiple answers are possible.

- Enhancing consumer trust & brand credibility
- Improving internal supply chain visibility
- Meeting regulatory or certification requirements
- Gaining competitive advantage
- Responding to investor/stakeholder expectations

Q3. What are the biggest challenges your company faces in adopting digital traceability tools?

- High implementation costs
- Data integration and technological complexity

- Risk of exposing sensitive supply chain data
- Lack of supplier readiness/collaboration
- Uncertainty about consumer demand/value

Q4.From a business perspective, how important are the following types of supply chain information to share with consumers?

	(Least) 1	2	3	4	5 (Most
Product origin (farm/fa cory location)	o	o	o	o	o
Environmental metrics	o	o	o	o	o
Certifications and audit results	o	o	o	o	o

Q5. In your experience, how strongly do traceability features influence consumer trust and willingness to pay a premium in your market? Traceability influence on… (On the below scale, 1 means least and 5 means most.)

	1	2	3	4	5
Consumer trust	o	o	o	o	o
Willingnes to pay a premium	o	o	o	o	o

Q6. What are the main reasons consumer acceptance of traceability differing across markets (e.g., emerging vs. developed economies)?

- Stricter regulations and legal requirements in developed markets
- Greater price sensitivity in emerging markets

- o Higher consumer awareness and expectations in developed markets
- o Stronger emphasis on sustainability in developed markets
- o Limited access to digital tools in emerging markets

Q7. How does your organization currently evaluate the return on investment (ROI) of implementing traceability systems? Multiple answers are possible.

- o Increased sales/market share
- o Risk management and compliance
- o We do not measure ROI specifically for traceability
- o Stronger brand reputation and loyalty
- o Operational efficiency and cost savings

Q8. Which mechanisms do you consider most credible for verifying traceability data shared with consumers?

- o Independent certification bodies (e.g., Fair Trade, Rainforest Alliance)
- o Blockchain or other tamper-proof digital systems
- o Independent media or watchdog organizations
- o The company's own reports and audits

Q9. How willing would your company be to collaborate with industry peers, NGOs, or regulators to standardize digital traceability practices? (On the below scale, 1 means least and 5 means most.

	1	2	3	4	5
Industry peers	o	o	o	o	o
NGOs	o	o	o	o	o
Regulators	o	o	o	o	o

Q10. How likely is your company to invest in digital traceability solutions in the following timeframes?(On the below scale, 1 means least and 5 means most.)

- Within the next 12–24 months
- In 3–5 years
- More than 5 years
- Already invested