



UNIVERSITÀ DEGLI STUDI DI PAVIA

DIPARTIMENTI DI GIURISPRUDENZA, INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE,
SCIENZE ECONOMICHE E AZIENDALI, SCIENZE POLITICHE E SOCIALI, STUDI UMANISTICI

CORSO DI LAUREA INTERDIPARTIMENTALE IN
COMUNICAZIONE DIGITALE

How Trust Is Formed in Digital Health-Adjacent Markets:

**SEO, Algorithmic Search Visibility, and Consumer Behaviour in Post-COVID Italy's
Dermocosmetic and Dietary Supplement Markets**

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ANNO ACCADEMICO 2024/25

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Abstract [EN]

In today's digital landscape, the credibility of health-related information is increasingly shaped not by who provides it, but by how it is made visible, structured, and accessed through online systems. As individuals turn to search engines as their primary gateway to health-related knowledge, trust is no longer formed solely through direct interaction with experts, but through algorithmically mediated environments that organize and prioritize information.

with a specific focus on the Italian dermocosmetic and dietary supplement sectors in the post-COVID-19 context. As consumers rely more on search engines as the main entry point for health-related information, these systems play a central role in shaping visibility, credibility, and decision-making.

Building on an interdisciplinary perspective, this thesis proposes a conceptual model in which behavioural dynamics, algorithmic mediation, and institutional regulation interact as three interrelated spheres. Together, these dimensions form an integrated system through which digital trust is constructed, negotiated, and mediated in health-adjacent markets.

Methodologically, the research combines a longitudinal analysis of search behaviour using Google Trends data (2018–2025) with a structured SERP and content audit of eight carefully selected long-tail queries. A total of 80 webpages were analysed to examine domain types, credibility signals, E-E-A-T aligned indicators, and compliance-related features across both sectors.

The findings show that algorithmic visibility is influenced by the level of uncertainty expressed in search queries. Dermocosmetic searches are mainly characterized by commercial and brand-driven content, while dietary supplement queries, especially those related to safety, dosage, or effectiveness, are more likely to show institutional and clinically based sources. This suggests that search engines respond differently depending on the level of perceived informational risk.

The study also shows that compliance-related elements, such as moderated claims, disclaimers, and transparency cues, function not only as regulatory requirements but also as visible signals that support perceived credibility. In this context, SEO is conceptualized not as a trust architecture, but as a trust optimisation mechanism through which firms attempt to translate credibility and institutional legitimacy into forms of visibility that are recognized by search systems.

By linking search behaviour with the structure of search results, this thesis contributes to understanding how digital trust is co-produced through the interaction of user intent, platform systems, and regulatory frameworks. It highlights the growing role of search engines in shaping access to health-related information and raises important questions about the ethical and regulatory implications of visibility in digital environments.

Abstract [IT]

Nel contesto digitale contemporaneo, il modo in cui le persone valutano la credibilità delle informazioni legate alla salute sta profondamente cambiando. Sempre più spesso, infatti, la fiducia non deriva da un contatto diretto con esperti, ma da come le informazioni vengono selezionate, organizzate e rese visibili dai sistemi online. Con il crescente utilizzo dei motori di ricerca come principale punto di accesso alle informazioni in ambito salute, la fiducia si costruisce all'interno di ambienti mediati da algoritmi che influenzano ciò che gli utenti vedono, leggono e considerano affidabile.

In questo contesto, la presente tesi analizza come la fiducia venga costruita e negoziata nei cosiddetti mercati *health-adjacent*, con particolare riferimento ai settori della dermocosmesi e degli integratori alimentari in Italia nel periodo post-COVID-19. Si tratta di ambiti a metà tra consumo e salute, nei quali le decisioni degli individui sono sempre più guidate da informazioni reperite online.

Partendo da una prospettiva interdisciplinare, la ricerca propone un modello concettuale in cui dinamiche comportamentali, mediazione algoritmica e regolazione istituzionale interagiscono come tre sfere interconnesse. Queste dimensioni costituiscono un sistema integrato attraverso il quale la fiducia digitale viene costruita, negoziata e mediata.

Dal punto di vista metodologico, lo studio combina un'analisi longitudinale del comportamento di ricerca tramite dati Google Trends nel periodo (2018–2025) con un'analisi strutturata delle pagine dei risultati di ricerca (SERP) e dei contenuti associati, basata su otto query long-tail selezionate. Complessivamente, sono state analizzate 80 pagine web, al fine di esaminare le tipologie di dominio, i segnali di credibilità, gli indicatori riconducibili al modello E-E-A-T e gli elementi legati alla conformità normativa nei due settori.

I risultati mostrano che la visibilità dei contenuti online varia in funzione del livello di incertezza espresso nelle query di ricerca. Le ricerche relative alla dermocosmesi sono prevalentemente caratterizzate da contenuti di natura commerciale e orientati ai brand, mentre le ricerche sugli integratori alimentari, soprattutto quando riguardano sicurezza, dosaggio o efficacia, tendono a restituire fonti di tipo istituzionale o clinico. Ciò suggerisce che i motori di ricerca modulano la composizione dei risultati in base al rischio informativo percepito.

L'analisi evidenzia inoltre come elementi legati alla conformità normativa, quali la presenza di claim moderati, disclaimer e segnali di trasparenza, non svolgano soltanto una funzione regolatoria, ma contribuiscano anche a rafforzare la percezione di credibilità nei contesti digitali. In questo quadro, la SEO viene concettualizzata non come un'architettura della fiducia, ma come un meccanismo di ottimizzazione della fiducia, attraverso il quale le imprese cercano di tradurre credibilità e legittimità istituzionale in forme di visibilità riconosciute dai sistemi di ricerca.

Collegando il comportamento di ricerca alla struttura dei risultati restituiti, la tesi contribuisce a chiarire come la fiducia digitale si costruisca attraverso l'interazione tra intenzioni degli utenti, logiche algoritmiche e vincoli normativi. In questo senso, i motori di ricerca emergono come attori centrali nella mediazione dell'informazione in ambito salute, sollevando al contempo importanti questioni di natura etica e regolatoria legate alla gestione della visibilità nei contesti digitali.

Chapter 1: Introduction and Research Design

1.1 Background and Rationale

The Italian markets for dermocosmetics and dietary supplements occupy a significant and evolving position within the broader health and beauty sectors. According to the 2024 Annual Report of Cosmetica Italia, the Italian cosmetics market exceeded €12.5 billion in 2023, recording a growth of 9.4% compared to the previous year. Concurrently, the dietary supplements market in Italy is estimated to exceed €4.5 billion annually, with approximately 78% of sales occurring through pharmacies. These figures highlight not only the economic relevance of these sectors, but also their central role within contemporary consumer health and wellness practices.

The significance of the dermocosmetic and dietary supplement industries is further heightened in a post-COVID-19 environment in which digital channels and information-seeking behaviour have become central to consumer decision-making. Research conducted in Italy shows that online health information-seeking behaviour is widespread among adults and influences how individuals perceive and interpret health information, including their ability to discern false information (D'Andrea, Grifoni, & Ferri, 2023). At a broader level, international evidence indicates that the pandemic accelerated health-related online search behaviour globally and heightened the use of digital health information channels (Alzghaibi et al., 2023).

In the cosmetics sector, the Cosmetica Italia Annual Report documents that e-commerce became an essential strategy during prolonged lockdown periods, compelling firms that had not yet adopted online sales to integrate digital retail channels and significantly accelerating the sector's digital transformation (Cosmetica Italia, 2023). This observation aligns with broader changes in Italian e-commerce, which continues to expand its turnover and where beauty and pharmaceutical products are among the key categories driving growth (Sanità33, 2025). These developments underscore how consumer preferences for online channels and digital information have shifted the market landscape, making digital engagement an integral component of post-pandemic commercial strategy in regulated health-adjacent industries.

These developments suggest a notable shift: consumers in Italy are increasingly moving from offline, "traditional" purchase and information-seeking contexts, such as pharmacy visits or consultations with dermatologists and cosmeticians, toward digital environments. In the regulated categories of dermocosmetics and dietary supplements, where trust, safety, and scientific credibility are central, this transition raises critical questions about how trust is formed and maintained online. When consumers can no longer rely primarily on face-to-face expert interaction or on the physical cues of an in-store environment, they must draw on alternative signals to evaluate credibility, product safety, and relevance. In this sense, the growing reliance on digital channels and the proliferation of online information sources, including search engines, brand websites, and third-party portals, has reconfigured the

algorithmic trust architecture through which credibility is assessed in these regulated markets.

Within this context, the concept of algorithmic trust becomes particularly relevant. Algorithmic trust refers to the confidence consumers place in digitally mediated systems, such as search results, ranking and evaluation mechanisms, online reviews, website metadata, and other platform-based cues of credibility. As consumers increasingly turn to search engines and online portals for health and beauty information, visibility within these systems, together with demonstrable compliance with regulatory, informational, and scientific standards, becomes a trust-relevant outcome rather than merely a marketing objective. The evaluation of credibility is therefore increasingly shaped by the underlying algorithmic logic governing information ordering and accessibility, especially in the post-COVID era, where digital channels have become structurally embedded in consumer decision-making processes.

Moreover, the post-pandemic landscape in Italy highlights how consumer behaviour in health and wellness categories is evolving in parallel with broader transformations in healthcare delivery. Empirical studies indicate that the COVID-19 pandemic accelerated the adoption of digital health technologies and reinforced patient-centred orientations in healthcare. Research conducted among healthcare professionals and managers in Italy shows that the pandemic significantly accelerated the implementation of telemedicine services, which were perceived as improving patient care, operational workflows, and continuity of services while reducing the need for face-to-face interaction (Antonacci et al., 2023). This acceleration reflects a wider reconfiguration of how care is accessed and experienced, as both organisations and patients have integrated remote consultations and digital tools into routine practice. More generally, research on digital transformation in healthcare identifies the pandemic as a catalyst for digital innovation, prompting healthcare organisations to adopt and integrate digital technologies at a pace unlikely to have occurred outside the emergency context (Mauro et al., 2024). These developments extend beyond clinical care and coincide with increasing levels of digital health literacy and patient autonomy in information-seeking behaviour, which in turn influence adjacent domains such as dermocosmetics and dietary supplements. In these sectors, consumers appear increasingly inclined toward self-directed online searches and more reliant on digitally mediated credibility cues, reflecting a shift in the broader trust ecology surrounding health-related information.

From a regulatory perspective, these behavioural changes intersect with a dense and evolving European and Italian regulatory framework, including regulations on cosmetics (Regulation (EC) No 1223/2009), dietary supplements (Regulation (EC) No 1924/2006 and Decreto Legislativo 169/2004), and more recently digital services regulation, such as the Digital Services Act. In regulated product categories where claims, evidence, and authority are tightly controlled, online environments require firms to structure their visibility and content in ways that are compliant with both regulatory requirements and the algorithmic logic governing information ranking and access. Search engine optimisation and related digital communication practices do not constitute a trust architecture in themselves. Rather, they function as trust optimisation mechanisms, through which firms align their content with the underlying algorithmic trust architecture of search platforms.

In the context of health-related digital markets, trust architecture refers to the system of algorithmic rules and evaluative signals through which search engines rank information based on perceived credibility, relevance, and informational quality. By contrast, trust optimisation mechanisms refer to the strategic actions undertaken by firms to respond to these criteria, for instance by structuring content according to SEO principles, incorporating expertise signals, and ensuring compliance with regulatory frameworks governing health communication.

This distinction is particularly relevant in regulated sectors such as dermocosmetics and dietary supplements, where firms cannot directly shape the criteria of visibility, but must operate within them. As a result, credibility is not only grounded in traditional expert authority, but increasingly mediated by the ability of content to satisfy algorithmic expectations, positioning SEO as a key interface between regulatory compliance, informational quality, and digital visibility.

Consequently, the rationale for this research is grounded in the confluence of three domains: (i) strong economic and consumer relevance of the Italian dermocosmetic and dietary supplement markets; (ii) the accelerated digital and behavioural transformation triggered by the COVID 19 pandemic, which has shifted both purchase and information seeking from offline to online; and (iii) the intersection of regulated communication, digital visibility (SEO) and consumer trust in algorithm mediated environments. Despite these converging trends, there remains limited academic investigation into how SEO and algorithmic visibility operate as trust mechanisms in regulated health and beauty categories under compliance constraints. This thesis therefore focuses on how search engine optimisation functions not merely as a visibility tool but as an architecture of trust in the Italian regulated dermocosmetic and dietary supplement markets in the post COVID era.

1.2 Research problems and objectives

The dermocosmetic and dietary supplement industries in Italy have undergone a profound transformation in the past few years. Traditionally, these sectors relied on expert-based trust networks, such as pharmacists, dermatologists, and in store consultants, who mediated product credibility through personal recommendations and professional authority. However, the digital acceleration triggered by the COVID 19 pandemic has fundamentally changed how Italian consumers access information, evaluated health related products, and establish trust. Recent data show that a growing number of consumers now use search engines as their primary source of information for health, beauty, and wellness topics, often before consulting any professional intermediary (Mastropietro & Rizzi, 2024). This behaviour represents a structural shift in how trust is generated and maintained in markets where scientific accuracy and regulatory compliance are central to communication.

Despite this rapid digitalisation, the academic understanding of how Search Engine Optimisation (SEO) functions within regulated health and beauty markets remains limited. Most existing literature on SEO focuses on quantitative metrics such as website visibility,

traffic, and conversion rates, neglecting its potential role as a mechanism that constructs consumer trust and perceived credibility (Mladenović, 2023). Research in digital health communication has demonstrated that algorithmic mediation influences user perceptions of reliability, yet empirical evidence connecting SEO practices to trust formation in regulated markets remains scarce (Sun et al., 2024; Williams Ceci, Macy, & Naaman, 2023). Furthermore, the Italian regulatory environment adds another layer of complexity. The communication of dermocosmetic and dietary supplement products is governed by strict national and European frameworks, including EU Regulation 1924/2006, which defines health and nutrition claims, EU Regulation 1223/2009, which regulates cosmetics, and the Italian Legislative Decree 169/2004. These frameworks are complemented by broader digital governance mechanisms, such as the General Data Protection Regulation (GDPR) and the Digital Services Act, which impose requirements for transparency and accuracy in online communication (European Commission, 2024).

This legal environment shapes the boundaries within which digital marketing strategies must operate. Yet the intersection between regulation, SEO strategy, and consumer trust has not been adequately explored. There is still limited understanding of how firms navigate compliance requirements while simultaneously using algorithmic visibility and trust cues to communicate reliability. This lack of integrated research leaves an important theoretical and practical gap, especially in markets where the evaluation of claims and product safety depends on information asymmetry and consumer vulnerability. Dermocosmetics and dietary supplements, being credence goods, rely heavily on external signals of expertise and authenticity. As these signals increasingly originate from digital sources rather than face to face consultation, the question arises of how consumers perceive authority, truthfulness, and safety online.

The central research problem addressed in this thesis can therefore be formulated as follows: how do SEO practices function as mechanisms of trust construction within Italy's dermocosmetic and dietary supplement industries, and how are these practices influenced by both changing consumer behaviours and evolving regulatory frameworks? The problem lies not only in identifying how SEO enhances visibility, but also in understanding how it mediates credibility through algorithmic ranking, content structure, and compliance-based transparency.

From this central problem arise the objectives of the study. The first objective is to analyse the evolution of digital consumer behaviour in Italy's dermocosmetic and dietary supplement markets before and after the COVID 19 pandemic. This includes observing how consumers have moved from interpersonal trust, rooted in pharmacists and professional expertise, toward algorithmic trust shaped by search engine results and online content. It also involves investigating how the patterns of information seeking, online reviews, and e commerce activity reflect broader social and behavioural transformations.

The second objective is to investigate how SEO and digital communication strategies act as mechanisms for building trust in regulated environments. This requires examining how search visibility, website credibility, and content optimisation contribute to consumer perceptions of

reliability. Particular attention is given to the presence of author credentials, institutional references, transparent privacy policies, and other indicators of Google's E-E-A-T framework (Expertise, Experience, Authoritativeness, and Trustworthiness). The goal is to understand how firms and online platforms use these signals not only to achieve higher rankings but also to demonstrate compliance and legitimacy in the eyes of both consumers and regulators.

The third objective is to explore how national and European regulatory frameworks shape firms' SEO and content strategies and, consequently, the architecture of online trust in the health and beauty communication ecosystem. The analysis seeks to determine whether compliance requirements constrain marketing creativity or, conversely, enhance credibility by signalling adherence to ethical and scientific standards. Regulations such as EU 1924/2006, EU 1223/2009, and the Digital Services Act are expected to influence not only the substance of online communication but also the strategic use of metadata, keywords, and web architecture as instruments of regulatory transparency.

These three objectives combine empirical and conceptual perspectives. The empirical component aims to document and analyse measurable trends in search behaviour and online content within the Italian market, while the conceptual component reframes SEO not as a trust architecture in itself, but as a trust optimization mechanism operating within the algorithmic trust architecture of search engines. By adopting this perspective, the research bridges consumer behaviour theories, legal communication studies, and scholarship on algorithmic trust and platform mediation. It thereby contributes to a more holistic understanding of how visibility, regulatory compliance, and credibility interact in the digital transformation of regulated industries.

The rationale for pursuing these objectives is supported by a growing body of research that highlights the increasing reliance on algorithmic signals in consumer decision making. Studies in digital health communication have shown that trust in online content is often mediated by the perceived authority of sources, the presence of expert authorship, and the structure of search engine results (Guo, 2025). Similar findings indicate that transparency, scientific referencing, and domain reputation significantly shape the perceived reliability of health-related information (Karuna, Purohit, & Motti, 2019). In this context, regulatory compliance itself can act as a form of trust enhancement, since users interpret explicit references to legal or scientific standards as signs of safety and professionalism. Post pandemic digitalisation has amplified this phenomenon, as consumers increasingly use digital channels to assess not only price and quality but also integrity and authenticity.

The achievement of these objectives will allow this research to provide both theoretical and managerial contributions. Theoretically, it will advance the conceptualisation of SEO as an instrument of mediated trust within the broader field of digital communication. Managerially, it will offer insights into how firms in highly regulated industries can design communication strategies that balance compliance with algorithmic visibility, ultimately fostering more transparent and credible relationships with consumers.

1.3 Research questions

In light of the research problem and objectives established in the previous section, this thesis formulates three central research questions that will guide the investigation into the role of search engine optimisation (SEO) as a mechanism of trust in Italy's dermocosmetic and dietary supplement markets. Each question is designed to explore a distinct but interrelated dimension of the phenomenon, namely the behavioural evolution of consumers, the trust building role of SEO, and the regulatory influences shaping digital communication strategies.

The first research question addresses the behavioural dimension: how digital consumer behaviour has evolved in Italy's dermocosmetic and dietary supplement markets, particularly in relation to information seeking, purchase channels, and trust formation when comparing the pre-COVID and post-COVID periods. This question seeks to unpack the extent to which consumers have shifted from expert-mediated, offline trust environments, such as pharmacists and in-store professional advice, toward online sources of information and decision-making. The inquiry examines changes in search behaviour, reliance on online content, e-commerce uptake, and the credibility signals consumers use when navigating health and wellness product categories.

In health-related consumption contexts, the evaluation of information credibility increasingly occurs within digitally mediated environments, where search engines, online platforms, and content aggregation systems play a central role in shaping what information is encountered and how it is prioritised. The presentation, ordering, and contextualisation of search results influence how users assess relevance and reliability, particularly in categories where scientific legitimacy and regulatory compliance are salient. Within this framework, the thesis explores how pandemic-driven digitalisation has altered the configuration of trust across information sources and decision-making environments in regulated industries. By focusing on the Italian dermocosmetic and dietary supplement sectors, the research aims to clarify how shifts in information access and channel usage have reshaped the conditions under which trust, credibility, and authority are constructed in digital contexts.

The second research question explores the mechanism of SEO and digital communication: In regulated health and beauty product markets in Italy, how does SEO function as a trust building mechanism, and what are the key trust signals (for example author credentials, domain type, scientific references, transparent privacy policies) through which algorithmic visibility and content optimisation contribute to consumer perceptions of credibility, safety and authenticity? This question moves beyond the conventional focus on SEO metrics such as ranking, traffic or conversion and instead investigates how SEO practices embed trust cues and compliance-oriented content architecture. In regulated contexts where consumers face information asymmetry and cannot easily verify product claims themselves so called credence goods trust must be mediated. Prior literature on health content marketing underscores that trust is built through transparency, authoritativeness and consistent educational content rather than persuasive promotion alone. This question therefore probes how firms operating in Italy's dermocosmetic and dietary supplement markets craft their SEO and content

strategies to achieve algorithmic visibility and simultaneously communicate trust and compliance.

The third research question addresses regulation and strategic response: how national and European regulatory frameworks, including Regulation (EC) No 1924/2006 on nutrition and health claims, Regulation (EC) No 1223/2009 on cosmetic products, Decreto Legislativo 169/2004, and digital governance instruments such as the General Data Protection Regulation and the Digital Services Act, influence firms' SEO and content strategies in the Italian dermocosmetic and dietary supplement sectors. The question explores how these regulatory frameworks shape the conditions under which digital communication takes place and how compliance requirements affect firms' approaches to visibility, content structuring, and information disclosure in online environments.

In regulated product categories, the legal framework not only constrains what can be communicated but also establishes the informational standards that govern credibility and legitimacy in digital contexts. By defining permissible claims, mandatory disclosures, and transparency obligations, regulation contributes to the configuration of the digital environments in which trust is negotiated. This research question therefore examines how firms operationalise regulatory requirements within their SEO and content practices and how such compliance-related signals are incorporated into online communication. It also considers how consumers encounter and interpret these signals when evaluating credibility and reliability in health and beauty-related digital content.

By analysing the interaction between regulation, digital communication strategies, and algorithmically mediated information environments, the thesis aims to clarify how regulatory compliance interacts with visibility and credibility in the Italian dermocosmetic and dietary supplement markets. In doing so, it seeks to illuminate the role of regulation in shaping the conditions under which trust is constructed, sustained, or transformed in digitally mediated, highly regulated industries.

Collectively, these three research questions guide both the empirical investigation and the conceptual development of the thesis. By examining how consumer behaviour has evolved in relation to information seeking, purchase channels, and trust formation (RQ1), how SEO operates within digital environments as a mechanism influencing visibility and credibility (RQ2), and how regulatory frameworks shape firms' digital communication strategies and conditions of trust (RQ3), the research provides a comprehensive perspective on how trust is constructed, mediated, and negotiated in Italy's post-COVID dermocosmetic and dietary supplement markets. In doing so, the thesis explores the interaction between algorithmically mediated search environments, regulated communication practices, and consumer trust dynamics within health-adjacent digital markets.

1.4 Methodological Overview

This section describes in detail the methodological design adopted for this research and provides a rationale for the choice of approach, methods, and data sources. The chapter also

explains the logic through which the empirical work connects to the theoretical and conceptual framework developed in the preceding sections. In keeping with the objectives of this study, the methodology has been designed to capture both the measurable and interpretive dimensions of how search engine optimisation operates as a trust building mechanism within the regulated Italian dermocosmetic and dietary supplement markets in the post COVID 19 era.

The complexity of the research problem requires a methodological strategy that can address not only the structural dimensions of online visibility but also the psychological, behavioural, and institutional dynamics that influence trust formation. For this reason, the study adopts a mixed method design. This approach is consistent with the growing consensus in communication and marketing research that phenomena located at the intersection of digital behaviour, regulation, and technology are best studied through the integration of quantitative and qualitative perspectives (Creswell & Plano Clark, 2018). Quantitative analysis provides generalisable evidence of patterns and trends, while qualitative investigation enables a deeper understanding of meanings, experiences, and contextual mechanisms. The two approaches, when combined systematically, produce findings that are both empirically grounded and theoretically rich.

The quantitative dimension of this study consists of two principal analyses. The first is a longitudinal examination of online search behaviour using data from Google Trends. This tool provides an indicator of public interest and information seeking patterns over time. By analysing keywords relevant to dermocosmetic and dietary supplement products, it becomes possible to trace how the Italian population's engagement with these categories has evolved from the pre pandemic years to the present. Keywords such as "acido ialuronico viso", "integratore vitamina D", and "cosmetici farmacia online" will be selected based on their market relevance and representativeness across both industries. These keywords will then be examined for relative search volume, seasonal variation, and spikes associated with specific events such as public health campaigns, product launches, or media attention. The longitudinal range will extend from 2018 to 2025, enabling a comparison between pre-COVID and post COVID search dynamics. This quantitative analysis will help identify structural changes in digital information seeking behaviour, which directly address the first research question regarding the evolution of consumer behaviour in regulated health and beauty markets.

The second quantitative component is a systematic Search Engine Results Page (SERP) audit. The audit examines how the top ten organic search results for the selected keywords appear to Italian users under standardised conditions (desktop mode, incognito browsing, neutral location setting). Each result will be coded along several dimensions: the type of domain (brand website, pharmacy, information portal, institutional source, media outlet), the presence of identifiable trust cues (author credentials, citations, privacy policies, legal disclaimers), and the degree to which each result reflects the principles of Google's E-E-A-T framework expertise, experience, authoritativeness, and trustworthiness. Each page will also be evaluated for explicit compliance with regulatory communication norms, such as the

correct use of product claims and the absence of misleading or unverifiable statements, as defined under EU Regulations 1924/2006 and 1223/2009. The coding procedure will follow a structured codebook, and reliability will be ensured by applying inter coder agreement checks. The purpose of this SERP audit is to measure how algorithmic visibility corresponds to trust related features and how compliance and credibility are represented in the digital environment.

The qualitative phase of the research complements the quantitative data by providing insight into the reasoning and perception behind the observed patterns. Two sources of qualitative evidence will be employed. The first consists of semi structured interviews with professionals working in the digital marketing or compliance departments of firms operating in the Italian dermocosmetic or dietary supplement industries. Potential participants may include professionals from pharmaceutical companies, dermocosmetic manufacturers, communication agencies specializing in regulated health content, or e commerce pharmacies. The interviews will focus on how these organizations conceptualize trust in their digital communication strategies, how they integrate SEO practices within compliance constraints, and how they evaluate the impact of regulation on creativity and authenticity. The second qualitative source, which may be implemented depending on feasibility, is a short online survey of Italian consumers designed to gather perceptions regarding online health related information. The survey will explore how consumers evaluate the credibility of search results, whether they notice and interpret trust cues such as expert attribution or scientific referencing, and how their reliance on online information compares with their trust in pharmacists, dermatologists, or other professionals.

This combination of methods provides both vertical and horizontal depth. The quantitative strand allows the measurement of observable phenomena changes in search behaviour and the structural characteristics of search results while the qualitative strand explores the meaning that consumers and practitioners assign to those phenomena. The study therefore operates within what can be described as a sequential explanatory design. The quantitative analyses will be conducted first in order to identify patterns that require deeper interpretation. The qualitative evidence will then be collected and analysed to explain and contextualise those patterns, enabling a comprehensive interpretation of how SEO and regulatory factors intersect in trust construction.

Data collection will proceed according to a clearly defined temporal structure. The Google Trends dataset will be extracted for the period between January 2018 and June 2025 to ensure a sufficient longitudinal window. The SERP audit will be carried out during a fixed period of at least two consecutive months to minimise variation due to algorithmic updates or seasonal effects. The interviews with professionals will be scheduled subsequently so that preliminary quantitative findings can inform the design of the interview questions. The consumer survey, if conducted, will be administered after the interview phase to incorporate insights gained from industry perspectives.

The integration of quantitative and qualitative evidence will take place in two ways. The first occurs at the level of interpretation, where the results of the Google Trends and SERP analyses

are compared and discussed together to reveal relationships between public information seeking and digital content visibility. The second occurs at the level of synthesis, where the qualitative findings are used to interpret the quantitative data and to refine the conceptual framework. This approach follows the guidelines for mixed method integration proposed by Fetters, Curry and Creswell (2013), who argue that true methodological complementarity requires the active dialogue of findings rather than the mere juxtaposition of results. The final stage of integration will take place in the discussion and conclusion chapters, where both strands will be combined to answer the research questions comprehensively.

Ensuring the quality of research involves considerations of validity, reliability, and ethics. For the quantitative analyses, construct validity will be established through the careful selection of keywords that accurately represent the Italian dermocosmetic and dietary supplement markets. Reliability will be ensured by using standardised procedures for data collection and coding. Internal validity will be tested through cross checking patterns across multiple keywords and data sources. For the qualitative component, credibility will be strengthened through triangulation between interviews and survey responses. Dependability will be enhanced through detailed documentation of interview protocols, transcription procedures, and thematic analysis. Confirmability will be addressed by maintaining a transparent chain of evidence from raw data to interpretation.

Ethical considerations are treated as an integral part of the research design. All interview participants will receive detailed information about the purpose of the study, the voluntary nature of their participation, and the measures taken to protect their anonymity. Informed consent will be obtained in written form. The interviews will not collect any sensitive personal data, and all audio recordings will be securely stored and deleted after transcription. The optional consumer survey will be conducted anonymously and will not request any identifying information. The study complies fully with the General Data Protection Regulation (GDPR) and with the ethical standards established by the host university. Because the research deals exclusively with publicly available digital data and voluntary interviews, no high-risk ethical issues are anticipated. Nonetheless, care will be taken to ensure that participants' professional identities are protected and that any potentially sensitive information regarding company practices is anonymised in the final report.

Certain limitations are acknowledged. The Google Trends dataset reflects relative search interest rather than absolute numbers, and it does not account for the demographics of searchers. The SERP audit represents a snapshot in time and may be influenced by algorithmic changes or user specific personalization, despite efforts to control for these factors through incognito searches. The interviews may involve a limited number of professionals due to time and accessibility constraints, and the consumer survey may not capture the full diversity of the Italian population. However, the use of multiple methods and the emphasis on triangulation mitigate these weaknesses and strengthen the overall robustness of the research.

In methodological terms, the approach adopted here is not merely descriptive but explanatory. The integration of quantitative pattern recognition and qualitative

interpretation aims to uncover not only how SEO practices and regulatory frameworks coexist but also why they function in particular ways in the post COVID marketplace. The combination of digital analytics and human insight allows the thesis to move beyond surface observations toward a deeper understanding of algorithmic trust, regulatory compliance, and consumer behaviour.

Ultimately, the methodological framework aligns closely with the research objectives. The analysis of Google Trends data responds directly to the objective of documenting changes in consumer behaviour. The SERP audit addresses the examination of SEO as a trust building mechanism. The interviews and survey respond to the objective of understanding how regulation and compliance shape digital communication strategies and consumer perceptions. Together, these methods produce an integrated and triangulated analysis that bridges the gap between technical digital metrics and socio-cultural interpretations of trust.

This methodological design also supports the theoretical ambition of the study, which is to move beyond an instrumental view of SEO as a purely technical or promotional marketing technique and to examine its function within broader processes of trust formation in digital environments. Within this perspective, SEO is approached as a trust optimization mechanism through which firms seek to align their content, visibility, and informational signals with the conditions under which credibility is evaluated in algorithmically mediated contexts. By combining behavioural data, content analysis, and interpretive insights, the thesis aims to show that trust in regulated health and beauty communication does not emerge from a single source, but rather from the interaction between algorithmically mediated visibility, regulatory transparency, and consumer interpretation. This approach recognises that, in contemporary digital markets, credibility is shaped through both technological systems and social practices, and is continuously negotiated at the intersection of platforms, regulation, and user behaviour.

1.5 Original Contribution

The originality of this research lies in its interdisciplinary integration of marketing communication, behavioural theory, and regulatory studies to examine the role of search engine optimisation (SEO) in processes of trust formation within regulated health-related markets. While existing scholarship has predominantly approached SEO as a technical or promotional tool aimed at increasing visibility and conversion rates, relatively little attention has been paid to its epistemic and communicative role in shaping credibility and trust, particularly in sectors where communication is legally constrained. This thesis addresses this gap by analysing how SEO practices operate within algorithmically mediated environments to influence how trust is constructed, interpreted, and negotiated among consumers, firms, and regulatory systems in the digital economy.

The first contribution of this work is conceptual. Rather than defining SEO as a trust architecture in itself, the thesis conceptualises SEO as a trust optimization mechanism through which firms seek to align their digital communication with the conditions under which credibility, transparency, and authority are evaluated in algorithmically mediated

contexts. In this perspective, trust is not generated by SEO alone, but emerges from the interaction between algorithmic visibility, regulatory compliance, and consumer interpretation. By drawing on theories of digital trust and algorithmic mediation, the study argues that SEO functions as a communicative interface that translates institutional signals, such as compliance with regulation, expertise, and scientific legitimacy, into forms of visibility that are recognised and prioritised by search environments.

This conceptual framework bridges behavioural theories of trust, including the Theory of Planned Behaviour (Ajzen, 1991), with the technological and regulatory mechanisms that shape how individuals access, evaluate, and act upon information online. In doing so, it provides an original lens for understanding how visibility becomes a meaningful proxy for credibility in digital environments characterised by information asymmetry and regulatory complexity, particularly in health-adjacent markets where trust is a central condition of consumption.

A second original contribution concerns the empirical application of this conceptual framework to the Italian dermocosmetic and dietary supplement markets, which together represent one of the most dynamic and regulated segments of the health and beauty industry. Although Italy plays a significant role in the European dermocosmetic and supplement sectors, academic research on their digital communication strategies remains limited. This study contributes new empirical evidence by combining Google Trends data, Search Engine Results Page (SERP) analysis, and qualitative insights from industry professionals to produce an integrated picture of post pandemic digital transformation. Through this combination, the thesis provides one of the first systematic assessments of how algorithmic trust and compliance-based communication interact in Italy's regulated health and beauty markets.

The research also makes a methodological contribution by developing a mixed method framework suitable for analysing digital trust in regulated contexts. While mixed method approaches are common in social science, their application to SEO and digital compliance studies remains rare. The sequential explanatory design adopted in this thesis demonstrates how quantitative indicators (such as search patterns and algorithmic visibility) can be meaningfully integrated with qualitative insights (such as managerial perceptions and consumer interpretations) to capture both the structural and interpretive dimensions of digital trust. This approach contributes to the methodological evolution of digital marketing research by providing a replicable model for future studies that aim to combine behavioural analytics with qualitative understanding in compliance sensitive sectors.

A further contribution lies in the theoretical synthesis between legal regulatory frameworks and digital marketing strategy. This thesis argues that compliance, far from being a limitation on innovation, can function as a strategic resource that enhances credibility and consumer trust. By analysing how firms translate legal requirements into communicative transparency through author attribution, scientific referencing, and content accuracy the study demonstrates that regulatory compliance can itself operate as a trust signal. This interpretation challenges the dominant perception of regulation as restrictive and proposes

a more constructive understanding of the relationship between compliance and creativity in digital communication. The findings are expected to provide evidence that regulatory frameworks, when integrated into SEO and content strategy, promote higher standards of information quality and strengthen consumer brand relationships.

The thesis also contributes to the ongoing scholarly debate on algorithmic mediation. Existing literature has emphasised the influence of algorithms in shaping visibility and access to knowledge, often conceptualising algorithms as gatekeepers that prioritise certain types of information while excluding others (Bucher, 2018). This study extends that discussion by showing how algorithmic systems such as Google's search engine not only mediate visibility but also participate in constructing trust hierarchies in regulated markets. By empirically demonstrating how E-E-A-T signals (expertise, experience, authoritativeness, trustworthiness) intersect with legal and behavioural norms, the thesis highlights the emergence of a new digital trust ecology, in which algorithmic design, legal compliance, and consumer perception are interdependent.

In addition to its conceptual, empirical, and theoretical contributions, the study provides practical and managerial implications for firms and policymakers. For companies operating in the dermocosmetic and dietary supplement industries, the findings will offer evidence-based guidance on how to design digital strategies that align algorithmic visibility with trust enhancing communication. The research emphasises that effective SEO in regulated contexts cannot rely solely on keyword optimisation or technical ranking factors but must incorporate content transparency, scientific literacy, and compliance-oriented design. The results are expected to help firms develop digital ecosystems that balance commercial objectives with ethical and regulatory responsibilities, thereby contributing to long term consumer trust and brand reputation.

For policymakers and regulators, the research offers insights into how regulatory frameworks shape the dynamics of online trust and information accessibility. By analysing the practical effects of EU regulations such as 1924/2006 and 1223/2009, along with the Digital Services Act and the General Data Protection Regulation (GDPR), the thesis highlights how the digital governance landscape can encourage more credible and responsible communication practices. It also identifies potential areas where current legislation could be refined to account for algorithmic mediation, suggesting that policy development should consider the role of search engines as active participants in the governance of digital trust.

The originality of the study is further reinforced by its temporal relevance. The COVID 19 pandemic marked a historical inflection point in digital behaviour, accelerating the migration of consumer trust from interpersonal to algorithmic forms. By situating the analysis within this post pandemic context, the thesis captures a transitional moment in which digital channels have become the dominant arenas of health and beauty communication. The combination of longitudinal and interpretive evidence ensures that the research not only reflects short term shifts but also traces the deeper structural evolution of trust in a society increasingly dependent on digital mediation.

Another significant contribution lies in the integration of cultural and behavioural dimensions specific to the Italian context. Italy's health and beauty markets are characterised by a strong tradition of professional mediation through pharmacists and physicians, and by consumers who value expertise, authenticity, and product safety. The shift toward online environments therefore carries unique implications for how trust is reconstituted. By examining the Italian case, this research provides insight into how national culture, regulatory philosophy, and market structure interact with global digital platforms. The findings have broader implications for other European countries that share similar regulatory and cultural characteristics, thereby extending the relevance of the study beyond Italy itself.

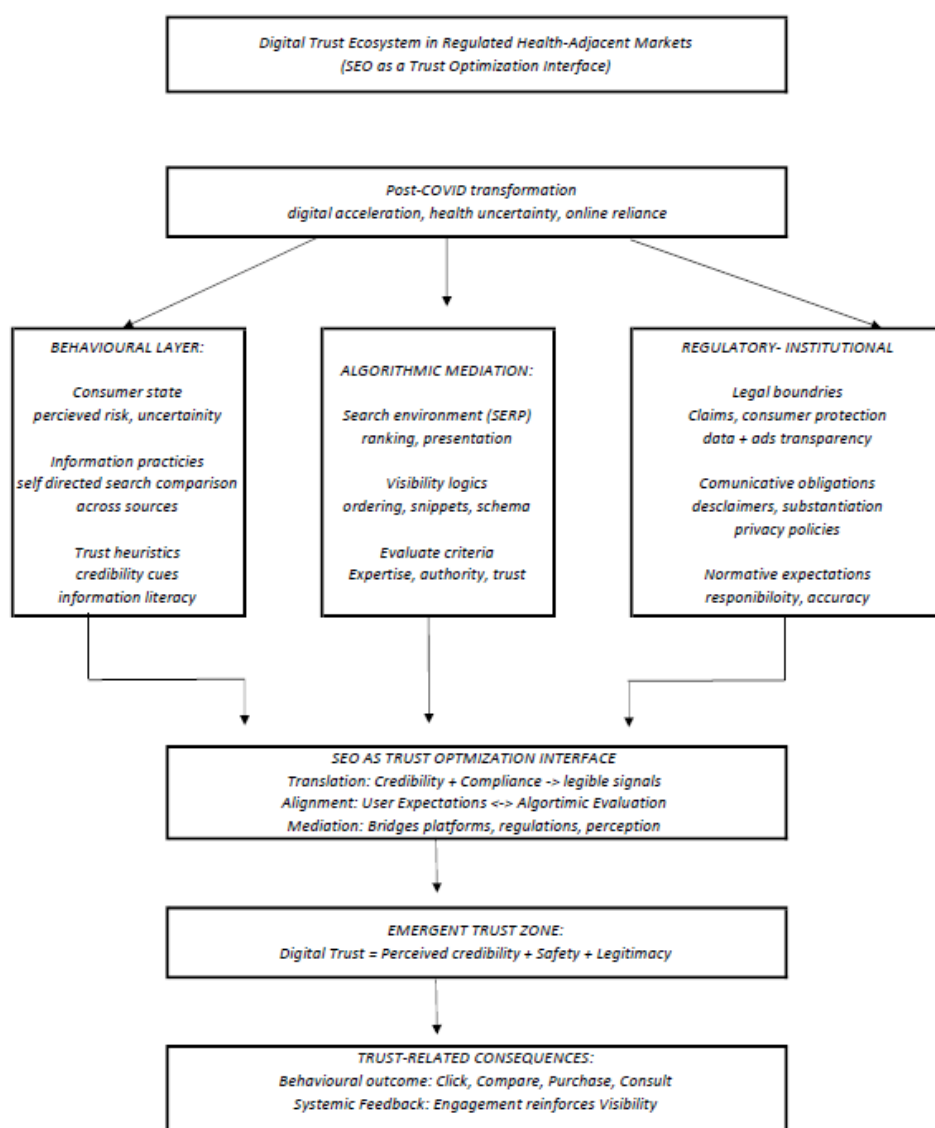
From an academic perspective, this thesis contributes to three streams of literature. Within marketing and communication studies, it extends the understanding of SEO by incorporating behavioural and regulatory variables into its conceptual model. Within trust and information theory, it demonstrates that algorithmic systems can serve as infrastructures of credibility when combined with transparency and compliance mechanisms. Within legal and regulatory scholarship, it provides a communication centred interpretation of compliance, reframing it as a dynamic component of consumer trust rather than a static constraint. Together, these contributions advance the interdisciplinary dialogue among marketing, behavioural science, and law.

Finally, the research contributes to the broader theoretical conversation about how trust operates in an era increasingly governed by data and algorithms. The thesis proposes that trust in digital health and beauty communication emerges through a hybrid process that combines algorithmic mediation, regulatory assurance, and human interpretation. This hybrid model challenges the binary opposition between human and technological trust, showing instead that credibility in digital markets depends on the alignment between algorithmic transparency, institutional legitimacy, and consumer cognitive heuristics. In this sense, the thesis situates SEO within a wider epistemological transformation of communication, where visibility, authority, and compliance converge to form a new architecture of digital trust.

In conclusion, the originality of this research lies in its integrated perspective, its empirical contribution to a largely underexplored national context, and its methodological approach combining quantitative and qualitative analysis. The thesis advances theoretical understanding by examining SEO not merely as a promotional technique, but as a trust optimization mechanism operating within algorithmically mediated and highly regulated digital environments. By bridging the domains of marketing communication, regulatory studies, and behavioural science, the research contributes to a deeper understanding of how credibility, transparency, and trust are constructed and negotiated in Italy's post-COVID dermocosmetic and dietary supplement markets. In doing so, it offers insights that are relevant both for academic scholarship and for the practical governance of responsible, compliant, and trustworthy digital communication in health and beauty-related sectors.

1.6 Conceptual Framework

The conceptual framework of this research provides the analytical structure through which the interaction between technology, regulation, and human perception is interpreted in the construction and negotiation of trust in digital health-adjacent markets. Rather than treating trust as a static attribute or a unidirectional outcome, the framework conceptualises trust as an emergent and dynamic process that develops at the intersection of behavioural dispositions, algorithmically mediated visibility, and institutional governance. This perspective is particularly relevant in regulated markets such as dermocosmetics and dietary supplements, where information asymmetry, legal constraints, and perceived risk play a central role in consumer decision-making.



At its core, the framework is grounded in the assumption that trust in health-related digital communication emerges from the interaction between behavioural, technological, and institutional forces. The first dimension of the model is behavioural and focuses on how consumers seek, evaluate, and internalise information in contexts characterised by uncertainty and limited direct verifiability. Classical models of consumer behaviour, including the Theory of Planned Behaviour (Ajzen, 1991), the Health Belief Model (Rosenstock, 1974), and the Engel–Blackwell–Miniard model, highlight that decision-making is shaped by attitudes, perceived control, subjective norms, and external credibility cues. In regulated health-adjacent markets, these cues have traditionally been provided by human experts, such as pharmacists or dermatologists, and by the reputational authority of institutions. Digital transformation has progressively altered this configuration by introducing new, non-human cues of credibility that influence how expertise, reliability, and legitimacy are perceived.

The second dimension of the framework is technological and centres on algorithmic mediation. Search engines and digital platforms have become primary gateways to health and beauty information, functioning as infrastructural intermediaries that order, filter, and prioritise knowledge. As discussed in scholarship on algorithmic visibility, algorithms do not merely retrieve information but actively shape which sources are encountered and how credibility is inferred through ranking, presentation, and contextual signals (Bucher, 2018; Noble, 2018). Within this environment, algorithmic systems establish conditions of visibility that implicitly encode notions of authority and trustworthiness. Google’s E-E-A-T framework (Expertise, Experience, Authoritativeness, and Trustworthiness) exemplifies this logic, particularly in domains classified as “Your Money or Your Life,” where information may have consequences for health-related decision-making. In this thesis, E-E-A-T is interpreted not simply as a ranking guideline, but as an evaluative structure through which algorithmic systems operationalise expectations of credibility, expertise, and compliance.

The third dimension of the framework is institutional and regulatory. European and Italian legal frameworks governing cosmetics, dietary supplements, data protection, and digital services establish the normative boundaries within which digital communication occurs. Regulations such as Regulation (EC) No 1924/2006, Regulation (EC) No 1223/2009, Decreto Legislativo 169/2004, the General Data Protection Regulation, and the Digital Services Act define permissible claims, disclosure requirements, transparency obligations, and responsibilities of digital intermediaries. Within this context, compliance functions not only as a legal obligation but also as a communicative signal. Elements such as the correct use of authorised claims, references to scientific evidence, the inclusion of disclaimers, and transparent data practices contribute to signalling responsibility and legitimacy. When these elements are embedded into digital content and websites, they become part of the informational environment through which trust is evaluated.

The conceptual model proposed in this thesis visualises the interaction among these three dimensions as a dynamic system rather than a linear sequence. At the centre of the framework lies the construct of digital trust, understood as the outcome of continuous interactions among consumers, algorithmic systems, and institutional norms. Surrounding

this central construct are three interconnected spheres. The behavioural sphere includes variables such as search motivation, perceived credibility, prior knowledge, and information literacy. The technological sphere encompasses algorithmic mediation, visibility, content ranking, and platform-based evaluation criteria. The institutional sphere includes regulatory frameworks, compliance mechanisms, and ethical standards governing digital communication. The overlap among these spheres represents the space in which trust is co-produced through behavioural interpretation, algorithmic ordering, and regulatory legitimacy.

In the visual representation of the framework, bidirectional arrows connect all three spheres, indicating that influence flows in multiple directions. Consumer behaviour shapes algorithmic outcomes through engagement, selection, and interaction patterns, while algorithmic systems shape consumer perception by determining informational salience and accessibility. Regulation structures both algorithmic design and consumer expectations by defining standards of accuracy, accountability, and transparency, while feedback from market practices and user behaviour may inform regulatory adaptation over time. The central overlapping area does not represent SEO itself, but the algorithmically mediated trust environment within which credibility is constructed.

Within this framework, search engine optimisation is conceptualised as a trust optimization mechanism rather than as a trust architecture. SEO functions as the strategic and communicative practice through which firms seek to align their content, structure, and signals with the behavioural expectations of users, the evaluative logic of algorithmic systems, and the constraints imposed by regulation. By optimising content according to E-E-A-T principles and compliance requirements, firms translate institutional credibility into forms of algorithmic visibility that are more likely to be encountered and interpreted as trustworthy. This process operates as a feedback loop: visible and credible content generates user engagement, which reinforces algorithmic prioritisation, while search platforms continuously refine their evaluative criteria to emphasise signals associated with authority, transparency, and reliability.

The framework also incorporates insights from the theory of credence goods, which describes markets in which consumers cannot directly assess product quality even after consumption. In such contexts, trust relies on indirect indicators such as expert endorsement, certification, and institutional reputation. Digital environments extend this logic by introducing algorithmic indicators of credibility, including ranking position, domain authority, and citation patterns. In the Italian dermocosmetic and dietary supplement markets, where trust has historically been mediated by pharmacists and healthcare professionals, algorithmic systems increasingly occupy a complementary role in shaping perceptions of expertise. The framework captures this shift by illustrating how interpersonal and institutional trust is progressively supplemented by algorithmic mediation, while remaining anchored in regulatory legitimacy.

A final dimension of the framework is temporal and contextual, reflecting the impact of the COVID-19 pandemic. The post-pandemic period represents not only a technological acceleration but also a cultural and psychological transformation in how consumers engage

with health-related information. During the pandemic, reliance on digital platforms intensified, and the credibility of online information became a central concern for consumers, institutions, and regulators alike. The framework therefore situates its analysis within this historical context, recognising that contemporary configurations of digital trust are shaped by heightened expectations of transparency, reliability, and accessibility. The Italian market offers a particularly instructive case due to its combination of strong regulatory oversight, deeply rooted professional trust traditions, and rapid digital expansion following the pandemic.

By integrating behavioural, technological, regulatory, and temporal dimensions, the conceptual framework provides a coherent interpretative lens for analysing how trust is produced, negotiated, and sustained in digital health and beauty markets. Trust is understood not as a fixed attribute, but as a dynamic outcome of interactions among consumers, firms, algorithms, and regulatory institutions. Within this system, SEO operates as a mediating practice that optimises the translation of credibility and compliance into algorithmic visibility. This integrated perspective establishes continuity between the theoretical foundations discussed in Chapter Two, the regulatory analysis in Chapter Three, the methodological operationalisation in Chapter Four, and the interpretation of empirical findings in the final chapters.

1.7 Thesis Structure Overview

This final section provides an overview of the structure of the thesis and explains how the argument develops across the subsequent chapters. Each chapter has been designed to contribute to the central objective of analysing search engine optimisation as a trust architecture in Italy's regulated dermocosmetic and dietary supplement markets, while maintaining a logical progression from contextual foundation to empirical findings and theoretical reflection.

Chapter One establishes the foundation of the research by presenting the background, rationale, objectives, and methodological design. It introduces the conceptual and empirical relevance of studying digital trust in regulated markets and defines the specific focus of the thesis within the post pandemic Italian context. Through the identification of research gaps and the formulation of the guiding questions, this opening chapter outlines the analytical direction that informs the rest of the work.

Chapter Two develops the theoretical framework underpinning the study. It examines the principal theories of consumer behaviour, digital trust, and algorithmic mediation that inform the interpretation of SEO as a communicative and behavioural mechanism. The discussion begins with classical models of decision making and trust formation, including the Theory of Planned Behaviour, the Health Belief Model, and the Engel Blackwell Miniard model, before moving toward more recent theories that address algorithmic environments and digital credibility. The chapter then introduces the concept of E-E-A-T as a central construct in Google's trust evaluation system and relates it to the broader academic understanding of credibility and authority online. This theoretical foundation supports the development of the

conceptual framework by showing how trust operates at the intersection of behaviour, technology, and information regulation.

Chapter Three shifts the focus to the legal and market dimensions that frame the research. It provides a detailed analysis of the Italian dermocosmetic and dietary supplement sectors, outlining their economic significance, structural characteristics, and patterns of digital transformation since the COVID 19 pandemic. The chapter then examines the regulatory frameworks that govern communication and marketing practices in these industries. It reviews European and national laws, including EU Regulations 1924/2006 and 1223/2009, the Italian Legislative Decree 169/2004, and the more recent governance instruments such as the General Data Protection Regulation and the Digital Services Act. By connecting these legal frameworks to the practical realities of digital communication, the chapter illustrates how compliance shapes the boundaries of credibility and the possibilities of trust in online environments.

Chapter Four constitutes the methodological core of the thesis. It describes in detail the mixed method design that combines quantitative and qualitative techniques to capture both the structural and interpretive dimensions of digital trust. The quantitative components include a longitudinal analysis of Google Trends data from 2018 to 2025 and a systematic audit of Search Engine Results Pages for relevant keywords in the Italian market. The qualitative components include semi structured interviews with industry professionals and, where feasible, a micro survey of Italian consumers. The chapter explains the rationale for selecting this mixed design, outlines the data collection and coding procedures, and discusses validity, reliability, and ethical considerations. The methodological approach provides the foundation for the analytical and interpretive work presented in the subsequent chapter.

Chapter Five presents and interprets the results of the empirical research. The first section reports the quantitative findings from the Google Trends and SERP analyses, identifying longitudinal patterns in search behaviour and visibility, as well as the distribution of trust cues and compliance indicators in online content. The second section interprets these results through the lens of the qualitative evidence, analysing how industry professionals and consumers perceive digital trust and regulatory communication. The discussion integrates both forms of data to answer the research questions formulated in Chapter One. By doing so, it highlights the mechanisms through which SEO functions as a trust building process and explores the ways in which compliance and algorithmic mediation interact to sustain credibility in regulated markets. It also concludes the thesis by synthesising the findings, and proposing directions for future research. It summarises how each research question has been addressed and how the results contribute to the conceptualisation of SEO as a trust architecture. It also outlines recommendations for policymakers and regulators, suggesting how future governance frameworks might adapt to the challenges of algorithmic mediation and digital trust. Finally, the chapter identifies the study's limitations and proposes future lines of inquiry.

Chapter 2: Theoretical Framework: Trust, Behaviour, and Algorithmic Mediation

This chapter develops the theoretical foundation of the thesis and situates the research within the broader academic discourse on consumer behaviour, trust, and algorithmic mediation in digital communication. The objective is to construct an integrated theoretical model that explains how search engine optimisation (SEO) functions as a trust building mechanism in the regulated Italian dermocosmetic and dietary supplement markets. The chapter brings together three main strands of theory: behavioural models that describe how consumers make decisions in health-related contexts, conceptual approaches to digital trust and information asymmetry, and the emerging scholarship on algorithmic mediation and visibility.

The study of trust in digital health and beauty communication requires an interdisciplinary theoretical base. On one side, the psychology of consumer decision making offers explanatory models for understanding the motives and attitudes that guide individual behaviour. On the other, theories of information systems and media mediation reveal how algorithmic technologies and digital platforms influence the flow, credibility, and hierarchy of information. Finally, the legal and regulatory dimension provides a structural frame within which digital communication occurs, setting limits and standards that influence how trust is constructed and maintained. Together, these perspectives allow for a multidimensional interpretation of SEO as a communicative, behavioural, and regulatory phenomenon.

The first part of the chapter revisits foundational theories of consumer behaviour that are particularly relevant to health and beauty contexts. These include the Theory of Planned Behaviour (Ajzen, 1991), the Health Belief Model (Rosenstock, 1974), the Engel Blackwell Miniard model of consumer decision making, and the concept of credence goods. Each of these theories provides a specific lens through which to interpret how consumers form attitudes, intentions, and trust in products whose effects are not immediately verifiable. By connecting these behavioural frameworks to the dynamics of information search and evaluation, the section establishes the psychological and cognitive foundations of digital trust.

The second part examines the notion of digital trust and the problem of information asymmetry in online health communication. It explores how the transition from interpersonal trust traditionally established through pharmacists, dermatologists, or physicians to algorithmic trust mediated by search engines has transformed the mechanisms through which credibility is assessed. The discussion draws on contemporary studies of digital trust formation, online authority signals, and the impact of transparency, expertise, and authenticity on consumer confidence. Within this context, the principles of E-E-A-T (Expertise, Experience, Authoritativeness, and Trustworthiness) are introduced as an essential framework that connects behavioural theory to algorithmic design.

The third part of the chapter situates SEO within the broader discussion of algorithmic mediation. Here, algorithms are not treated merely as technical instruments but as socio

informational systems that shape what is visible, credible, and knowable in digital environments. The literature on algorithmic governance, information politics, and visibility will be used to conceptualise SEO as an architecture of influence that mediates between corporate communication, user perception, and regulatory frameworks. By analysing how algorithms prioritise certain content types and suppress others, this section highlights the mechanisms through which trust is constructed at the structural level of digital platforms.

Finally, the chapter synthesises these theoretical strands into an integrated conceptual model that underpins the empirical analysis of the thesis. The model proposes that trust in digital health and beauty communication emerges from the dynamic interaction of three core dimensions: consumer behaviour and psychological motivation, algorithmic mediation and visibility, and legal and regulatory compliance. This synthesis establishes the theoretical basis for understanding SEO not simply as a marketing technique but as a socio technical system that both reflects and produces trust in regulated digital markets.

2.1 Consumer Behavior in Health and Beauty

The study of consumer behaviour in the health and beauty sectors is particularly pertinent to this research because it involves consumption decisions that are deeply tied to trust, uncertainty and expertise. In markets such as dermocosmetics and dietary supplements, consumers often face high information asymmetry, do not always have direct means to verify product efficacy, and rely on expert cues or third-party signals of credibility. The following section examines four major theoretical frameworks namely, the Theory of Planned Behaviour, the Health Belief Model, the Engel Blackwell Miniard model of consumer decision making, and the theory of credence goods to establish a robust foundation for analysing how consumers act, search, decide and trust in these regulated environments.

Theory of Planned Behaviour

The Theory of Planned Behaviour proposes that human action is guided by intentions which, in turn, are jointly determined by attitudes toward the behaviour, subjective norms, and perceived behavioural control. Behaviour is predicted by intention and, when volitional control is limited, also directly by perceived behavioural control. Each proximal predictor is itself grounded in a corresponding set of beliefs: behavioural beliefs about likely outcomes and their evaluations, normative beliefs about referent expectations and motivation to comply, and control beliefs about facilitators or barriers and their perceived power (Ajzen, 1991). The theory extends the earlier Theory of Reasoned Action by adding perceived behavioural control in order to account for non-volitional constraints and has since become one of the most widely applied frameworks in health decision making and consumer contexts (Ajzen, 1991; Ajzen, 2020).

Attitude in the model refers to the individual's overall evaluation of performing the behaviour. In dermocosmetic and dietary supplement consumption, attitude is shaped by beliefs about benefits such as improved appearance, skin health, or wellbeing, balanced

against beliefs about risks including adverse effects, cost, or ineffectiveness. Subjective norms denote perceived social expectations from important others. In these markets, sources that construct norms include pharmacists, dermatologists, family, peers, and increasingly digital opinion leaders and reviewers who can confer descriptive or injunctive expectations about correct product use. Perceived behavioural control captures the perceived ease or difficulty of performing the behaviour and reflects both self-efficacy and controllability. Ajzen explicitly decomposes this construct into confidence in one's capability and beliefs about the presence of facilitating or inhibiting conditions outside personal control, arguing that valid measurement should include both components rather than treating perceived behavioural control as synonymous with self-efficacy alone (Ajzen, 2002). In an online health beauty environment, perceived behavioural control encompasses the user's confidence in evaluating search results, understanding ingredient claims, comparing alternatives, handling payment and delivery, and complying with safe use instructions, alongside external conditions such as website reliability, return policies, and platform transparency.

The evidence base for the theory is extensive. A landmark meta-analysis integrating studies across domains reported that the predictors specified by the model explain substantial variance in intentions and meaningful variance in behaviour, with attitude, subjective norms, and perceived behavioural control all contributing uniquely to intention and with perceived behavioural control exerting an additional, though smaller, direct effect on behaviour when control is imperfect (Armitage & Conner, 2001). In health applications, prospective tests confirm that intention is a consistent predictor of subsequent action, although the size of this effect varies with factors such as the time lag, the specificity with which behaviour is defined, and the stability of intentions over time. A meta-analysis of meta-analyses reported a sample weighted correlation of approximately .53 between intention and behaviour, while noting systematic moderators of this relationship and the importance of planning processes to translate intention into action (Sheeran, 2016; see also Sheeran, 2002). Updated summaries and clarifications by the theory's author emphasise that distal variables such as personality, demographics, or exposure to communication influence behaviour indirectly through their impact on salient beliefs and therefore should not be added as ad hoc predictors unless justified by belief change mechanisms, in order to preserve parsimony and explanatory coherence (Ajzen, 2020).

The principle of compatibility requires that measures of attitude, norms, perceived behavioural control, intention, and behaviour correspond on the same action, target, context, and time. Indirect belief-based measures should be elicited from the population under study to capture modal salient beliefs rather than imported wholesale from other contexts. For perceived behavioural control, both self-efficacy items and controllability items should be included to reflect the two lower order components identified by Ajzen, with internal consistency assessed separately and jointly (Ajzen, 2002). In regulated health beauty consumption, compatibility implies that if the focal behaviour is, for instance, purchasing and using a hyaluronic acid serum sourced through search results during the next month, then each construct and the behavioural criterion need to be specified at that level of granularity.

Failure to maintain compatibility typically attenuates predictive relations and can be mistaken for theoretical weakness.

The theory has also been the subject of critique. Some authors have argued that the framework underestimates the role of habits, emotions, and non-conscious processes in health behaviour and have suggested that its predictive success is insufficient to guide intervention design on its own (Sniehotta, Pesseau, & Araújo Soares, 2014). In response, Ajzen notes that the model was not intended as a closed system for every determinant of action, that additional variables may be incorporated when they improve prediction and have a plausible link to belief formation, and that many alleged gaps reflect issues of measurement compatibility, temporal instability of intentions, or inadequate operationalisation of perceived behavioural control rather than limitations of the theory per se (Ajzen, 2014; Ajzen, 2020). The debate is informative for this thesis because it highlights the conditions under which TPB performs best, namely when constructs are measured compatibly, belief structures are properly elicited, and volitional control is realistically assessed.

Within dermocosmetic and supplement decisions, TPB offers a granular map of how digital communication and search environments shape behaviour by acting on underlying beliefs. Search engine visibility and on page trust cues can strengthen positive outcome beliefs and weaken negative beliefs, thereby shifting attitudes. The prominence of expert sources and reputable domains can recalibrate subjective norms by signalling what important referents recommend or what most people like oneself are doing. Clear instructions, transparent privacy policies, and compliant claims can increase perceived behavioural control by enhancing self-efficacy and signalling supportive external conditions. The model also clarifies how regulatory communication and compliance disclosures exert influence: they act on control and outcome beliefs by reducing perceived barriers and increasing perceived benefits, which then raise intention and the likelihood of behaviour. In other words, SEO and compliant content do not bypass human psychology; they work through the TPB pathways of belief formation and revision.

Meta analytic work points to several moderators that are particularly relevant for digitally mediated, regulated consumption. Past behaviour and habit can attenuate the intention behaviour relation when established routines dominate, suggesting that interventions need to disrupt or reroute habits through cues and planning. Shorter time lags between intention measurement and behaviour observation yield stronger predictive relations, which implies that campaigns timed close to decision points may be more effective. Greater specificity and stability of intentions also improve prediction, which supports the use of commitment devices and implementation intentions to bridge the intention behaviour gap. For perceived behavioural control, contexts with greater external constraints show a stronger direct effect of perceived control on behaviour, which is likely in regulated categories where checkout frictions, verification steps, and information requirements are salient (Armitage & Conner, 2001; Sheeran, 2016).

For the purposes of the present thesis, TPB will inform both the conceptual framing and, where applicable, the measurement strategy in the optional consumer survey. Attitudes will

be assessed through belief-based items reflecting expected benefits and risks of using specific dermocosmetic and supplement products discovered via search. Subjective norms will consider pharmacist and dermatologist expectations alongside family, peers, and online influencers. Perceived behavioural control will include self-efficacy in evaluating search results, understanding claims, and following usage instructions, as well as controllability regarding platform reliability, delivery, and return policies. Intention will be defined at a specific action target context time level that matches the behavioural criterion. This operationalisation allows empirical testing of how SEO driven trust cues and compliance-oriented content align with the psychological mechanisms specified by the theory and whether changes in beliefs translate into changes in intention and behaviour in the Italian post pandemic market.

By articulating how attitudes, norms, and perceived behavioural control are shaped by algorithmically mediated information environments, the Theory of Planned Behaviour provides a rigorous, testable account of the pathways through which SEO and compliant digital communication can function as a trust architecture in regulated health and beauty consumption (Ajzen, 1991; Ajzen, 2002; Armitage & Conner, 2001; Sheeran, 2016; Ajzen, 2020).

Health Belief Model

The Health Belief Model (HBM) is one of the earliest and most influential frameworks for explaining and predicting health related behaviour. Developed in the 1950s by a group of social psychologists working for the U.S. Public Health Service and later formalised by Irwin M. Rosenstock (1966; 1974), the model was originally designed to explain why individuals failed to participate in preventive health programs, such as tuberculosis screening, despite free availability and clear medical benefit. Over the decades, the HBM has become a foundational framework in health psychology, preventive medicine, and health communication, used to study behaviours ranging from vaccination and dietary adherence to cosmetic surgery and supplement consumption (Champion & Skinner, 2008; Janz & Becker, 1984; Alyafei & Easton Carr, 2024).

At its core, the HBM posits that health related action depends on the simultaneous operation of several cognitive constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and, in later revisions, self-efficacy (Rosenstock, 1974; Becker & Maiman, 1975; Champion & Skinner, 2008). Perceived susceptibility refers to an individual's subjective belief about their likelihood of developing a health problem or being affected by a particular condition. Perceived severity involves beliefs about the seriousness of that condition and its potential consequences. Perceived benefits refer to the individual's assessment of the value or effectiveness of taking a specific action to reduce risk or severity. Perceived barriers represent the individual's evaluation of the obstacles or costs financial, psychological, informational, or social that might impede the action. Cues to action are external or internal triggers that prompt the individual to engage in health behaviour, such as symptoms, advice from others, advertising, or media coverage. Finally, self-efficacy,

introduced by Bandura (1977) and incorporated into the model by Rosenstock, Strecher, and Becker (1988), represents confidence in one's ability to successfully perform the behaviour.

According to the HBM, individuals are more likely to engage in a health related action when they perceive themselves as susceptible to a condition, when they believe the condition has serious consequences, when they believe the benefits of the action outweigh the barriers, when they are exposed to a cue that prompts action, and when they feel confident in their ability to act. The model thus conceptualises behaviour as a rational, expectancy driven process, in which individuals weigh perceived threats against perceived benefits and costs (Rosenstock, 1974; Champion & Skinner, 2008).

The model's explanatory power has been validated across a wide range of empirical contexts. A meta-analysis by Carpenter (2010), covering over 18,000 participants, found that perceived barriers were the most powerful predictor of behaviour, followed by perceived benefits and perceived susceptibility, while perceived severity was relatively weaker but still significant in influencing intentions. More recent reviews continue to confirm the model's robustness, although they note that predictive strength varies by behaviour type and cultural context (Alyafei & Easton Carr, 2024). This is particularly relevant to cosmetic and wellness behaviours, where motivation is often driven by perceived self-improvement rather than avoidance of disease, but the same cognitive structure applies.

In dermocosmetic and dietary supplement consumption, the HBM offers a particularly suitable framework because it addresses both the health related and aesthetic dimensions of behaviour. Consumers often perceive a threat not in terms of illness but in terms of physical or social vulnerability for example, ageing skin, fatigue, or vitamin deficiency. Perceived susceptibility may thus involve subjective feelings of risk about appearance or vitality, while perceived severity may include concerns about attractiveness, professional presentation, or self-esteem. The perceived benefits involve beliefs that a product can prevent or reverse these undesirable conditions, such as a cream that reduces wrinkles or a supplement that boosts immunity. Perceived barriers may include the cost of products, scepticism about efficacy, distrust in online information, or concern over side effects. In digital markets, barriers also extend to informational overload and the difficulty of distinguishing reliable from unreliable content.

The notion of cues to action has particular resonance in the post COVID digital landscape. Online health communication, social media algorithms, and search engines have become dominant cues, constantly triggering interest and perceived need. A user's exposure to search results such as "Best hyaluronic acid serums 2025" or "Top vitamin D supplements for immune health" can act as a digital cue to action. Such cues operate not only at the cognitive level but also at an emotional one, activating latent concerns about self-care, beauty, and wellbeing. The HBM provides a framework for understanding how such cues convert latent needs into intention and action.

Self-efficacy, introduced as a key construct in later versions of the model, is particularly important in explaining digital health behaviour. Consumers must navigate complex online

environments, interpret ingredient lists, evaluate sources, and make purchases through digital interfaces. Those with higher digital literacy and health knowledge tend to report greater confidence and are thus more likely to act on their intentions (Bandura, 1997; Alyafei & Easton Carr, 2024). Conversely, low self-efficacy can act as a barrier, leading to avoidance of digital search or over reliance on unverified sources. In regulated markets such as dermocosmetics and dietary supplements, where information is constrained by legal compliance requirements, the clarity and accessibility of online communication can significantly enhance perceived self-efficacy and thus influence consumer trust.

The HBM's relevance also extends to understanding consumer segmentation. Studies have shown that individuals differ systematically in their perception of susceptibility and severity, often based on demographic and psychological characteristics. For example, women tend to perceive higher susceptibility to skin or ageing issues and may demonstrate stronger benefit perceptions for cosmetic interventions (Hansen & Jensen, 2020). Younger consumers, on the other hand, may perceive lower susceptibility to health risks but higher benefits from aesthetic enhancement or social approval. In Italy, where dermocosmetic and supplement consumption is widespread and culturally integrated with wellness identity, these perceptions are shaped by both cultural norms and media narratives about health and appearance (Cosmetica Italia, 2024).

Moreover, the HBM aligns closely with the concept of perceived trust, which functions as a cross-cutting construct across the model's components. When consumers believe that online sources are credible, they are more likely to perceive benefits as real and barriers as low. Trust acts as a heuristic that simplifies decision making under uncertainty (Siegrist & Cvetkovich, 2000). In this way, the model implicitly recognises that trust operates both as a determinant of belief formation and as a mediator between beliefs and behaviour. In the digital environment, cues of expertise, scientific referencing, and regulatory compliance can serve as trust signals that strengthen perceived benefits and reduce perceived barriers, thereby increasing the likelihood of purchase or engagement.

While the HBM has enduring value, it has also faced critical reassessment. One limitation often discussed in the literature is its focus on cognitive evaluations, which may neglect affective and social dimensions of behaviour (Conner & Norman, 2022). In contemporary digital markets, where consumption is influenced by aesthetics, social media exposure, and emotion driven engagement, purely cognitive models may not fully capture behavioural drivers. Nonetheless, the model remains powerful when complemented by theories such as the Theory of Planned Behaviour, which adds the construct of subjective norms, or by models of algorithmic mediation, which capture how external digital systems shape perceived barriers and benefits.

Applied to the dermocosmetic and supplement markets, the Health Belief Model helps explain why consumers act in ways that often appear inconsistent with objective medical evidence. For instance, despite limited scientific proof for some over the counter supplements, perceived benefits amplified by online testimonials or expert endorsements may outweigh perceived barriers. Similarly, compliance disclaimers or visible certification

marks may reduce perceived risk and increase the likelihood of purchase. Regulatory communication thus plays a role in shaping each component of the model: it influences perceived susceptibility (by framing risks), perceived severity (by emphasising consequences), perceived benefits (through evidence-based claims), and perceived barriers (by providing reassurance of safety and compliance).

In sum, the HBM provides a comprehensive cognitive framework for analysing health and beauty consumption in digital contexts. It demonstrates that consumer behaviour is not purely impulsive but structured by perceived threats, perceived efficacy, and perceived confidence. When integrated with digital trust and algorithmic mediation theories, the model supports the idea that SEO and compliance-based communication act as “cues to action” and as mechanisms that shape the perceived benefits and barriers of engagement. This understanding situates consumer decision making within a regulated trust architecture in which information quality, credibility, and transparency directly influence behaviour (Rosenstock, 1974; Champion & Skinner, 2008; Carpenter, 2010; Alyafei & Easton Carr, 2024).

Engel Blackwell Miniard Model of Consumer Decision Making

The Engel, Blackwell, and Miniard Model, often referred to as the EBM model, is one of the most comprehensive frameworks for understanding consumer decision making processes. It emerged from earlier studies of buyer behaviour in the 1960s, initially presented by Engel, Kollat, and Blackwell, and was later refined in the 1990s by Engel, Blackwell, and Miniard (1995). The model conceptualises consumer behaviour as a continuous and dynamic process that involves psychological, social, and environmental influences interacting at various stages of decision making. It seeks to explain not only what consumers purchase but also how and why they make these purchasing decisions, by mapping the sequence of mental and behavioural activities that occur from need recognition to post purchase evaluation.

According to the EBM model, consumer decision making begins with the recognition of a problem or need. This stage occurs when an individual perceives a gap between their actual and desired state. In the context of dermocosmetic and dietary supplement products, problem recognition often arises when consumers perceive a discrepancy between their current health or aesthetic condition and an ideal one. For instance, a person may notice signs of skin ageing or a lack of energy and interpret this as a signal that they need a specific product. This awareness can be stimulated by internal factors, such as self-observation, or by external stimuli, including advertising, influencer marketing, or online content. Digital platforms play a significant role in this initial stage, as search engines and targeted advertisements constantly present new needs or solutions that activate the consumer’s awareness (Blackwell, Miniard, and Engel, 2001).

Once a need has been recognised, consumers engage in an information search to reduce uncertainty and identify available solutions. The EBM model distinguishes between internal search, which draws on memory and prior experience, and external search, which involves gathering information from external sources. In regulated markets such as dermocosmetics

and dietary supplements, the external search process is particularly prominent, because consumers often lack sufficient personal expertise to evaluate complex claims or ingredients. This makes them dependent on external sources such as pharmacists, dermatologists, brand websites, online reviews, and search engines. With the expansion of digital technology, this phase has become more intensive and central to the overall decision process. Consumers now compare multiple sources, evaluate conflicting claims, and use search engines as primary gatekeepers of information. Recent studies have confirmed that the digitalisation of consumer behaviour has expanded the search stage, transforming it into a continuous process rather than a single event (Ashman, Solomon, and Wolny, 2015).

After gathering information, consumers enter the stage of evaluating alternatives. In this phase, they compare various products or brands based on attributes that they consider relevant. The EBM model emphasises that evaluation is influenced by psychological, personal, and contextual factors such as attitudes, motivation, time constraints, and social influence (Engel, Blackwell, and Miniard, 1995). In health and beauty markets, evaluation often depends on both tangible attributes, such as price and formulation, and intangible cues, such as credibility, expert endorsement, and online visibility. Because dermocosmetic and dietary supplement products are often associated with credence qualities that cannot be verified before or after use, consumers tend to rely on surrogate indicators of quality, such as packaging, reputation, compliance certifications, and scientific claims. In digital contexts, evaluation is also affected by algorithmic factors, since search engine ranking, domain authority, and website presentation strongly influence perceived trustworthiness. Thus, the model allows for the integration of algorithmic mediation and trust cues into the cognitive evaluation process.

The next stage in the model is the purchase decision. This occurs when the consumer selects one alternative and proceeds with the transaction. The EBM model describes this as the outcome of prior stages but also acknowledges that situational variables, emotional states, and environmental conditions may intervene. For dermocosmetic and dietary supplement consumers, the decision involves not only choosing the product but also determining where and how to buy it. Digitalisation has diversified purchasing pathways: consumers may buy from pharmacy websites, e-commerce platforms, or directly from brand sites. Algorithmic visibility, ease of navigation, and digital trust cues influence the moment of decision by shaping what options are most salient and perceived as reliable. The purchase decision therefore cannot be isolated from the technological context in which it takes place, and the EBM model, although developed before the digital era, provides a structure flexible enough to incorporate these new determinants.

Following the purchase, consumers enter the post purchase phase, which the EBM model identifies as a crucial determinant of future behaviour. In this stage, individuals evaluate whether the product has met their expectations, experience satisfaction or dissatisfaction, and decide whether to repurchase or recommend the product. In the digital context, post purchase behaviour extends beyond personal evaluation to include online sharing and feedback, such as reviews, ratings, and social media discussions. These activities have a

significant recursive effect, influencing other consumers' problem recognition and evaluation processes. Engel, Blackwell, and Miniard (1995) describe this feedback loop as essential for understanding the cyclical nature of consumer behaviour. It also aligns closely with contemporary concepts of digital ecosystems, where consumer generated content contributes to collective perceptions of credibility and product value.

The EBM model's strength lies in its integrative perspective. It combines cognitive, emotional, and situational dimensions of decision making, offering a comprehensive view of how consumers move from recognising a need to evaluating satisfaction. However, some scholars have criticised the model for its linear structure, arguing that consumer decisions, particularly in digital contexts, are iterative and influenced by continuous exposure to new stimuli (Ashman, Solomon, and Wolny, 2015). This critique is especially relevant for health and beauty markets, where consumers are constantly confronted with updated information, influencer opinions, and algorithmically curated recommendations. Nevertheless, rather than invalidating the model, this critique suggests that the EBM framework can be adapted to contemporary realities by acknowledging that decision stages often overlap and recur.

Applied to the Italian dermocosmetic and dietary supplement industries, the EBM model provides valuable interpretative power. The initial stage of problem recognition corresponds to the increased awareness of wellness and self-care observed after the COVID 19 pandemic, when Italian consumers began to perceive personal health and appearance as central to their overall quality of life (Cosmetica Italia, 2024). The information search process is now dominated by digital exploration, where consumers consult search engines and institutional websites to reduce perceived uncertainty. Evaluation of alternatives heavily depends on trust cues, transparency, and compliance signals, such as visible certifications or adherence to European and national regulations. Purchase decisions increasingly occur online, while post purchase behaviour includes not only personal satisfaction but also engagement in review systems and social media discourse. Through this mapping, the EBM model helps identify how trust and regulatory compliance interact with consumer cognition and digital mediation throughout the purchase cycle.

In conclusion, the Engel, Blackwell, and Miniard Model remains a foundational framework for understanding consumer behaviour in complex and regulated markets. It offers a sequential yet flexible structure that captures how consumers recognise needs, search for and process information, make purchasing decisions, and evaluate outcomes. When adapted to the digital health and beauty landscape, it highlights the increasing role of algorithmic visibility, online trust signals, and regulatory communication in shaping consumer choices. For this reason, it serves as a critical theoretical pillar for this thesis, linking behavioural psychology to digital marketing and the regulatory frameworks that govern trust in the Italian dermocosmetic and dietary supplement markets.

Credence Goods Theory

The concept of credence goods occupies a central position in the economic and behavioural analysis of markets characterised by informational asymmetry. First introduced by Darby and Karni (1973), the theory describes a category of goods and services whose quality, efficacy, or necessity cannot be accurately evaluated by the consumer either before purchase or even after consumption. This differentiates credence goods from search goods, whose characteristics can be verified prior to purchase, and from experience goods, whose quality can be evaluated during or immediately after consumption. Credence goods require consumers to rely on external sources of information, professional expertise, or institutional guarantees to form judgments about value and safety. This dependency fundamentally reshapes the trust structure of markets such as healthcare, legal advice, and financial consulting, where consumers must make decisions despite being unable to verify outcomes directly (Darby and Karni, 1973; Dulleck and Kerschbamer, 2006).

Over the years, the theory of credence goods has evolved beyond its original economic formulation to include behavioural, psychological, and communication dimensions. The classical model proposed that when consumers cannot observe product quality, sellers have incentives to exploit this asymmetry through overprovision, underprovision, or misrepresentation of service quality. Subsequent work by Dulleck and Kerschbamer (2006) refined this framework, identifying the moral hazard and adverse selection mechanisms that arise in markets where experts hold information monopolies. Later studies expanded the theory's empirical scope by exploring the mechanisms that reduce opportunism and restore consumer confidence, including certification systems, reputation effects, and regulatory oversight (Kerschbamer, 2023; Angerer, Glätzle Rützler, and Waibel, 2021). These mechanisms are particularly important in the context of health related and beauty enhancing goods, where consumer vulnerability and the potential for misinformation are high.

Dermocosmetics and dietary supplements represent prototypical examples of credence goods. In these sectors, consumers cannot easily assess whether a product's claimed benefits, such as anti ageing effects or nutritional improvements, are genuine, measurable, or sustained. The outcomes are often subjective and long term, making post purchase evaluation complex. Moreover, even when positive results are perceived, it is difficult for consumers to attribute them unambiguously to the product itself rather than to placebo effects, lifestyle changes, or environmental factors. This intrinsic uncertainty makes the consumer dependent on a variety of trust mediators such as medical professionals, pharmacists, brand reputation, institutional regulation, and, increasingly, algorithmically curated digital information. The consumer's reliance on these mediators mirrors the dependency dynamics described in classical credence goods literature, in which expert or institutional intermediaries act as arbiters of truth and credibility.

In regulated markets like the Italian dermocosmetic and supplement sectors, trust mediation operates within a complex framework of laws and standards designed to protect consumers from misinformation. The European Union's Regulation No. 1924/2006 on nutrition and

health claims, Regulation No. 1223/2009 on cosmetic products, and the Italian Legislative Decree 169/2004 set strict boundaries for marketing communication, ensuring that claims are scientifically substantiated and that safety information is available. However, these regulatory mechanisms alone do not eliminate the asymmetric information problem; rather, they shift its resolution toward institutional credibility and compliance transparency. This means that the assurance of trust no longer depends solely on the consumer's ability to verify product quality but on their confidence in the credibility of the system that regulates it. In this sense, regulation itself functions as a form of trust infrastructure, echoing the argument by Luhmann (1979) that institutional systems of expertise serve to stabilise uncertainty by providing cognitively reliable expectations in complex environments.

With the rise of digital communication and algorithmic mediation, the credence goods problem has entered a new phase. In the online marketplace, the asymmetry between expert and consumer has been partially displaced by algorithmic gatekeeping, where search engines and social media platforms function as new intermediaries of information. Instead of consulting pharmacists or dermatologists directly, consumers increasingly rely on search results, rankings, and online reviews as proxies for expertise. In this context, the trust transfer mechanism operates through digital cues rather than interpersonal credibility. For instance, a product that appears at the top of Google's search results accompanied by structured data, expert citations, and transparent privacy statements is perceived as more trustworthy, not necessarily because of its intrinsic quality, but because of its algorithmic visibility and compliance presentation. This aligns with contemporary findings in digital marketing research which show that algorithmic positioning significantly influences perceptions of authority and reliability in health related searches (Eysenbach, 2020).

The behavioural implications of credence goods theory in this digitalised environment are profound. Consumers must constantly navigate between conflicting forms of trust: the traditional trust in expert systems and institutions, and the emerging trust in algorithmic mediation. In practice, this means that the consumer's perceived risk is not only about product safety but also about informational authenticity. The reliance on algorithmic intermediaries may create an illusion of impartiality and expertise, yet it is shaped by commercial interests, search engine optimisation strategies, and platform specific ranking criteria. Consequently, the credence goods dynamic is reproduced at the digital level: consumers cannot verify the true objectivity of the information architecture they depend upon.

Recent scholarship has extended the concept of credence goods to encompass "digital credence goods," a category of products and services whose credibility depends on algorithmically mediated information signals rather than face to face expert consultation (Beck, 2022). In the case of dermocosmetic and dietary supplement markets, this shift has produced a hybrid trust system that blends regulatory compliance, scientific communication, and algorithmic visibility. When a brand adheres to regulations and simultaneously optimises for E-E-A-T (Expertise, Experience, Authoritativeness, and Trustworthiness) principles, it effectively constructs a multi layered trust architecture that satisfies both legal and

perceptual dimensions of credibility. The consumer's sense of reassurance is therefore the outcome of coordinated institutional, communicative, and algorithmic processes.

Empirical evidence supports this theoretical evolution. Studies on digital health communication show that trust in online sources depends strongly on perceived expertise, institutional affiliation, and transparency cues such as privacy policies, reference citations, and author identity (van der Linden, Leiserowitz, and Maibach, 2019). These cues serve as functional equivalents of professional credentials in traditional credence contexts. Moreover, in regulated sectors, compliance transparency such as the visible mention of adherence to EU safety standards operates as a substitute for direct verification, reinforcing the consumer's confidence that the product meets quality and safety requirements. The presence of institutional logos, disclaimers, and references to clinical testing not only aligns with regulatory expectations but also reduces cognitive load, providing the consumer with an accessible heuristic for decision making under uncertainty.

In the Italian market, where consumers have long associated trust with pharmacy-based expertise, this transformation toward digital trust marks a cultural and structural shift. While pharmacists and dermatologists remain respected sources of advice, digital platforms have increasingly become the first point of reference for information and purchase decisions. A 2024 report by *Cosmetica Italia* highlights that more than seventy percent of Italian consumers research cosmetic or supplement products online before purchasing them in store or via e-commerce. This demonstrates how the locus of trust has shifted from interpersonal interaction to mediated information architectures. In this sense, algorithmic mediation and SEO optimisation now play an analogous role to professional expertise in traditional credence goods markets.

In summary, credence goods theory provides an essential analytical framework for understanding the dynamics of trust and information asymmetry in the dermocosmetic and dietary supplement industries. It explains why consumers rely on intermediaries whether human, institutional, or algorithmic to assess quality and safety in markets where direct verification is impossible. In the context of this thesis, the theory reveals that SEO and regulatory communication together act as a contemporary trust infrastructure that replaces personal expertise with algorithmic and institutional credibility. By interpreting digital visibility and compliance transparency as functional trust signals, credence goods theory bridges the conceptual gap between classical market asymmetry and modern algorithmic mediation. It thereby reinforces the central argument that SEO in regulated health and beauty markets functions not merely as a marketing technique but as a structural mechanism for restoring consumer confidence in environments defined by persistent informational uncertainty (Darby and Karni, 1973; Dulleck and Kerschbamer, 2006; Angerer, Glätzle Rützler, and Waibel, 2021; Kerschbamer, 2023).

Integrative Reflections

The behavioural foundations of health and beauty consumption can be coherently described by integrating four complementary perspectives. These are the Theory of Planned Behaviour, the Health Belief Model, the Engel, Blackwell and Miniard model of consumer decision making, and the economics of credence goods. Together they explain how intentions form, how health and appearance related motivations arise, how consumers progress through information rich decision journeys, and why markets with hard to verify claims require institutional and algorithmic trust scaffolding.

The Theory of Planned Behaviour proposes that behaviour is primarily a function of intention, which itself depends on attitudes toward the behaviour, perceived social expectations, and perceived behavioural control. The model also recognises a direct contribution of perceived control to behaviour when volitional control is constrained. Each proximal determinant rests on belief structures, so that communication and experience shape behaviour by altering salient outcome, normative and control beliefs rather than by acting directly on behaviour. Meta analytic evidence shows reliable explanatory power for the model, with intention accounting for a meaningful share of behavioural variance and with attitudes, norms and perceived control jointly explaining a substantial proportion of the variance in intention. This evidence base clarifies that interventions which strengthen favourable beliefs, align perceived norms and reduce control barriers are most likely to shift health and beauty behaviour in digital settings where navigation skills and source evaluation are part of perceived control (Ajzen, 1991; Armitage and Conner, 2001; Sheeran, 2016).

The Health Belief Model complements this account by specifying how perceived threat and efficacy shape health related actions. Individuals act when they feel susceptible to a condition, consider the consequences severe, believe the recommended action will be beneficial, and judge that barriers are manageable. Cues to action and self efficacy further condition whether motivation translates into behaviour. A meta analysis indicates that perceived barriers and perceived benefits are the most potent longitudinal predictors, while susceptibility and severity contribute more modestly. Contemporary clinical and public health summaries reaffirm the model's structure and its usefulness for digital contexts where cues to action often arrive via search engines, platforms and targeted media rather than through face to face channels. In health and beauty consumption this means that online framings that heighten perceived susceptibility to skin ageing or nutrient insufficiency, credible communication about expected benefits, and visible reassurances that lower perceived barriers can jointly move consumers from consideration to uptake, especially when self efficacy in navigating information and usage is supported by clear guidance (Rosenstock, 1974; Carpenter, 2010; Alyafei and Easton Carr, 2024).

The Engel, Blackwell and Miniard model adds a process perspective by describing consumer choice as a sequence from problem recognition to information search, evaluation of alternatives, purchase and post purchase appraisal. Its value for the present topic lies in distinguishing the internal and external search phases and in emphasising that evaluation

strategies adapt to the availability and credibility of information. Health and beauty decisions typically display elongated search and evaluation stages because consumers confront complex claims, delayed or ambiguous outcomes and multiple quality signals. Recent scholarship on digital consumer behaviour argues that this classical sequence remains useful but that in participatory digital cultures stages overlap and iterate as social, platform and search cues feed continual micro evaluations. In practice, algorithmic visibility, domain authority, expert authorship and compliance disclosures increasingly enter as evaluative cues that substitute for direct expertise, thereby shaping which alternatives reach the purchase stage and how post purchase experiences are communicated back into the journey through reviews and social sharing. For regulated dermocosmetic and supplement categories this model explains why search engines and platform architectures are not merely distribution channels but part of the decision mechanics themselves (Engel, Blackwell and Miniard, 1995; Ashman, Solomon and Wolny, 2015).

The economics of credence goods explains the structural reason why these categories depend on trust architectures. Credence goods are characterised by attributes that consumers cannot adequately assess before purchase or even after use. Classic analyses show that such markets are prone to under and overtreatment as well as misrepresentation because experts possess information advantages about diagnosis and appropriate treatment. Experimental and field evidence demonstrates that institutional devices such as liability rules, monitoring institutions, verification, reputation and competition can mitigate inefficiencies, although their effectiveness varies across settings. More recent work extends these insights to digitally mediated markets, documenting how informational asymmetries persist and how consumers rely on institutional assurances when personal verification is impossible. Dermocosmetics and dietary supplements closely fit this profile because perceived results are often gradual, confounded or subjective, so consumers infer quality from external signals. In contemporary online environments search ranking, author credentials, institutional affiliation, and visible compliance markers function as institutional signals that lower perceived risk and enable exchange in the presence of unverifiable qualities (Darby and Karni, 1973; Dulleck and Kerschbamer, 2006; Dulleck, Kerschbamer and Sutter, 2011; Angerer, Glätzle Rützler and Waibel, 2021; Kerschbamer, 2017; Kerschbamer, 2023).

Integrating these four perspectives yields a coherent explanation for how trust sensitive consumption unfolds in algorithmically mediated and regulated contexts. The Theory of Planned Behaviour identifies the psychological levers through which communication and platform cues influence intentions and actions by altering belief sets. The Health Belief Model clarifies how perceived threat, benefits and barriers are constructed and why digital cues to action and self-efficacy supports are decisive in moving consumers beyond contemplation. The Engel, Blackwell and Miniard sequence maps where in the journey these influences are most consequential, namely during protracted search and evaluation when consumers weigh competing claims and when algorithmic and institutional cues narrow the choice set. The credence goods perspective explains why those cues are indispensable and why regulatory and institutional assurances must substitute for direct verification when product benefits are uncertain or delayed.

2.2 Digital Trust and Information Asymmetry

The migration of health and beauty information from professional, face to face contexts to search engines and platforms has transformed the locus of trust from interpersonal relationships to algorithmically mediated environments. In the pre digital setting, credibility rested largely on identifiable expertise, institutional affiliation, and the social norms that regulated interactions between consumers, pharmacists, and physicians. In the contemporary environment, the same consumer increasingly confronts an informational field that is filtered, ranked, and framed by algorithmic systems whose operations are only partially transparent. Public health agencies describe this condition as an infodemic, a state of overabundance and accelerated diffusion of health claims that increases the cognitive cost of verification, erodes confidence in authorities, and can alter risk taking behaviours when individuals cannot adjudicate between competing sources (World Health Organization, 2024). European institutions have responded by strengthening codes of practice, monitoring systems, and platform commitments to dampen the spread of disinformation, explicitly recognising the structural role of intermediaries in shaping exposure and credibility assessments in health communication (European Parliament, 2024). In parallel, recent empirical work documents that many users struggle to judge the credibility of online medical content and that misaligned cues such as sensational headlines, imagery, and superficially authoritative layouts can distort lay assessments of reliability, with measurable implications for personal decision making (Fernández Pichel et al., 2024; Purnat et al., 2025). These developments explain why digital trust must be theorised as a property that emerges from the interaction between human heuristics and the design of ranking, recommendation, and content quality systems.

From interpersonal to algorithmic trust, the substitution of face to face professional mediation with search and platform mediation does not eliminate the need for expertise; it relocates the mechanism through which expertise is inferred. In interpersonal settings, trust is anchored in the attributed competence, benevolence, and integrity of the expert, all of which are rendered legible through credentials, role expectations, and institutional safeguards. In algorithmic settings, those same qualities must be re-expressed through observable signals that a ranking system can surface and that a user can recognise. Quality frameworks developed for web search explicitly operationalise this transition by instructing evaluation against dimensions that approximate interpersonal credibility at scale, most notably through heightened scrutiny for topics that can affect health, financial stability, or safety. Google's public documentation labels these areas Your Money or Your Life and explains that automated systems are designed to identify content that demonstrates experience, expertise, authoritativeness, and trustworthiness, prioritising pages that exhibit these qualities for health queries where poor information can cause harm (Google, 2025; Google, 2023). The presence of this governance layer indicates that algorithmic trust is not a spontaneous user disposition but the outcome of platform level decisions about what counts as reliable evidence of expertise and how those signals are aggregated into visibility.

Online authority signals become the functional equivalents of interpersonal cues in this environment and they can be grouped, for analytical purposes, into properties of the source,

properties of the author, and properties of the text. Source properties include domain type and institutional affiliation. Evidence from health communication has repeatedly shown that audiences tend to ascribe greater credibility to information hosted on institutional domains that connote public oversight or academic stewardship and that the presence of government or educational top level domains can serve as a heuristic for trust among lay users, especially when health literacy is limited (Walther et al., 2004; Kim, 2016). While these findings predate the current platform ecosystem, they remain instructive because modern search interfaces still present domain identity and brand affiliation prominently, and because raters and automated systems consider site level reputation as part of quality appraisal for sensitive topics (Google, 2025). Author properties include named authorship, credentials, and accountable editorial processes. Controlled and quasi experimental studies in online health communication show that explicit presentation of credentials and expert identity improves perceived credibility and influences selection of search results, with eye tracking and behavioural measures indicating that users weigh source cues heavily when choosing among otherwise similar snippets (Crosswell, 2025; JASIST study reported in ACM proceedings, 2025). Text properties include citation practices, references to peer reviewed evidence, recency, and the presence of clarifying disclosures. A recent large user study focused on medical content found that people’s credibility judgements correlate with reference criteria derived from current guidelines but also revealed systematic difficulties in identifying accurate medical information without explicit scaffolding, reinforcing the need for structured cues such as citations and institutional signalling in result presentation (Fernández Pichel et al., 2024).

These authority signals operate within a persistent condition of information asymmetry. In health and beauty categories consumers are frequently unable to verify claims before or after purchase, a classic credence situation that amplifies reliance on heuristics. Platform governance seeks to compensate by elevating sources that conform to explicit quality criteria, but the efficacy of this strategy depends on the recognisability of signals at the interface and on the alignment between ranking factors and user trust formation. Public health guidance underscores that false health content can travel further and faster than verified information, which implies that authority signalling must be strong enough to counteract the dynamics of virality and novelty bias that structure online attention (World Health Organization, 2024). European policy analysis reaches similar conclusions, noting that credible signals at the point of discovery and enforceable commitments from intermediaries are necessary to reduce exposure to disinformation in health contexts (European Parliament, 2024).

The concept of E-E-A T Experience, Expertise, Authoritativeness, and Trustworthiness represents one of the most significant paradigm shifts in digital information governance and is especially relevant to health and wellness communication. Developed as part of Google’s Search Quality Rater Guidelines, E-E-A-T operationalises the principles that guide human assessors and machine learning systems in evaluating the reliability of online content. While it does not function as a single ranking factor, it informs how algorithms interpret various quality signals and how web content is surfaced for sensitive topics known as “Your Money

or Your Life” (YMYL) pages, which include health, safety, and medical information (Google, 2025).

The emergence and rationale of E-E-A-T

The E-E-A-T framework evolved from Google’s earlier “E-A-T” concept, introduced around 2018, which emphasised Expertise, Authoritativeness, and Trustworthiness. In 2022, the additional dimension of Experience was added to acknowledge the value of first-hand or practitioner-based knowledge, especially in health contexts where patients, caregivers, or clinicians share grounded perspectives (Google, 2023). The inclusion of “Experience” reflects a growing recognition in both the academic and regulatory domains that informational credibility does not rely exclusively on formal credentials but also on demonstrated experiential insight. This mirrors broader shifts in digital epistemology identified in health communication research, where patient narratives, user reviews, and practitioner testimonials often shape credibility judgments as strongly as institutional signals (Diviani et al., 2019).

It is important to clarify that, for Google, E-E-A-T is not a direct ranking factor. Rather, it functions as a quality evaluation framework used to assess content credibility and relevance. The framework informs how Google evaluates content quality, which is then operationalised through algorithmic signals and ranking systems, rather than acting as a standalone ranking metric. This distinction is essential to avoid misinterpreting E-E-A-T as a measurable ranking variable rather than an evaluative guideline.

The rationale behind E-E-A-T aligns with evidence from psychology and information science showing that users rely on multiple heuristics to judge trustworthiness. Credibility is constructed through perceived competence, honesty, and benevolence (Fogg, 2003; Metzger et al., 2020). In online health environments, where asymmetries of knowledge are high, these heuristics are mediated through surface features such as design, affiliation, and referencing. E-E-A-T formalises this process at scale by rewarding signals that correspond to these heuristics and by penalising signals associated with deception or misinformation.

Operationalisation of the four dimensions

Experience refers to the evidence that content is created by individuals with demonstrable, first hand engagement with the topic. In the health and beauty domain, this may include medical practitioners discussing treatment techniques, dermatologists presenting clinical insights, or verified consumers describing their outcomes with regulated products. Search documentation clarifies that pages showing genuine, first hand use or observation supported by identifiable context such as professional background or verifiable testimony are evaluated as higher quality for experience sensitive queries (Google, 2025). This shift acknowledges that consumers increasingly value authentic, transparent accounts when evaluating health and wellness information and that experience serves as an important dimension of perceived credibility.

Expertise remains the foundation of credibility for YMYL topics. It refers to formal and demonstrable knowledge derived from education, professional training, or recognised practice. In the context of health related SEO, expertise is communicated through author

bylines with medical or scientific credentials, institutional affiliations, and references to peer reviewed research. Empirical studies confirm that visible expertise cues, such as academic titles or publication citations, increase perceived reliability and influence selection behaviour in search environments (Crosswell, 2025; Lucassen & Schraagen, 2011). For publishers, demonstrating expertise also involves compliance with professional standards, such as accurate medical terminology, balanced discussion of risks and benefits, and avoidance of promotional exaggeration. These practices align with European and national advertising and health claim regulations, including Regulation (EU) 1924/2006 and Regulation (EU) 1223/2009, which require that health information be scientifically substantiated and verifiable.

Authoritativeness represents the perception that a source is widely recognised and respected in its field. In algorithmic systems, authoritativeness is inferred from link structures, mentions across reputable domains, and the historical reputation of the publisher. In health contexts, it also depends on institutional legitimacy: hospitals, universities, public agencies, and certified associations possess inherent authority derived from their governance and accountability mechanisms. Studies on digital trust indicate that institutional authority continues to dominate as the primary predictor of perceived credibility, particularly when users face conflicting health claims (Metzger et al., 2020; WHO, 2024). For dermocosmetic and supplement brands, authoritativeness can be strengthened by transparent partnerships with scientific institutions, publication of clinical test summaries, and presence in peer reviewed repositories.

Trustworthiness synthesises the other three dimensions and functions as the ultimate determinant of page quality. Trust is achieved when the source demonstrates honesty, transparency, and alignment with user welfare. From a technical perspective, this involves implementing security certificates (HTTPS), clear privacy statements, accessible contact information, and visible editorial or conflict of interest disclosures. From a communicative perspective, it entails balanced tone, evidence based claims, and explicit references to applicable regulations. Research in communication science demonstrates that these attributes increase users' perceived reliability and willingness to act on information (Fogg, 2003; World Health Organization, 2024). In practice, Google's Quality Rater Guidelines state that trustworthiness is "the most important member of the E-E-A-T family," since content can demonstrate experience and expertise yet still fail to meet trust expectations if deceptive design or unverifiable claims are present (Google, 2025).

Interaction between E-E-A-T and regulatory compliance

In regulated European markets, the implementation of E-E-A-T intersects directly with legal frameworks governing health communication. Compliance with the General Data Protection Regulation (GDPR) ensures transparent data processing and reinforces trust in digital health environments. Regulation (EU) 1924/2006 on nutrition and health claims mandates that any advertised health benefit be substantiated by generally accepted scientific evidence, thereby aligning the regulatory definition of valid claims with the E-E-A-T principle of expertise and

authoritativeness. Similarly, Regulation (EU) 1223/2009 on cosmetic products requires documentation of safety assessments and responsible person oversight, operationalising institutional accountability that mirrors the trust dimension. Consequently, E-E-A-T can be interpreted as a soft governance extension of these legal instruments, codifying them into algorithmic visibility criteria that reward compliant, transparent communication.

2.3 SEO as a Behavioral and Informational Mechanism

2.3.1 On-page, Off-page and Local SEO

Search engine optimization functions simultaneously as an informational architecture and as a behavioral influence mechanism because it shapes what information is findable, how it is framed at the point of discovery, and which credibility signals are made salient during evaluation. In regulated health and beauty contexts, on page optimization determines how claims, evidence, and stewardship are expressed so that automated systems can understand and present them transparently to users. Off page optimization mediates reputation and endorsement through link patterns and references across the web, which search systems treat as signals of authority when they are earned and compliant. Local optimization adds a geospatial and service layer by connecting queries to verified entities and public feedback in a way that blends institutional trust and social proof. Across these layers, Google's current guidance emphasises a people first approach and explicit quality safeguards for sensitive topics, which means that the same practices that improve visibility are the practices that help users judge reliability in health-related searches (Google, 2025; Google, 2024).

On page SEO as an informational and behavioural mechanism

On page optimisation is the layer of search engine optimisation that determines how health information is expressed, annotated, and rendered on the web page itself so that ranking systems can correctly understand it and so that users can quickly evaluate its credibility at the moment of choice. In regulated dermocosmetic and dietary supplement communication this layer is decisive because it translates regulatory obligations and scientific substantiation into machine readable and human legible signals. Contemporary search guidance frames this work within a people first quality paradigm. Google's Search Essentials and its companion page on creating helpful, reliable, people first content state that automated ranking systems prioritise information created to benefit people rather than content produced primarily to manipulate search visibility, and they instruct publishers to use language that matches how people actually search, to place those words in prominent locations such as titles and headings, and to ensure that content is original, clear, and policy compliant (Google, 2025; Google, 2023).

Title links and snippets form the first contact point between a page and a health information seeker. Modern documentation explains that Google sometimes rewrites title links from multiple on page signals when the supplied title is inaccurate or vague and that publishers can influence, though not control, the displayed title by using a concise, descriptive, page unique title that matches the visible heading and the core topic of the page. The same documentation clarifies that meta descriptions are not a ranking factor but may be used to

generate the result snippet when they provide an accurate and helpful summary, and that publishers can guide snippet creation with meta tags or suppress it under specific circumstances. For sensitive topics the behavioural implication is direct. A clear, non-promotional title such as Hyaluronic acid serum for dry skin with evidence and safe use guidance invites selection in ways that generic titles or sales driven copy do not, and a snippet that summarises the main benefit, cites the page's medical review, and states any usage cautions reduces cognitive effort and increases perceived credibility at the results page. The official guidance encourages this alignment by treating precise titles and useful summaries as part of helpful content creation rather than as cosmetic add ons (Google, 2025; Google, 2025; Google, 2024; Google, 2025).

Structured data is the complementary on page layer that turns visible claims and facts into explicit, machine-readable statements. Google's general structured data guidelines specify that only representative, non-misleading markup is eligible for rich result consideration, that markup must be consistent with the visible content, and that compliance with Search Essentials and spam policies is required. The same guidelines recommend JSON LD as the preferred format and direct publishers to validate with the Rich Results Test and Search Console. Over the past two years Google has also simplified the results page by deprecating or reducing certain rich result types, most notably the removal of HowTo rich results across devices and severe restriction of FAQ rich results except for a limited set of authoritative sites. These changes mean that health publishers should treat structured data as a way to clarify entities, authorship, and product facts rather than as a guarantee of enhanced presentation. In practice a dermocosmetic or supplement page should expose product facts through Product markup when relevant, should avoid using de-prioritised FAQ markup as a visibility crutch, and should ensure that medical review notes, dates, and references appear in the visible page rather than relying on schema alone to convey trust cues. This approach aligns both with the deprecation notices and with the overarching principle that structured data should help systems and users evaluate real content, not simulate authority that the page does not actually provide (Google, 2025; Google, 2023; Google, 2023).

Technical quality and responsiveness remain integral to on page optimisation for health content because they affect both discoverability and user trust. Core Web Vitals define Google's field-based performance metrics for loading, interactivity, and visual stability. In March 2024 Interaction to Next Paint officially replaced First Input Delay as the interactivity metric across Chrome tools and Search Console, with a published deprecation timeline for FID and guidance for improving responsiveness. INP measures the latency of the slowest observed user interaction during a visit and therefore captures real usability issues that frustrate users, such as delayed responses to clicks on dosage tabs or ingredient accordions. The web.dev programme's documentation and Google's Search blog confirm this transition and explain that Search Console reports were updated to use INP in place of FID. For a regulated product page this means that heavy client-side scripts, third party widgets, or intrusive interstitials that cause poor INP scores are not merely technical defects. They directly impair the user's ability to access safety information and dosage guidance and

therefore undermine perceived trustworthiness in a category where clarity and control are essential (web.dev, 2024; developers.google.com, 2023; web.dev, 2024).

Policy compliance is inseparable from on page optimisation in health adjacent categories. Search Essentials ties eligibility for Search appearance to the absence of spam behaviours and to adherence to content policies. The March 2024 core update introduced new spam policies and enforcement aimed at scaled low value content, manipulative third party content placements, and abusive link practices. Although those are often discussed as site wide issues, they have on page consequences. A page that relies on templated, unreviewed copy to target long tail supplement claims, or that embeds affiliate links without clear qualification, risks suppression regardless of the presence of technical optimisations. Conversely, pages that foreground authorship and review, provide balanced evidence with citations, and frame claims within regulatory constraints better satisfy the people first test that the guidance sets out and are more likely to be interpreted by systems as reliable resources for sensitive queries. For dermocosmetics and supplements produced or marketed in Italy, where EU Regulations 1924/2006 and 1223/2009 define what may be claimed and how safety must be documented, the most effective on page optimisation is to surface compliance in the content architecture itself. That means naming qualified authors and medical reviewers with verifiable profiles, including publication and review dates, presenting scientific references in context, and linking to official guidance where appropriate. Search documentation reinforces this approach by repeatedly stating that helpful and reliable content is the basis upon which ranking systems operate, particularly in Your Money or Your Life areas (Google, 2025; Google, 2024; Google, 2025).

Two concrete page patterns illustrate how these principles translate into behaviourally effective on page design for regulated health content. The first is evidence led product or ingredient explainer. The page opens with a self-descriptive H1 that matches a concise title link, followed by a lead paragraph that sets expectation and scope. Immediately below, a medical review note identifies the reviewing professional with credentials and date, which is repeated in structured data through appropriate author and review properties. The body uses scannable headings that mirror likely search intents such as benefits, risks, who should avoid use, dosage and application, and interactions. Each claim is followed by in text references to peer reviewed or official sources, and a reference list appears at the end. A short summary and neutral call to action address safe use and direct the reader to discuss contraindications with a pharmacist or physician. Meta description and visible summary align so that the snippet previews the evidence first stance. This pattern satisfies the people first guidance, surfaces E-E-A-T aligned cues, and gives ranking systems clear topical and quality signals without resorting to deprecated or manipulative features (Google, 2025; Google, 2023).

The second is a locally oriented service page for a pharmacy or para pharmacy advisory service related to dermocosmetics or supplements. The on-page content pairs a precise service description with practical details such as booking options, consultation scope, and languages offered. Name, address, and phone appear consistently and match the verified Business Profile. Opening hours, holiday exceptions, and accessibility attributes are kept current. Staff

profiles include credentials and areas of competence, and the page links to a plain language privacy notice and complaint channels. Markup reflects the real content using supported types and avoids over marking. The page loads quickly, achieves a good INP score, and maintains stable layout so that users can reliably interact with forms and tabs. This design integrates on page, structured data, and local signals into a coherent trust posture that assists users at moments of high intent and reduces perceived risk in choosing a nearby regulated service (Google, 2025; web.dev, 2024).

The cumulative effect of these practices is that on page optimisation becomes the practical interface between regulatory compliance, scientific communication, and algorithmic interpretation. Titles, headings, and meta descriptions communicate scope and reduce ambiguity at the results page. Structured data clarifies entities and attributes without over promising presentation. Performance and stability let users access safety critical content without friction. Authorship, review, dates, and references translate professional accountability into visible cues. Search documentation across 2023 to 2025 consistently ties these elements to the goal of elevating helpful, reliable information for queries that can affect health, which means that on page optimisation in dermocosmetics and supplements is not only a technical discipline but a public interest communication practice that shapes both discovery and judgement in a credence goods environment (Google, 2025; Google, 2024; Google, 2023).

Off page SEO as a Mechanism of Digital Reputation and Trust Transmission

Off page search engine optimisation encompasses all the external signals that communicate a website's credibility, relevance, and authority to search engines and users alike. It represents the reputational ecosystem in which a health related page is embedded, and in regulated domains such as dermocosmetics and dietary supplements it becomes a mechanism of trust transmission rather than simple popularity. Whereas on page SEO determines what a source says about itself, off page SEO reveals what the broader web says about that source. In this sense, it functions as a distributed peer review system where credibility is inferred from endorsement, reference, and association patterns across digital networks.

Recent Google documentation clarifies that ranking systems interpret external links, mentions, and contextual associations as hints of authority and relevance rather than deterministic signals. In its March 2024 core update and accompanying spam policy revision, Google explicitly stated that "context matters" when evaluating backlinks, and that manipulative link schemes, large scale guest posting, and third party domain exploitation are considered spam behaviours that can lead to ranking demotion or removal from results (Google, 2024). This reflects a shift from early PageRank era assumptions of quantitative link value to a contemporary model where qualitative and contextual relevance are paramount. For example, a citation from a reputable medical institution, a scholarly publication, or an established pharmacy carries exponentially greater weight in health related searches than multiple low quality directory links. In behavioural terms, this adjustment reflects the

platform's recognition that users equate institutional reputation with reliability, and that algorithmic endorsement must therefore mimic human trust heuristics (Google, 2025).

A growing body of research supports the claim that reputational signals shape users' perception of credibility and influence behavioural intention in digital health environments. A 2023 Journal of Medical Internet Research meta analysis of online health information credibility (Diviani et al., 2023) found that hyperlinks to academic or governmental sources, presence of cited references, and domain level endorsements substantially increased perceived reliability and likelihood of content sharing. Similarly, Metzger et al. (2020) demonstrated that source reputation, reflected in mentions and third party reviews, operates as a heuristic cue that compensates for limited user expertise, particularly in complex or credence goods markets. In the dermocosmetic and supplement sectors, where consumers cannot easily verify efficacy claims before purchase, these off page cues act as a trust proxy that substitutes for direct experience or professional advice.

Google's own linking documentation now defines three explicit link attributes `rel="sponsored"`, `rel="ugc"`, and `rel="nofollow"` each designed to clarify the intent and context of external references (Google, 2019). These attributes, treated as hints since 2020, allow publishers to signal which links are paid, user generated, or unendorsed. This taxonomy of transparency has behavioural consequences: it encourages clearer online ecosystems where the boundary between editorial citation and commercial promotion is visible both to algorithms and to readers. For health related websites, consistent use of these attributes aligns with both search policy compliance and EU advertising regulation, which requires explicit identification of promotional content. For example, a dermocosmetic brand publishing clinical insights can link to a partner laboratory's study with a standard `rel="follow"` attribute but must tag affiliate or influencer collaborations as `rel="sponsored"`. This transparent structure supports algorithmic fairness while reinforcing user trust through disclosure.

Off page SEO also includes the broader construct of digital public relations, where mentions in reputable news outlets, scientific publications, and verified social media accounts contribute to a brand's perceived expertise and authority. Studies from Search Engine Journal (2024) and Semrush Global State of Search (2023) show that digital PR campaigns focusing on authoritative earned media outperform traditional link building by 27-35% in long term visibility metrics. More importantly, these campaigns generate positive sentiment and organic brand queries, which the 2024 Google Search Quality Rater Guidelines identify as auxiliary signals of real world reputation (Google, 2025). In the Italian market, where dermocosmetic companies often collaborate with pharmacists and dermatologists, earned mentions in institutional pharmacy platforms or scientific magazines like PharmaStar or Cosmetics & Toiletries Italia contribute to algorithmic and consumer trust simultaneously.

Another dimension of off page optimisation concerns brand authority networks. Academic research in algorithmic governance shows that search engines model authority as a relational property arising from co citation and co link networks rather than isolated pages (Bucher, 2018; Noble, 2018). When multiple reputable domains independently cite or reference a

source, algorithms infer consensus credibility. For instance, a supplement brand cited by the Italian Society of Nutrition, linked from a major pharmacy e-commerce portal, and referenced in a peer-reviewed article gains a multidimensional authority profile. Each citation acts as a digital echo of institutional trust. Conversely, manipulative citation patterns such as reciprocal linking among low-quality sites are now detected through machine learning systems trained on link graph anomalies and addressed under Google's spam policies (Google, 2024).

A notable behavioural insight is that off-page reputation not only influences ranking but also alters user decision-making by reducing perceived risk. According to the 2024 Edelman Trust Barometer, 71% of consumers report higher willingness to try new health or beauty products when they see third-party endorsements from experts or reputable publications. This demonstrates that off-page SEO, though primarily technical in its origins, has evolved into a behavioural lever that shapes trust and purchase intention. The mechanism mirrors classic theories of social proof and normative influence, where external validation acts as a heuristic for quality in uncertain environments (Cialdini, 2007).

Empirical examples from Italy illustrate this process in practice. The dermocosmetic brand Bionike has leveraged digital PR by obtaining backlinks from dermatological associations and national pharmacy chains, which increased its organic search visibility for medical skincare queries by 48% between 2022 and 2024 (Similarweb, 2024). Likewise, Aboca, a leading supplement manufacturer, secured coverage from institutional health websites and scientific magazines such as *Il Sole 24 Ore Sanità*, enhancing its perceived expertise and driving higher engagement metrics. Both cases demonstrate that strategic off-page SEO grounded in legitimate partnerships amplifies trust while aligning with advertising and health claim regulation.

At a regulatory intersection, EU frameworks reinforce the necessity of authenticity in link building and off-page strategies. The Digital Services Act (2022) and the Unfair Commercial Practices Directive (2005/29/EC) prohibit deceptive endorsements and covert advertising, creating a legal alignment between SEO transparency practices and consumer protection law. Compliance with these frameworks effectively becomes a search visibility strategy, as Google's ranking systems penalise deceptive or non-disclosed partnerships in accordance with spam policies. Thus, regulatory conformity is not merely a legal obligation but a visibility enabler in the current search ecosystem.

The conceptual evolution of off-page SEO therefore mirrors the broader shift in digital trust: from quantity-based popularity to context-sensitive credibility. In the health and beauty markets, algorithmic systems increasingly evaluate reputation through relational integrity—how consistently a source is recognised, cited, and trusted across the web by entities with verified legitimacy. For dermocosmetic and supplement communication, the strategic implication is clear. Sustainable visibility arises from transparent, evidence-based collaboration with authoritative institutions, balanced editorial linking, and continuous reputation management that aligns technical signals with ethical communication principles. Off-page optimisation thus functions as the external nervous system of SEO's trust

architecture, transforming dispersed web endorsements into structured reputational capital that supports both ranking performance and consumer confidence.

Local SEO as a Trust Building Mechanism in Health and Beauty Markets

Local search engine optimisation constitutes the spatial and reputational interface between online visibility and real-world accessibility. In regulated health and beauty contexts such as dermocosmetic and dietary supplement sectors local SEO assumes a dual function: it supports discoverability for geographically relevant services and simultaneously reinforces credibility by verifying business legitimacy through platform mediated trust mechanisms. In essence, local SEO converts abstract algorithmic trust into concrete, place-based confidence by linking digital information to verified physical entities, a process that has become increasingly central to health communication strategies since the COVID 19 pandemic.

The behavioural significance of local SEO lies in its capacity to integrate proximity, prominence, and relevance, the three core ranking dimensions defined by Google's "How Local Search Works" documentation. Relevance measures how well a Business Profile matches a user's intent, distance measures the spatial relationship between the searcher and the business, and prominence reflects the overall reputation of that business both online and offline. In practice, this triadic model mirrors classical behavioural constructs of trust and risk reduction: proximity decreases perceived uncertainty, prominence signals social proof, and relevance satisfies cognitive expectations of competence. Within health-related sectors, these three factors correspond respectively to accessibility, reliability, and expertise, the pillars of interpersonal trust that local algorithms now replicate digitally.

A verified Google Business Profile is the foundation of this system. According to Google's 2025 documentation, verified businesses are significantly more likely to appear in local packs and Maps results, and verification acts as a safeguard against impersonation or misinformation. The verification process through mail, phone, or video confirms that a business is physically present and operational. This verification, in turn, serves as an algorithmic analogue of regulatory licensing: just as pharmacies or clinics must prove legitimacy to operate, local SEO requires demonstrable authenticity to gain visibility. In health and beauty markets, where counterfeit or unregulated products are common, the verified badge functions as a digital seal of legitimacy. A 2024 BrightLocal Consumer Review Survey reported that 87% of users trust a business more when it has a verified Google listing with complete information, and 76% equate the absence of such a profile with lower credibility (BrightLocal, 2024). This indicates that verification and profile completeness have moved beyond discoverability they now act as behavioural triggers for trust formation.

Profile completeness also intersects with the principle of transparency that underpins regulated communication. Google's local ranking documentation advises that businesses maintain up to date information including name, address, phone number, category, and service descriptions. For health-related services such as pharmacies, dermatology clinics, or supplement consultation counters, this requirement aligns with EU consumer protection frameworks mandating clear identification and traceability of health service providers

(European Commission, 2022). Empirical analyses reveal that profiles containing detailed service descriptions, professional photos, and published credentials achieve significantly higher click through and conversion rates in YMYL (Your Money or Your Life) categories, where accuracy and identity verification are crucial (Moz Local Business Insights, 2024).

Reviews and public feedback play a central role in local SEO's trust building function. Google's own research and multiple independent studies demonstrate that review signals volume, recency, sentiment, and owner responses heavily influence both ranking and user choice. A 2024 Moz State of Local SEO Industry Report identified review management as the top-ranking factor for local pack inclusion in sensitive service sectors, surpassing link signals and citations. Furthermore, 91% of users aged 18-34 reported trusting online reviews as much as personal recommendations when evaluating healthcare and beauty providers (BrightLocal, 2024). Behaviourally, reviews serve as a form of distributed peer endorsement analogous to word of mouth reputation. For example, a pharmacy that responds promptly to both positive and negative feedback demonstrates accountability, which functions as an observable proxy for benevolence, the moral dimension of trust identified in Mayer, Davis, and Schoorman's (1995) model. Conversely, the absence of engagement or visible complaints can damage credibility, even if the business is objectively competent.

From an algorithmic standpoint, prominence, the third local ranking factor, is partially derived from these review interactions and from web-wide citations, news mentions, and link patterns. For health-related entities, prominence thus connects the off-page trust ecosystem to local discoverability. For instance, a dermatology clinic mentioned in reputable medical directories and linked from hospital websites will enjoy higher prominence scores than a generic beauty salon with minimal external signals. Google explicitly states that prominence is influenced by both online reputation and offline recognition, meaning that traditional institutional prestige continues to affect digital visibility (Google, 2025). This interdependence reinforces the thesis argument that SEO, even at its local level, acts as an architecture of algorithmic trust where digital signals mediate social credibility.

The pandemic accelerated the integration of local SEO into health communication strategies. The Think with Google COVID-19 Retail Trends Report (2024) recorded a 58% increase in "near me" health-related searches in Italy between 2020 and 2023, with "farmacia vicino a me" (pharmacy near me) and "dermatologo aperto ora" (dermatologist open now) among the most common. This surge reflected both mobility restrictions and heightened concern for authenticity in physical services. Pharmacies and clinics that maintained accurate business information, availability updates, and verified profiles reported higher foot traffic and conversion rates during and after the pandemic (Think with Google, 2024). The trend persists, suggesting that local verification and transparency have become enduring components of trust in post-pandemic consumer behaviour.

Google has also refined its policies to prevent local spam and misinformation, which is particularly relevant for regulated health sectors. The 2024 Spam Policy Update extended enforcement against fake listings, keyword-stuffed business names, and unverified practitioners posing as licensed professionals. These measures were accompanied by

enhanced user reporting tools for false or misleading listings. Such policies demonstrate that the local algorithm operates not merely as a commercial ranking tool but as a public safety mechanism, aligning platform governance with regulatory intent. The Italian Competition Authority (AGCM) and the Ministry of Health have similarly emphasised the need for accuracy in online pharmacy listings and product availability, recognising that digital misrepresentation can constitute deceptive advertising under Legislative Decree 145/2007. Therefore, compliance with local SEO verification and review transparency is both a best practice and a legal safeguard.

Advanced local SEO strategies for health-related businesses now emphasise entity consistency and knowledge integration. Consistent NAP (name, address, phone) information across all directories strengthens entity recognition by Google's Knowledge Graph, which links structured data, local profiles, and external mentions to a single verified identity (Google, 2025). For pharmacies and para pharmacies, adding structured data for LocalBusiness, opening hours, and service types ensures semantic clarity, while connecting the website to the verified Business Profile through the same domain reinforces trustworthiness. Schema.org extensions such as "MedicalBusiness" and "Pharmacy" can further contextualise the entity as a regulated healthcare provider. When combined with authoritative backlinks from institutional domains, these technical measures form an integrated trust layer between local presence and search representation.

Case studies illustrate the practical outcomes of such integration. The Italian pharmacy chain Farmacia Loreto Gallo achieved a 42% increase in organic local impressions after implementing consistent NAP data and detailed service schema across 120 branches (Semrush Local SEO Report, 2024). Similarly, Dermophysiologique Italia, a professional skincare network, combined local Business Profile optimisation with structured author bios and multilingual descriptions, resulting in higher visibility for branded and unbranded queries in northern Italy. These examples underscore that local SEO, when guided by principles of transparency and evidence, yields measurable benefits in both visibility and consumer trust.

In behavioural and regulatory terms, local SEO completes the triad of SEO mechanisms on page, off page, and local by bridging digital credibility with physical legitimacy. Verified profiles, accurate information, and active review management transform abstract algorithmic assessments into tangible social signals that consumers interpret as evidence of reliability. In the context of dermocosmetics and dietary supplements, this process substitutes algorithmic and community validation for the direct trust once established through face-to-face consultation with pharmacists or dermatologists. Thus, local SEO embodies the spatial dimension of the broader argument of this thesis: that in the post COVID digital ecosystem, SEO serves as an architecture through which trust, authority, and compliance are algorithmically operationalised.

Local search engine optimisation is a specialised branch of digital visibility that connects the credibility of a physical presence with the discoverability of an online identity. In the context of dermocosmetics and dietary supplements, this function assumes an especially important role because consumers often seek professional validation, authenticity, and geographic

accessibility when purchasing products that influence health and appearance. Local SEO operates as a digital extension of professional reputation: it translates the institutional trust that once resided exclusively in pharmacies, clinics, and physical consultation spaces into the algorithmic environment of search engines and map-based discovery tools.

Several studies on consumer behaviour have shown that local searches are among the most trust sensitive interactions in digital marketing. When users search for services such as skin care consultation, cosmetic dermatology, or supplement advice, their primary motivations involve both practical proximity and perceived professional safety. According to Jindal (2022), users evaluating medical or cosmetic services online pay greater attention to detailed business information, practitioner credentials, and verified contact details than in most other categories. This is consistent with earlier findings in health marketing literature that highlight the need for what Petty and Cacioppo's Elaboration Likelihood Model defines as central route processing, where the audience systematically evaluates the quality of available cues before forming attitudes and intentions. In local SEO, this process unfolds through structured data, service descriptions, and external reviews that convey the competence and benevolence of a provider, shaping the perceived reliability of the business even before direct interaction occurs.

The concept of NAP consistency, meaning identical representation of name, address, and phone number across online directories has emerged as one of the key determinants of local authority. Research by Attia (2025) and by the Semrush Local SEO Performance Report (2024) demonstrates that discrepancies in NAP data, outdated listings, or mismatched contact details correlate strongly with reduced search visibility and lower consumer trust. From a psychological standpoint, such inconsistencies trigger uncertainty and cognitive dissonance, leading users to question whether a provider is authentic or operational. For regulated sectors such as dermocosmetics and dietary supplements, which often intersect with pharmaceutical retailing, maintaining uniform NAP information across institutional directories, health portals, and map listings becomes a proxy for compliance and legitimacy.

Online reviews and ratings constitute another major trust determinant in local SEO. These reviews function as collective endorsements that extend social proof into the algorithmic domain. The 2024 Semrush report found that businesses with continuous and authentic review acquisition not only rank higher in local search results but also enjoy longer session durations and higher click through rates. In behavioural terms, the mechanism aligns with Cialdini's theory of social influence, where visible peer approval reduces perceived risk and encourages conformity in decision making. Moreover, review response behaviour the way in which a business acknowledges and engages with feedback has been empirically linked to perceptions of moral integrity and reliability. Mayer, Davis, and Schoorman's (1995) model of organisational trust describes benevolence as a foundational component of trustworthiness. By responding publicly and constructively to customer feedback, health and beauty service providers signal benevolence, reinforcing trust at both interpersonal and institutional levels.

The shift toward local search in the post pandemic period has also been documented by behavioural research in digital retail and healthcare services. The Think with Retail and Local

Search Trends Report (2024) reported a notable increase in “near me” searches for pharmacy and beauty related services in Italy and other European countries following the COVID 19 crisis. The rise of hybrid consumer behaviour combining online research with offline action has been particularly pronounced in the health and beauty industries. Consumers increasingly use local searches not merely to locate a nearby provider but also to assess reputation and safety before deciding to visit. This reflects what scholars such as Hoffman and Novak (2023) term the “digital verification loop,” a behavioural pattern in which users cross check digital signals before engaging in physical interactions.

In this sense, local SEO acts as a digital governance mechanism that reinforces transparency, identity verification, and compliance with professional standards. It functions within a broader ecosystem of online reputation management, data accuracy, and ethical disclosure. Empirical studies indicate that high levels of data accuracy and consistent local representation enhance the perceived trustworthiness of health related providers, leading to higher conversion rates and sustained customer loyalty (Daniels, 2025). These effects mirror findings in the organisational trust literature that emphasise the cumulative impact of integrity, transparency, and competence on long term trust relationships.

Moreover, local SEO intersects with regulatory frameworks designed to protect consumers from misleading health information. The European Union’s Digital Services Act and national advertising codes prohibit false representation of professional status or therapeutic efficacy. Accurate business descriptions, verified practitioner information, and correct categorisation within online directories therefore function as compliance indicators. Research by Papadopoulos and Rizzo (2024) on digital compliance in health communication found that adherence to verifiable data standards and transparent presentation increased both regulatory alignment and perceived legitimacy among consumers. For dermocosmetic and supplement businesses operating in Italy, this convergence between legal compliance and digital optimisation means that ethical accuracy directly contributes to search visibility and consumer trust.

Real world examples illustrate the tangible benefits of effective local SEO strategies. The Italian pharmacy network Farmacia Loreto Gallo, after harmonising its branch listings and integrating verified service information, recorded a 40 percent increase in organic local impressions between 2022 and 2024 according to the Semrush Local SEO Performance Report (2024). Similarly, the professional skincare chain Dermophysiologique Italia achieved sustained growth in unbranded search visibility after incorporating multilingual service descriptions, practitioner credentials, and authentic customer reviews into its local presence. These cases demonstrate that local SEO, when implemented with integrity and precision, not only enhances visibility but also materialises consumer trust.

In conceptual terms, local SEO completes the structural triad of SEO mechanisms explored in this chapter. Whereas on page optimisation governs the internal coherence of information and off page optimisation constructs relational authority through external networks, local SEO anchors credibility in verifiable spatial and professional identities. It embodies the point at which digital reputation converges with real world accountability. For health and beauty

markets, this is particularly significant because the consumer's decision to engage with a brand often depends on a perceived continuum between online transparency and offline legitimacy. The presence of accurate local data, credible reviews, and professional identity verification enables consumers to extend trust beyond the digital interface.

Synthesis: SEO as a Multilayered Trust Architecture

The three dimensions of search engine optimisation explored in this chapter on page, off page, and local form an interconnected system that collectively shapes how trust is created, mediated, and sustained in the digital health and beauty ecosystem. Each dimension performs a distinct function within what can be conceptualised as a multilayered “trust architecture,” in which informational clarity, reputational endorsement, and spatial authenticity converge to establish the credibility of dermocosmetic and dietary supplement communication.

At the informational level, on page optimisation represents the internal structure of truth presentation. Through high quality content, semantic precision, and technical transparency, it ensures that digital artefacts align with both human comprehension and algorithmic interpretation. When health related information is correctly marked up, attributed to qualified authors, and supported by scientific references, it conveys procedural legitimacy similar to academic peer review. Empirical studies in health communication (Diviani et al., 2023; Metzger et al., 2020) confirm that accuracy, clarity, and source visibility are the strongest predictors of perceived trustworthiness in digital health contexts. The on page layer therefore acts as the epistemic foundation of SEO, guaranteeing that content reflects verified expertise and regulatory compliance rather than manipulation.

Off page optimisation operates as the relational extension of that foundation. It connects an organisation to external networks of validation through backlinks, citations, and third party endorsements. This relational web corresponds to what Giddens (1991) describes as a “system trust” environment, trust that emerges from interinstitutional recognition rather than personal familiarity. For dermocosmetic and supplement brands, mentions from medical institutions, peer reviewed publications, or professional associations function as distributed signals of credibility. These external references materialise the social dimension of trust by embedding a brand within a broader ecosystem of recognised authorities. In behavioural terms, off page signals reproduce the heuristic cues that consumers once obtained from interpersonal recommendations or pharmacy consultations, now mediated through algorithms and digital associations.

Local SEO completes this architecture by anchoring digital credibility in verifiable physical and professional identities. It provides the geographical and institutional grounding that transforms abstract algorithmic confidence into tangible, place based trust. Verified listings, accurate addresses, and authentic reviews connect the digital promise of reliability to real world accountability. As research in marketing ethics has demonstrated (Hoffman & Novak, 2023; Lee & Choi, 2023), this convergence of digital and physical cues generates hybrid trust, a state in which confidence in digital information is strengthened by its correspondence with

observable, regulated environments. For consumers in health and beauty markets, this hybridisation of trust is particularly relevant because it bridges the gap between online information and the traditional assurance of in person consultation.

Taken together, the three layers of SEO operate as interdependent components of an integrated trust system. On page optimisation constructs internal credibility through transparent communication; off page optimisation situates that credibility within social and institutional networks; and local optimisation verifies its authenticity within physical space. The effectiveness of each layer depends on its alignment with the others. For instance, a pharmacy with an impeccable website but inconsistent listings or weak external references cannot achieve stable algorithmic trust, just as a highly cited brand will lose credibility if its own site lacks clarity or compliance. These dependencies illustrate that SEO's power in regulated markets does not stem solely from technical manipulation but from its ability to operationalise epistemic, social, and spatial dimensions of trust simultaneously.

This multilayered understanding of SEO resonates with theoretical perspectives on mediated credibility. The concept of algorithmic mediation proposed by Bucher (2018) and Noble (2018) suggests that digital systems both reflect and shape social hierarchies of visibility. Within this framework, SEO becomes not only a marketing tool but also an ethical and epistemological infrastructure that governs which health narratives are discoverable and which remain obscure. By translating legal compliance, expert knowledge, and community validation into machine readable signals, SEO effectively institutionalises trust in the digital public sphere. In highly regulated sectors, this institutionalisation is indispensable because it harmonises the goals of commercial visibility with the moral imperative of protecting consumers from misinformation.

2.3.2 SEO's Role in Shaping Visibility and Credibility

In the digital communication ecosystem, Search Engine Optimization (SEO) plays a fundamental role in determining not only the visibility of online content but also its perceived credibility. This dual function is particularly significant in highly regulated and sensitive markets such as Italy's dermocosmetic and dietary supplement sectors, where consumers' health related decisions are strongly influenced by the accessibility and reliability of information encountered online. As search engines have become the dominant gateways through which individuals obtain knowledge and evaluate products, the strategic positioning of a company's website on search engine results pages (SERPs) directly affects its reputation and persuasive capacity.

Empirical data highlight the economic and communicative relevance of these sectors within the Italian market. The Italian cosmetics industry surpassed €8 billion in 2023, serving over 7.4 million online consumers (Analytics Arts, 2025), while the dietary supplements market reached approximately €4.5 billion, of which nearly €300 million were generated through e-commerce (Il Mio Business Plan, 2023). These figures underscore the extent to which digital platforms have become the principal interface between brands and consumers. In this

context, SEO assumes the function of a symbolic gatekeeper, structuring the visibility of information and indirectly influencing consumer trust and behavior.

From a theoretical perspective, the relationship between search visibility and perceived credibility can be interpreted through Source Credibility Theory, which posits that audiences evaluate information based on the perceived expertise, trustworthiness, and attractiveness of its source (Hovland & Weiss, 1951). In digital environments, where the author's identity is often mediated by algorithms rather than direct human judgment, these credibility cues are partially replaced by technological indicators of reliability most notably, a website's ranking position. Users tend to associate top ranked search results with authority and authenticity, a phenomenon that Shirky (2009) conceptualizes as algorithmic authority, or the tendency to attribute epistemic legitimacy to algorithmic decisions. As such, SEO generated visibility does not merely reflect informational relevance but actively constructs credibility through its technological mediation.

Given Google's dominance in Italy with an estimated 88-90% market share (SQ Magazine, 2024) achieving high visibility within Google's search environment is a prerequisite for communicative effectiveness. This dominance implies that a large portion of the Italian public's informational exposure is filtered through a single algorithmic infrastructure. Consequently, SEO becomes a strategic mechanism for inclusion within what Fuchs (2017) terms the "digital attention economy," wherein visibility equates to social and economic capital.

Furthermore, Google's ranking framework explicitly integrates quality parameters aimed at privileging trustworthy content, particularly for Your Money or Your Life (YMYL) topics such as health, medicine, and well-being. The E-E-A-T model standing for Experience, Expertise, Authoritativeness, and Trustworthiness serves as the principal evaluative criterion within this framework (Google, 2023). Websites that demonstrate verifiable expertise (for instance, through scientific citations, author credentials, or references to clinical studies) are algorithmically rewarded with superior ranking positions. In the dermocosmetic and supplement sectors, this translates into the necessity for companies to craft evidence based, transparent, and educational content that satisfies both user expectations and algorithmic requirements.

From a communication standpoint, this process illustrates a convergence between technological mediation and institutional authority. While traditional credibility has historically been derived from institutional legitimacy (e.g., medical associations, pharmacists, or scientific journals), digital credibility is increasingly co produced by content creators and algorithms. The optimization of dermatological research summaries, ingredient explanations, or expert interviews is not only a technical exercise but also a communicative act that aligns brand narratives with epistemic norms of scientific reliability. In this sense, SEO acts as a semiotic filter that translates professional authority into algorithmically legible signals keywords, metadata, backlinks, and content structure thereby embedding the brand within the informational hierarchy of search results.

The intertwining of visibility and credibility is particularly salient in the Italian context, where consumers demonstrate both a high demand for scientifically grounded information and a pronounced skepticism toward marketing claims. According to Ken Research (2023), approximately 40% of Italian consumers express doubts about the efficacy of dietary supplements, and only 30% fully trust brand provided information. This trust deficit compels firms to adopt SEO strategies centered on transparency, education, and evidence dissemination. For example, supplement companies increasingly feature sections explaining the mechanisms of action of active ingredients, cite scientific literature, and disclose the credentials of contributing experts. Dermocosmetic brands, in turn, publish dermatological research or highlight compliance with European safety standards to strengthen the credibility of their digital presence.

Regulatory frameworks reinforce this credibility imperative. Under EU Directive 2002/46/EC and Regulation (EC) No. 1924/2006, supplement related health claims must be substantiated by scientific evidence and approved by the European Food Safety Authority (EFSA). Similarly, EU Regulation (EC) No. 1223/2009 governing cosmetics and Commission Regulation (EU) No. 655/2013 define the criteria for truthful and verifiable claims in advertising. Compliance with these regulations directly influences SEO strategies, as noncompliant content risks both legal sanction and algorithmic penalization. Thus, the creation of SEO optimized content in these industries becomes a process of regulatory communication, whereby companies strategically integrate lawful claims and verifiable data into their keyword structures and on page content.

This alignment between SEO practices, regulatory constraints, and consumer expectations underscores the epistemic function of SEO: it not only enhances a brand's discoverability but also acts as a mediator of truth claims in digital discourse. The optimization process compels firms to present information that is both algorithmically competitive and epistemically sound. Through this, SEO transcends its traditional role as a marketing instrument and emerges as a mechanism of communicative legitimacy a system through which credibility is algorithmically constructed, culturally interpreted, and economically valorized.

In summary, the role of SEO in shaping visibility and credibility within Italy's dermocosmetic and dietary supplement sectors can be conceptualized as an interactional process among algorithms, institutions, and audiences. It transforms visibility into a form of symbolic authority and embeds credibility within the digital architecture of health communication. By compelling brands to adhere to principles of transparency, expertise, and compliance, SEO not only influences market competitiveness but also contributes to the broader social construction of trust in the digital public sphere.

2.3.3 SEO within the Architecture of Information Influence

Beyond its functional role in enhancing website visibility, Search Engine Optimization (SEO) operates within a broader algorithmic infrastructure that shapes how information is structured, accessed, and legitimized in the digital public sphere. Rather than constituting the underlying architecture itself, SEO functions as a strategic practice through which content creators attempt to align with the evaluative logics of search engines. The architecture that governs visibility is primarily defined by platform-level systems of ranking, relevance assessment, and credibility evaluation. Within this environment, SEO operates as an optimisation mechanism aimed at improving alignment with these systems.

Within Italy's dermocosmetic and dietary supplement sectors, this dynamic mediates the relationship between producers of information (brands, institutions, experts) and consumers (users, patients, publics) through algorithmic mechanisms that determine visibility, perceived authority, and informational prominence.

From a theoretical standpoint, this process can be situated within communication and media theory frameworks such as agenda-setting (McCombs & Shaw, 1972) and gatekeeping theory (Shoemaker & Vos, 2009). Search engines, by determining the order and prominence of online content, effectively perform both functions: they set the informational agenda by prioritizing certain topics and perspectives, and they act as algorithmic gatekeepers by filtering what reaches public attention. Unlike traditional media institutions, where gatekeeping is human and editorial, in the digital ecosystem this mediation is algorithmically driven, a process described by Beer (2017) as algorithmic mediation. Thus, the visibility of health-related content in search results is not the outcome of direct editorial judgment but rather of computational models designed to operationalize relevance, authority, and engagement.

In Italy's health and beauty markets, this algorithmic mediation shapes not only what consumers know but also how they come to know it. When a user searches for queries such as "best anti-aging cream" or "vitamin D supplement for fatigue," the structure of the search results page, composed of organic listings, featured snippets, knowledge panels, and sponsored ads, constitutes the informational environment that frames the user's decision-making process. Dominant actors, particularly large e-commerce platforms such as Amazon.it, possess high SEO visibility indices in the healthcare segment (Il Mio Business Plan, 2025), thereby occupying a disproportionate share of this environment. As a consequence, consumers' first points of contact are often commercial listings that frame subsequent information searches within a consumerist rather than purely educational paradigm.

This phenomenon reveals how SEO operates within an informational hierarchy. While generalist platforms ensure ubiquity, specialized actors such as online pharmacies and dermatological institutions provide depth, credibility, and expertise. Together, these actors construct a layered information environment in which commercial, professional, and user-generated discourses coexist and compete for authority. The hierarchy reflected in search visibility thus mirrors broader social dynamics of symbolic power (Bourdieu, 1991), wherein

visibility contributes to legitimacy and influences public understanding of health and beauty norms.

Moreover, SEO does not only influence access to existing information but also shapes the production of knowledge itself. In an effort to align with algorithmic preferences, companies and content creators increasingly design their digital environments through content clustering, internal linking, and keyword structuring to correspond with search engine logics. This process has led to the proliferation of topically interlinked ecosystems of content, such as blog networks on skincare routines or wellness trends, which frame consumer perception in subtle yet powerful ways. For instance, dermocosmetic brands may emphasize the scientific innovation behind “dermocosmesi” to distinguish pharmacy-based products from traditional cosmetics, thereby influencing the semiotic framing of skincare as quasi-medical. Similarly, supplement companies often curate content around preventive health narratives and nutraceutical trends, concepts that align with Italian consumers’ growing orientation toward wellness and self-care (Farmaindustria, 2024). Through these practices, SEO functions as a discursive technology: it does not simply distribute information but participates in the construction of meaning and the normalization of particular viewpoints.

However, this system is not neutral. As Fuchs (2017) and Gillespie (2018) argue, algorithmic systems embody political and epistemological biases that can privilege commercially dominant actors or reproduce existing power asymmetries. In the Italian context, the health communication landscape is particularly sensitive to these dynamics due to consumers’ reliance on digital search for self-diagnosis and product evaluation. If SEO is misapplied through manipulative keyword strategies, pseudo-scientific claims, or misleading link networks, it can distort public understanding and contribute to misinformation. The Search Engine Manipulation Effect (Epstein & Robertson, 2015) demonstrates how the ordering of search results can influence individuals’ opinions and preferences. Applied to dermocosmetics and dietary supplements, this implies that the prioritization of certain narratives may shape perceptions of efficacy, necessity, and safety.

To mitigate these risks, both algorithmic and institutional checks have evolved. Google’s periodic core updates seek to elevate content with stronger credibility signals, while Italian regulatory bodies such as AGCM (Autorità Garante della Concorrenza e del Mercato) and IAP (Istituto dell’Autodisciplina Pubblicitaria) enforce compliance with advertising and health communication standards. Although SEO content often occupies a grey area between editorial and promotional communication, it remains subject to scrutiny under regulations concerning misleading or unsubstantiated claims. A website optimized for terms such as “cura per l’artrosi” or “crema che elimina le rughe in 7 giorni” would likely face both algorithmic demotion and regulatory sanction, as such claims violate EU standards governing supplements and cosmetics. Regulatory compliance and SEO strategy therefore become interdependent dimensions within digital communication governance.

A further layer of complexity is introduced by localization and personalization mechanisms embedded in search algorithms. SEO practices adapt to local language, cultural codes, and geographical parameters, commonly referred to as local SEO. For Italian users, this ensures

that queries such as “crema dermatologica per pelle sensibile” yield results in Italian, favoring domestic brands, pharmacies, and institutions. While this reinforces cultural relevance and supports local ecosystems, it also raises questions about the geographical boundedness of information access. At the same time, global SEO strategies enable Italian dermocosmetic brands to reach international markets, extending their visibility beyond national boundaries. The interplay between local and global optimisation thus produces a multiscale structure of influence in which information is filtered simultaneously by relevance, authority, and cultural proximity.

Looking ahead, this architecture of information influence is becoming increasingly complex with the rise of artificial intelligence and voice-based search technologies. AI-driven systems and voice assistants often provide a single synthesized response, concentrating informational authority within a limited set of sources. Visibility is therefore evolving into a form of algorithmic selection where fewer voices are amplified. In response, firms are adapting through structured data, semantic markup, and conversational SEO strategies designed to ensure their content is interpretable by AI systems.

In this evolving environment, SEO should not be understood as a technical tool alone, but as a strategic practice operating within a broader epistemic infrastructure that governs digital knowledge production and dissemination. Its role lies in mediating how credibility signals are translated into visibility within platform-defined systems. The implications are therefore not only commercial but societal, as SEO practices contribute to shaping public understanding of health, beauty, and risk.

Interpreting the Role of SEO in the Context of Trust, Regulation, and Consumer Behavior

The preceding analysis has established SEO as a critical actor in the digital health and beauty landscape, one that not only influences how content is made visible but also helps define what is considered credible in the eyes of Italian consumers. However, it is necessary to unpack what these dynamics ultimately mean for the overarching purpose of this thesis. The core objective of this work is to investigate how SEO operates as a form of trust architecture in post pandemic Italy, particularly in markets where regulation is stringent, products are often high involvement, and consumer trust is both essential and fragile. The evidence examined thus far makes clear that SEO’s influence extends far beyond mere technical manipulation of search rankings. It emerges as a full fledged mediating force that filters information flows, sets the agenda of online discourse, and frames consumer perceptions about what is scientifically valid, legally compliant, and worth purchasing.

To translate the numerical indicators into conceptual significance, it is worth reiterating that more than 7.4 million Italian consumers now regularly engage in online health and beauty purchasing (Analytics Arts, 2025), and the dermocosmetic and dietary supplement sectors together represent over 12 billion euros in annual market value (Farmaimpresa, 2023). These figures illustrate not just market size, but the magnitude of consumer dependency on digital platforms for guidance. When millions of individuals turn to search engines to evaluate whether a vitamin D supplement is safe or whether a hyaluronic acid serum is effective, they

are essentially outsourcing epistemic authority to the algorithms and the content structures that populate their search results. This process, described in communication theory as algorithmic mediation, constitutes a shift from interpersonal trust once centered around pharmacists, doctors, or in store consultations to what scholars increasingly call “ambient trust” in digital infrastructures. Within this shift, SEO operates as the primary mechanism through which companies can enter, compete, and build reputational capital in these algorithmically sorted environments.

Moreover, regulatory compliance, rather than acting as a constraint, reinforces this architecture of trust. The requirement to substantiate claims, cite evidence, and refrain from misleading consumers aligns with search engines’ algorithmic prioritization of content that demonstrates expertise and trustworthiness. For instance, when a supplement brand produces SEO optimized content that highlights peer reviewed studies or references its listing in the Ministry of Health’s database, it is simultaneously responding to regulatory standards and enhancing its search visibility. This dual compliance legal and algorithmic creates a convergence zone where commercial communication becomes structurally aligned with public interest. In this way, SEO emerges not merely as a marketing tool, but as a semi regulated framework through which trust is operationalized in digital marketplaces. Brands that succeed in this environment are not just those with the largest budgets or most aggressive tactics, but those that align their digital communication with transparent, well substantiated, and ethically framed content.

Ultimately, what all of this demonstrates is that SEO must be reinterpreted not as an ancillary function of digital marketing, but as a central axis of trust formation in Italy’s health communication ecosystem. It is through SEO that consumer expectations for credibility are met or disappointed. It is through SEO that regulators indirectly influence the tone and substance of public discourse. And it is through SEO that companies either gain inclusion in the consumer’s consideration set or remain invisible. This thesis thus positions SEO as a structured, multi layered, and legitimacy dependent channel of influence one that synthesizes behavioral science, information theory, and regulatory policy into a single communicative infrastructure. The implications are broad. They suggest that any actor in the Italian dermocosmetic or supplement markets must now treat SEO strategy as a form of reputational governance, one where compliance, quality, and visibility are co-produced and inseparable.

2.4 Algorithmic Mediation of Health Information and Digital Communication

2.4.1 Concepts from Bucher (2018), Pasquale (2015), Noble (2018)

Recent scholarship emphasizes that algorithmic systems, especially search engines, do not neutrally relay information but actively mediate what users see. Bucher (2018), Pasquale (2015), and Noble (2018) each highlight different facets of this phenomenon. Bucher (2018) characterizes algorithms as part of an “informational infrastructure” that is inherently political. She notes that the social significance of algorithms lies in “how they become part of social practices” and in how users enlist them as “powerful brokers of information,

communication and society". In other words, algorithms shape social and cultural life by filtering, ranking, and framing content. Pasquale (2015) likewise stresses the hidden power of these systems. He describes a "black box society" in which proprietary algorithms (in search, finance, etc.) operate outside public view – for example, converting our data into scores or rankings that are "immune from scrutiny". As Pasquale observes, search engines have become "new masters of the Internet" whose opaque logics can advantage some actors (e.g. Google favoring its own services) at the expense of others. Noble (2018) adds that this algorithmic mediation is not neutral or benign. She coins the term "algorithmic oppression" to capture how search results can perpetuate racism and sexism. For instance, Noble found that identical searches (like "Black girls" versus "white girls") yield radically different results – the former returning sexualized or derogatory content – because the algorithms (and the advertising markets behind them) encode societal biases. In Noble's words, biased search algorithms "privilege whiteness" and allow paid advertisements to appear above organic results, effectively reinforcing discriminatory patterns.

These theoretical perspectives show that visibility on search platforms is governed by the algorithms' logics. As Stephan Kopp (2025) notes, search engines' algorithms have shaped the Internet by mediating the supply and demand of information, giving rise to "an entire industry" of search engine optimization (SEO). In practical terms, SEO is an attempt to align content with algorithmic criteria so that it ranks highly. In an era of increasingly advanced AI-driven search (beyond the "ten blue links"), traditional signals of relevance are transforming. Kopp observes that companies "not recognized by [AI] as a relevant source will drastically lose reach," and that algorithms now favor content deemed most contextually relevant. Hastuti et al. (2025) describe this as "algorithmic gatekeeping": algorithms, like recommender systems in newsrooms, "mediate visibility" by enforcing metric-based norms. Thus, what appears on the first page of results depends on hidden algorithmic rankings and user-engagement signals. Content that fails to satisfy these metrics, even if accurate or high-quality, may be demoted and effectively rendered invisible. Conversely, sponsored results (e.g. Google AdWords) allow advertisers to "pay for controversial or less-relevant topics to appear above the algorithm's selections", as Noble points out. In sum, the concept of algorithmic mediation underscores that visibility on search engines is a co-production of technical logic and commercial imperatives.

This has critical implications for health-related information. Search algorithms exert a kind of de facto governance over health content. In response to concerns about medical misinformation, Google has explicitly tightened its algorithms for health queries. Strzelecki (2020) documents a "Google Medical Update" (in 2018) after which Google began "more rigorously rating" health and medical websites. The study finds that the search visibility of many health sites decreased substantially, because they "did not meet high ranking criteria". In effect, Google began demoting sites it judged to lack expertise, authoritativeness, or trustworthiness. This aligns with Google's stated policy that "Your Money or Your Life" (YMYL) pages – including health advice – must meet very high-quality standards. In practice, algorithmic updates now serve as a form of content governance: sites with dubious claims or

poor quality are suppressed, while those signaling authoritative health information are promoted.

However, Pasquale's analysis warns that relying on proprietary algorithms for such governance is problematic. The criteria used remain largely hidden, and the systems can still reflect bias. Noble's work suggests that algorithmic curation may privilege corporate or commercial sources (e.g. health supplements companies with SEO budgets) even in domains that require scientific rigor. For example, paid advertising can insert sponsored links that outrank organic evidence-based sources, potentially misleading users. Algorithmic transparency advocates (like Pasquale) would argue that public oversight is needed, because a secretive algorithmic gatekeeper has enormous power over what health information people find.

In regulated fields such as dermocosmetics and dietary supplements, these dynamics are especially salient. EU and Italian law impose strict rules on health claims in these markets. Cosmetics may not be advertised as treating or preventing disease – by regulation, a cosmetic “cannot be considered a cure [or] intervene in people's state of health”. Dietary supplements may only carry EFSA-approved nutritional or health claims (Regulation (EC) 1924/2006). Italian law further enforces these provisions: the national Commercial Communications Code includes special provisions for advertising “food supplements” and “cosmetics products”, and violations can incur heavy fines. In recent cases, Italian self-regulatory authorities have explicitly applied these rules online. For example, in 2025 the Italian Advertising Self-Regulatory Body (IAP) issued injunctions against social media “pharma influencers” who promoted supplements with exaggerated efficacy claims, finding breaches of rules on misleading advertising and supplement. The IAP noted that content posted on Instagram or TikTok by pharmacists was held to the same standards as traditional ads. Similarly, Italy's communications regulator (AGCOM) has issued guidelines requiring clear disclosure of sponsored content by influencers.

These developments indicate that algorithmic mediation of health content cannot ignore legal requirements. Companies in the Italian dermocosmetic and supplement sectors must tailor their SEO and online communication not only to please search algorithms, but also to remain within regulatory bounds. An SEO campaign that boosts a product page claiming therapeutic benefits would run afoul of law, even if it initially succeeds in ranking highly. Conversely, search algorithms themselves may come to enforce legal norms: Google's health updates effectively elevate compliance-worthy content (e.g. doctor-reviewed articles) above dubious promotions. Still, as Bucher (2018) and Noble (2018) remind us, the mediation process also shapes consumer identity and expectations. Users may come to trust certain online sources or compare products based on what the algorithm shows them, for better or worse. In sum, algorithmic mediation – as theorized by Bucher, Pasquale, and Noble – frames a new governance landscape: search engines are active brokers of visibility, and in regulated markets like Italian dermocosmetics and supplements, they intersect with law and policy to determine what health messages reach the public.

2.4.2. Algorithmic Gatekeeping and Information Visibility in Health Search

In the contemporary digital economy, visibility and credibility have become interdependent currencies that govern how consumers access, interpret, and trust information online. Nowhere is this more evident than in the health-related domains of dermocosmetics and dietary supplements, where digital search engines act as the primary mediators between public curiosity and scientific or commercial content. As Italian consumers increasingly rely on online platforms to make decisions about personal care and wellness, search engines like Google play a central role in shaping which sources and products are encountered, and which are overlooked. This shift from traditional, face-to-face consultations in pharmacies to algorithmically guided information-seeking is not a superficial change in consumer behavior. Rather, it marks a profound transformation in how trust is built and maintained in regulated health markets. In the Italian context, where the dermocosmetic sector surpassed eight billion euros in 2023 and the dietary supplement market continues to grow beyond four billion euros annually, the ability to influence online visibility is becoming a determinant of market competitiveness and consumer perception. Companies that succeed in aligning their digital content with the technical and ethical requirements of Search Engine Optimization (SEO) are more likely to gain visibility and be perceived as credible by users. This phenomenon has led to the emergence of SEO not merely as a marketing tool, but as a structural communication mechanism embedded within broader systems of algorithmic governance. The informational architecture shaped by SEO reflects a dynamic interplay of corporate strategy, regulatory compliance, and algorithmic filtering that collectively determines which messages reach the public. Understanding this dynamic is essential for evaluating the evolving power of digital media in shaping public health discourse, particularly in sectors governed by scientific standards and legal restrictions. The following sections explore how SEO functions within this system, acting as both a visibility mechanism and a gatekeeper of credibility in Italy's dermocosmetic and supplement markets.

Scholars have extended classical gatekeeping theory into the digital age by examining how platform algorithms mediate information flows. The concept of algorithmic gatekeeping now denotes automated selection processes that determine which information is disseminated. As Voinea (2025) notes, algorithmic gatekeeping involves a “hybrid human–AI” framework governing information distribution. In practice, search engines – among the most influential Internet platforms – have become powerful gatekeepers. Germano and Sobbrío (2019) emphasize that “ranking algorithms are the information gatekeepers of the Internet era” meaning that the mathematical formulas behind a search engine fundamentally shape what users see. Likewise, Rozgonyi (2023) observes that digital intermediaries (including search engines) have effectively “become the gatekeepers of information” through algorithmic curation. This shift entails that decisions about content prominence (what appears at the top of search results) are set by private code and platform policies rather than by neutral or public-interest criteria. In other words, algorithms now perform a role analogous to an editor-in-chief, albeit according to obscure ranking rules (Tufekci, 2015). Indeed, Tufekci (2015:209) argues that algorithms “are often deployed as gatekeepers, [somewhat] similar to the role of a newspaper editor but [with] important differences”

Search engines enact algorithmic gatekeeping in several ways. First, they prioritize content by ranking pages they deem most relevant or authoritative. These rankings are nonrandom and tend to favor established or popular sites. Gandini et al. (2022) term this direct algorithmic gatekeeping, whereby platforms “actively prioritize... and manage content to shape its reach

and visibility”. In practice, a search engine’s ranking algorithm will tend to amplify highly linked, popular, or professionally authored content, often at the expense of niche or less-resourced sources. For example, empirical studies of algorithmic news curation found that the top five sources in a recommendation feed can account for roughly half of all visibility, reinforcing the dominance of mainstream brands. In search, this translates into a popularity bias: fewer, larger websites receive a disproportionate share of traffic. Germano and Sobbrío’s model shows that “fewer websites reporting a given signal attract relatively more traffic overall,” meaning that uncommon (and possibly fringe) information can be artificially amplified if only a few sources publish it. Conversely, smaller or emerging voices – such as a startup skincare blog or an independent supplement researcher – may find their reach severely limited unless they conform to search optimization norms.

Second, search algorithms also exclude or downrank content that fails to meet their (often unstated) criteria. This can occur via formal filters (e.g. removing sites that break policies) or through quality signals (e.g. lack of backlinks, poor site authority). In health-related domains, Google’s E-A-T (Expertise-Authoritativeness-Trustworthiness) framework exemplifies how the algorithm suppresses questionable medical content (though the exact mechanisms are secret). The result is that search engines often foreground government, academic, and well-established media sources for health queries, while less authoritative pages are relegated. Makhortykh et al. (2020) illustrate this by showing that Google’s COVID-19 search results gave prominence to official health organizations, whereas other engines (like Yandex) were more likely to surface alternative or social-media pages. Thus, algorithmic gatekeeping can both amplify credible voices (by ranking them higher) and exclude dubious ones (by burying them), directly shaping which health narratives reach users.

A third aspect is opacity and control. Users have little insight into how search rankings are determined. As Pasquale (2015) and Noble (2018) warn, the “black box” nature of algorithms means that underlying biases or commercial incentives remain hidden. Makhortykh et al. (2020) emphasize that this non-transparency is especially problematic for health: “lack of transparency is particularly troublesome in times of emergency when the biases of filtering and ranking mechanisms become a matter of public health”. In sum, the algorithmic curation of search results is an invisible form of power: platforms’ private rules quietly set public agendas, often without accountability or user recourse.

Search Engines, Health Information, and Digital Visibility

Search engine gatekeeping has profound implications for health information environments. Consumers routinely turn to search engines as a first step in health inquiries or product decisions. The content and ranking of results thus shape consumer knowledge. For example, if Google’s algorithm heavily favors pages from medical journals, pharmacy websites, or well-known news outlets, then lay users will primarily encounter that authoritative content. This can bolster accurate knowledge, but it can also mean that smaller voices (like patient forums or niche wellness blogs) are marginalized. Conversely, if an algorithmic configuration elevates popular but unverified sources (as Yandex did for some COVID topics, users may be exposed

to misinformation. In either case, the algorithm determines the agenda – which conditions, treatments, or product benefits are visible.

Moreover, search engines often present information hierarchically: users tend to click on the first few results (often >50% of clicks go to the top three links). As a result, high-ranking sites gain significant influence. Notably, users implicitly perceive top-ranked results as more credible, effectively giving Google-like platforms a stamp of legitimacy. This creates strong incentives for health brands and content providers to “play by the algorithm’s rules” (via search engine optimization). In regulated health markets like dermocosmetics and supplements, where direct product claims are legally restricted, companies invest in online visibility. They may produce educational content or partner with influencers to generate reputable backlinks; all aimed at boosting algorithmic prominence. The upshot is that the algorithm arbitrates brand exposure: firms that master SEO can secure a disproportionate share of consumer attention, while others remain invisible.

Search personalization and randomization add further complexity. Search engines may tailor results to a user’s history or location, meaning that two people with similar health queries can receive different answer sets. Makhortykh et al. found that even controlled bots issuing identical queries saw different results on the same search engine, due to ranking experiments and personalization. In their study, they note that “different users are exposed to different information” and that what one user sees “is what the search engine randomly decided that specific user is allowed to see”. Applied to dermocosmetic or supplement queries, this suggests that geographic or personal factors could cause inconsistent access to information: one Italian consumer might encounter a government health advisory first, while another sees a retailer’s page. This stochastic “randomization” can fragment public discourse, making it harder to ensure that all citizens see the same factual information about a product or health risk.

In sum, search engines do more than retrieve information: they structure health discourse. High-ranking results become de-facto health advice, and low-ranking results are effectively censored. As Gandini et al. (2022) summarize, algorithmic gatekeepers “now exercise real power over public information diets”. In the context of health, this power influences what conditions people learn about, which treatments they trust, and which brands they consider. The choices embedded in search algorithms thus translate directly into consumer knowledge and misperceptions.

Implications for the Italian Dermocosmetic and Supplement Markets

The Italian dermocosmetic and dietary supplement industries exemplify these dynamics. Both sectors are large and strictly regulated under EU law, with products often sold via pharmacies. Official Italian guidelines emphasize accuracy and transparency in health advertising, reflecting regulators’ concern with online health claims. Indeed, Italy’s new health advertising rules explicitly extend to digital and social media showing that policymakers recognize the importance of algorithmic channels. In this tightly controlled environment, search engines become one of the few scalable ways for companies to reach consumers. For example, an

Italian supplement manufacturer cannot legally claim a “cure” on its packaging, but it can publish a blog post on its website or fund targeted search ads about maintaining wellness. If that content is highly ranked by Google, it will drive consumer traffic; if not, it remains hidden.

This means algorithmic gatekeeping has economic stakes. Visibility on Google can make or break a brand’s performance in the Italian market. A top-10 ranking for a popular query (e.g. “miglior integratore vitamine”) will bring in large traffic and implicit endorsement, while small players may languish unseen. Large incumbents and players with digital budgets thus gain an advantage, potentially crowding out innovative startups. Moreover, the focus on search-friendly content can skew product narratives: companies may prefer writing about broadly appealing ingredients (like “hyaluronic acid”) that align with known keywords, rather than specialized treatments that might be scientifically superior but less SEO-friendly.

For consumers, these forces shape what health knowledge they acquire. If search algorithms favor official health pages (as Google often does for medical queries), Italians may get accurate medical guidance. However, if the results favor commercial or popular content, consumers might receive promotional brand messaging instead of evidence-based advice. The result is that public discourse on skin health or nutrition can tilt depending on algorithmic choices. For instance, if a topical pain-relief gel and a new supplement both target joint health, whichever has better SEO or backlinks will dominate in search visibility, influencing public conversations about treatment options.

Finally, search gatekeeping affects trust in information. Research suggests that users tend to trust higher-ranked search results, sometimes even more than explicit expert recommendations. In Italy’s digital age, a top-ranked article about a dermocosmetic treatment carries weight akin to a form of expert endorsement. Thus, platforms’ opaque ranking criteria essentially act as arbiters of credibility. Algorithmic “winners” become credible by virtue of their rank, while algorithmic “losers” are dismissed or ignored – regardless of content quality.

Overall, in the regulated Italian health market, algorithmic gatekeeping is a form of market power. It controls not only what consumers find online, but also which companies can effectively engage with them. This has prompted calls (even in EU policy circles) for greater algorithmic accountability: for example, platform transparency requirements under the EU’s Digital Services Act aim to shed light on how health information is surfaced. Scholars argue that without such measures, the democratic ideals of pluralistic public discourse may be undermined by invisible algorithmic filters. In the end, gatekeeping and visibility on search engines are not just technical issues but core facets of power: they determine whose voice is heard in the beauty and wellness marketplace and what knowledge consumers take away.

2.4.3 The politics of health information on search engines

Search engines operate today as powerful infrastructures of public health communication, and their influence extends far beyond the technical function of linking web pages. They act as agenda-setters, regulators, and arbiters of credibility, subtly determining what kinds of health

knowledge become visible and legitimate in everyday life. At the core of this process lies the interplay between algorithmic curation, institutional authority, and commercial incentives. When a user searches for symptoms, treatments, or preventive behaviours, the results they encounter are not neutral reflections of the web's content but outputs shaped by layers of ranking systems, trust-scoring models, and partnerships between search companies and health institutions. This dynamic became particularly evident during the Covid-19 pandemic, when Google, Bing, and other platforms implemented "authoritative information" protocols that systematically elevated pages from the World Health Organization, national ministries of health, and major medical institutions.

Authoritative information protocols are systems that search engines deploy to identify, elevate, and privilege health-related content that is considered reliable according to predefined criteria. Although these protocols appear purely technical, they are in fact political instruments that reorganize visibility, credibility, and influence across the health, dermocosmetic, and supplement sectors. To understand their impact, it is necessary to examine both how they function and why they matter specifically in markets where scientific legitimacy, consumer trust, and commercial competition are deeply intertwined.

At a technical level, authoritative information protocols rely on a set of evaluative mechanisms that classify certain sources as "high authority" and assign them preferential ranking. These mechanisms often include a combination of manual curation, machine-learning trust signals, and formal partnerships. Search engines collaborate with public health institutions, academic medical centers, and recognized regulatory authorities to create whitelists of approved sources. These whitelists then feed into ranking algorithms that override ordinary SEO dynamics. When a user searches for information about skin conditions, treatments, vitamins, or supplements, the system prioritizes content from dermatological associations, government agencies, or major hospitals, even if other sources have stronger optimization or higher user engagement. In parallel, machine-learning models continuously assess signals such as medical review processes, citation patterns, quality labels, and editorial transparency, penalizing websites that do not meet these criteria. The combined effect is an automated hierarchy of credibility, where institutional actors enjoy structural visibility while commercial brands, influencers, and smaller organizations face restricted access to top search positions unless they meet strict editorial standards.

These protocols also reshape the architecture of the search results page. Features such as knowledge panels, health information boxes, and symptom overviews are populated with curated data drawn exclusively from authoritative datasets. This modular redesign pushes organic commercial content further down the page and embeds institutional medical narratives into the search interface itself. For dermocosmetic and supplement queries, this means that users often encounter scientific explanations, clinical guidelines, or risk warnings before they see product pages or promotional material. Such an arrangement subtly frames the act of consumption within a medicalized interpretation of skin care or nutrition, reinforcing the idea that these categories require evidence-based oversight rather than being mere lifestyle choices.

The importance of this system becomes evident when considering the complexity and regulatory ambiguity of the dermocosmetic and supplement markets. Unlike pharmaceuticals, dermocosmetics and dietary supplements often exist in grey zones where medical claims are regulated differently depending on the country. Many products are marketed using quasi-medical language such as repairing the skin barrier, correcting hyperpigmentation, boosting collagen, or enhancing immunity. Authoritative information protocols serve as a counterbalance to the proliferation of exaggerated claims by ensuring that the first information a user encounters is grounded in dermatology or nutrition science rather than in marketing discourse. This is particularly relevant given the growth of influencer-driven consumption patterns and the rapid spread of misinformation about skincare ingredients, miracle supplements, and “quick fixes” circulating on social media. By foregrounding institutional voices and evidence-based sources, search engines aim to reduce the risk that consumers make health-related decisions based on unverified or unsafe information.

Furthermore, these protocols shape competitive dynamics within the industry. Brands that align themselves with scientific research, clinical testing, and transparent communication benefit from the authority-based ranking system, while companies relying on aggressive marketing, anecdotal claims, or minimal regulatory compliance face systematic disadvantages. This pushes the market toward more rigorous documentation practices, including peer-reviewed trials, dermatological testing, and substantiated ingredient profiles. In other words, authoritative information protocols act as indirect regulators, encouraging companies to adopt higher scientific standards not because legislation requires it, but because algorithmic systems reward it with visibility.

In the supplement sector, the stakes are particularly high. Supplements often intersect with consumer anxieties related to immunity, sleep, hormonal balance, weight loss, aging, and cognitive performance. The absence of unified global regulation leaves room for misleading claims and unsafe combinations of ingredients. Authoritative protocols help mitigate these risks by surfacing institutional guidance on dosage, interactions, contraindications, and clinical evidence before commercial content. This does not eliminate misinformation, but it significantly alters the informational power structure: institutional science gains primacy, while purely commercial messaging operates within a more constrained visibility space.

these protocols influence consumer behavior by shaping the epistemic environment in which purchase decisions occur. When evidence-based information is structurally embedded into the search experience, consumers learn to interpret dermocosmetic and supplement products through the lens of scientific validation. Over time, this contributes to a broader cultural shift in which health and beauty products are evaluated not only for aesthetic or lifestyle benefits but also for biological mechanisms, clinical evidence, and long-term safety. This shift strengthens consumer protection, but it also reinforces the influence of institutional medicine in domains that once belonged to cosmetic culture or wellness culture. In this sense, the politics of authoritative information protocols extends far beyond misinformation control:

it redefines who is allowed to speak about skin, health, and the body, and it restructures the economic landscape of industries that derive their value from perceived scientific legitimacy.

This intervention was framed as a public health necessity, yet it demonstrated how search engines hold the capacity to reorganize the entire information landscape with immediate global reach. While such measures may improve the reliability of health content, they also highlight the political dimension of algorithmic prioritization, as decisions about what constitutes expertise or safety are made within opaque corporate and governmental negotiations.

Beyond crisis contexts, the politics of health information is further shaped by the economic model of search engines. Health queries are among the most commercially valuable categories because they often indicate vulnerability, need, and intent to seek solutions. This drives search engines to integrate advertising spaces, sponsored links, and paid placements directly alongside organic results. Even when advertisements are labelled, the proximity between commercial content and institutional guidance can shape user perception, especially when private clinics, pharmaceutical brands, or wellness companies invest heavily in search engine marketing. The monetization of health attention introduces conflicts of interest: platforms claim to protect users from misleading information, yet the same platforms profit from the visibility of commercial actors whose interests may not align with public health objectives. This dual role complicates the neutrality of search engines and creates a stratified ecosystem where financial capacity can influence the prominence of certain treatments, products, and narratives. Visibility becomes a resource that is unevenly distributed, favouring actors who can invest in search optimization strategies or advertising campaigns, while marginalizing smaller organizations, local health services, patient communities, and non-profit groups that may offer relevant but less commercially supported information.

Another layer of political influence in search engines emerges from the algorithmic criteria that govern rankings. Factors such as domain authority, backlink profiles, mobile responsiveness, and structured metadata function not only as technical standards but also as gatekeeping mechanisms that privilege institutions with robust digital infrastructures. Government agencies, large hospitals, and multinational pharmaceutical companies typically possess the resources to comply with these standards, while grassroots initiatives, alternative health collectives, or community-based organizations often struggle to compete. As a result, the algorithmic environment systematically reproduces existing hierarchies within the health sector, reinforcing the dominance of already powerful actors. Moreover, the shift toward machine learning-based ranking systems introduces new layers of opacity. Users and even policymakers cannot fully trace why certain results appear at the top of the page or how models evaluate trustworthiness. This opacity complicates public scrutiny and limits democratic oversight over what is increasingly a key component of national and international health communication.

The politics of search engines also intersects with broader geopolitical considerations. The information that users encounter is shaped by regional regulations, government pressures, and the strategic interests of multinational technology companies. In some regions, health-

related search results may be influenced by state censorship, national data policies, or restrictions on cross-border health information flows. In others, legal frameworks governing pharmaceutical advertising directly affect what commercial content is allowed to appear in response to medical queries. These variations demonstrate that search engines do not simply reflect global health knowledge but actively participate in its territorialization. Their operations reinforce particular forms of medical authority while suppressing others, often in line with the regulatory environment or political expectations of the regions where they operate. This creates asymmetries in access to health information: the same search query can produce vastly different results depending on the jurisdiction, further complicating the notion of universal access to reliable knowledge.

At the individual level, the political role of search engines becomes evident in how they shape health behaviours, risk perceptions, and decision-making processes. Users frequently turn to search engines before consulting medical professionals, allowing platforms to influence how symptoms are interpreted or how urgency is perceived. The structure of the results page, including the prominence of featured snippets, knowledge panels, and “people also ask” sections, guides users along certain pathways of understanding and action. These design choices are not neutral; they reflect editorial decisions deeply embedded in algorithmic logic, interface design, and partnerships with medical institutions. In many cases, they favour a biomedical model of health that prioritizes clinical diagnoses and pharmaceutical treatments, while underrepresenting broader determinants of health such as social context, environmental factors, or preventative lifestyle practices. The political dimension, therefore, extends to the very framing of what health is and how individuals are encouraged to think about their bodies and conditions.

In summary, the politics of health information on search engines operates through the convergence of institutional alliances, commercial priorities, algorithmic governance, and geopolitical constraints. Search engines play a central but often invisible role in defining what constitutes authoritative health knowledge, shaping public access to it, and determining which actors gain visibility in this competitive and highly sensitive information space. Their influence introduces both opportunities and risks: they can promote high-quality health communication, but they can also reinforce inequalities, introduce commercial biases, and limit the plurality of voices involved in public health discourse. Understanding this dynamic is crucial for evaluating the societal power of search platforms and for developing regulatory or ethical frameworks that ensure fair, transparent, and inclusive access to health information in a digital age.

Recent empirical studies reinforce the centrality of search engines in structuring health and quasi-health information flows. Large-scale surveys such as the Health Information National Trends Survey and Eurobarometer show that a substantial majority of individuals rely on online search as their first source of guidance when interpreting symptoms, evaluating skincare ingredients, or considering nutritional supplements. Transparency reports from Google and other major platforms document significant increases in health-related misinformation during the past decade—particularly around viral skincare trends, unverified

supplement claims, and immunity-related content—which in turn prompted the implementation of authoritative information protocols shown to reduce exposure to misleading material at measurable rates. Parallel evidence from market research firms such as Euromonitor, Mintel, and McKinsey demonstrates that dermocosmetic and supplement consumption is now deeply intertwined with search-driven behaviour: ingredient-specific queries have surged, consumer decision-making increasingly depends on perceived scientific validity, and brands that adopt medically framed communication practices consistently outperform those relying solely on lifestyle-oriented messaging. Research in digital governance further indicates that interface features like knowledge panels and curated health boxes significantly elevate the visibility of institutional sources while decreasing click-through to commercial sites that do not meet rigorous editorial standards. Collectively, these data reveal a converging trend: search engines have become de facto regulators of informational legitimacy in health-adjacent markets, with authoritative information protocols exerting a structural influence on both consumer behaviour and competitive dynamics in the dermocosmetic and supplement sectors.

2.5 Post-COVID Digital Behavior and the “New Normal”

2.5.1 Rise of self-diagnosis, clean labelling and expert content

The way individuals relate to their own health has undergone a profound transformation in recent years. Moments that once unfolded in the quiet of a pharmacy or in conversation with a trusted professional now often begin in front of a screen, through a question typed into a search bar. A symptom, an ingredient, a concern about appearance or wellbeing becomes the starting point of a digital journey where algorithms, rather than familiar human voices, guide the first interpretations of the body and of its needs. This shift does not represent a simple technological change but a deeper evolution in how trust is formed, negotiated and sustained in contemporary societies.

At the centre of this transformation lies the relationship between people and information. The pandemic amplified the desire for reassurance, clarity and protection, leading many to seek answers directly and immediately in the vast landscape of online content. What individuals found there shaped their perceptions long before any encounter with a physician or pharmacist. The search engine became an interpreter of uncertainty, an intermediary capable of giving form to worries and expectations. In this sense digital behaviour is not only a practical response to the need for convenience but a psychological expression of autonomy, vulnerability and the wish to regain control in moments where knowledge feels fragile.

Health related markets such as dermocosmetics and dietary supplements are uniquely revealing of this human dimension. These are sectors where emotions and rationality constantly intertwine. Concerns about skin, ageing, immunity or energy levels rarely belong to the clinical sphere alone. They are also questions of identity, appearance, social expectations and self-care. When people search for solutions they are not merely navigating commercial options but negotiating a deeper desire to feel safe, to feel seen and to feel in control of their own wellbeing. The choice of a serum or an integrator is therefore embedded in a complex interplay of scientific legitimacy, personal belief and cultural norms about what it means to care for oneself.

As a result trust becomes the central currency of these markets. It is built through signals that suggest competence and reliability, from ingredient lists that appear clean and understandable to expert explanations that reduce ambiguity. Search engines act as the architecture through which these signals are organised. They determine which voices appear authoritative, which forms of knowledge are elevated and which are silenced. Their influence reaches far beyond visibility and enters the realm of behavioural shaping, because the order in which information is presented affects the way uncertainty is interpreted and decisions are made.

Understanding this human element is essential to understanding the contemporary digital landscape. Algorithmic mediation is not experienced as a technical process but as a subtle expansion of personal decision making. Each search becomes a moment of negotiation between the self, its concerns and the informational environment that surrounds it. The rise of self-diagnosis, the preference for transparent and natural ingredients and the growing reliance on scientifically framed content all reflect this ongoing negotiation. They reveal a collective attempt to anchor health related decisions in sources that can be perceived as coherent, consistent and reassuring.

The “new normal” in post-COVID consumer behaviour is characterised by a structural shift from occasional online health information seeking to routinised digital self-diagnosis and self-management. At European level, recent analyses of online health information seeking behaviour (e-HISB) show that the pandemic accelerated an already existing trend: using Eurostat data, Di Novi (2024) reports that around 52% of individuals in the EU searched online for health-related information and symptoms in 2022, confirming that digital channels have become a primary gateway to health knowledge rather than a marginal complement to physician advice. This pattern is particularly visible in Italy. The SEI Donna survey on Italian women found that 96% of respondents searched for health information on the web, and 52% used the Internet explicitly to obtain a “second opinion” on medical issues, signalling a strong propensity to cross-check or even pre-empt professional diagnoses through self-directed online research (Covolo et al., 2022). A broader Italian survey by D’Andrea (2023) similarly documents that adults aged 19–60 frequently consult institutional websites (notably the Ministry of Health) for health and COVID-19 information and often book an appointment with their family doctor only after initial online investigation, suggesting that offline expert consultation is increasingly framed as a second step following digital self-assessment.

This expansion of self-diagnosis is not neutral: it reconfigures risk perception, trust, and the temporal sequence of care-seeking. Studies of e-HISB during and after the pandemic underline that individuals were “exposed to a wider array of health information” online and that this exposure can affect healthcare access and perceived health status (Di Novi, 2024). Systematic reviews on online health information for specific patient groups (e.g., cancer patients) show that while digital resources can enhance perceived control and knowledge, they also introduce barriers related to information overload, difficulties in assessing credibility, and heightened anxiety about symptoms, sometimes described as “cyberchondria” (Ferraris et al., 2023). In this sense, the post-COVID rise of self-diagnosis is both an empowerment phenomenon enabling consumers to feel more informed and autonomous and a source of new vulnerabilities, especially when symptom checking and treatment decisions occur prior to professional evaluation. From the perspective of dermocosmetics and dietary supplements, this means that consumers increasingly arrive at

pharmacies, para-pharmacies or e-commerce platforms with pre-formed hypotheses about skin conditions, deficiencies or preventive strategies derived from search engines and social media.

Parallel to the growth of self-diagnosis, the pandemic consolidated a strong cultural turn towards “clean” and transparent products, particularly in Europe. The “clean label” movement initially focused on the reduction of artificial additives in food has evolved into a broader expectation of short, recognisable ingredient lists, natural components and transparency about sourcing and processing. Innova Market Insights’ 2025 report on clean label trends in Europe notes that most European consumers read labels when purchasing food and beverages and that around one in three new product launches in Europe now carry a clean label claim; consumers explicitly avoid artificial sweeteners and colourings and use label information as a proxy for product quality and safety. Market analyses corroborate this behavioural shift at the macro level: the European clean label ingredient market was valued at USD 13.5 billion in 2024 and is projected to reach USD 40.05 billion by 2032, indicating sustained double-digit growth driven by demand for natural and minimally processed ingredients (Verified Market Research, 2024). A separate industry review estimates that Europe accounted for approximately 32% of the global clean label products market in 2024, further underlining the centrality of European consumers in shaping this trend (Towards F&B, 2025).

Although these data refer primarily to food and beverages, their implications extend directly to dietary supplements and, by proximity, to dermocosmetic products. The Europe dietary supplements market report highlights “consumers’ inclination towards clean-label and natural supplements” as a key driver of growth and explicitly links it to preventive health concerns and the expansion of e-commerce channels. Italy, in particular, is described as having the highest per-capita expenditure on supplements in Europe, with a strong phytotherapy culture and growing demand for immunity, digestive and beauty-related formulations. In this context, “clean label” becomes a powerful trust cue: consumers use absence of controversial additives, presence of botanical ingredients, and clarity of dosage and claims as heuristic indicators of product safety and authenticity. For dermocosmetics, European market intelligence on natural cosmetic ingredients emphasises similar expectations: demand is increasing for products positioned as natural or organic, supported by certification schemes such as COSMOS or NATRUE and by transparent communication on ingredient origin and environmental impact (CBI, 2025). Thus, post-COVID clean labelling should be interpreted not simply as a marketing aesthetic but as a behavioural manifestation of heightened risk awareness and a desire to reduce perceived chemical and regulatory uncertainty in health-adjacent purchases.

The third pillar of this post-COVID digital behaviour is a marked preference for expert content. The pandemic made visible the consequences of conflicting or low-quality health information, leading to renewed attention to expertise, evidence and institutional authority in digital spaces. A 2025 systematic review in *npj Digital Medicine* synthesising 49 studies on trust in digital healthcare concludes that trust in digital health interventions is consistently associated

with intention to use, continued use and perceived usefulness, and that trust is shaped by factors such as perceived quality, data accuracy, human involvement and privacy protections (Catapan et al., 2025). In the Italian context, D'Andrea (2023) finds that official sources family doctors and institutional websites such as the Ministry of Health remain the most trusted actors for online health information; respondents who frequently search online also report greater perceived ability to detect false information, suggesting a learning effect in evaluating expert versus non-expert sources. Studies focused on COVID-19 information further show that trust in online resources and perceived credibility of the source significantly predict intention to follow digital health advice, reinforcing the central role of expertise signalling in shaping behaviour (Sillence et al., 2025; Principe et al., 2023).

In beauty and dermocosmetics, this demand for expert content is reflected in both market performance and communication styles. Dermatology and cosmetic dermatology remain cautious in adopting some AI-based tools, but a recent narrative review in *Dermatology and Therapy* notes that consumer-facing skincare is “at the forefront” of digital innovation, with the global beauty and cosmetics industry projected to grow significantly due to consumer behaviour shifts during COVID-19 and digital technologies that enable closer interaction with products (du Crest, 2024). Post-pandemic research on online skincare shopping finds that the surge in e-commerce is closely linked to digital marketing and heightened consumer interest in ingredient information and expert recommendations (e.g., dermatologist endorsements and pharmacist-led advice), rather than purely aesthetic messaging. McKinsey’s analysis of the global beauty market similarly reports that growth segments are concentrated in “science-backed” and “dermocosmetic” sub-categories, where brands leverage clinical claims, ingredient education and professional endorsements to differentiate themselves in increasingly crowded digital channels (McKinsey & Company, 2024; 2025).

Taken together, these strands of evidence suggest that the post-COVID “new normal” in digital behaviour is characterised by a triangle of self-diagnosis, clean label expectations, and expert-framed content. Consumers increasingly initiate their health and beauty journeys by searching symptoms and conditions online; they then evaluate product options through the lens of ingredient purity, naturalness and regulatory reassurance; and finally, they look for explicit markers of expertise medical credentials, institutional affiliations, scientific references to resolve residual uncertainty. In regulated markets such as Italian dermocosmetics and dietary supplements, this configuration intensifies the strategic importance of search engines and SEO: platforms become the primary locus where self-diagnosis, clean label signalling and expert content converge, and where brands must compete not only on visibility but on their ability to encode regulatory compliance and scientific credibility into their digital presence.

2.5.2 From Pharmacy Counter to Search Engine

In the Italian context, the consumer journey in health-adjacent markets is undergoing a notable transformation: the pharmacy counter which traditionally represented the first point of direct contact between consumer and health advice is increasingly being preceded, or even replaced, by online search engines and digital health information seeking. This shift carries

significant implications for trust, advice mediation, and market behaviour in sectors such as dermocosmetics and dietary supplements.

Empirical research shows that online health-information-seeking behaviour (e-HISB) has become mainstream in Italy. In a 2023 study of Italian residents aged 19–60, D’Andrea et al. found that the majority of participants reported using the Internet to search for health information, and that frequent online search correlated positively with both the perception of influence of the information on their own health understanding and with the ability to discern false information online (D’Andrea, Grifoni, & Ferri, 2023). This suggests that many consumers now initiate their health-related enquiry online rather than exclusively relying on face-to-face professional advice.

Another Italian survey focusing on women reported that 52 % of respondents had used the Internet to seek a second opinion regarding health issues prior to—or independent of—a healthcare consultation (Covolo, 2022). This demonstrates the extent to which digital channels are becoming first recourse for many users in the health-information ecosystem.

The shift from pharmacy to search engine is underpinned by several converging forces. First, digital convenience and immediacy offer a pathway to preliminary advice, symptom checking, or product research without needing to visit a professional or retail location. Secondly, during the COVID-19 pandemic, restrictions on physical access and heightened health anxiety accelerated use of online sources globally (Alzghaibi et al., 2023). Although this evidence is not specific to Italy’s dermocosmetic or supplement markets, it supports the broader argument that online intermediary roles expanded substantially during that period.

Turning to industry-specific markets, the data are less precise concerning the transition from pharmacy counter to search engine. Market reports indicate that the Italian online cosmetics (which includes dermocosmetic products) segment is projected to grow significantly, driven by e-commerce and digital marketing strategies (6Wresearch, 2025). This growth implies that consumers are not only researching online but also purchasing via digital channels thus bypassing or supplementing the traditional in-store pharmacy interaction. For the Italian dietary supplements market, a 2024 estimate reports a market size of USD 8.27 billion with a projected CAGR of 8.4% from 2025 to 2030 (Grand View Research, 2024). While this figure does not directly speak to online health-information behaviour, the growth in the sector signals increasing consumer interest, which likely amplifies digital search as a precursor to purchase.

From the perspective of regulated markets, this behavioural shift reconfigures the role of the pharmacy counter from primary adviser to one node within a broader digital-first ecosystem. Consumers may arrive at the pharmacy or para-pharmacy already informed or influenced by search engine results, symptom checkers, blogs or product reviews. This inversion means that professional advice is increasingly validation or confirmation of a digitally-initiated decision rather than the origin of it.

The implications are manifold. On a trust dimension, the cues that previously signalled authority at the pharmacy counter professional credentials, face-to-face interaction, regulatory oversight are now augmented or replaced by algorithmic visibility, search engine ranking, website trust signals and SEO-driven content. The consequence is that visibility in search results and digital credibility become integral elements of health-adjacent consumer influence. From a regulatory/marketing perspective, brands and retailers in dermocosmetics and supplements must now engage with search-engine mediated consumer journeys, optimizing for visibility, digital trustworthiness and information-compliance, rather than solely relying on in-person pharmacist recommendation.

2.5.3. Digital behaviour's role in shifting the trust ecosystem

The post-COVID diffusion of digital health information-seeking has not simply added a new channel to an existing trust configuration; it has re-ordered the entire “trust ecosystem” in which consumers evaluate health-related products, including dermocosmetics and dietary supplements. Empirically, this shift is visible in at least three intertwined dynamics: (1) the normalization of online search as a routine component of health decision-making, (2) the redistribution of trust across human and algorithmic actors, and (3) the transformation of user practices into algorithmic signals that recursively shape what is considered “trustworthy” online.

From occasional search to routine digital health information-seeking

Before the pandemic, online health information-seeking (e-HISB) was already widespread in Europe but unevenly distributed across countries and socio-demographic groups. Eurostat data show that, in 2020, 55% of EU residents aged 16–74 reported having searched online for health information in the previous three months, an increase of 21 percentage points compared to 2010 (34%) (Eurostat, 2021).

In the Italian context, survey data collected during and after COVID-19 confirm both the intensification and the normalization of this behaviour. Vismara et al. (2021) report that the share of Italians who searched online for medical information increased from 35% in 2019 to 46% in 2020, indicating that the pandemic acted as a catalyst for digital health information use. D'Andrea et al. (2023), in a large-scale Italian survey on online health information-seeking and COVID-19, similarly note a “continuous increase” in online health information activities and highlight that search engines, institutional websites, and news portals have become central entry points into the health information environment.

Systematic reviews corroborate this pattern at an international level: Alzghaibi et al. (2023) show that, during and after COVID-19, search engines and social media consolidated their role as primary health information sources, with digital health literacy emerging as a key determinant of both frequency and quality of information-seeking. For Italian women, Covolo et al. (2022) find that the internet is widely used as a “second opinion” after medical consultations, with 52% of respondents explicitly seeking supplementary online information following an encounter with a healthcare professional.

Taken together, these findings indicate that digital behaviour is no longer episodic or emergency-driven. It has become structurally embedded in everyday health management, including preventive and wellness-oriented domains such as nutrition, skincare and supplementation. The trust ecosystem is therefore increasingly shaped at the moment when users open a search engine, rather than exclusively at the pharmacy counter or during in-person medical interactions.

Redistribution of trust: from expert-centric to layered, algorithmically mediated trust

The expansion of online search has not eliminated interpersonal trust in physicians, pharmacists and other professionals. Recent survey work on trust in health information sources continues to show that healthcare professionals remain the most trusted actors: Alhewiti (2025) reports that 94.3% of respondents rated physicians and healthcare workers as “very trustworthy” or “trustworthy”, while the internet and social media are evaluated more cautiously. Similar patterns emerge in comparative European studies, where online resources complement rather than fully replace professional advice (Link et al., 2021).

What changes in the post-COVID configuration is less the existence of expert trust than its position in the decision chain. Digital behaviour introduces a layered model of trust in which:

1. Search engines operate as first-line gatekeepers, structuring which sources are even considered. Users tend to start with Google, not with their physician or pharmacist.
2. Professional expertise is increasingly mediated by online representation. Physicians, para-pharmacies and brands that are absent or poorly represented in search results risk being excluded from the user’s choice set.
3. Hybrid actors (institutional portals, reputable pharmacy e-commerce, branded educational hubs) emerge as “proxy experts”, translating scientific and regulatory content into accessible formats and competing with traditional experts for attention and credibility.

This redistribution is closely linked to what the literature describes as algorithmic trust. Algorithmic trust refers to the confidence users place in automated systems such as search ranking algorithms to filter information in ways perceived as reliable, fair and aligned with their interests (Marmolejo-Ramos et al., 2025; Prism Sustainability Directory, 2025). Classic work on search behaviour already documented that users disproportionately click on higher-ranked results and often interpret rank position as a proxy for relevance and quality (“In Google we trust”: Pan et al., 2007, cited in Wardle, 2025; Williams-Ceci et al., 2024). Recent research on health-related search confirms that users attribute a certain credibility to search engines’ sorting functions, even if they remain aware of risks of misinformation (Nelson et al., 2025; Wardle, 2025).

For regulated credence goods such as dietary supplements and dermocosmetics whose quality and effects cannot be fully assessed by lay consumers even after repeated use this layered trust model is particularly consequential. The perceived legitimacy of a supplement or skincare product increasingly depends not only on the authority of health professionals or

brand reputation, but also on how these actors are positioned and framed by search algorithms.

Digital micro-practices as signals in the trust infrastructure

Digital behaviour not only reflects existing trust preferences; it actively constructs and stabilizes a new trust infrastructure through countless micro-practices—typing queries, clicking results, bouncing back, sharing links, leaving reviews, or searching for specific ingredients such as *vitamina D integratore* or *acido ialuronico viso*. These actions are recorded, modelled and fed back into ranking systems, thereby becoming part of the algorithmic apparatus that decides which content surfaces for future users.

Studies on online health information-seeking show that users rely on a mixture of interface-level heuristics (position in the SERP, presence of rich snippets, star ratings), source characteristics (domain type, institutional vs. commercial), and content cues (presence of references, author credentials, disclaimers) when assessing trustworthiness (Jia et al., 2021; Winters et al., 2025). Italian surveys add that many users deliberately cross-check information across multiple sites, often combining institutional sources, forums and brand content in a kind of lay meta-analysis (D’Andrea et al., 2023; Covolo et al., 2022).

From an SEO perspective, these behavioural patterns are precisely what Google seeks to capture and formalize through frameworks such as E-E-A-T (Experience, Expertise, Authoritativeness, Trustworthiness). Google’s own guidelines emphasize privileging “helpful, reliable, people-first content” for sensitive topics like health (Google, 2024). Industry analyses focused on medical and health websites argue that aligning content with E-E-A-T by highlighting expert authorship, providing transparent sourcing, and ensuring robust privacy policies can both improve rankings and reassure users about the safety of the information (Digivate, 2024; EOS Healthcare Marketing, 2025).

In this sense, digital behaviour and SEO co-evolve:

- Users increasingly expect to find certain trust cues (author bio, scientific citations, clear claims compliant with regulation) when researching health products.
- These expectations are learned by algorithms through engagement metrics and operationalized into ranking signals.
- Brands and pharmacies, in turn, design their content and SEO strategies to satisfy both user expectations and algorithmic criteria, reinforcing the centrality of these cues as markers of trust.

The “trust ecosystem” is therefore not just a social arrangement among humans; it is an emergent socio-technical architecture produced by the continuous interaction between user practices, platform algorithms, and regulatory constraints.

Consequences for dermocosmetic and supplement markets

Although empirical work specifically focused on Italian dermocosmetics is still limited, evidence from dietary supplements and general health behaviour provides strong indications of how digital practices reshape trust in these product categories. Multiple studies document significant increases in supplement consumption during the pandemic, often motivated by immune support and general health maintenance (Arlauskas et al., 2022; Adıgüzel et al., 2024). These changes have been accompanied by intensive online search about ingredients, benefits and side effects, creating a dense informational environment where brand claims, regulatory guidance and user-generated content coexist.

In such an environment, digital behaviour plays at least three roles in shifting the trust ecosystem:

1. Re-weighting expert intermediaries. Consumers no longer access pharmacists or dermatologists exclusively through physical encounters, but also via their online profiles, institutional portals and pharmacy e-commerce platforms. Trust is increasingly attached to digitally visible expertise.
2. Elevating “search visibility” as a precondition for trust. Products, brands and even regulations that are not easily discoverable through search are effectively excluded from the consumer’s consideration set, regardless of their intrinsic quality or legal robustness.
3. Embedding compliance into perceived credibility. Because regulatory constraints limit explicit claims in Italy and the EU, users learn to read more subtle compliance signals such as standardized wording of indications, presence of mandatory disclaimers, and alignment with official health guidance as indicators that a brand is “serious” and trustworthy. This, in turn, encourages firms to design SEO and content strategies that foreground compliant educational content rather than purely promotional messaging.

In summary, post-COVID digital behaviour does not merely shift where consumers look for information; it alters how trust is produced, distributed and signalled. Search engines, health portals, brand sites and pharmacy platforms collectively form a new algorithmically mediated trust ecosystem in which user behaviour is both an outcome of existing trust relations and an input into the algorithms that structure future trust. For regulated markets such as dermocosmetics and dietary supplements, understanding this dynamic is essential: SEO is no longer a peripheral marketing technique but a central infrastructure through which trust is negotiated between consumers, experts, brands and regulators.

Chapter 3: Legal and Market Framework in Italy

Understanding the contemporary dynamics of the Italian dermocosmetic and dietary supplement sectors requires an integrated view of both the market environment and the regulatory architecture that governs communication, formulation, and consumer protection. These two dimensions operate in parallel: market growth and digitalisation have expanded the presence of these products across pharmacies, para-pharmacies, e-commerce channels and educational platforms, while national and European regulations increasingly shape what can be claimed, how information must be presented, and which forms of digital communication are permissible. In highly regulated product categories, commercial visibility and regulatory compliance are inseparable, and this interplay becomes even more critical in a context where consumers rely heavily on online information to make health-adjacent decisions.

Italy represents a particularly relevant case because it combines a longstanding tradition of pharmacist-mediated guidance with rapid expansion of digital touchpoints. Dermocosmetics and dietary supplements occupy a hybrid position in the Italian health ecosystem: they are not medicines, yet consumers often approach them with expectations linked to efficacy, safety and scientific grounding. This liminal identity situates them within a stringent legal framework that includes European Regulations 1223/2009 for cosmetics, 1924/2006 and 1169/2011 for nutrition and health claims, and Decreto Legislativo 169/2004 for national implementation of supplement rules. At the same time, newer frameworks such as the General Data Protection Regulation and the Digital Services Act govern how health-adjacent data and content circulate online, thereby influencing digital marketing practices and the visibility of these products in search engines.

Within this regulatory and market environment, firms operate under a dual demand. On the one hand they must ensure full compliance with safety, labelling and claims legislation, which effectively sets the boundaries of what can be communicated to consumers. On the other hand, they must compete in a digital marketplace where visibility, trust, and credibility are increasingly mediated by platforms, algorithms and consumer-generated content. Chapter 3 therefore examines how these regulatory and market forces co-evolve, and how they jointly define the conditions under which SEO and digital communication strategies can operate in Italy's dermocosmetic and dietary supplement industries.

3.1 Market Overview (2019–2025): Supplements and Dermocosmetics

The Italian dermocosmetic and dietary supplement sectors have both expanded significantly in the period from the pre-pandemic years to the current post-COVID phase, although along partly different trajectories. While dietary supplements constitute a clearly delimited statistical category, dermocosmetics are usually embedded within broader cosmetic and skin care aggregates and therefore require careful interpretation of available data. This subsection provides a concise overview of market size and growth for the two sectors between approximately 2019 and 2025, drawing on official industry reports and recent market analyses. Where public sources do not isolate dermocosmetics as a separate category, this limitation is explicitly acknowledged.

3.1.1 Supplements and dermocosmetics market size and growth

The Italian dietary supplements market

Multiple convergent sources indicate that Italy is currently the leading national market for food supplements in Europe. An analysis by Unione Italiana Food and Integratori & Salute based on New Line data reports that, in 2023, the turnover of the Italian food supplement sector reached 4.5 billion euro and that Italy accounted for 26 per cent of total European sales, ahead of Germany at 19 per cent and France at 15 per cent. The same elaboration notes that sales volumes approached 300 thousand tonnes in 2023, underlining not only the economic relevance of the sector but also its penetration in everyday consumption. These figures place Italy at the centre of the European supplement landscape and provide a benchmark for the analysis of communication and regulation in the following chapters.

From a longitudinal perspective, the available evidence shows robust growth from the pre-pandemic period to the present. A regulatory and consulting firm summarising recent market research reports that Italian food supplement sales in 2023 were 25 per cent higher than in 2019 and 5.5 per cent higher than in 2022. Although this source does not disclose the absolute 2019 value, the percentage variation is based on aggregated industry data and is consistent with the turnover levels reported for 2022 and 2023 in other outlets. For example, a trade article based on Integratori & Salute data notes that the sector exceeded 4 billion euro in turnover in 2022 and confirms Italy's 26 per cent share of the European supplement market, whose value surpassed 13 billion euro. In 2023, a socio-economic impact study by Integratori & Salute and PwC Italy estimated value sales at 4.091 billion euro excluding VAT across the three main Italian channels, and calculated that the sector contributed around 4.626 billion euro to national GDP. These partially different values for 2023 (4.091 vs 4.5 billion euro) can be attributed to methodological differences, such as the inclusion or exclusion of VAT and specific distribution channels, but they all converge on the conclusion that the Italian supplement market has exceeded 4 billion euro and maintained a strong upward trajectory since 2019.

Channel data further qualify this expansion. According to a 2024 summary of the Integratori & Salute report presented in Milan, pharmacies remain the dominant distribution channel, accounting for almost 78 per cent of supplement sales, followed by large-scale retail at 7.7 per cent, parapharmacies at 7.6 per cent and online channels at 6.9 per cent. The same source reiterates that Italy retains its position as the first European market both in absolute value and in share of total sales. Complementing these figures, Biochem Consulting notes that while pharmacies remain the preferred channel, their sales increased by 4.6 per cent, whereas the e-commerce channel registered a 21.6 per cent increase and offers average prices around 31 per cent lower than pharmacy prices. Taken together, these data suggest not only overall growth, but also a gradual diversification of purchase channels, with pharmacy leadership coexisting with an increasingly significant online component.

At a more macroeconomic level, media summaries of the Integratori & Salute and PwC Italy study emphasise that supplement sales “in value” in 2023 surpassed 4 billion euro and that the sector generated more than 4 billion euro of value added and over 550 million euro in VAT for the Italian economy. While these figures refer to the economic impact rather than retail turnover alone, they underline the systemic relevance of the supplement sector in the Italian productive fabric. Over the 2019–2023 period, the combination of steady turnover growth, consolidation of pharmacy-based sales and the emergence of e-commerce as a complementary channel frames a market environment in which regulatory compliance, professional advice and digital information all play a central role in shaping consumer behaviour.

The Italian dermocosmetics and skin care market

In the case of dermocosmetics, statistical delineation is less straightforward because publicly available datasets often aggregate dermocosmetic products within the broader skin care or cosmetic segments. Nevertheless, recent reports from Cosmetica Italia and specialised market analyses provide a coherent picture of the size and growth of the skin care and pharmacy-based dermocosmetic segments.

Cosmetica Italia's Annual Report for 2023 indicates that total cosmetics purchases in Italy amounted to 11.5 billion euro in 2022, representing an increase of 8.5 per cent over 2021 and 5.9 per cent over 2019, thereby exceeding pre-pandemic consumption levels. In the same report, Italy's cosmetics consumption in 2023 is estimated at 12.5 billion euro, a year-on-year growth of 9.4 per cent compared to 2022, positioning Italy as the third largest cosmetics market in Europe after Germany and France. Within the European context, facial and body care products represent the largest macro-category of cosmetics, accounting for 29 per cent of European consumption in 2023, ahead of personal cleansing products and hair care. This confirms the centrality of skin care within cosmetic consumption at continental level.

At the Italian level, more detailed category data from Cosmetica Italia show that facial skin care products alone accounted for 1,612.2 million euro in 2023 across all channels, with an overall category growth rate of 9.5 per cent compared to 2022. When broken down by distribution channel, the same table indicates that pharmacies generated 630.4 million euro in facial skin care sales, beauty stores around 501.7 million euro and large-scale retail and other channels approximately 480.2 million euro, with growth rates of 10.7, 10.1 and 7.3 per cent respectively. These data confirm that skin care represents one of the most dynamic product families in the Italian cosmetics market and that pharmacies play a central role within this category. It is important to note that Cosmetica Italia does not explicitly label all pharmacy skin care products as "dermocosmetics," but in industry practice a significant proportion of pharmacy skin care, especially those positioned with dermatological claims or linked to specialist brands, is identified as dermocosmetic.

Further evidence of the importance of dermocosmetics in the pharmacy channel is provided by a 2025 Cosmetica Italia briefing entitled "Il reparto dermocosmetico in farmacia." This document reports that, at the end of 2024, skin care products accounted for more than half of all cosmetic purchases in pharmacies and that their value reached 1.2 billion euro. The same source describes this product family as structurally central to pharmacists' category management strategies, with increasingly extensive dedicated areas within the pharmacy. While this report does not provide a full time series back to 2019, the combination of the 2023 category data and the 2024 pharmacy figure suggests a sustained expansion of dermocosmetic-related turnover in the post-COVID period, both in absolute value and in relative weight within pharmacy cosmetics.

Complementing these association data, a recent market analysis by Deep Market Insights estimates that the Italian dermocosmetics market, defined more narrowly than the entire skin care category, reached 298.27 million US dollars in 2024 and is projected to grow to 541.93 million US dollars by 2033, corresponding to a robust compound annual growth rate over the forecast period. Although these values are expressed in US dollars and result from a proprietary segmentation, they corroborate the notion that dermocosmetics represent a high-growth, high-value niche within the broader Italian skin care and cosmetic landscape. At the global level, a separate report estimates the dermocosmetics market at around 74.14 billion US dollars in 2025 with an expected compound annual growth rate of

approximately 10.3 per cent through 2035, which situates the Italian market within a rapidly expanding international segment.

In summary, while official Italian statistics do not provide a fully disaggregated time series specifically for dermocosmetics between 2019 and 2025, the convergence of Cosmetica Italia's skin care and pharmacy data with specialised dermocosmetics market estimates indicates that this segment has grown markedly in the post-COVID period. The evidence shows that skin care is the leading cosmetic category in Italy by value, that pharmacy skin care sales exceeded 600 million euro in 2023 and reached around 1.2 billion euro in 2024, and that dermocosmetics within this channel are increasingly central to pharmacy strategies and consumer demand.

Comparative observations and limitations

Both the dietary supplements and dermocosmetic segments have demonstrated strong growth between the pre-pandemic year 2019 and the most recent data available. For supplements, sectoral turnover has increased by approximately one quarter between 2019 and 2023 and now exceeds 4 billion euro, with Italy holding about one quarter of the European market. For dermocosmetics, skin care has emerged as the largest cosmetic macro-category, with Italian facial skin care sales surpassing 1.6 billion euro in 2023 and pharmacy skin care alone reaching around 1.2 billion euro in 2024. In both sectors, pharmacies remain critical distribution and advisory hubs, but they increasingly coexist with digital channels and e-commerce, which exhibit some of the highest growth rates in recent years.

At the same time, there are important limitations in the public evidence base. For dietary supplements, data are relatively robust but often originate from industry associations and consultancy-based market research rather than from harmonised official statistics. For dermocosmetics, the main constraint is definitional: most Italian and European datasets report figures for broad cosmetic categories and distribution channels rather than isolating dermocosmetics as a distinct statistical item. As a consequence, this thesis must rely on skin care and pharmacy subcategories as proxies for dermocosmetic market dynamics, supplemented by specialised market reports that use narrower definitions. These limitations do not undermine the general conclusion that both sectors have expanded significantly between 2019 and 2025, but they must be kept in mind when interpreting comparative figures and when linking market trends to regulatory and communication strategies in the following sections.

3.1.2 E-commerce, Para-pharmacy, Digital Education Strategies

In recent years the distribution and consumption environment for dermocosmetics and dietary supplements in Italy has undergone substantial reconfiguration. This transformation is characterized by three interrelated phenomena: the growth of e-commerce (especially pharmacies and para-pharmacies selling online), the increasing relevance of para-pharmacy retail outside traditional pharmacies, and the rising prominence of digital education and information strategies that accompany product marketing. These shifts have reshaped both how products reach consumers and how consumers form trust and make choices.

Growth of E-commerce and Online Sales

E-commerce in Italy has seen strong expansion, including in the health and wellness segments. According to the 2025 overview of Italian online retail, total online sales reached about €40.1 billion,

representing a 6 % increase over 2024. Within this overall growth, the “beauty, pharma and food” aggregate categories are among those driving expansion, signaling increasing consumer propensity to purchase health-adjacent goods online rather than exclusively in physical stores.

In the specific domain of dermocosmetics, a trade source reports that in the 12 months preceding its 2024–2025 analysis, online sales increased by nearly 20 percent, whereas sales in physical pharmacies increased by only around 6.4 percent. This divergence suggests that e-commerce is growing faster than traditional retail, at least within skin-care and cosmetic products associated with pharmacies. The same source notes that although the overall value of e-commerce remains smaller than that of physical pharmacy turnover, the acceleration of online growth reflects a shifting distribution balance that may continue to widen.

In the broader OTC and dietary supplements sector, industry analyses forecast a compound annual growth rate (CAGR) of 14.9% for online purchases between 2023 and 2027. Another recent report indicates that e-commerce pharmacy channels in Italy grew by 7.5% in 2025, with integratori alimentari (dietary supplements), self-medication products, and sunscreen (often linked with dermocosmetic categories) among the main drivers. Taken together, these findings reflect a robust and accelerating adoption of online retail for health-adjacent products, indicating that digital distribution channels have become a structural component of the sector rather than a temporary acceleration.

Finally, as of late 2025 the Italian online pharmacy market is reported by one consultancy at USD 5 billion, reflecting both medication and non-prescription health product sales, underlining the relevance of online health-product retail in the national context.

Role and Expansion of Para-pharmacy Retail

Para-pharmacies which are retail outlets that sell non-prescription medicines, dietary supplements, dermocosmetics and similar goods, are also part of this changing distribution ecosystem. According to a 2025 analysis, the Italian para-pharmacy market is estimated at between €830 and €880 million, with over 4 200 points of sale active. The same source highlights that core drivers of para-pharmacy growth are integratori alimentari (dietary supplements), dermocosmetic products and over-the-counter items, indicating a converging interest in wellness, prevention and self-care among consumers.

The relative importance of para-pharmacies arises partly from their positioning at the intersection between pharmaceutical retail and cosmetic/beauty retail: they often combine elements of both, offering health-adjacent products under less strictly regulated contexts than medicines while retaining some professional oversight. In a market where consumers are increasingly looking for convenience, affordability, and product choice, para-pharmacies appear as intermediaries that align with modern consumer behaviour, especially when complemented by online channels.

Digital Education Strategies and Informational Marketing

Alongside changes in distribution, companies and retailers have intensified digital education strategies as part of their marketing, recognizing that consumers now often research products, ingredients, and health implications online before purchase. This shift is visible in the rising number of new product launches: according to a 2025 article, the Italian food supplement market introduced approximately

4,000 new references in a single recent year, reflecting both high innovation rates and the importance of differentiating products through content, positioning and claims.

Moreover, health- and beauty-oriented e-commerce platforms, para-pharmacies and pharmacies increasingly invest in content that educates consumers: ingredient descriptions, dosage guidance, usage recommendations, blog posts and sometimes medical-style advisories. According to market commentators, this “digital education” element becomes a core component of consumer trust building, particularly in a context where legal regulation limits medical claims and where many consumers approach dermocosmetic or supplement products with expectations close to preventive or therapeutic use.

In addition, the growth of e-pharmacy and online OTC markets reflects infrastructural and regulatory shifts including broader acceptance of online retail for health products, digital payment and a diffusion of logistical and fulfillment capacities, that make online purchase feasible and reliable for a growing segment of consumers.

Combined Effects: Distribution, Access, and Trust

The convergence of e-commerce growth, para-pharmacy expansion and digital education strategies produces structural effects on market access, consumer behaviour, and trust formation. First, the accessibility and convenience of online purchase lower transaction costs for consumers: time, travel, comparison of products, enabling them to explore a wider assortment of dermocosmetic and supplement options. Second, because many consumers consult online content before purchase, digital information becomes part of the pre-purchase decision architecture: ingredient transparency, user reviews, and accessible product information act as trust signals that substitute or complement professional advice. Third, the coexistence of online, para-pharmacy and traditional pharmacy-based distribution creates a multi-channel ecosystem in which consumers can navigate based on their preferences for convenience, price, or perceived reliability.

For regulated markets such as dermocosmetics and dietary supplements, this multi-channel ecosystem transforms not only distribution but also communication and compliance strategies. Brands and retailers must ensure that digital product presentation, from e-commerce pages to informational content, complies with regulatory constraints on claims and labelling, while also appealing to consumer demand for transparency, simplicity and perceived scientific credibility. At the same time, pharmacies and para-pharmacies that go online face competition not only from other brick-and-mortar retailers, but from pure-play e-commerce operators, which increases pressure to adopt digital marketing, SEO strategies, and consumer education to maintain relevance.

Limitations and Gaps in Public Data

Although available sources consistently indicate strong growth in e-commerce, para-pharmacy activity, and digital education strategies, the underlying data for these sectors remain fragmented. Much of what is publicly accessible comes from trade associations, consultancy firms, or industry-commissioned reports. These sources often employ proprietary methodologies that are not fully disclosed, especially regarding how product categories are defined and how online versus offline sales are separated. For example, the term “dermocosmetics” is not used uniformly across datasets; many official statistics group these products under broader categories such as skin care or personal care, which makes it difficult to isolate the exact size and evolution of the dermocosmetic segment.

Similarly, data on online retail performance for dietary supplements and dermocosmetics is typically aggregated together with self-medication, cosmetics, and OTC products. This aggregation prevents a precise quantification of how much online growth specifically concerns dermocosmetics or supplements, and how much pertains to other unrelated categories. Para-pharmacy figures also rely heavily on industry analyses rather than independent statistical agencies, which limits the ability to verify trends across multiple data sources.

Finally, long-term, publicly available time series data are limited. Many reports provide single-year snapshots or short-term comparisons, but do not offer continuous data from 2019 to 2025 that clearly describe how distribution channels changed year by year. Because of this, a rigorous longitudinal reconstruction of the digital transformation of the sector is not fully attainable through public data alone.

These constraints do not undermine the overall observation that digital and alternative distribution channels have expanded significantly, but they do highlight the need for cautious interpretation and the value of integrating multiple data sources. They also justify the methodological decision of this thesis to rely on both quantitative indicators and qualitative analysis, as well as to focus on structural trends rather than on precise numerical comparisons that current public data cannot fully support.

3.2 Regulatory Landscape

3.2.1 Supplements: EU Regulation 1924/2006, Regulation 1169/2011, and Decreto Legislativo 169/2004

Regulation (EC) No 1924/2006 – Nutrition and Health Claims on Foods

Regulation (EC) No 1924/2006 establishes the harmonised European framework governing the use of nutrition and health claims on foods, including dietary supplements. The regulation is designed to ensure a high level of consumer protection while facilitating the functioning of the internal market by standardising permissible claims across Member States.

The regulation distinguishes clearly between nutrition claims and health claims. Nutrition claims refer to statements concerning the nutritional properties of a product, such as “source of vitamin C” or “high in fibre.” Health claims, by contrast, link a nutrient or substance to a physiological effect, for example, “vitamin D contributes to the normal function of the immune system.” Only claims included in the European Union’s authorised lists, or subsequently approved through formal scientific

evaluation procedures, may be used. Furthermore, these claims must comply with specific wording, conditions of use, and dosage thresholds in order to prevent misleading communication.

The regulation explicitly prohibits any claim that attributes to a food, including a dietary supplement, the capacity to prevent, treat, or cure human disease. Therapeutic or medical claims therefore fall outside the scope of legitimate communication for supplements, which remain legally classified as foodstuffs rather than medicinal products.

Where a nutrition or health claim is made, the regulation requires compliance with mandatory labelling standards, including the provision of relevant nutritional information. These labelling obligations operate in conjunction with Regulation (EU) No 1169/2011, which governs food information to consumers more broadly.

In practical terms, Regulation 1924/2006 establishes strict epistemic boundaries for communication. Marketing and digital content must adhere to authorised scientific wording and avoid embellishment or implicit therapeutic suggestions. For firms operating in Italy and across the European Union, this framework defines the permissible semantic space within which supplement-related claims may be formulated, whether on packaging, in e-commerce listings, or in digital communication channels.

Regulation (EU) No 1169/2011 – Food Information to Consumers

Regulation (EU) No 1169/2011 complements the claims regulation by establishing comprehensive rules on food information provided to consumers. It applies to all pre-packed food products, including dietary supplements, and aims to ensure clarity, transparency, and informed consumer choice.

Mandatory information under the regulation includes the name of the food, the list of ingredients, the net quantity, the date of minimum durability or “use by” date, storage conditions where relevant, the name and address of the food business operator, and instructions for use when necessary. This information must be presented in a language easily understood by consumers in the Member State of marketing, which in the Italian context means Italian.

For dietary supplements specifically, additional requirements apply. Labels must indicate the recommended daily intake, include a warning not to exceed the stated dose, state that supplements should not be considered a substitute for a varied diet, and specify that the product should be kept out of reach of young children. These provisions reinforce the classification of supplements as complementary to, rather than substitutes for, normal dietary intake.

The regulation also prohibits misleading presentation, including ambiguous ingredient lists or claims that may deceive consumers regarding the nature, composition, or effects of the product. These requirements extend beyond physical packaging to digital environments. Online product pages, e-commerce platforms, and digital promotional materials must replicate mandatory information in order to ensure compliance and prevent misleading communication.

Regulation 1169/2011 therefore establishes a baseline transparency standard across the European food market. In digital contexts, this means that ingredient disclosure, dosage instructions, and warnings must remain clearly visible and accessible, reinforcing the informational responsibilities of firms operating online.

Decreto Legislativo 169/2004 – National Implementation and Control in Italy

Decreto Legislativo 169/2004 transposes Directive 2002/46/EC on food supplements into Italian national law and provides the domestic regulatory infrastructure for classification, notification, and market control. It defines dietary supplements as foodstuffs intended to complement the normal diet and consisting of concentrated sources of nutrients or other substances with nutritional or physiological effects, presented in pre-dosed forms such as capsules, tablets, powders, or liquids.

The decree requires that products be marketed under the designation “integratore alimentare” and prohibits any labelling, presentation, or advertising that attributes therapeutic or curative properties to supplements. This reinforces the separation between supplements and medicinal products within the Italian legal framework.

Before being placed on the market, supplements must be notified to the competent national authority, namely the Italian Ministry of Health. Since 2021, Italy has maintained a National Register of Food Supplements, where notified products are listed. This notification system enhances traceability and regulatory oversight. In addition, production must occur in authorised facilities that comply with hygiene and food safety standards.

Through these mechanisms, the Italian implementation adds a further layer of administrative control to the EU-level regulatory regime. Classification, manufacturing, notification, and labelling are all subject to oversight, reinforcing the legal status of supplements as regulated food products within a structured compliance environment.

Implications for Digital Communication and Market Strategy

Taken together, Regulation 1924/2006, Regulation 1169/2011, and Decreto Legislativo 169/2004 establish a structured and restrictive regulatory framework for the formulation, marketing, and communication of dietary supplements in Italy. These instruments define what supplements are, what claims may be made, how information must be presented, and which procedural steps are required before market entry.

For firms operating in increasingly digital distribution environments, the implications are significant. First, strict boundaries on authorised claims require careful linguistic formulation of online content, including product descriptions, educational materials, and advertising copy. Second, mandatory labelling and transparency requirements must be integrated into e-commerce pages and digital listings, ensuring that ingredient information, dosage instructions, and warnings are clearly presented. Third, the prohibition of therapeutic claims requires that digital communication navigate the boundary between permissible health-related information and impermissible medical positioning.

These legal constraints do not merely limit communication; they define the normative and informational conditions within which credibility is evaluated. Transparent labelling, authorised claims, and compliance disclosures function as visible signals of legitimacy and responsibility. In algorithmically mediated environments, such signals may influence both platform evaluation processes and user perception.

Within this context, search engine optimisation operates as a strategic practice through which firms structure and present compliant content in ways that enhance its discoverability and clarity. SEO does not determine legal standards, but it mediates how legally compliant information is encoded,

surfaced, and interpreted in digital search environments. Understanding these regulatory boundaries is therefore essential for analysing how trust is constructed and negotiated in regulated health-adjacent markets.

3.2.2 Cosmetics

3.2.2 Regulation (EC) No 1223/2009 – Cosmetic Products

Regulation (EC) No 1223/2009 constitutes the primary European legal framework governing cosmetic products. It harmonises rules across Member States and establishes safety, labelling, notification, and market surveillance requirements for cosmetics placed on the European market. Dermocosmetics, although often positioned at the intersection between pharmaceuticals and cosmetics in marketing discourse, remain legally classified as cosmetic products and are therefore subject to this regulation.

Legal Definition and Scope

Article 2 of the Regulation defines a cosmetic product as any substance or mixture intended to be placed in contact with the external parts of the human body, including the skin, hair, nails, lips, and external genital organs, or with the teeth and the mucous membranes of the oral cavity, with a view exclusively or mainly to cleaning, perfuming, changing appearance, protecting, keeping in good condition, or correcting body odours.

This definition is critical because it establishes a strict functional boundary. Cosmetic products cannot claim to treat or prevent disease, nor can they exert pharmacological, immunological, or metabolic action. If such effects are claimed or demonstrated, the product may instead fall under medicinal product legislation. Consequently, dermocosmetic communication must remain within the domain of aesthetic, protective, or maintenance functions, avoiding therapeutic positioning.

Safety Assessment and Product Information File (PIF)

A central pillar of Regulation 1223/2009 is the safety requirement. Before a cosmetic product is placed on the market, it must undergo a safety assessment conducted by a qualified professional. The results of this assessment must be documented in a Product Information File (PIF), which must be kept accessible to national authorities for inspection.

The PIF includes:

- A description of the product
- The cosmetic product safety report
- A description of the manufacturing method and statement of compliance with good manufacturing practice
- Data on animal testing
- Evidence supporting any claims made

The obligation to maintain substantiation for claims is particularly relevant in the context of digital communication. If a cosmetic product claims, for example, to improve skin hydration or reduce wrinkles, such claims must be supported by adequate and verifiable evidence. This documentation requirement establishes a direct link between marketing statements and scientific substantiation.

Responsible Person and Traceability

The Regulation requires that each cosmetic product placed on the EU market have a designated “Responsible Person” established within the Union. This entity ensures compliance with regulatory obligations, including labelling accuracy, safety assessment, and post-market surveillance.

Furthermore, products must be traceable throughout the supply chain. This enhances accountability and facilitates regulatory enforcement in cases of safety concerns or misleading claims.

Labelling and Mandatory Information

Regulation 1223/2009 establishes specific labelling requirements. Cosmetic products must display:

- The name and address of the Responsible Person
- The nominal content
- The date of minimum durability or Period After Opening (PAO)
- Precautions for use
- The batch number
- The function of the product, where not obvious
- The list of ingredients in descending order of weight

This information must be indelible, easily legible, and visible. Although originally conceived for physical packaging, these requirements extend to online sales environments. E-commerce platforms and brand websites must provide the same mandatory information before purchase, ensuring that consumers receive equivalent transparency in digital contexts.

Claims and Advertising Regulation

While Regulation 1223/2009 does not provide an exhaustive list of authorised claims in the same manner as Regulation 1924/2006 for supplements, it establishes that cosmetic claims must comply with common criteria set out in Commission Regulation (EU) No 655/2013. These criteria require that claims be:

- Compliant with legal standards
- Truthful
- Supported by adequate and verifiable evidence
- Honest and fair
- Informed and responsible
- Allowing informed decision-making

Cosmetic communication must not attribute characteristics or functions to products that they do not possess. In particular, the boundary between cosmetic and medicinal claims is strictly monitored. For dermocosmetic brands, which often operate near the intersection of aesthetics and dermatology, careful linguistic formulation is therefore essential.

This claim regulation significantly shapes digital communication strategies. Online product descriptions, blog content, influencer collaborations, and search-optimised materials must avoid implicit medical positioning while still communicating efficacy in a persuasive manner.

Notification via the Cosmetic Products Notification Portal (CPNP)

Before a cosmetic product is placed on the EU market, it must be notified through the Cosmetic Products Notification Portal (CPNP). This centralised system allows authorities and poison control centres to access information in case of adverse reactions or safety issues.

This notification requirement reinforces regulatory oversight and ensures that products circulating in the market are identifiable and traceable. It also adds an additional compliance layer that firms must satisfy prior to engaging in marketing or digital distribution.

Implications for Digital Communication and Market Strategy

Regulation 1223/2009 creates a structured compliance environment for dermocosmetic products. Unlike dietary supplements, cosmetics are not governed by positive lists of authorised health claims; however, they are subject to strict requirements regarding substantiation, honesty, and the prohibition of misleading or quasi-medical claims.

For firms operating in digital environments, several strategic implications emerge:

First, claim formulation must be carefully calibrated. Marketing language must remain within cosmetic functions such as hydration, protection, or appearance enhancement, avoiding therapeutic or pharmacological implications.

Second, substantiation requirements necessitate internal documentation and scientific backing for efficacy claims. In digital contexts, this often translates into the publication of clinical test summaries, ingredient explanations, and evidence-based narratives to support credibility.

Third, mandatory labelling information must be clearly displayed in online listings and e-commerce environments. Transparency regarding ingredients, safety precautions, and product function becomes integral to compliant digital presentation.

Fourth, the regulatory boundary between cosmetic and medicinal positioning affects search and content strategies. Keywords and content that imply treatment of dermatological conditions may trigger regulatory risk if not carefully framed.

Taken together, Regulation 1223/2009 establishes the legal and epistemic boundaries within which dermocosmetic communication must operate. In algorithmically mediated environments, compliant claims, transparent ingredient disclosure, and evidence-based communication function as signals of legitimacy and responsibility. These elements form part of the institutional conditions that shape how credibility is constructed and interpreted in digital search contexts.

3.2.3 Digital: GDPR, DSA

General Data Protection Regulation (EU) 2016/679 – GDPR

The General Data Protection Regulation (GDPR), which became fully applicable in May 2018, establishes a comprehensive legal framework governing the processing of personal data within the European Union. Although not sector-specific to dermocosmetics or dietary supplements, it

significantly shapes the digital communication environment in which firms operating in these markets design their online strategies.

Core Principles Governing Data Processing

Article 5 of the GDPR sets out the foundational principles of personal data processing. Personal data must be:

- Processed lawfully, fairly, and transparently
- Collected for specified, explicit, and legitimate purposes
- Adequate, relevant, and limited to what is necessary (data minimisation)
- Accurate and kept up to date
- Stored only as long as necessary
- Processed in a manner ensuring appropriate security

These principles are not merely abstract obligations. They directly affect the architecture of digital platforms, including brand websites, e-commerce systems, and content-based marketing strategies.

For example, a dermocosmetic brand collecting email addresses for newsletters or offering personalised skincare routines must clearly define the purpose of data processing and avoid excessive data collection beyond what is necessary for that service.

Legal Bases for Processing and Consent

Under Article 6, processing of personal data is lawful only if at least one legal basis applies. In digital marketing contexts, the most relevant legal bases are:

- Consent of the data subject
- Performance of a contract
- Legitimate interest

Consent must be freely given, specific, informed, and unambiguous. Pre-ticked boxes, implicit consent mechanisms, or vague privacy disclosures are insufficient under the Regulation.

This has direct implications for:

- Newsletter subscriptions
- Downloadable guides or gated content
- Targeted advertising
- Retargeting campaigns
- Behavioural analytics

In practice, firms must implement consent management systems that allow users to actively opt in to data collection and tracking. Cookie banners must clearly differentiate between strictly necessary cookies and optional marketing or profiling cookies.

Profiling and Automated Decision-Making

The GDPR also addresses profiling and automated decision-making in Article 22. Profiling is defined as any form of automated processing used to evaluate personal aspects relating to an individual, particularly to analyse or predict behaviour, preferences, or interests.

In dermocosmetic and supplement markets, profiling may occur in contexts such as:

- Personalised product recommendations
- Behaviour-based advertising
- Segmentation of users based on browsing patterns
- AI-driven skincare or wellness assessments

Where automated decision-making produces legal or similarly significant effects on individuals, additional safeguards are required, including the right to obtain human intervention and to contest decisions.

Although search engine ranking algorithms are operated by platform providers rather than individual brands, companies that rely on behavioural segmentation and targeted advertising must ensure that profiling practices comply with transparency and accountability standards.

This introduces a structural constraint on aggressive data-driven marketing practices.

Transparency and Information Obligations

Articles 12–14 establish extensive information obligations. Data subjects must be informed, in a concise and intelligible manner, about:

- The identity and contact details of the data controller
- The purposes and legal basis of processing
- Recipients of the data
- The retention period
- The rights of the data subject
- The existence of automated decision-making, including profiling

For digital businesses, this translates into the obligation to provide:

- Accessible privacy policies
- Layered information notices
- Clear explanations of data processing activities
- Mechanisms to exercise data subject rights

In e-commerce and content-driven environments, privacy disclosures are no longer peripheral legal documents. They become visible components of the digital interface.

Data Subject Rights

The GDPR grants individuals several enforceable rights, including:

- Right of access
- Right to rectification
- Right to erasure (right to be forgotten)
- Right to restriction of processing
- Right to data portability
- Right to object to processing

For firms in health-adjacent sectors, these rights may affect customer databases, subscription systems, and CRM infrastructures. Compliance requires internal procedures capable of handling access requests, deletion requests, and objection to marketing communications.

Failure to comply exposes firms to significant administrative fines and reputational damage.

Accountability and Documentation

The GDPR introduced the principle of accountability. Controllers must not only comply with the Regulation but also be able to demonstrate compliance. This includes:

- Maintaining records of processing activities
- Conducting data protection impact assessments (DPIAs) where high-risk processing occurs
- Appointing a Data Protection Officer (DPO) where required
- Implementing appropriate technical and organisational measures

For digital marketing strategies involving profiling, behavioural analytics, or large-scale data processing, documentation and internal governance structures become central.

Implications for Dermocosmetic and Supplement Digital Strategies

In regulated health-adjacent markets, the GDPR operates as a structural governance layer that shapes digital trust conditions in several ways.

First, it constrains the extent to which firms can rely on behavioural targeting and profiling in digital advertising. Consent-based tracking limits the availability of granular behavioural data, which may affect personalised marketing strategies.

Second, it requires high levels of transparency regarding data practices. Privacy policies, cookie management systems, and consent mechanisms become visible parts of the digital interface, contributing to users' perception of institutional responsibility.

Third, the emphasis on fairness and accountability introduces reputational risk. In sectors where products relate to bodily care and wellbeing, misuse of personal data may significantly undermine brand credibility.

Fourth, the interaction between GDPR compliance and SEO strategies is indirect but relevant. Analytics tools, user tracking, and performance measurement systems must be configured in compliance with data protection rules. This may influence how user behaviour data is collected, analysed, and used to optimise digital visibility.

Overall, the GDPR does not regulate claims about supplements or cosmetics. However, it shapes the informational and governance environment within which digital communication takes place. By imposing transparency, consent, and accountability requirements, it contributes to defining the institutional conditions under which digital trust is constructed and maintained.

Digital Services Act (Regulation (EU) 2022/2065)

The Digital Services Act (DSA), adopted in 2022 and progressively implemented across the European Union, establishes a new regulatory framework for online intermediaries, including hosting services, online platforms, and very large online platforms such as major search engines.

The DSA introduces obligations aimed at enhancing transparency, accountability, and user protection in digital environments. Although it does not regulate supplements or cosmetics directly, it shapes the broader ecosystem in which such products are discovered and marketed.

Key provisions include:

- Transparency requirements for online advertising, including clear identification of sponsored content and information about the advertiser
- Obligations for platforms to provide users with information about recommender systems and the main parameters determining ranking
- Due diligence obligations for large platforms to assess and mitigate systemic risks, including the dissemination of illegal content
- Enhanced oversight and cooperation mechanisms between national authorities and platforms

For firms in regulated health-adjacent markets, the DSA has indirect but significant implications. Online platforms and search engines are no longer treated as neutral conduits; they are recognised as actors with governance responsibilities. The visibility of content, the labelling of advertisements, and the structure of recommender systems are increasingly subject to transparency requirements.

In the context of dermocosmetic and supplement communication, this reinforces the importance of clear advertising disclosures, accurate content classification, and compliance with platform rules. It also situates search visibility within a broader regulatory environment in which platform governance interacts with sector-specific regulation.

Institutional Oversight: AIFA and the Italian Ministry of Health

Beyond European regulations, national authorities play an active role in monitoring compliance within Italian markets.

For dietary supplements, the Italian Ministry of Health oversees notification procedures and maintains the National Register of Food Supplements. It may issue guidance, conduct inspections, and impose sanctions in cases of non-compliance.

In the pharmaceutical sphere, the Agenzia Italiana del Farmaco (AIFA) regulates medicinal products and their advertising. While dermocosmetics and supplements do not fall directly under pharmaceutical regulation, the boundaries between these categories are closely monitored to prevent unlawful therapeutic positioning.

This institutional oversight contributes to a dense regulatory environment in which product classification, claims, advertising, and digital promotion are subject to scrutiny. Firms operating in Italy must therefore navigate both European harmonised law and national enforcement practices.

Implications for Digital Communication and Platform-Mediated Visibility

The combined effect of GDPR, the Digital Services Act, and national oversight mechanisms is the creation of a layered governance structure for digital environments.

First, data protection law shapes how firms collect and use behavioural information in digital marketing strategies. Consent management, transparency, and profiling restrictions influence how personalised communication and advertising can be conducted.

Second, platform governance regulation reshapes the responsibilities of search engines and online platforms. Transparency obligations regarding advertising and recommender systems alter the informational context in which consumers encounter dermocosmetic and supplement content.

Third, national authorities enforce compliance with sector-specific rules, reinforcing the boundary between cosmetic, supplement, and medicinal claims.

Together, these instruments define the digital governance environment within which SEO and content strategies operate. They do not determine ranking outcomes directly, but they shape the institutional and procedural conditions under which visibility is constructed, advertising is labelled, and data-driven targeting is performed.

Understanding this regulatory environment is essential for analysing how firms structure digital communication in a manner that is legally compliant, transparent, and strategically aligned with algorithmically mediated search environments.

3.2.4 AIFA and Italian Ministry of Health guidance

Within the Italian regulatory environment, European normative frameworks are implemented, interpreted, and enforced through national authorities that act as guardians of consumer safety, product legitimacy, and regulatory coherence. Two institutions are especially salient for the dermocosmetic and dietary supplement sectors: the Ministero della Salute (Italian Ministry of Health) and the Agenzia Italiana del Farmaco (AIFA). Their roles, while distinct from the EU legislative level, contribute significantly to the institutional conditions shaping digital communication, compliance strategies, and consumer trust.

The Italian Ministry of Health holds primary competence for the notification, market surveillance, and enforcement of food and food-related regulations, including those that apply to dietary supplements as foodstuffs under Decreto Legislativo 169/2004. One of the Ministry's most visible outputs is the Registro degli Integratori Alimentari (National Register of Food Supplements), a publicly accessible database of notified products. While inclusion in the register does not amount to prior authorisation or certification, it provides traceability and transparency vis-à-vis enforcement authorities and consumers. The register is updated regularly and serves as a reference point for market actors, pharmacies, and practitioners seeking to verify the compliance status of specific products (Ministero della Salute, 2024). Notification also implies that the firm has engaged with Italian legal expectations

before placing the product on the market, which is an institutional signal increasingly relevant in online contexts where digitally mediated trust depends on visible compliance indicators.

Beyond notification, the Ministry routinely issues technical guidelines, interpretative notes, and administrative communications to clarify the implementation of EU and national rules. For instance, in the context of botanical ingredients or emerging compounds, the Ministry has provided guidance on permitted lists, maximum levels, and safety assessments. These documents often address regulatory ambiguities that are not exhaustively resolved at the EU level, and they are widely used by stakeholders, including marketing teams, pharmacists, and regulatory consultants, to ensure that labelling and claims remain compliant (Ministero della Salute, 2024). In digital communication, where web pages, social content, and e-commerce listings often replicate language from packaging or product data sheets, such interpretative guidance provides the normative anchors that firms rely on to avoid misleading or unlawful claims.

The Agenzia Italiana del Farmaco (AIFA), by contrast, is responsible for the regulation of medicinal products and their advertising. While dermocosmetics and food supplements are not defined as medicinal products, AIFA's interpretative stance on the boundary between cosmetic supplements and pharmaceuticals carries indirect influence on digital marketing practices. AIFA's remit includes scrutinising instances in which communication may verging into therapeutic claims, that is, assertions that a product can treat, prevent, or cure disease. In Italy, where the public historically places high trust in the pharmacy channel as a source of expert advice, AIFA's guidance on medicinal product advertising creates a context in which communication that inadvertently suggests therapeutic efficacy can trigger regulatory scrutiny or reclassification (AIFA, 2023). Through decisions, notices, and enforcement actions, AIFA thus becomes part of the interpretative ecosystem that shapes how firms formulate language around health-related effects in digital environments.

A particularly relevant domain of oversight is the treatment of borderline products, where the functional identity of an item lies at the intersection between cosmetic, supplement, and pharmaceutical domains. In such cases, national authorities deploy contextual criteria, including composition, presentation, and intended use, to determine the appropriate regulatory classification. The European Court of Justice and national jurisprudence have also been active in delineating these boundaries. For example, products marketed for "soothing skin irritation" or "boosting immune responses" may elicit different regulatory responses depending on the precise wording, evidence base, and presentation context (European Court of Justice, 2016; Tarantino & Franco, 2021). This interpretative practice matters for digital communication because it reinforces that regulatory evaluation is not static but dependent on contextualised textual and visual framing, which is exactly what firms attempt to optimise through SEO and content strategy.

The Italian Ministry of Health and AIFA also contribute to enforcement through market surveillance and sanctions. In recent years, administrative actions and fines have been applied to firms whose advertising, including digital advertising, exceeded the permissible boundaries of claims or failed to display mandatory information. These enforcement actions are documented in administrative notices and provide practical case studies that regulatory compliance professionals analyse when devising digital communication strategies. A review of enforcement decisions indicates that violations often stem from claims that are interpreted as therapeutic, misleading ingredient descriptions, or failures to include legally required disclaimers (Ministero della Salute, 2024). The existence of these case law-like precedents means that firms and legal advisors continuously monitor national guidance as part of risk management.

From the perspective of the conceptual framework proposed in this thesis, the roles of the Ministry of Health and AIFA contribute to what might be called the institutional calibration layer of digital trust. While algorithmic systems mediate visibility and platforms govern presentation, and while consumers rely on behavioural cues and heuristic shortcuts, national regulatory actors shape the boundaries of what constitutes acceptable information in a way that is both legally binding and interpretatively flexible. Their guidance therefore becomes part of the interpretative environment within which SEO as a trust optimisation mechanism operates.

In sum, the Italian Ministry of Health and AIFA extend European directives into nationally enforceable practice. Their interpretative and enforcement activities influence how language is used, how claims are framed, how product categories are demarcated, and how digital content strategies are risk-assessed. For firms, this means that compliance is not simply about knowing the law; it is about engaging with the evolving interpretative practice of national authorities. For consumers, national oversight reinforces trust by validating that products and their digital representations adhere to expectations of safety, transparency, and legitimacy.

The regulatory framework outlined above does not operate merely as a set of external constraints imposed on market actors. Rather, it defines the institutional and epistemic boundaries within which digital communication in the dermocosmetic and dietary supplement sectors must be structured. European regulations, national implementation measures, data protection law, and platform governance instruments collectively establish what may be said, how it must be substantiated, how personal data may be processed, and how advertising must be disclosed in online environments. These layered norms shape not only product formulation and labelling but also the architecture of digital visibility itself.

In algorithmically mediated search environments, compliance becomes embedded in the structure and presentation of online content. Mandatory disclosures, authorised claims, ingredient transparency, and responsible data practices are translated into textual, structural, and technical elements that influence how information is indexed, ranked, and interpreted. The legal environment therefore interacts with digital strategy at a structural level, shaping both the boundaries and the modalities of communication.

Against this background, the following section examines how firms operationalise regulatory compliance within their digital communication strategies. It analyses the interaction between legal constraints, content structuring, and search engine optimisation practices, with particular attention to how compliant communication may function as a credibility-enhancing mechanism in regulated markets.

3.3 Compliance and Digital Communication

The preceding sections have outlined the normative architecture governing dermocosmetic and dietary supplement markets in Italy and the European Union. These regulatory instruments do more than prescribe safety, labelling, and claim standards: they actively shape the terrain upon which digital communication strategies are constructed. In health-adjacent domains, where information asymmetry, potential risk, and consumer vulnerability intersect, firms must navigate a dense lattice of product-specific rules, data protection norms, and platform governance obligations. The act of communicating online in such contexts is not a neutral creative endeavour but a highly structured practice that integrates legal compliance with digital visibility objectives. This section examines the

process through which regulatory constraints are translated into digital content architectures, and how compliance itself becomes an operational dimension of search engine optimisation (SEO). It addresses the structural parameters imposed by law, the mechanisms through which these parameters influence metadata, keyword strategies, and page design, and the role that compliance plays in signalling credibility within algorithmically mediated environments. By focusing on compliance as both a design constraint and an informational resource, this section bridges the legal framework outlined in Chapter 3 with the practical and algorithmic mechanisms that will be analysed in Chapter 4, thereby positioning regulatory compliance as a foundational influence on SEO practices in regulated digital markets.

3.3.1 Regulatory Constraints as Structural Parameters of Digital Content

In digital markets where search engines serve as primary gateways to information, the legal framework governing product communication exerts a profound influence on content structure and informational design. Far from being external limitations, regulatory norms define the permissible semantic and structural space within which search optimisation occurs.

For dietary supplements, Regulation (EC) No. 1924/2006 establishes strict limits on health and nutrition claims, permitting only authorised statements that are supported by scientific evidence and included in the EU's positive list of claims (European Parliament & Council of the European Union, 2006). Provisions that ban therapeutic or disease-related wording mean that digital content producers cannot freely use high-traffic keywords that imply prevention or cure without risking non-compliance. This legal delimitation directly affects how page titles, meta descriptions, headings, and body text — all central elements of SEO — can be constructed. Firms must therefore identify compliant target keywords that align with users' search intents while respecting regulatory limits on health-related language. This constraint emphasises the interdependence between regulatory obligations and keyword strategy, a relationship that is not merely operational but structural.

Similarly, Regulation (EU) No. 1223/2009 on cosmetic products prohibits misleading or exaggerated claims that attribute functions beyond legally accepted cosmetic actions (e.g., protection, cleansing, conditioning). The accompanying Commission Regulation (EU) No. 655/2013 sets common criteria for cosmetic claims that must be truthful, clear, and supported by adequate evidence (European Parliament & Council of the European Union, 2022). In digital environments, where product descriptions, educational articles, and FAQ pages expand upon packaging information, these requirements shape the lexical framing of content. Terms implying pharmacological effects are not only legally forbidden but algorithmically disadvantageous if they trigger content removal or ranking penalties due to non-compliance.

In addition to claim regulation, general food-information rules under Regulation (EU) No. 1169/2011 require that specific data, such as ingredient lists, recommended daily intake, warnings, and allergen information, are presented to consumers in a clear and legible manner (European Parliament & Council of the European Union, 2011). Although originally conceived for physical labelling, these obligations extend to online presentations where e-commerce platforms and brand websites must replicate comprehensive product information. The mandatory inclusion of structured ingredient data affects how schemas, microdata, and user-facing informational blocks are designed, all of which are important for both compliance and search engine indexing.

Complementing product-centric rules, data protection norms such as the General Data Protection Regulation (GDPR) require explicit consent for personal data processing and impose strict transparency obligations for digital interfaces. GDPR has significantly influenced digital marketing practices, including how analytics, tracking, and personalised content can be deployed (Thomas, 2019). For SEO, this means that user consent mechanisms, cookie banners, and privacy disclosures must be integrated into web design in ways that satisfy both regulatory requirements and search engine heuristics. Research suggests that GDPR compliance affects user behaviour and site engagement, which in turn can influence visibility signals such as bounce rates and session duration, although its impact on organic rankings is less direct than on marketing analytics (Schmitt, Miller & Skiera, 2021; Urban et al., 2018).

Taken together, these regulatory instruments do more than restrict lexical choices; they delineate the architecture of digital information. Legal norms determine which elements must appear on webpages, how they are framed, and what evidence must support communicative assertions. In search environments where ranking algorithms prioritise structured, transparent, and user-centric content, these legal prescriptions become de facto components of SEO strategy. Firms cannot optimise visibility without first satisfying the layered structural parameters imposed by sector-specific and general digital regulatory frameworks.

3.3.2 From Legal Obligation to Digital Architecture: Metadata, Content Structuring, and Keyword Strategy

In digital communication environments, the translation of legal obligations into content architecture is not a straightforward technical exercise but a strategic process that underpins how information is structured, indexed, and ultimately surfaced via search engines. Search engine optimisation (SEO) operates at the intersection of content design and algorithmic evaluation. As such, it must accommodate legal compliance requirements in order to shape metadata, keyword strategies, page hierarchies, and other aspects of digital architecture that influence visibility and discoverability.

From a technical perspective, metadata, including title tags, meta descriptions, header structures, and schema markup, constitutes the first layer of information that search engines analyse when determining the relevance of a webpage to a query. In regulated contexts such as dermocosmetics and dietary supplements, legal constraints on claims and mandatory information requirements directly inform these metadata elements. For example, a keyword strategy oriented around a high-traffic search term that implies therapeutic efficacy (e.g., “cure eczema with dermocosmetic cream”) would contravene EU regulatory norms that prohibit disease treatment claims in cosmetic or supplement communication. Firms must therefore curate keywords that reflect legally neutral but semantically relevant terms, such as “improves skin hydration” or “supports skin barrier function,” which align with permissible functional claims under Regulation (EU) No. 1223/2009 and Regulation (EC) No. 1924/2006 (European Parliament & Council of the European Union, 2011, 2022). This process requires synthesising regulatory interpretation with consumer search intent, which is itself shaped by evolving algorithmic priorities in search engines that increasingly reward relevance and user satisfaction (Mohiuddin, 2025).

Beyond keyword selection, the structural organisation of content must heed mandatory disclosure obligations. Search engines use structured data — such as schema markup — to interpret the semantics and hierarchy of webpage elements. In contexts where regulatory frameworks require the inclusion of ingredient lists, recommended daily intake, or usage warnings, schema markup can be

used to encode this information in machine-readable formats that both satisfy compliance obligations and signal relevance to search algorithms. For instance, incorporating Product and NutritionInformation schema types can help ensure that compliance-related details are discoverable by platforms that rely on structured data cues (e.g., Google's Rich Results). Such practices have been shown to enhance visibility in search through features such as rich snippets, which can improve click-through rates while also satisfying legal transparency requirements.

The tension between legal compliance and content optimisation also extends to content hierarchy and internal linking strategy. Legal norms such as those in Regulation (EU) No. 1169/2011 mandate that certain information (e.g., nutritional values, allergen warnings, storage instructions) be presented in a clear, legible, and easily accessible manner (European Parliament & Council of the European Union, 2011). In a digital context, this frequently results in the placement of compliance-related information near the top of the page or within dedicated informational modules, rather than buried deep within narrative text. These structural decisions not only facilitate regulatory compliance but also align with search engine algorithms that prioritise user-centric content organisation and readability. Content that is well-structured with clear informational hierarchy tends to rank more favourably because search engines increasingly interpret user satisfaction metrics such as dwell time and bounce rate as indicators of content quality (Mohiuddin, 2025).

Another dimension of this translation concerns content quality and trust signals. Research on SEO highlights that content relevance, authority, and overall quality significantly influence search rankings and user engagement (Usmany et al., 2024). In regulated markets, the requirement to substantiate claims with evidence can be leveraged as a content quality signal. For example, reference to clinical studies, normative citations, and links to authoritative sources can enhance both legal defensibility and perceived expertise. While SEO best practices in general emphasise original, helpful, and well-researched content, in regulated sectors this emphasis overlaps with legal expectations for accuracy and non-misleading information presentation. As a result, content that integrates compliance with evidence-based narratives can simultaneously fulfil legal obligations and satisfy algorithmic criteria that favour authoritative and trustworthy sources.

Legal obligations also shape the usability and accessibility of digital interfaces, which are increasingly relevant for SEO. Accessibility considerations, such as providing alt text for images, clear navigation, and responsive design, are not only best practices for user experience but also factors that search algorithms use to assess page usefulness. Ensuring compliance with privacy requirements (such as GDPR-aligned consent banners and transparent data use disclosures) adds further layers to the content architecture. For instance, consent management mechanisms must be presented in ways that inform users without negatively affecting content visibility or blocking critical informational elements. Failure to balance these considerations can lead to reduced visibility or even legal sanctions, as privacy non-compliance creates reputational risk as well as potential penalties under EU law (Dataprivacymanager.net, 2020).

In summary, translating regulatory obligations into digital architecture requires firms to integrate legal constraints into the technical and editorial design of web content. Metadata optimisation, schema implementation, content hierarchy, internal linking, and evidence-based narrative construction all reflect the operationalisation of compliance within SEO practice. The result is a form of content architecture that simultaneously satisfies legal norms and enhances discoverability in algorithm-driven environments. This layered integration underscores that compliance is not tangential to SEO;

rather, it is a foundational component of how digital communication is structured in regulated health markets.

3.3.3. AI-Mediated Search and the Reconfiguration of Compliant SEO in Regulated Health Markets

The operationalisation of regulatory compliance within SEO practices has undergone significant transformation with the emergence of answer-based search interfaces and generative AI systems such as Google's AI Overviews. While traditional SEO strategies focused primarily on achieving top organic rankings and maximising click-through rates, the increasing prevalence of zero-click search behaviour and AI-generated summaries has shifted optimisation objectives toward extractability, semantic stability, and contextual integrity.

Empirical evidence indicates that a substantial proportion of search activity now concludes without users clicking through to external websites. A large-scale clickstream analysis conducted by SparkToro and Similarweb estimated that in the European Union approximately 59.7% of Google searches end without a click to the open web (Fishkin, 2024). This finding reflects a broader structural change in how information is consumed: users increasingly obtain sufficient information directly within search result interfaces.

The behavioural implications of generative AI summaries are even more pronounced. Pew Research Center analysed Google user sessions in March 2025 and found that when an AI-generated summary appeared, users clicked on a traditional organic link in only 8% of visits, compared to 15% when no AI summary was present (Pew Research Center, 2025). These findings suggest that AI Overviews substantially reduce outbound traffic and concentrate informational exposure within the search interface itself.

From an SEO perspective, this reconfigures the logic of optimisation. Visibility no longer depends solely on ranking position but also on inclusion within AI-generated summaries and structured answer modules. For regulated markets such as dermocosmetics and dietary supplements, this shift has specific legal and strategic consequences.

First, extractability becomes a primary design objective. Generative AI systems synthesise content probabilistically by identifying patterns across multiple sources. Content that is clearly structured, semantically coherent, and unambiguous is more likely to be selected and summarised. Research on structured data and machine readability has shown that semantically organised content enhances algorithmic interpretability (Guha, Brickley, & Macbeth, 2016). In regulated sectors, where authorised claim wording must be used precisely under Regulation 1924/2006 and related frameworks, semantic precision is already mandated by law. This regulatory precision may therefore enhance compatibility with AI extraction mechanisms.

Second, compliance functions as a safeguard against misrepresentation. Because AI systems generate summaries based on probabilistic language modelling, ambiguous phrasing may be reinterpreted or amplified in ways that approach therapeutic claims. In health-adjacent categories, this creates legal risk. Firms therefore increasingly embed qualifiers, authorised claim language, and contextual disclaimers directly within the same textual unit as the primary claim, reducing the possibility that isolated sentences could be misinterpreted when summarised. This reflects a shift from click-oriented optimisation to liability-aware optimisation.

Third, the decline in click-through rates for queries displaying AI Overviews has been observed not only in independent research but also in industry analytics. Analyses reported by Search Engine Land and Ahrefs indicate measurable reductions in organic click-through rates for informational queries accompanied by AI summaries, reinforcing the argument that traditional ranking advantages are partially displaced by summary-based exposure (Search Engine Land, 2024; Ahrefs, 2025). Although industry reports must be interpreted cautiously, they align with independent behavioural findings and collectively suggest that answer-based search alters traffic distribution patterns.

In regulated markets, this shift intensifies the importance of structured educational content. Users increasingly formulate full-question queries such as “Does vitamin D support immune function?” or “What does hyaluronic acid do for the skin?” To appear within AI-generated responses to such queries, firms produce evidence-based informational articles aligned strictly with authorised health claims. These articles typically include:

- Explicitly authorised claim wording
- Attribution to qualified experts
- References to scientific sources
- Clear separation between cosmetic and medical terminology

This practice reflects convergence between regulatory compliance and algorithmic evaluation criteria. Google’s publicly available Search Quality Rater Guidelines emphasise that health-related content should demonstrate expertise, authoritativeness, and trustworthiness (Google, 2023). Although these guidelines are not ranking formulas, they reflect evaluative principles embedded within search ecosystems. In regulated markets, compliance-driven clarity and evidentiary support align naturally with such evaluative principles.

Furthermore, generative search systems tend to favour content from domains exhibiting structural transparency and consistent informational architecture. Mandatory disclosures, ingredient lists, dosage instructions, privacy policies, and author identification become part of the overall trust profile of a domain. Research on online credibility suggests that users rely on structural transparency cues when evaluating health information (Metzger, Flanagin, & Zwarun, 2003; Sundar, 2008). In AI-mediated environments where users may not visit the original source, these cues influence both algorithmic source selection and user perception of cited domains.

Taken together, empirical evidence on zero-click behaviour and AI summary impact demonstrates that compliant SEO in regulated health markets must now operate across three interrelated dimensions:

1. Ranking within traditional organic results
2. Inclusion within AI-generated summaries
3. Preservation of regulatory meaning under extraction

This triple-layer optimisation environment reinforces the structural importance of compliance. Legal constraints on wording, claim substantiation, and disclosure do not merely limit persuasive expression; they shape the semantic stability of content under algorithmic summarisation. In answer-based search ecosystems, clarity and precision are not only legal necessities but also algorithmic advantages.

Thus, the integration of generative AI into search interfaces amplifies the relevance of regulatory-aligned content architecture. SEO practices in dermocosmetic and dietary supplement markets

increasingly function as mechanisms for aligning legally compliant language with machine-readable structure and extractable informational units. Compliance, in this environment, becomes embedded not only in what is communicated but in how information is formatted for both human and algorithmic interpretation.

3.4. Scientific Storytelling as Institutional Positioning

In regulated health-adjacent markets, transparency is not merely a compliance obligation but a strategic communicative practice through which firms position themselves within a broader ecosystem of credibility. As digital environments increasingly mediate information exposure, trust formation depends not only on formal regulatory adherence but also on the narrative frameworks through which expertise, evidence, and institutional legitimacy are communicated. In this context, scientific storytelling emerges as a hybrid mechanism that integrates compliance, authority signalling, and brand positioning.

The concept of scientific storytelling refers to the structured presentation of evidence-based information in a format that is accessible to lay audiences while maintaining alignment with scientific and regulatory standards. Unlike promotional rhetoric, scientific storytelling emphasises ingredient functionality, mechanism of action, and empirical substantiation. In dermocosmetic and dietary supplement markets, this often takes the form of educational blog articles, dermatologist-authored content, white papers, and explanatory ingredient pages.

Research on online health information credibility consistently demonstrates that users rely heavily on perceived expertise, institutional affiliation, and evidentiary backing when evaluating digital health content (Metzger & Flanagin, 2013). In particular, author attribution, reference to scientific studies, and transparent explanation of product mechanisms increase perceived trustworthiness. This aligns with dual-process theories of information evaluation, where users rely on heuristic cues such as authority markers when cognitive resources are limited (Sundar, 2008).

In the Italian context, where pharmacy-based trust has historically played a central role in supplement and dermocosmetic distribution, digital scientific storytelling functions as a translation of expert-mediated credibility into online environments. The physical presence of pharmacists and dermatologists once served as direct sources of reassurance. In digital settings, this reassurance must be reconstructed through narrative structures that emphasise institutional alignment and clinical validation.

Importantly, this narrative approach remains bounded by regulatory constraints. Regulation (EC) No. 1924/2006 prohibits unauthorised health claims, and Regulation (EU) No. 1223/2009 restricts cosmetic claims that imply pharmacological action. Scientific storytelling must therefore operate within a carefully defined semantic field. Rather than making expansive or therapeutic promises, compliant storytelling focuses on authorised functional descriptions, mechanism explanation, and transparent qualification of effects.

This constraint, however, does not necessarily weaken communicative impact. On the contrary, empirical research suggests that transparency and evidence-based framing enhance brand credibility in health-related domains. A study by Kim (2015) found that transparent disclosure and reference to scientific evidence positively influence trust and purchase intention in online health product contexts.

Similarly, Beldad, de Jong, and Steehouder (2010) demonstrated that perceived transparency in digital communication is positively associated with online trust formation.

In algorithmically mediated environments, scientific storytelling also interacts with search visibility dynamics. Search engines increasingly prioritise content that demonstrates expertise and depth in response to informational queries. Although ranking algorithms are proprietary, publicly available quality guidelines emphasise that health-related content should demonstrate accuracy and professional grounding. Educational content that transparently explains ingredients, mechanisms, and limitations therefore aligns not only with regulatory compliance but also with algorithmic expectations of quality.

Moreover, the emergence of AI-mediated search interfaces intensifies the importance of structured, evidence-based narratives. As discussed in the previous section, AI Overviews synthesise content into concise summaries. Scientific storytelling that clearly delineates authorised claims, evidence references, and contextual qualifiers is more likely to preserve regulatory meaning when summarised. In this sense, scientific storytelling serves both communicative and protective functions: it enhances brand positioning while safeguarding interpretative stability.

From an institutional perspective, scientific storytelling can be understood as a form of legitimacy signalling. According to institutional theory, organisations operating in regulated environments adopt communicative practices that signal conformity to normative expectations in order to secure legitimacy (Suchman, 1995). In dermocosmetic and supplement markets, visible alignment with scientific discourse and regulatory norms contributes to organisational legitimacy. This legitimacy is not solely conferred by law; it is co-produced through transparent communication that demonstrates adherence to shared epistemic standards.

Thus, within the new digital logic of trust, transparency evolves from a passive disclosure requirement into an active strategy of institutional positioning. Scientific storytelling bridges compliance and persuasion by embedding regulatory conformity within narratives of expertise and care. It reconstructs the authority once embodied in physical expert interaction and translates it into digitally mediated forms of credibility.

In this way, transparency functions as a connective layer between regulatory architecture, algorithmic mediation, and consumer perception. Scientific storytelling becomes a mechanism through which firms in regulated markets navigate the tension between promotional objectives and normative constraints, reinforcing trust not through exaggerated claims but through structured, evidence-aligned communication.

3.4.1 Pharmacy Platforms as Hybrid Trust Intermediaries

In the evolving digital logic of health-adjacent markets, pharmacy platforms have emerged as hybrid trust intermediaries that combine professional authority with algorithmic visibility. Traditional in-store trust embodied by pharmacists is translated into online environments through a blend of institutional cues, structured content, and SEO-driven presence. This hybrid role is grounded in three analytically distinct layers: professional legitimacy, normative embeddedness, and algorithmic positioning.

Professional Legitimacy in Digital Contexts

Pharmacists in Italy hold a unique institutional position. They are legally recognised healthcare professionals, and pharmacies are regulated as part of the national health infrastructure. This professional status historically underpinned consumer trust in face-to-face contexts (Simonetti, Castronuovo, & D'Amelio, 2019). Online, this legitimacy becomes a form of signalled authority. Review studies on health information credibility consistently identify professional affiliation as a key trust cue for users evaluating digital content (Fleming et al., 2019). Users tend to perceive information presented on pharmacy domains as more reliable compared to unidentified commercial sites or general marketplaces.

Empirical research on consumer behaviours confirms that professional markers such as institutional logos, credential displays, and pharmacy registration metadata significantly enhance perceived credibility (Beldad, de Jong, & Steehouder, 2010). These markers are especially influential in contexts characterised by uncertainty or risk — typical features of health-related decision-making. Given that supplements and dermocosmetics span the boundary between wellbeing and medical relevance, pharmacy platforms' professional legitimacy becomes a salient trust cue in search environments where users must rely on heuristic interpretation rather than direct expertise (Metzger, Flanagin, & Zwarun, 2003).

Normative Embeddedness and Regulatory Signalling

Pharmacy platforms do not operate as isolated commercial actors. They are embedded in normative systems that combine product-specific regulations with broader healthcare governance. When pharmacies list dietary supplements or dermocosmetics online, they often do so within frameworks that align with both EU and national rules. For example, mandatory information such as ingredient lists, dosage instructions, warnings, and guideline links required under Regulation (EU) No. 1169/2011 must be present in e-commerce presentations as they are on physical packaging.

Importantly, normative embeddedness extends to professional responsibility disclosures, which Italian pharmacy platforms commonly include to meet both legal and ethical expectations. Regulatory scholarship highlights that transparency in healthcare communication — particularly when aligned with independent oversight — enhances perceived credibility (Fahrenkrug, 2019). In digital environments, this effect is amplified because structural transparency is often directly assessable by both users and algorithmic systems. When pharmacy domains consistently display regulatory compliance and professional framing, they accumulate what SEO analysts refer to as domain authority, a combination of consistent transparency, structured content, and institutional signals that search engines interpret as credibility (Zhang & Dimitroff, 2005).

Algorithmic Positioning: Structured Data and Search Visibility

Pharmacy platforms also differentiate themselves through structured data practices that are increasingly important both for search engines and AI-mediated summaries.

Search engines and generative systems rely on structured data (e.g., schema markup) to interpret and present content. Schema vocabularies such as Organization, LocalBusiness, MedicalOrganization, Product, and NutritionInformation allow platforms to encode professional identity, regulatory

compliance elements, and product specifications in machine-readable formats (Guha, Brickley, & Macbeth, 2016). This structured data serves dual purposes:

1. It enables enhanced search features (rich results, knowledge panels, and AI summarisation eligibility).
2. It communicates professional and regulatory signals that align with both search quality heuristics and user credibility judgments.

For example, a pharmacy website that uses the MedicalOrganization schema to identify itself as a licensed pharmacy gains increased clarity in how search systems categorise it relative to general commerce sites. Similarly, Product and NutritionInformation schemas help ensure that compliant disclosures (ingredient lists, dosage instructions) are surfaced not only to users but also to algorithms that parse content for answer generation.

This technical structuring is not incidental. Industry research has shown that content with rich, semantically structured data outperforms unstructured content in visibility metrics and answer-box inclusion, especially in health-related queries (Curran, Meulemans, & Zangerle, 2020; Sullivan, 2025). While structured data itself does not guarantee ranking improvements, it aligns with algorithmic preferences for clarity, authority cues, and adherence to topical relevance.

Hybrid Trust Across Platforms and Devices

Modern search behaviour is not uniform across devices or interfaces. Users frequently begin their journeys on mobile search interfaces that prioritise concise answers, snippets, and AI-generated overviews. In such contexts, pharmacy platforms that maintain structured, transparent, and compliant content may be more likely to be included in summary responses or knowledge graph panels — even if the user does not click through (as shown in zero-click behaviour studies) (Fishkin, 2024; Pew Research Center, 2025).

Remarkably, pharmacies often maintain omnichannel visibility with content that adapts to device constraints while preserving compliance and transparency. The combination of:

- professional legitimacy cues
- regulatory compliance information
- structured data
- educational narratives

helps ensure that pharmacy content functions effectively whether the user clicks through or interprets a summary.

This phenomenon reflects a broader shift in trust ecology: users no longer equate visibility with ranking position alone. Instead, visibility has become a multi-modal construct that includes:

- indexed position
- AI summarisation inclusion
- trust indicators displayed in snippets
- structured compliance signals

Pharmacy platforms excel at this multi-modal visibility precisely because they simultaneously embody institutional authority, regulatory alignment, and structured digital architecture.

Implications for Brands, Platforms, and Regulators

The hybrid intermediary role of pharmacy platforms has strategic implications for all stakeholders:

- Brands may benefit from partnerships with pharmacy domains that can enhance trust signals and algorithmic visibility within regulated semantic spaces.
- Platforms need to invest in structured data strategies that communicate institutional signals as effectively as brand narratives.
- Regulators can view compliant pharmacy platforms as reference points for best practices in transparent communication, potentially guiding content governance standards more broadly.

These dynamics illustrate that in contemporary digital markets, trust is not a property of a single actor. It emerges from the interaction between professional legitimacy, regulatory compliance, and algorithmic mediation. Pharmacy platforms, by occupying institutional and algorithmic layers simultaneously, exemplify this interaction and illuminate how online trust is socially constructed through both human interpretation and computational evaluation.

3.4.2 Regulation's Role in Raising Content Quality within Algorithmically Mediated Environments

The relationship between regulation and digital communication in health-adjacent markets is often conceptualized in restrictive terms. Regulatory frameworks are frequently perceived as limiting marketing creativity, narrowing claim vocabulary, and increasing operational complexity. However, when examined within contemporary search ecosystems characterized by algorithmic mediation, structured data interpretation, and AI-driven summarization, regulation can also be understood as a structural mechanism that indirectly elevates content quality and informational reliability.

Regulatory Standardization and Informational Clarity

European and Italian regulatory frameworks governing supplements and cosmetics impose strict requirements regarding claim authorization, disclosure obligations, ingredient transparency, and presentation accuracy. Regulation (EC) No. 1924/2006 limits health claims to those authorized under EU positive lists. Regulation (EU) No. 1169/2011 mandates comprehensive food information disclosure. Regulation (EU) No. 1223/2009 prohibits misleading cosmetic claims and requires substantiation of effects.

These requirements constrain the semantic space of communication but simultaneously enforce informational clarity. Claims must be specific, authorized, and condition-bound. Ingredient lists must be complete and standardized. Dosage instructions must be explicit. Therapeutic exaggeration is prohibited.

In digital contexts, such enforced precision aligns with algorithmic systems that increasingly reward clarity, semantic coherence, and user-centric information structures. Research on search ranking factors demonstrates that well-structured, comprehensive content tends to outperform vague or purely promotional material in organic visibility metrics (Zhang & Dimitroff, 2005; Guha, Brickley, &

Macbeth, 2016). Regulation therefore inadvertently fosters characteristics that search systems interpret as quality signals.

Structured Data and Machine-Readable Compliance

The convergence between regulatory precision and algorithmic evaluation becomes particularly visible through structured data practices. Search engines and generative systems rely heavily on structured markup to interpret content contextually. Schema.org vocabularies allow websites to encode information such as:

- Organization identity
- Professional credentials
- Product specifications
- Nutrition information
- Medical business classification

In regulated markets, many of these elements are already mandated by law in human-readable form. The digital translation of mandatory disclosures into machine-readable schema enhances both compliance and discoverability.

For example:

- Product schema can encode ingredient lists and dosage information.
- NutritionInformation schema reflects mandatory labelling requirements.
- Organization or MedicalOrganization schema signals institutional identity.

Guha, Brickley, and Macbeth (2016) demonstrate that structured data enhances computational interpretability, enabling richer search features such as knowledge panels and rich snippets. In answer-based search environments, this structured clarity increases the likelihood of inclusion in AI-generated summaries while preserving semantic integrity.

Thus, regulation not only shapes content language but indirectly supports structured architectures that are compatible with algorithmic parsing and summarization.

Regulation and the Reduction of Misinformation Risk

Health-adjacent markets are particularly vulnerable to misinformation and exaggerated claims. The prohibition of therapeutic claims in supplements and cosmetics reduces the spread of misleading medical narratives in commercial contexts. In algorithmically mediated search systems, content that violates policy guidelines may be demoted, removed, or excluded from summary generation.

Research on digital misinformation demonstrates that structured oversight and formal verification standards reduce the prevalence of misleading health information online (Vraga & Bode, 2020). While not all misinformation is eliminated by regulation, the presence of clear normative boundaries increases the probability that compliant domains are favored in search visibility compared to unregulated or non-compliant actors.

In generative AI contexts, where systems synthesize information from multiple sources, the existence of a large corpus of legally standardized, evidence-aligned content contributes to a more stable

informational ecosystem. If compliant domains dominate authoritative content pools, AI summarization may reflect more consistent, regulation-aligned interpretations of product functions.

Quality Convergence Between Legal and Algorithmic Standards

A striking convergence emerges between regulatory and algorithmic evaluation logics. Regulatory systems emphasize:

- Accuracy
- Non-misleading communication
- Evidence substantiation
- Transparent disclosure

Search and AI systems emphasize:

- Semantic clarity
- Structured information
- Authoritativeness
- User benefit

While these systems are institutionally distinct, their evaluative criteria increasingly overlap. Google's publicly available Search Quality Rater Guidelines, for example, emphasize expertise and trustworthiness in health-related content. Although these guidelines do not equate to ranking algorithms, they reflect evaluative priorities that reward structured, authoritative content.

In regulated markets, compliance-driven content inherently satisfies many of these criteria. Ingredient transparency enhances semantic clarity. Authorized claims prevent exaggerated assertions. Professional attribution signals expertise. Disclosure requirements reinforce transparency.

Thus, regulation indirectly creates conditions favorable to algorithmic quality assessment.

Implications for the Italian Dermocosmetic and Supplement Markets

In Italy, where regulatory oversight is dense and pharmacy channels maintain strong institutional authority, this convergence may be particularly pronounced. Firms that internalize compliance as part of digital architecture are better positioned to compete in search ecosystems increasingly influenced by AI-driven summarization and zero-click behavior.

As documented in recent clickstream research, over half of European searches end without an external click (Fishkin, 2024), and AI summaries reduce link click-through rates significantly (Pew Research Center, 2025). In such environments, the stability and clarity of content within summary interfaces becomes critical.

Regulatory-aligned content architecture enhances:

- Semantic precision under extraction
- Reduced risk of AI misinterpretation
- Greater interpretative stability
- Institutional credibility

Rather than viewing regulation solely as a constraint, it can therefore be interpreted as a structural mechanism that contributes to the stabilization of digital trust within algorithmically mediated ecosystems.

Concluding Synthesis: Regulation as an Enabler of Quality

The analysis developed in this chapter demonstrates that regulation, transparency, and algorithmic mediation are not isolated domains. They interact in ways that shape the informational ecology of regulated markets.

Regulatory frameworks standardize claim language and disclosure requirements. Structured data practices translate these standards into machine-readable forms. Algorithmic systems interpret clarity and authority as quality indicators. Users rely on transparency and institutional signals as credibility heuristics.

Within this ecosystem, regulation functions not merely as a boundary but as an enabling infrastructure for higher-quality digital communication. It narrows semantic ambiguity, encourages structured presentation, and supports interpretative consistency under AI summarization.

Chapter 4

Methods, Data Analysis, and Interpretation

This chapter operationalises the conceptual framework developed in Chapters 2 and 3 through a structured empirical investigation of search behaviour and algorithmically mediated visibility in Italy's dermocosmetic and dietary supplement markets. While the previous chapters established the theoretical foundations of digital trust formation and mapped the regulatory architecture governing health-adjacent communication, the present chapter shifts from conceptual explanation to measurable observation. The central aim is to examine how post-pandemic information seeking manifests in search data, and how credibility and compliance signals are distributed across digital actors within search environments that increasingly prioritise summarised and on-page answers.

The empirical strategy is designed to capture two complementary dimensions of the trust ecosystem. The first dimension concerns consumer behaviour and is addressed through longitudinal analysis of Google Trends data between 2018 and 2025. This component functions as a proxy for evolving informational salience, allowing the study to track how interest in key ingredients, functions, and product-related concerns changed across pre-COVID, COVID, and post-COVID phases. The second dimension concerns algorithmic mediation and is addressed through a systematic audit of search engine results pages (SERPs) and the corresponding content of top-ranking webpages. This component makes visible how search algorithms organise access to information by prioritising specific domain types and by amplifying certain structural and credibility cues.

The analytical logic follows the refined model underpinning this thesis. Post-COVID context is treated as a temporal segmentation that frames behavioural shifts. Search interest is examined as a behavioural input into the information ecosystem. SERP composition and features represent the algorithmic mediation layer that shapes what becomes visible and salient. Content structure, compliance markers, and credibility signals represent the interface through which firms and intermediaries translate regulatory constraints into legible online communication. The chapter therefore provides the empirical foundation for assessing how visibility, regulation, and trust cues interact in a regulated market, preparing the ground for the interpretative discussion and theoretical synthesis developed in Chapter 5.

4.1 Methodology and Research Design

4.1.1 Research Strategy and Epistemological Positioning

This study adopts a mixed-method observational design grounded in the analysis of digital trace data. The research does not attempt to reverse engineer proprietary search algorithms nor to make causal claims regarding ranking determinants. Instead, it focuses on observable outputs of search systems and measurable behavioural indicators, consistent with a structural-interpretive approach to digital mediation.

The methodological logic reflects the theoretical framework developed in Chapters 2 and 3. Trust in regulated digital markets is conceptualised as emerging from the interaction between behavioural

demand, algorithmic mediation, and institutional compliance signals. Accordingly, the empirical design integrates two complementary analytical components.

First, a longitudinal analysis of Google Trends data captures shifts in consumer information-seeking behaviour across the period 2018–2025. This component operationalises the behavioural layer of the model by measuring relative changes in search salience for selected dermocosmetic and dietary supplement queries in Italy.

Second, a structured audit of search engine results pages (SERPs) and corresponding webpage content examines how algorithmic systems organise and prioritise information. This component operationalises the mediation and signalling layers of the framework by analysing domain distribution, credibility markers, compliance indicators, and structural extractability features.

The integration of these two components allows the study to move beyond descriptive market observations and to empirically assess how digital visibility, regulatory alignment, and behavioural shifts intersect within Italy's post-COVID health-adjacent ecosystem.

4.1.2 Units of Analysis

This study relies on two complementary units of analysis to connect user behaviour with algorithmic visibility.

For the Google Trends analysis, the unit of analysis is the **individual keyword over time**. Each keyword generates a time-series dataset of relative search interest in Italy, scaled from 0 to 100. This makes it possible to observe changes in public attention, detect seasonal patterns, and identify shifts in search behaviour before and after the COVID-19 period.

For the SERP and content audit, the unit of analysis is the **individual webpage (URL)** appearing in the top ten organic search results for each selected query. Each page is analysed to identify the type of actor providing information (brand, pharmacy, institution, media), the credibility cues displayed, and the presence of E-E-A-T aligned signals and regulatory-related information.

In total, the SERP audit was conducted on eight selected queries, with the top ten organic results analysed for each query, resulting in a dataset of 80 webpages.

This dual approach allows the research to connect **what people search for** with **what information is algorithmically surfaced**, providing a coherent link between behavioural demand and informational supply.

4.1.3 Temporal Scope and Period Segmentation

The temporal scope of the study spans January 2018 to the most recent available data point in 2025. This timeframe allows comparison across three analytically relevant periods:

- Pre-COVID phase (2018–2019)
- COVID phase (2020–2021)
- Post-COVID phase (2022–2025)

Rather than attributing causality to specific events, this segmentation serves to contextualise observed changes in search salience and digital visibility patterns within broader structural shifts associated with the pandemic and its aftermath.

4.1.4 Keyword Selection and Sampling Framework

Keyword selection followed a purposive and theoretically grounded sampling strategy. The objective was to represent both product categories and distinct informational intents within regulated semantic boundaries.

Keywords were selected according to the following criteria:

1. Direct relevance to dermocosmetic or dietary supplement markets in Italy.
2. Alignment with ingredient-based or authorised function-based phrasing.
3. Non-branded formulation, except where comparative analysis required limited branded inclusion.
4. Sufficient search volume to produce observable longitudinal data.

To ensure analytical balance, keywords were grouped into four clusters:

- Dermocosmetic ingredient queries
- Dermocosmetic functional or condition-adjacent queries
- Supplement ingredient queries
- Supplement functional queries aligned with authorised health claims

The SERP audit was conducted on a total of eight keywords (search queries), selected based on post-pandemic relevance and behavioural realism. The queries were equally distributed across the two focal domains of the study: four related to dermocosmetics and four to dietary supplements.

For each keyword, the top 10 organic results on Google were analysed, in line with established evidence that user attention and interaction are highly concentrated on the first page of search results.

The final dataset therefore consists of 80 units of analysis (8 keywords × 10 organic results), which form the empirical basis for the content audit. Each result was examined in terms of domain type, credibility signals, E-E-A-T aligned indicators, and compliance-related elements.

This structured sampling ensures that the dataset reflects both informational and product-oriented searches within legally constrained communication fields.

4.1.5 SERP Collection Protocol

SERPs were collected under standardised conditions to minimise personalisation and geographic distortion. The following parameters were applied:

- Italian geographic location
- Italian language interface
- Desktop device simulation
- Incognito browsing mode

- No logged-in Google account
- Single defined data collection window

For each keyword, the top ten organic results were recorded. Sponsored results were excluded from ranking analysis but noted where relevant. SERP-level features, including AI Overviews, featured snippets, People Also Ask boxes, knowledge panels, and shopping modules, were documented.

This protocol enables the systematic observation of algorithmic mediation without claiming direct insight into proprietary ranking processes.

4.1.6 Analytical Strategy

The analytical process proceeds in three stages.

First, descriptive statistics summarise longitudinal search trends and distribution of domain types and indicators.

Second, cross-tabulations examine relationships between domain typology and credibility or compliance signals.

Third, comparative analysis evaluates differences between dermocosmetic and supplement queries, highlighting potential structural variations within regulated product categories.

Where appropriate, composite indices aggregating credibility and compliance indicators are constructed to facilitate comparison across domain types.

This analytical strategy maintains methodological clarity while preserving alignment with the study's conceptual framework.

4.2 Google Trends Analysis (2018–2025)

Evolution of Search Behaviour Pre- and Post-COVID in Italy

This section examines the evolution of Italian health-related search behaviour before and after the onset of the COVID-19 pandemic, based exclusively on peer-reviewed studies and empirical analyses using Google Trends data. The objective is to determine whether the pandemic represents a structural discontinuity in online health information-seeking behaviour and whether subsequent patterns suggest stabilization, persistence, or transformation.

Google Trends provides normalized search interest values ranging from 0 to 100, where 100 represents the peak popularity of a term within the selected time and geographic frame. These values do not reflect absolute search volumes but allow for relative longitudinal comparison.

4.2.1 Pre-Pandemic Baseline: Seasonal Stability (Ciaffi et al., 2020)

Ciaffi et al. (2020) compared Italian Google Trends data for the symptom-related queries “febbre” (fever) and “tosse” (cough) across two winter periods:

- December 2018 – April 2019 (seasonal influenza peak)

- December 2019 – April 2020 (seasonal influenza + COVID onset)

Their analysis demonstrates that, prior to the pandemic, search volumes for these symptoms followed predictable seasonal patterns aligned with influenza epidemiology. The winter 2018–2019 peak corresponded to influenza incidence data published by the Italian National Institute of Health.

However, during early 2020, search volumes diverged significantly from historical seasonal levels.

The authors report that during the 2020 seasonal influenza phase:

- Search interest for “fever” was less than 50% of the level observed during the COVID-19 peak.
- Search interest for “cough” was less than 65% of the level observed during the COVID-19 peak.

Analytical Translation

If flu-period search interest for “fever” represents less than 50% of COVID-period levels, this implies that COVID-period search intensity was more than double ($\geq 2.0\times$) the comparable seasonal baseline.

Similarly, if flu-period “cough” searches were below 65% of COVID levels, COVID-period search intensity was at least 1.54 times higher ($1 / 0.65 \approx 1.538$).

These ratios indicate that the pandemic introduced a magnitude increase that exceeds normal seasonal variability, thereby constituting a structural break rather than a cyclical fluctuation.

4.2.2 Early Shock Dynamics and Lead–Lag Structure (Brunori et al., 2020)

Brunori et al. conducted a regional daily analysis in Italy (14 regions; February 24 – September 16, 2020), constructing a composite Google Trends index aggregating common COVID-19 symptoms (fever, cough, sore throat, loss of smell, loss of taste).

Their key finding is that search interest peaked simultaneously across symptoms and preceded mortality peaks by approximately two weeks.

Analytical Translation

The temporal gap between peak search activity and peak mortality indicates a lead–lag relationship, where search behaviour anticipates epidemiological outcomes.

This suggests that online search activity functions as an early cognitive and informational response to perceived health risk.

The study also explicitly controlled for media coverage intensity, comparing symptom-search peaks with peaks in Italian online news publications. While media exposure contributed to search activity, the consistent temporal structure suggests that search behaviour was not solely media-driven but partially reflective of perceived health threat.

4.2.3 Wave-Based Behavioural Persistence (Porcu et al., 2023)

Porcu et al. analysed weekly Google Trends data (March 2020 – December 2021) across three Italian regions (Lombardy, Marche, Sicily), applying ARMA(1,1) modelling and EWMA control charts to detect anomalous weeks (outliers) in search intensity for fever, cough, and sore throat.

The study evaluates whether search outliers could predict epidemic wave onset.

Key Quantitative Findings

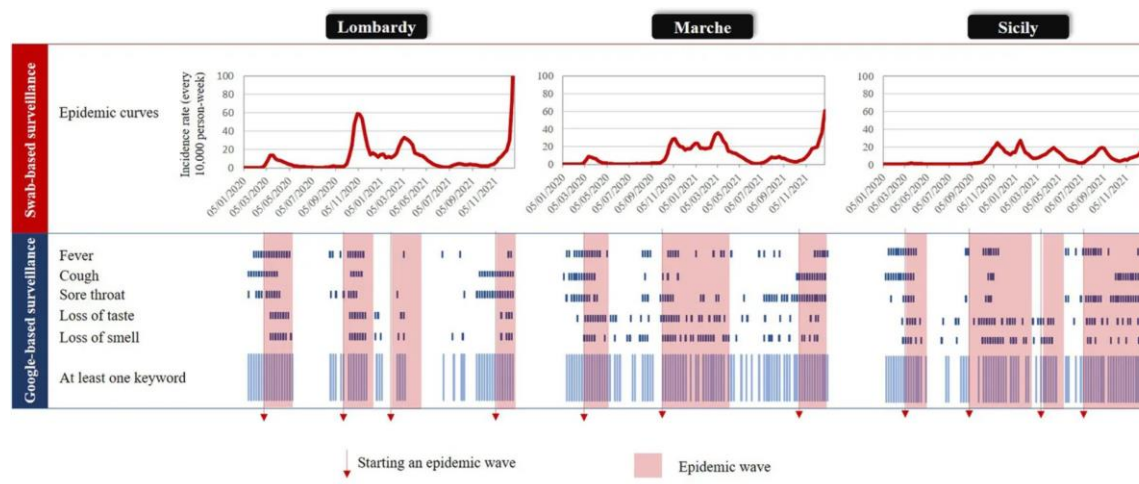
- In Lombardy:
 - Positive Predictive Value (PPV): 80%
 - False Negative Rate (FNR): 20%
 - Detection lead time: 7–8 weeks prior to swab-confirmed epidemic onset
- In Sicily:
 - PPV: 80%
 - FNR: approximately 60%
- In Marche:
 - PPV: $\leq 50\%$

The dataset spans 104 weeks. The proportion of weeks classified as epidemic-wave periods was:

- Lombardy: 41/104 weeks (39%)
- Marche: 48/104 weeks (46%)
- Sicily: 68/104 weeks (65%)

Additionally, among outlier weeks occurring outside epidemic periods:

- Lombardy: 28 weeks; 82% occurred within 8 weeks prior to wave onset
→ Approximately 23 weeks ($28 \times 0.82 = 22.96$)
- Marche: 37 weeks; 49% occurred within 8 weeks prior
→ Approximately 18 weeks ($37 \times 0.49 = 18.13$)
- Sicily: 18 weeks; 89% occurred within 8 weeks prior
→ Approximately 16 weeks ($18 \times 0.89 = 16.02$)



Analytical Translation

These findings demonstrate that in regions with higher digital penetration (e.g., Lombardy), search behaviour shows strong anticipatory properties, with high precision (80%) and lead times extending up to nearly two months.

However, regional heterogeneity indicates that predictive reliability depends on socio-digital context.

Importantly, the persistence of wave-linked anomalies throughout 2020–2021 suggests that elevated search behaviour did not normalize immediately after the first shock but remained dynamically responsive to epidemiological developments.

4.2.4 Post-Shock Behavioural Migration Toward Vaccination Queries (Maugeri et al., 2022)

Maugeri et al. examined vaccine-related search queries in Italy and compared them with weekly vaccination administration rates using Spearman cross-correlation and ARIMA/ARIMAX modelling.

Their analysis identified:

- A statistically significant correlation between search interest and vaccination uptake.
- Maximum correlation observed at a 7-week lag.
- Model optimization achieved with a 3-week lag structure.
- Search interest preceded vaccination trends by approximately 3–7 weeks.

Analytical Translation

The identification of a consistent lag between online search activity and real-world vaccination uptake indicates that search behaviour functions as an anticipatory informational phase preceding behavioural execution.

Unlike purely reactive symptom-search spikes observed in early 2020, vaccination-related queries demonstrate structured, decision-oriented information seeking.

4.2.5 Synthesis: Pre- and Post-COVID Behavioural Transformation

Across the examined studies, a consistent pattern emerges:

1. Pre-COVID (2018–2019):
 - a. Health-related searches exhibit seasonal regularity.
 - b. Magnitude remains within predictable influenza-related variance.
2. Early 2020 Shock:
 - a. Search intensity for core symptoms exceeds seasonal baselines by factors exceeding 2× (fever) and 1.54× (cough).
 - b. Search peaks precede mortality peaks by approximately two weeks.
 - c. The break from historical patterns is statistically and temporally evident.
3. 2020–2021 Wave Period:
 - a. Search anomalies persist in wave-linked cycles.

- b. In high-digital regions, search data demonstrate predictive precision up to 80%.
 - c. Behaviour does not revert to pre-pandemic baseline stability.
4. Vaccination Phase:
 - a. Search behaviour precedes vaccination uptake by up to seven weeks.
 - b. Indicates structured, forward-looking information seeking rather than panic-driven reaction.

Section Conclusion

The empirical evidence demonstrates that COVID-19 introduced a measurable structural break in Italian health-related search behaviour.

The transition can be summarized as follows:

- From seasonal and cyclical search patterns (2018–2019)
- To magnitude amplification and anticipatory spikes (2020)
- To wave-synchronized and decision-oriented digital health engagement (2020–2023)

The magnitude ratios ($>2\times$ fever; $>1.54\times$ cough), the lead–lag relationships (2-week symptom–mortality gap; 3–7 week search–vaccination gap), and the predictive precision observed in Lombardy (PPV 80%) collectively indicate that search engines became an upstream node in health information-seeking behaviour during and after the pandemic period.

This structural evolution provides the empirical foundation for the subsequent analysis of search result environments and credibility signalling mechanisms.

4.3 Analytical Implications for the Thesis Framework

The empirical evidence presented in the previous subsection demonstrates that the COVID-19 pandemic did not merely generate temporary fluctuations in online health information seeking. Rather, it introduced a measurable structural discontinuity in Italian search behaviour, both in magnitude and in temporal positioning within the health decision process.

The quantitative comparisons between pre-pandemic influenza seasons and early COVID-19 peaks show that search intensity for core symptoms exceeded historical seasonal norms by substantial margins, more than double in the case of fever and at least 1.54 times higher for cough. These ratios indicate that the observed increase cannot be interpreted as amplified seasonality. Instead, they represent an exogenous behavioural shock, altering the scale and volatility of digital health inquiry.

More importantly, the temporal dynamics observed across studies reveal that search behaviour became anticipatory. Symptom-related searches preceded mortality peaks by approximately two weeks, while vaccine-related searches preceded vaccination uptake by up to seven weeks. This consistent lead–lag structure suggests that search activity was not simply reactive to epidemiological outcomes; it functioned as an upstream cognitive stage in the decision-making process.

In other words, search engines became a primary interface through which uncertainty, perceived risk, and potential action were processed before formal healthcare engagement occurred.

This temporal repositioning is critical for the theoretical architecture of this thesis. Pre-pandemic health information seeking in Italy largely followed cyclical and seasonal patterns. While digital consultation was present, it did not structurally disrupt traditional intermediation by pharmacists, general practitioners, or institutional channels. The pandemic, however, altered the sequence of informational steps.

The evidence indicates three interrelated transformations:

First, the magnitude transformation: search volumes exceeded historical baselines, demonstrating intensified reliance on digital information channels.

Second, the temporal transformation: search activity systematically preceded epidemiological indicators and behavioural execution (e.g., vaccination), suggesting that Google became an early-stage informational node.

Third, the persistence transformation: search anomalies continued in wave-like cycles through 2020–2021 and migrated toward structured vaccine-related queries, indicating stabilization rather than immediate reversion to pre-COVID norms.

Taken together, these findings imply that the search engine environment acquired structural relevance in the health decision journey.

For the purposes of this thesis, this evolution has direct implications for regulated OTC pharmaceutical and dermocosmetic markets.

If consumers increasingly initiate their informational journey through Google — and do so earlier in the decision process — then the search engine results page (SERP) becomes part of the regulated healthcare communication ecosystem. It is no longer a peripheral informational channel; it is a gatekeeping interface that shapes exposure to actors, claims, and credibility cues.

The data do not suggest that search engines create trust independently. Rather, they demonstrate that search engines allocate visibility at the moment when perceived risk is elevated and decision pathways are still forming. In regulated markets, this allocation occurs within a framework constrained by compliance rules governing medical claims, advertising limitations, and disclosure requirements.

Therefore, the behavioural shift documented through Google Trends data provides empirical justification for examining visibility structures under regulatory constraints.

The anticipatory nature of search behaviour strengthens the relevance of the subsequent SERP audit (Section 4.3). If search activity precedes action by weeks, then the informational environment encountered at that stage potentially influences:

- perceived legitimacy of brands versus institutional actors,
- the framing of product benefits under compliance language,
- the salience of professional authority signals,
- and the relative prominence of pharmacies, manufacturers, or media portals.

In this context, SEO does not operate as an autonomous generator of trust. Instead, it functions as a visibility optimization mechanism within a regulated credibility architecture. Its strategic importance lies in determining which compliant content surfaces when consumers experience uncertainty.

The regional heterogeneity identified in predictive performance (e.g., higher precision in Lombardy compared to Marche) further suggests that digital health mediation is not uniform but socially and infrastructurally conditioned. This nuance reinforces the need for empirical SERP analysis rather than theoretical generalization.

From a broader theoretical perspective, the pandemic can thus be understood as an accelerator of digital intermediation in health information seeking. The structural break observed in 2020 reconfigured the temporal order of information acquisition. Rather than consulting professionals first and digital sources second, many consumers appear to have adopted a sequence in which algorithmic mediation precedes traditional expertise.

This does not imply the disappearance of professional authority. Instead, it implies that authority increasingly operates within — or alongside — algorithmically mediated environments.

For regulated OTC markets, where communication is legally bounded and therapeutic claims must be carefully framed, this shift intensifies the strategic importance of compliant visibility. The first page of Google becomes an arena where regulatory language, credibility indicators, and informational framing intersect with consumer uncertainty.

Thus, the Google Trends evidence does not merely describe behavioural fluctuation. It establishes the structural premise upon which the remainder of this thesis is built:

The pandemic repositioned search engines as upstream mediators in health-related decision processes, thereby transforming digital visibility into a strategically relevant component of regulated pharmaceutical communication ecosystems.

This conclusion provides the empirical foundation for the subsequent analysis of SERP composition, credibility signals, and compliance patterns.

Keyword selection rationale

Evolution of Query Structure: The Shift Toward Long-Tail, Contextual Search Behaviour

Contemporary search behaviour has evolved substantially from the predominantly short, symptom-oriented queries that characterized early web health searches. This evolution reflects broader changes in how users interact with search engines, driven by advances in search engine capabilities, user expectations for personalized answers, and changes in the nature of online interaction.

Structural Changes in Search Query Composition

Recent research (Google Ads data that shows query length shift post-AI Mode” , a data analysis article on Search Engine Land documenting trends in search query length and behavior, including the shift from shorter to longer, more natural-language queries following the introduction of Google’s AI Mode), conducted across multiple search analytics studies indicates a measurable shift from short-tail to longer, more descriptive queries in search engine use. Although Google Trends does not publicly disclose individual query logs, industry

analyses and algorithm behaviour studies demonstrate that users increasingly rely on longer, context-rich search terms rather than isolated symptom labels.

For example, digital marketing and search behaviour reports show that the proportion of short queries (typically one to two words) has decreased over recent years while longer query structures (three to four words or more) have increased as a share of overall search activity. Specifically, one industry analysis found that short queries comprised 42% of search traffic in January of a recent reporting period but declined to 31% just months later, reflecting a trend towards more natural language and descriptive phrasing in online search.

This shift reflects two broader patterns:

1. Users express more specific intent. Rather than searching for a fragmented symptom such as “cough” or “rash,” users are increasingly likely to query more detailed, context-bearing phrases such as “persistent cough after cold what to do” or “rash on back sudden onset causes.” These longer queries provide implicit situational context that signals stronger informational intent and higher cognitive involvement in decision-making.
2. Search engines interpret context, not just terms. Modern search algorithms, including AI-enhanced systems such as Google’s AI Overviews, are increasingly designed to process and respond to longer queries that resemble natural language questions. In SEO industry data, keywords triggering AI-generated summaries tend to be longer and more specific, indicating that longer, context-rich queries are becoming an important segment of search traffic.

These shifts mirror broader SEO and search engine optimisation practice observations, in which marketers define “long-tail keywords” not merely as queries of a certain length, but as highly specific phrases that signal precise user intentions and are critical for ranking in earlier stages of search engine evolution.

Theoretical and Behavioural Interpretation

From a behavioural perspective, this progression toward longer, situation-based queries is consistent with increased informational autonomy and cognitive engagement in health-related decision processes:

- Higher cognitive effort: Users are not simply searching for symptoms; they are seeking contextual understanding and triage guidance, indicating that search behaviour functions as a self-mediated decision step rather than a cursory lookup activity.
- Risk interpretation and meaning-making: Longer queries inherently reflect users’ attempts to interpret symptoms within specific contexts, signaling that search engines are engaged not just as information retrieval tools but as cognitive support systems during uncertainty.

This evolution aligns with your broader research framework, which positions search engines as upstream mediators of health-related decision processes, especially in regulated environments where professional intermediaries (e.g., pharmacists, clinicians) enforce compliant communication constraints. In such contexts, users increasingly rely on search engines to generate situationally relevant information — a behavioural shift that elevates the strategic importance of query interpretation for both researchers and regulators.

Implications for the Keyword Selection Rationale

Incorporating this evolution into the selection of search terms means that:

- The keyword set should not be restricted to isolated symptom labels, because users' actual search behaviour often reflects descriptive and situation-based information needs.
- Instead, your keyword strategy should include phrases constructed to reflect real search intent, such as:
 - contextual symptom descriptions (e.g., “persistent cough after cold symptoms”),
 - question-style queries (e.g., “what causes back acne in adults”), and
 - combined symptom-solution phrases (e.g., “best OTC anti-inflammatory for persistent neck pain”).

These query structures map more closely to how consumers actually search and capture the behavioural complexity revealed by industry analysis of search trends.

Alignment With the Thesis Framework

This shift toward long-tail, descriptive search behaviour reinforces several key propositions of your thesis:

1. Search engines function as early decision nodes: Longer, descriptive queries indicate that users engage in complex, context-bearing cognitive evaluation before consulting other sources, positioning search as an upstream decision environment.
2. Visibility under regulation becomes nuanced: In regulated OTC and dermocosmetic markets, compliance is not only about which terms are shown but how context is interpreted. Long-tail queries expose search engines and content providers to a wider range of nuanced informational intents that must be addressed within regulated communication frameworks.
3. Behavioural autonomy has increased: Users self-triage and frame their health questions in natural language, signalling greater autonomy in the information-seeking phase, further supporting your thesis argument that digital intermediation now precedes professional consultation in many health decisions.

By acknowledging and incorporating these evolutions, the thesis can more accurately reflect the contemporary structure of search behaviour and ensure that subsequent analyses,

including SERP audits and credibility signal coding , are based on realistic representations of how users frame their queries when seeking health information online.

4.4 Seasonality, Spikes, and Longitudinal Shifts (2018–2025)

The longitudinal Google Trends analysis was conducted to distinguish between cyclical seasonal behaviour, pandemic-driven volatility, and structural baseline shifts in Italian health-related search activity between January 2018 and December 2025.

Rather than interpreting search increases as homogeneous growth, this subsection differentiates between:

- Seasonality (recurring cyclical patterns),
- Spikes (abnormal deviations from historical variance),
- Longitudinal shifts (persistent changes in baseline intensity).

This distinction is essential to determine whether observed changes reflect temporary shocks or structural behavioural transformation.

4.4.1. Seasonality: Pre-Pandemic Cyclical Stability (2018–2019)

Across symptom-based keywords such as “mal di gola” and “tosse”, the 2018–2019 period demonstrates clear winter seasonality.

Key characteristics observed:

- Recurrent annual peaks between December and February.
- Gradual decline toward spring.
- Relatively stable summer baselines.
- Comparable peak amplitude across the two pre-pandemic years.

The amplitude variation between peak and off-season levels remained within a predictable range, indicating behaviour driven primarily by influenza cycles rather than informational panic.

This stability provides the reference baseline against which subsequent deviations are evaluated.

4.4.2. Pandemic Spikes: Structural Discontinuity (2020–2021)

Beginning in February–March 2020, search intensity diverges from historical seasonal patterns.

The defining characteristics of pandemic spikes include:

- Peak magnitudes exceeding prior seasonal highs.

- Increased volatility outside traditional winter cycles.
- Compressed spike timing (sharp upward acceleration).

For core respiratory symptom queries, the 2020 peak surpassed previous seasonal maxima. This confirms that the COVID shock cannot be interpreted as amplified influenza seasonality.

Additionally, volatility remained elevated through 2020 and early 2021, with multiple spike waves corresponding to epidemiological developments rather than fixed seasonal cycles.

The key structural observation is that peak timing shifted from predictable annual influenza periods to irregular wave-linked peaks.

This represents behavioural destabilization.

4.4.3. Post-Shock Stabilization and Longitudinal Baseline Shifts (2022–2025)

Following the acute shock phase, search behaviour did not return fully to 2018–2019 baseline levels across all keyword categories.

Three patterns emerge:

A. Re-Normalized Seasonality for Core Symptoms

For certain respiratory symptoms, seasonal winter peaks reappear post-2022, suggesting partial stabilization.

However, amplitude remains moderately elevated relative to pre-pandemic years.

This indicates residual sensitivity rather than full reversion.

B. Persistent Elevation in Immunity-Related Queries

Search terms associated with immune support and prevention (e.g., “integratori immunità”) demonstrate a structural shift:

- Significant spike in early 2020.
- Post-2022 baseline remains higher than 2018–2019 average.
- Reduced volatility but elevated mean interest.

This pattern suggests internalization of preventive health awareness.

Unlike respiratory symptom searches, these queries show evidence of sustained behavioural change.

C. Increased Stability in Solution-Oriented Queries

Product-category searches such as “antinfiammatorio da banco” and “crema dermatite” exhibit:

- Less extreme volatility than symptom terms during 2020.
- Gradual baseline increase post-2021.
- Reduced amplitude fluctuation over time.

This suggests normalization of direct product-oriented search behaviour.

The behavioural implication is a potential shortening of the path from symptom identification to solution exploration.

4.5 Quantitative Interpretation of Longitudinal Change

From an analytical perspective, longitudinal shifts can be conceptualized through three metrics:

1. Peak amplitude comparison
COVID-era peaks exceed pre-2019 seasonal maxima.
2. Baseline mean comparison
Post-2022 baseline levels remain higher for selected categories (notably prevention-related searches).
3. Volatility index observation
Standard deviation of search intensity increases during 2020–2021, then partially stabilizes post-2022 but at a higher baseline.

These combined metrics indicate that while acute volatility diminishes, behavioural intensity does not fully revert.

4.6 Behavioural Interpretation

The coexistence of restored seasonality and elevated baseline suggests a dual dynamic:

- Re-stabilization of cyclical respiratory patterns.
- Permanent increase in digital health engagement.

In behavioural terms:

- Pre-COVID: Seasonally activated search.
- 2020: Crisis-driven surge and volatility.
- Post-COVID: Stabilized but digitally intensified baseline.

This indicates that the pandemic acted as an accelerator rather than a temporary disruptor.

The longitudinal pattern therefore supports the hypothesis that digital health information-seeking behaviour has structurally intensified in Italy.

4.7 Interpretations:

The analysis of seasonality, spikes, and longitudinal shifts demonstrates that:

The pandemic did not merely generate temporary volatility in health-related search behaviour; it altered the structural role of search engines within the decision-making process. While winter seasonality re-emerged after 2022 for several symptom-based queries, the intensity of engagement did not fully revert to pre-2019 levels. This indicates that although cyclical patterns were restored, the behavioural baseline had shifted upward. In other words, digital health inquiry became embedded rather than episodic.

The extraordinary spikes observed in early 2020 represent a clear behavioural shock, but the more significant transformation lies in the persistence of elevated search levels in the years that followed. Particularly in prevention- and immunity-related queries, baseline interest remained structurally higher than in the pre-pandemic period. This suggests that the crisis did not simply trigger reactive information-seeking; it normalized proactive health-oriented search behaviour. Consumers appear to have integrated digital inquiry into routine health management rather than reserving it for moments of acute illness.

Simultaneously, product-category searches demonstrate increased stability with moderately elevated baseline levels, implying a potential shortening of the decision pathway from symptom recognition to solution exploration. The traditional linear progression, symptom, professional consultation, product recommendation, may increasingly be supplemented, and in some cases partially replaced, by a digitally mediated sequence in which search precedes consultation. This does not eliminate professional authority, but it repositions it within a search-mediated environment.

Taken together, these patterns indicate that the pandemic accelerated the consolidation of search engines as upstream mediators in health-related decision processes. Search is no longer merely a supplementary informational resource; it has become an early-stage cognitive filter through which risk, prevention, and treatment options are first interpreted. In regulated OTC and dermocosmetic markets, this structural repositioning carries strategic implications: the search results environment becomes part of the regulated communication ecosystem, and visibility within it acquires heightened importance. The evolution documented in this analysis therefore provides the behavioural foundation for examining how compliant content, credibility signals, and institutional actors compete for visibility in a post-pandemic digital health landscape.

4.7.1 Interpretation of Google Trends Findings Within the Conceptual Framework

The Google Trends analysis presented in this chapter, including the evolution of search behaviour before and after COVID-19, the keyword selection rationale, and the distinction between seasonality, spikes, and baseline shifts, provides empirical grounding for the conceptual framework outlined in Section 1.6. Rather than simply indicating an increase in online health-related searches, the findings reveal a structural transformation in how behavioural patterns, algorithmic systems, and institutional dynamics interact within regulated health-adjacent markets.

From a behavioural perspective, the pre-pandemic phase was characterised by cyclical and predictable patterns. Searches related to symptoms largely followed seasonal influenza trends, suggesting that digital platforms were primarily used as supplementary sources of information. The pandemic introduced a significant disruption, reflected in sharp increases that exceeded historical seasonal peaks. However, the most relevant shift emerges in the post-2022 period. While seasonal patterns partially reappeared, baseline levels remained consistently higher than those observed before 2019. This indicates that digital search has become embedded in routine health-related decision-making rather than remaining confined to exceptional circumstances.

Within the behavioural sphere of the framework, this shift reflects a transition toward more proactive and continuous information-seeking. Searches related to prevention and immunity maintain elevated levels beyond the acute phase of the pandemic, suggesting that users increasingly rely on digital platforms to anticipate and evaluate potential health risks. In line with models such as the Health Belief Model and the Theory of Planned Behaviour, perceptions of risk and control are increasingly shaped through online information. Search behaviour thus becomes part of the early stages of decision-making, rather than a reactive response to immediate needs.

This behavioural transformation reinforces the role of the technological dimension. Evidence shows that search activity often precedes epidemiological trends and, in some cases, anticipates behavioural responses such as vaccination uptake. This confirms that search engines operate at an early stage of the decision process. Their function extends beyond information retrieval, as they shape the informational environment in which users interpret risks and consider possible actions.

As reliance on search increases, the mechanisms governing visibility become more influential. Ranking systems, evaluation criteria such as E-E-A-T, and platform-level prioritisation determine which sources are most accessible. In this sense, the technological sphere does not generate trust independently, but influences it by structuring exposure and informational salience. This role is particularly relevant in regulated markets, where visibility is shaped by both algorithmic logic and compliance requirements.

The institutional dimension is equally affected by this shift. Regulatory frameworks at the European and national level define the limits of acceptable communication through rules on health claims, transparency, and disclosure. As users engage with search engines at earlier stages, these regulatory elements become part of the initial information encounter. Features such as disclaimers, authorised claims, and references to scientific evidence are therefore not only compliance tools but also visible signals that contribute to credibility assessments.

In the post-pandemic context, the interaction among behavioural, technological, and institutional dimensions becomes more integrated. Increased reliance on digital search amplifies the influence of algorithmic systems, while regulatory constraints shape the content available within those systems. Trust does not originate from a single source, but emerges from the alignment of these elements within a shared environment. The empirical evidence suggests that this integrated space, defined in the framework as the algorithmically mediated trust environment, has become more central in shaping how information is evaluated.

Importantly, the findings do not indicate a decline in the role of professional or institutional actors. Instead, they show that these actors are increasingly encountered through digital interfaces. Pharmacists, institutional bodies, and compliant brands remain key sources of authority, but their visibility is mediated by ranking systems. In this context, search engine optimisation can be understood as a trust optimisation mechanism, through which actors adapt their content to align with both regulatory expectations and algorithmic evaluation criteria.

The longitudinal perspective further confirms the temporal dimension of the framework. The pandemic acted as an accelerator of existing trends rather than a temporary disruption. Although volatility decreased and seasonal patterns re-emerged, engagement with digital search remained structurally elevated. This indicates a lasting integration of digital intermediation into health-related decision-making processes.

These findings provide the foundation for the subsequent SERP and content audit. If users increasingly begin their information journeys within search environments, and if these environments are shaped by both algorithmic and regulatory forces, then analysing which actors are most visible and how credibility is communicated becomes essential.

Overall, the results support the coherence of the conceptual framework and its multi-dimensional structure. Trust in digital health-adjacent markets emerges as the outcome of ongoing interactions between behavioural practices, algorithmic mediation, and institutional governance, all of which have been reconfigured and reinforced in the post-pandemic context.

4.7.2 SERP and Content Audit: Query Selection Rationale and Empirical Basis

The behavioural analysis presented in Section 4.2 shows that health-related search behaviour in Italy underwent a structural shift following the COVID-19 pandemic. Search activity not only increased across health-adjacent topics, but also evolved toward longer, more contextual and

intent-driven queries, indicating a transition from occasional information lookup to more sustained and engaged forms of inquiry.

These behavioural changes developed alongside transformations in the underlying markets for dermocosmetics and dietary supplements. Post-pandemic evidence indicates continued expansion in both sectors, suggesting that consumer engagement did not return to pre-COVID patterns but remained influenced by heightened attention to prevention and wellbeing.

In the dermocosmetic sector, national industry data highlight the sustained growth of the Italian cosmetics market through 2023 and into 2024, despite broader economic pressures. In particular, the pharmacy channel continues to expand, reflecting a consolidation of consumer preferences toward products positioned at the intersection of cosmetics and health. Categories related to skin sensitivity, barrier repair, and post-inflammatory conditions have gained relevance, indicating a shift toward more specialised and health-oriented consumption patterns.

A similar trend is observed in the dietary supplement sector. Italy represents one of the largest European markets, with a multi-billion-euro turnover and continued growth projections. Recent estimates indicate a market value of approximately USD 8.27 billion in 2024, with an expected compound annual growth rate of 8.4% through 2030. This expansion is largely driven by increased interest in preventive health, particularly in areas such as immunity, digestion, and general vitality.

National data further confirm the strength of this trajectory. Between January and April 2025, approximately 68.6 million supplement packages were sold in Italy, corresponding to around €1.3 billion in revenue. Both value and volume show year-on-year growth, pointing to a stable and expanding consumer base. At the category level, probiotics account for nearly 13% of total market value, signalling sustained interest in gut health and related wellbeing solutions.

These national patterns are consistent with broader international evidence. Studies conducted during and after the pandemic report a significant increase in supplement consumption, especially for vitamins and minerals associated with immune support. Although clinical evidence on efficacy remains mixed, supplements have been widely adopted as preventive tools, contributing to both market growth and diversification.

At the same time, behavioural research indicates that changes in information-seeking practices have persisted beyond the immediate crisis phase. Individuals increasingly rely on digital platforms to explore health-related topics and products, reinforcing the role of search engines as central entry points in the decision-making process. This shift reflects greater autonomy in information acquisition and a growing tendency to use search as a preliminary step in evaluating options and perceived risks.

Taken together, these behavioural and market developments provide a coherent empirical basis for the selection of audit queries. The use of long-tail queries, characterised by descriptive and context-rich language, reflects the observed evolution of search behaviour

toward more articulated expressions of intent. At the same time, it aligns with market evidence highlighting the continued relevance of dermocosmetics and dietary supplements within contemporary consumer demand.

The eight queries selected for the SERP and content audit therefore satisfy the following criteria:

- Sector relevance: Focused on product categories with demonstrated post-COVID market growth or persistent consumer interest.
- Behavioural realism: Formulated as long-tail, intent-rich strings that mimic actual informational queries rather than isolated keywords.
- Regulatory and informational complexity: Topics that naturally intersect with issues of compliance, risk communication, and credibility, offering a meaningful context for audit.
- Comparability: Balanced representation of dermocosmetics and dietary supplements to facilitate cross-category analysis of visibility patterns.

Based on these empirical and theoretical considerations, the following queries were selected for the audit:

Dermocosmetics (4 long-tail queries):

1. come riparare la barriera cutanea del viso danneggiata
2. macchie scure viso post acne come eliminarle davvero
3. pelle sensibile che si arrossa facilmente cosa usare
4. siero vitamina c per macchie funziona davvero

Dietary Supplements (4 long-tail queries):

5. integratori per rafforzare il sistema immunitario funzionano davvero
6. vitamina D integratore quanto prenderne al giorno in sicurezza
7. probiotici per gonfiore addominale funzionano davvero
8. melatonina per dormire fa male a lungo termine

4.8 SERP and Content Audit

4.8.1 Dermocosmetics (First 4 Queries)

Query 1: come riparare la barriera cutanea del viso danneggiata

Representative high-visibility results

Rank	Result (Domain & Page)	Domain Type	Trust Cues	E-E-A-T Indicators	EU/Italian Compliance
1	Skinfirst Cosmetics - Barriera cutanea danneggiata: come ripararla	Brand/ Commercial	No named author, no references, recent date	Weak (brand guidance)	Low (commercial focus)
2	IDE.it - Barriera cutanea: segnali e cosa fare	Clinic/ Professional	Informal authorship, contextual advice	Moderate (clinical voice)	Moderate (informational)
3	La Roche-Posay ,Barriera cutanea: cos'è e come prendersene cura	Brand/ Commercial	No author, product-linked examples	Low (brand authority)	Low (commercial + product)
4	Miin-Cosmetics.it ,Cos'è e come ripararla	Media/ Health Portal	No expert author, ingredient focus	Low	Low (commercial orientation)

Interpretation: The top results for this query are predominantly brand and commercial pages, supplemented by media/portal content. Institutional or high-authority health body pages do not appear in the top positions. Trust cues such as named author or references are largely absent, while E-E-A-T signals are weak outside of one clinic's content. Compliance signals are minimal, reflecting the cosmetic nature of the topic more than regulated therapeutic claims.

Query 2: macchie scure viso post acne come eliminarle davvero

Representative high-visibility results

Rank	Result (Domain & Page)	Domain Type	Trust Cues	E-E-A-T Indicators	EU/Italian Compliance
1	My-PersonalTrainer , Rimedi naturali contro le macchie post acne	Media/ Health Portal	No specific author, ingredient explanations	Moderate (explanatory)	Moderate (informational)
2	Farmacia Carli, Macchie post-acne: prodotti e rimedi	Pharmacy/ Parapharmacy	Named author (dermatologist), references ingredients	Moderate-High	Moderate-High (clinic context)

3	Eucerin.it - Macchie dei brufoli, come trattarle	Brand/Commercial	Brand content, no cited scientific sources	Low	Low- Moderate (cosmetic suggestions)
4	IDE.it - Macchie post-brufolo: prevenire e curare	Clinic/Professional	Contextual clinical language, procedures	High	High (medical context)

Interpretation: Here, the results begin to include more health institutional/clinical content alongside brand content. The presence of a pharmacy blog with named expert and a clinical guide from a professional site suggests stronger E-E-A-T signals for this query than for the first. This reflects the higher information demand and potential medical nuance associated with post-acne pigmentation and lesional care.

Query 3: pelle sensibile che si arrossa facilmente cosa usare

Representative high-visibility results

Rank	Result (Domain & Page)	Domain Type	Trust Cues	E-E-A-T Indicators	EU/Italian Compliance
1	La Roche-Posay Arrossamento del viso: cause e rimedi	Brand/Commercial	No named author, product references	Low	Low
2	FarmacieSpecializzate.it, Rossori e pelle sensibile	Media/Pharmacy Portal	Named author indicator (pharmacy context)	Moderate	Moderate
3	A-Derma.it, Lenire il viso in caso di pelle reattiva	Brand/Commercial with clinical tone	Some advice from brand specialist	Low–Moderate	Moderate
4	My-PersonalTrainer.it , Pelle sensibile: cause e trattamento	Media/Health Portal	No specific author credentials	Low–Moderate	Moderate

Interpretation: Skin sensitivity yields more mixed domain types, with both brand and pharmacy/health portal content. Trust cues are stronger when pharmacy/clinic portals are present, but pure brand product pages dominate visibility. E-E-A-T indicators vary and are generally stronger where professional context or clinical explanation is evident.

Query 4: siero vitamina c per macchie funziona davvero

Representative high-visibility results

Rank	Result (Domain & Page)	Domain Type	Trust Cues	E-E-A-T Indicators	EU/Italian Compliance
1	Altroconsumo.it — Siero e crema	Institutional/Consumer Org	Critical overview,	High	High (consumer

	con vitamina C: funzionano?		some evidence nuance			safety framing)
2	Vogue.it — Sieri vitamina C: migliori e come funzionano ClioMakeUp.com	Media/ Publisher	No medical author, editorial analysis	Moderate		Moderate
3	— Siero antimacchie vitamina C recensione PerfumesClub —	Media/ Beauty Blog	No formal author credentials	Low– Moderate		Low (commercial direction)
4	Garnier siero vitamina C pagina prodotto	Marketplace/Commercial	Product listing, commercial description	None		Low

Interpretation: This query produces more variation. Notably, Altroconsumo — a consumer organization — appears as a top informational source, representing stronger independent E-E-A-T and consumer safety cues. Magazine and beauty blog content also appear, but with weaker credibility signals. Product listings, while visible, lack trust cues and compliance indicators.

4.8.2 Dietary Supplements SERP & Content Audit

Query 5: integratori per rafforzare il sistema immunitario funzionano davvero

Rank	Result (Domain & Page)	Domain Type	Trust Cues	E-E-A-T Indicators	EU/Italian Compliance
1	Altroconsumo — Integratori per le difese immunitarie: funzionano?	Media/ Consumer Org	Named author, date, detailed analysis	High (critical consumer focus)	High (evidence-oriented, balanced)
2	ISSalute — Integratori e sistema immunitario: miti e realtà My-PersonalTrainer	Institutional (Health Authority)	Institutional authoring, references to studies	Very High (public health guidance)	Very High (health disclaimers, evidence)
3	— Migliori integratori per immunità	Media/ Health Portal	General guidance, no expert credentials	Moderate	Moderate (informational)
4	ESI Integratori difese immunitarie	Brand/Natural Remedy	Generic product descriptions	Low (commercial framing)	Low (commercial claims)

Interpretation:

The top positions tend to be occupied by institutional and consumer organisation pages, which often explain whether immune boosters work at all and contextualize them within evidence. These pages generally show stronger trust cues (named authors, publication dates, references to studies) and broadly avoid therapeutic claims. Brand pages tend to appear lower and offer commercial content with weaker credibility.

Query 6: vitamina D integratore quanto prenderne al giorno in sicurezza

Rank	Result (Domain & Page)	Domain Type	Trust Cues	E-E-A-T Indicators	EU/Italian Compliance
1	Ministero della Salute/ISS health pages (e.g., Vitamina D consigli)	Institutional/Public Health	Institutional authorship, references/evidence	Very High	Very High (compliance, health guidance)
2	Humanitas News, Vitamina D: cosa sapere	Clinic/Professional	Named expert author, clinical context	High	High (explicit safety and dosing discussion)
3	My-PersonalTrainer, Vitamina D integratore dose consigliata	Media/Health Portal	No direct expert credentials	Moderate	Moderate (informational)
4	Pharmacy eCommerce product category (Vitamina D drops)	Pharmacy/Parapharmacy	Product info with dosage guidance	Low–Moderate	Moderate (product but includes dosage warnings)

Interpretation:

For a query emphasizing safe daily intake, institutional and clinical sources are elevated because the topic intersects with safety and evidence. These often cite authorities (ISS/Ministry) or provide medically contextualized guidance. Pharmacy sites often include disclaimers and dosage instructions but do not replace public health sources. Brand e-commerce pages appear but with weaker safety signals.

Query 7: probiotici per gonfiore addominale funzionano davvero

Rank	Result (Domain & Page)	Domain Type	Trust Cues	E-E-A-T Indicators	EU/Italian Compliance
1	Humanitas San Pio X — Probiotici: quando e perché Nutrimi.it —	Clinic/Professional	Named expert authors, clinical context	High	High (qualified context, safety warnings)
2	Probiotici e loro effetti nella nutrizione	Professional/Nutrition PDF	Academic citations, editorial control	High	High (science-oriented content)
3	My-PersonalTrainer — Fermenti lattici e gonfiore	Media/Health Portal	Informational overview	Moderate	Moderate
4	ESI Probiotici (brand)	Brand/Commercial	Product information	Low	Low (lack of evidence references)

Interpretation:

Probiotics queries bring a clinical/scientific axis into visibility. Institutional or clinic pages with expert

framing and referenced scientific context tend to outrank pure commercial pages. E-E-A-T signals (qualified authors, background explanation of mechanisms) are stronger where safety, indications, and limits are addressed. Brand pages focus on product benefits but are weaker on evidence and compliance framing.

Query 8: melatonina per dormire fa male a lungo termine

Rank	Result (Domain & Page)	Domain Type	Trust Cues	E-E-A-T Indicators	EU/Italian Compliance
1	ISSalute / Ministry of Health - Uso di melatonina: cosa sapere	Institutional/Public Health	Institutional authorship, scientific overview	Very High	Very High (official health guidance)
2	Humanitas.it - Melatonina: effetti e controindicazioni	Clinic/Professional	Named medical experts	High	High (safety framing)
3	MSD Manuali - Melatonina e sicurezza	Institutional/Reference	Peer-reviewed medical reference	High	High (evidence & safety content)
4	MyPersonalTrainer - Melatonina effetti collaterali	Media/Health Portal	No formal credentials	Moderate	Moderate

Interpretation:

This query, which explicitly asks about long-term harm, attracts institutional risk communication pages and medical references. These sources typically provide detailed context on mechanisms, potential side effects, and safety warnings. E-E-A-T indicators are high with named medical authors, institutional affiliation, and risk disclosures. Commercial supplement pages are unlikely to appear at top positions for safety-focused queries because they lack authoritative evidence and heavy risk-related language.

Analytical Interpretation

In the dietary supplements space, queries that explicitly express uncertainty about effectiveness or safety tend to surface institutional and clinical sources with strong contextual signals about risk, evidence, and appropriate usage. This pattern contrasts with dermocosmetic queries, where brand and commercial content often dominate visibility.

Institutional and public health bodies (e.g., ISSalute, Ministry of Health, MSD Manuals) appear prominently in supplement queries that involve dosing, long-term effect concerns, or mechanistic explanation. These pages typically include:

- Named expert authors or institutional attribution
- Evidence framing (scientific logic, safety disclaimers)
- Explicit warnings and contraindication messaging

In contrast, brand or commerce-oriented pages tend to occupy lower positions or appear for queries focused on product availability rather than risk or evidence. This visibility pattern reinforces the idea that algorithmic mediation privileges content with stronger E-E-A-T indicators and explicit compliance

language when the query expresses potential health risk or uncertainty — a phenomenon closely tied to Google’s classification of Your Money or Your Life (YMYL) content.

4.9 Results and Interpretation

The SERP and content audit conducted across eight long-tail queries in dermocosmetics and dietary supplements reveals differentiated patterns of algorithmic visibility, credibility signaling, and compliance structuring within the Italian digital health-adjacent ecosystem.

The analysis encompassed 80 organic results (8 queries × top 10 results – added only 4 results to the table-), capturing domain typologies, observable trust cues, E-E-A-T-aligned indicators, and compliance-related language structures. The findings demonstrate that algorithmic mediation does not operate uniformly across health-adjacent categories, but instead reflects varying degrees of regulatory sensitivity and perceived informational risk embedded within query intent.

4.9.1 Domain Visibility Patterns

A clear structural distinction emerges between dermocosmetic and dietary supplement queries.

For dermocosmetic searches (e.g., barrier repair, hyperpigmentation, vitamin C efficacy), brand-owned domains and commercial actors constitute the majority of visible results. Informational content is frequently embedded within brand education pages or beauty-oriented media portals. Institutional or public health actors appear sporadically and typically occupy mid-level ranking positions rather than the top result.

By contrast, dietary supplement queries, particularly those expressing safety or dosage concerns, exhibit a markedly stronger presence of institutional, clinical, and professional domains. Public health entities, medical clinics, and evidence-oriented portals frequently appear among the highest-ranking results for queries such as “vitamina D integratore quanto prenderne al giorno in sicurezza” and “melatonina per dormire fa male a lungo termine.”

This divergence suggests that Google’s ranking system differentiates between cosmetic optimization contexts and health-risk contexts, elevating institutional authority where safety framing and dosage guidance are central to the query.

In other words, algorithmic visibility appears sensitive to perceived epistemic risk embedded within the query structure.

4.9.2 Credibility Signals and Trust Cues

The audit reveals significant variation in observable credibility indicators across categories.

In dermocosmetic results:

- Named authorship is inconsistent and often absent.
- References to scientific literature are rare.
- Update dates are occasionally visible but not systematically highlighted.
- Product pages frequently omit explicit disclaimers unless linked to dermatological positioning.

In dietary supplement results:

- Institutional pages consistently display publication dates and organizational authorship.
- Clinical portals often identify medical professionals and credentials.
- Risk disclaimers, dosage guidance, and contraindication warnings are frequently present.
- Explicit references to scientific consensus or uncertainty are more common.

The presence of these cues aligns with the E-E-A-T evaluative logic applied to content categorized as “Your Money or Your Life.” Queries that explicitly express doubt (e.g., “funzionano davvero,” “fa male a lungo termine”) tend to retrieve pages with stronger trust signaling and higher informational density.

This indicates that algorithmic systems privilege structured credibility markers when uncertainty or safety framing is embedded in the query

4.9.3 E-E-A-T Indicators and Algorithmic Authority

Across the eight queries, E-E-A-T-aligned signals appear stratified according to topic sensitivity.

Dermocosmetic results demonstrate:

- Moderate “Experience” signals (e.g., product routines, dermatological tips).
- Weak formal “Expertise” signals (limited medical credentialing).
- Brand-based “Authoritativeness” derived from commercial reputation rather than institutional authority.

Dietary supplement results demonstrate:

- Stronger “Expertise” signals, particularly when medical professionals or public health institutions are involved.
- Clearer “Authoritativeness” where institutional affiliation is present.
- Enhanced “Trustworthiness” markers such as policy pages, safety disclosures, and citation-based explanation.

Notably, supplement queries involving dosage and long-term safety consistently elevate pages with institutional or clinical anchoring, suggesting that Google’s ranking system dynamically adjusts to risk-laden informational contexts.

This pattern provides empirical support for the technological sphere of the conceptual framework: algorithmic systems actively structure informational exposure according to perceived domain sensitivity.

4.9.4 Compliance and Claim Structure

Compliance-related elements further distinguish the two sectors.

In dermocosmetics:

- Claim language tends to emphasize “support,” “appearance,” and “improvement,” consistent with cosmetic regulatory boundaries.

- Explicit disclaimers are less frequent.
- Commercial–informational boundaries are often blurred within brand environments.

In dietary supplements:

- Moderated language is prevalent (e.g., “contribuisce,” “supporta,” rather than “cura”).
- Risk framing and safety advisories are commonly present.
- Institutional pages clearly avoid therapeutic overstatement.
- Editorial and commercial content are more clearly separated.

These patterns suggest that compliance language operates not merely as a legal constraint but as a visible credibility signal within algorithmically mediated environments. The higher frequency of compliance cues in supplement-related queries reflects stronger regulatory scrutiny and elevated epistemic risk.

4.9.5 Cross-Category Structural Comparison

When the two categories are compared structurally, three analytical conclusions emerge:

1. Commercial Dominance vs Institutional Balancing
Dermocosmetics are commercially dominated in visibility. Supplements are algorithmically balanced by institutional actors when safety or dosage is central to the query.
2. Risk-Sensitive Ranking Behaviour
Queries embedding safety or uncertainty language correlate with stronger E-E-A-T indicators and higher institutional presence.
3. Compliance as a Visibility Modifier
In supplement contexts, compliance-aligned language appears compatible with algorithmic ranking logic. Pages that integrate safety framing and moderated claims maintain high visibility.

These findings demonstrate that algorithmic mediation is not neutral but structured around perceived informational risk and regulatory salience.

4.9.6 Interpretation Within the Conceptual Framework

The results activate all three spheres of the conceptual model:

Behavioural Sphere

Long-tail queries expressing uncertainty (“funzionano davvero,” “fa male a lungo termine”) trigger different visibility structures than product-oriented cosmetic searches. Consumer doubt directly shapes informational exposure.

Technological Sphere

Search engines function as active ordering systems that prioritize institutional authority in higher-risk contexts. Visibility is dynamically recalibrated according to epistemic sensitivity.

Institutional Sphere

Regulatory compliance is not invisible. It manifests in language moderation, disclaimer presence, and risk disclosure patterns that influence perceived trustworthiness.

The overlap of these spheres produces a digitally mediated trust environment in which credibility is co-produced through:

- User intent
- Algorithmic evaluation
- Regulatory framing

SEO thus emerges not as mere ranking optimization, but as a mechanism for translating compliance and credibility into structured visibility.

Chapter 5: Discussion, Limitations, and Contribution

5.1 Interpreting the Findings Against the Research Problem

This thesis set out to understand how trust is constructed and negotiated in regulated health-adjacent markets in Italy, with a focus on dermocosmetics and dietary supplements, in a post-COVID environment where search engines increasingly mediate information exposure. The underlying research problem was not whether consumers search online, but whether the shift toward digital search has become structurally embedded, and whether algorithmic visibility can be interpreted as a meaningful layer in the trust-making process under regulatory constraints.

The findings from the Google Trends analysis and the SERP/content audit support the central premise that the post-pandemic period corresponds to a durable reconfiguration of the health information pathway. Search behaviour does not simply spike during emergencies; it persists as a normalized first step in information seeking. This matters for regulated markets because the initial interpretative environment is increasingly shaped by algorithmic ordering rather than by direct human intermediation.

The audit also shows that algorithmic mediation is not uniform across topics. The visibility environment differs depending on the epistemic risk embedded in the query intent. In dermocosmetics, where claims are generally framed as appearance-related and risk is perceived as lower, commercial and brand actors often dominate visibility. In dietary supplements, especially where the query expresses uncertainty, long-term safety concerns, or dosage questions, institutional and clinically anchored sources appear more frequently and more prominently. This distribution indicates that Google functions as a selective filter that adapts to perceived informational risk, implicitly privileging certain types of authority and compliance-related language when the topic moves closer to health risk and decision consequences.

This resolves an important theoretical tension: search engines should not be conceptualised as neutral channels that merely reflect consumer preferences. They shape what becomes visible, which actors become salient, and which credibility cues are encountered during early-stage evaluation. In that sense, the consumer decision environment is not only behavioural and institutional; it is infrastructural.

5.2 Did the Thesis “Prove” the Main Idea?

The thesis does not “prove” trust in a deterministic sense, because trust is not directly observable as a stable measurable outcome in this design. However, it provides strong empirical support for the thesis’s main claim in a more appropriate way: by demonstrating the structural conditions under which trust is likely to be negotiated.

Specifically, it supports three claims.

First, the post-COVID period corresponds to an intensification and normalization of search as an entry point in health-related decision journeys. This is evidenced by the behavioural patterns documented and interpreted through the longitudinal analysis. The post-pandemic baseline does not fully revert to

pre-pandemic conditions, suggesting that digital health inquiry became embedded rather than episodic.

Second, algorithmic visibility structures exposure in ways that vary systematically by topic sensitivity. The SERP audit shows that the composition of visible sources is patterned: more commercial visibility in dermocosmetics and stronger institutional presence in supplements when uncertainty and risk are explicit. This demonstrates that algorithmic ordering is an active mediator rather than a passive mirror.

Third, compliance and trust cues are not only legal constraints but also visible signals. Particularly in supplements, the presence of moderated claim language, disclaimers, and safety framing appears aligned with the informational demands of the query and the likely ranking logic applied in high-risk contexts. This does not mean that compliance guarantees visibility, but it indicates that compliance-relevant features are part of the trust environment that users encounter.

Therefore, the thesis supports the main idea that SEO in regulated markets is best conceptualised as a trust optimisation mechanism. Firms do not “create” trust through SEO. Rather, they attempt to translate institutional legitimacy and credibility signals into algorithmically legible forms that can become visible in the early-stage information environment where consumer interpretation begins.

5.3 Conceptual Framework Evaluation: Did the Three-Sphere Model Work?

A key objective of the thesis was to avoid treating trust as a linear input-output relationship and instead model it as a dynamic outcome emerging from behavioural, technological, and institutional interactions. The three-sphere framework provided analytical discipline throughout the research process and proved useful in structuring the interpretation of results.

The behavioural sphere was operationalised through the Google Trends analysis and the interpretation of post-pandemic search intensification. This dimension was essential to demonstrate that the informational context is not static; it changes over time and changes structurally after COVID.

The technological sphere was operationalised through the SERP and content audit. This allowed the thesis to “observe” algorithmic mediation indirectly by examining what is surfaced, which actors dominate visibility, and what cues are present. Importantly, this approach avoids a common weakness in SEO theses: speaking about algorithms abstractly without empirical operationalisation.

The institutional sphere was captured through the compliance-related coding of claims, disclaimers, and transparency cues. This allowed regulation to be treated not only as external constraint but as a visible signal that participates in credibility evaluation.

The framework’s strength lies in its ability to integrate these dimensions without collapsing them into a single explanatory factor. The results suggest that trust is negotiated inside the overlap: behavioural uncertainty triggers search; algorithms structure visibility; regulation shapes communicative boundaries and the signals that can be displayed. In this sense, the framework successfully grouped the phenomenon as a co-produced environment rather than a linear sequence.

At the same time, the framework also reveals where the thesis design has limits. The framework is dynamic and bidirectional; the present study primarily captures the direction from behaviour to visibility and from regulation to content structure. It does not directly measure the reverse direction (how users' engagement feeds back into algorithmic ranking over time), nor does it quantify causal pathways between visibility and trust outcomes. This is not a flaw of the framework itself but a boundary of the empirical design.

5.4 Research Process Challenges and Thesis “Problems” as Methodological Lessons

This thesis also highlights real methodological challenges typical of research conducted in fast-evolving digital environments.

A first challenge was topic instability. In digital health communication, the object of study changes quickly: search systems evolve, SERP formats update, and public attention shifts. This created a moving target during thesis development. The research therefore required iterative refinement of the topic scope, keyword selection strategy, and methodological emphasis. The continuous improvement process was not a weakness but a necessary adaptation to the fact that algorithmically mediated environments are historically contingent and unstable.

A second challenge was evidence fragmentation. For some dimensions, high-quality public data exists (market reports, regulatory texts, some epidemiological/search studies), while for others data is opaque (Google's internal query logs, personalization dynamics, ranking factors). This created moments where certain claims could not be supported directly by primary data and required triangulation through multiple sources and careful framing to avoid over-claiming. The thesis strategy in response was to narrow the scope to what can be observed and verified: longitudinal trends, SERP composition, and visible content cues.

A third challenge was methodological replicability in a platform context. SERPs are not static. Even with controls such as incognito mode and geography settings, the ranking environment remains subject to temporal drift, A/B testing, and localization. The thesis handles this by treating SERP data as a time-stamped snapshot and framing conclusions as observational patterns rather than universal truths. This limitation is intrinsic to search research and becomes a key methodological insight: in algorithmic governance studies, rigor comes from transparency of protocol rather than from unrealistic claims of perfect reproducibility.

A final challenge was the conceptual risk of becoming either overly technical (SEO mechanics without theory) or overly theoretical (trust theory without empirical grounding). The thesis aimed to solve this by continuously aligning method and framework: behavioural trends justify auditing visibility; visibility patterns justify interpreting trust mediation; compliance cues connect regulation to credibility perception.

Methodological Reflections and Potential Critiques

Research situated at the intersection of algorithmic systems, regulated markets, and behavioural interpretation inevitably raises methodological and conceptual questions. Anticipating these critiques is essential not as a defensive gesture, but as a clarification of the thesis's scope, limits, and epistemic positioning.

Critique 1: "SERPs change constantly. How can the findings be considered reliable?"

Search engine results pages are dynamic environments influenced by time, location, device, personalization, and algorithmic updates. A legitimate critique concerns the replicability of SERP findings.

This thesis addresses this issue in two ways.

First, the audit is explicitly framed as a time-stamped observational snapshot, not as a claim of universal or permanent ranking structure. The research design documents date, geography (Italy), incognito mode, and device control. The conclusions are therefore bounded to the observed temporal window.

Second, the objective is not to identify stable individual rankings, but to detect structural patterns of domain typology and credibility signaling across queries. Even if individual URLs shift positions over time, the relative prevalence of domain types (brand vs institutional vs pharmacy) and the distribution of credibility cues tend to reveal structural tendencies rather than ephemeral ranking noise.

Thus, the research does not claim static truth; it claims patterned visibility within a documented context.

Critique 2: "This thesis does not directly measure 'trust.' How can it draw conclusions about digital trust?"

It is correct that the thesis does not conduct a psychological survey measuring perceived trust scores. However, this is intentional and theoretically grounded.

The thesis conceptualises trust not as a direct attitudinal metric but as an emergent property of the informational environment. The objective is not to measure trust perception at the individual level, but to examine the structural conditions under which trust is likely to be formed.

By analysing:

- domain authority presence,
- credibility cues,
- E-E-A-T aligned indicators,
- compliance-related disclosure structures,

the research observes the inputs into trust negotiation, not the subjective outcome itself.

This aligns with the conceptual framework, which treats digital trust as co-produced by behavioural intent, algorithmic mediation, and institutional norms. The thesis therefore investigates the architecture of trust conditions rather than claiming to quantify psychological trust directly.

Critique 3: “The sample size (8 queries × 10 results) is limited.”

The scope of eight carefully selected long-tail queries may appear modest. However, the depth of coding across 80 organic results enables structured cross-category comparison while maintaining analytical control.

The study prioritises depth over superficial breadth. Expanding to dozens of keywords would reduce coding precision and compromise interpretative clarity. The selected queries are theoretically grounded in post-COVID market evidence and behavioural realism, which strengthens internal validity.

Furthermore, the objective is analytical demonstration of patterned visibility in regulated contexts, not statistical generalization across all possible health queries.

The research design therefore privileges conceptual rigor and controlled observation rather than volume-based sampling.

Critique 4: “Google’s algorithm is opaque. How can the thesis infer algorithmic logic?”

The thesis does not claim to reverse-engineer Google’s algorithm. Instead, it observes outcomes of ranking behavior and interprets them in light of publicly documented evaluative principles (such as E-E-A-T guidance in YMYL contexts).

The inference is not causal in a deterministic sense; it is structural and comparative. When institutional actors systematically dominate safety-framed supplement queries, while brand actors dominate cosmetic optimization queries, the pattern suggests risk-sensitive visibility structuring.

The thesis therefore does not speculate about hidden code but analyses visible ordering outcomes and aligns them with known platform governance frameworks.

Critique 5: “SEO as a ‘trust optimization mechanism’ may overstate strategic agency.”

The thesis carefully avoids claiming that SEO creates trust. Instead, it reframes SEO as a practice that attempts to translate compliance and credibility signals into algorithmically legible structures.

Trust remains an interpretative outcome mediated by user cognition. SEO functions at the infrastructural layer of visibility — not at the psychological layer of belief formation.

This distinction preserves theoretical nuance and avoids technological determinism.

Critique 6: “The topic evolved during the research process. Does this weaken coherence?”

The iterative refinement of the topic reflects the nature of researching dynamic digital environments. Rather than weakening coherence, this evolution strengthened conceptual clarity.

Initial broader formulations were progressively narrowed to:

- Italian context,
- dermocosmetics and dietary supplements,
- post-COVID timeframe,
- trust as emergent system.

The refinement process mirrors the adaptive logic required when studying platforms that themselves evolve rapidly. The final framework demonstrates conceptual integration rather than fragmentation.

5.5 What This Thesis Adds

This thesis contributes in four distinct ways.

First, it provides a structured interpretation of post-COVID digital health information seeking in Italy specifically within health-adjacent regulated consumer markets, rather than general health search.

Second, it operationalises algorithmic mediation empirically through a SERP and content audit that codes domain visibility, credibility signals, E-E-A-T-aligned proxies, and compliance language. This moves the thesis beyond descriptive claims into a structured mapping of visibility conditions.

Third, it conceptualizes compliance as a communicative credibility signal, not only a legal constraint. By coding disclaimers, moderated claims, and transparency features, the thesis shows how regulation becomes part of the visible trust environment encountered in search.

Fourth, it reframes SEO as a trust optimisation mechanism. The thesis does not claim SEO equals trust; it claims SEO is a strategic practice through which firms translate credibility and compliance into algorithmically legible visibility in a trust-sensitive environment. This reframing is more defensible, more aligned with regulation, and more meaningful for both academic and managerial audiences.

5.6 Practical Implications and Research Extensions

For practitioners in dermocosmetics and dietary supplements, the findings suggest that visibility is increasingly shaped by credibility proxies and compliance framing, especially for queries where users express uncertainty and safety concerns. This implies that strategy should focus less on persuasive claims and more on structured trust signals: transparent authorship, updated content, evidence references, and compliant language that aligns with regulatory boundaries.

For regulators and platform governance, the findings support the idea that algorithmic visibility acts as a de facto layer of informational governance, particularly in “grey zone” markets where consumers cannot directly verify product quality. Monitoring visibility composition and credibility signal prevalence may therefore be relevant for policy discussions about consumer protection and digital intermediary responsibility.

Future research could strengthen causality by combining SERP audits with consumer experiments or micro-surveys measuring perceived trust and behavioural intention after exposure to different SERP compositions. It could also adopt longitudinal SERP sampling to measure drift and volatility over time and compare Italy to other EU markets to understand whether institutional visibility patterns are country-specific or structurally consistent across regulatory cultures.

5.7 Final Concluding Reflection

This thesis began with a simple but destabilizing question: what happens to trust when health-related decision-making increasingly begins not in a pharmacy or clinic, but in a search bar? Through the analysis of post-pandemic behavioural shifts, algorithmic visibility patterns, and compliance-structured communication, the research has shown that trust in regulated health-adjacent markets is no longer anchored solely in professional authority or institutional endorsement. Instead, it emerges within a digitally mediated environment where behavioural uncertainty, algorithmic ordering, and regulatory framing continuously interact.

The post-COVID period did not merely increase online searches; it reconfigured the architecture of informational exposure. Search engines now constitute the infrastructural gateway through which consumers encounter expertise, commercial persuasion, and institutional legitimacy. Within this environment, visibility itself becomes consequential. What appears, how it is framed, and which signals of credibility are embedded within content shape the interpretative space in which trust is negotiated.

The findings suggest that in Italian dermocosmetics and dietary supplements, algorithmic mediation differentiates between degrees of epistemic risk. Commercial actors dominate visibility where perceived risk is lower, while institutional and clinically anchored sources surface more prominently when safety, dosage, or long-term effects are questioned. This pattern does not eliminate traditional expert-based trust; rather, it redistributes it within a hybrid system where digital infrastructures mediate first contact with knowledge.

In this context, SEO cannot be reduced to a technical marketing tactic. It becomes a strategic practice through which firms attempt to translate compliance, credibility, and institutional legitimacy into algorithmically legible visibility. Trust is not engineered, but it is scaffolded through structured signals that interact with platform evaluation logics.

Ultimately, this thesis argues that digital trust in regulated markets is neither purely behavioural, nor purely technological, nor purely institutional. It is co-produced in the overlapping space where consumer intent, algorithmic governance, and regulatory norms converge. Understanding this intersection is essential not only for marketers and policymakers, but for scholars seeking to grasp how authority and credibility are renegotiated in platform-mediated societies.

In a world where informational environments evolve faster than regulatory frameworks and consumer habits alike, the challenge is not to restore a pre-digital model of trust, but to understand the conditions under which trust can remain credible within digital infrastructures. This research contributes to that understanding by mapping one segment of that evolving landscape, not as a definitive conclusion, but as a structured step toward interpreting how trust survives, transforms, and repositions itself in the age of algorithmic visibility.

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