

From Offline to Online - Two Decades of Digital Innovations in Valais Hotels

Adoption of Websites, Booking Engines and Social Media (2000–2025)

Authors:

Prof. Roland Schegg & Vincent Raisière*

Sherine Seppey**

*Tourism Institute (ITO) / ** Institute of Entrepreneurship & Management

HES-SO Valais-Wallis

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1. Managerial summary (I)

This study examines the temporal dynamics of digital adoption among hotels in the Swiss canton of Valais, focusing on three key milestones: the launch of hotel websites, the integration of online booking engines on hotel websites, and the appearance of social media links (e.g., Facebook, Instagram, YouTube). The analysis forms part of the Resilient Tourism Innosuisse Flagship project, which aims to foster data-informed transformation across the regional tourism ecosystem in Switzerland.

Using a combination of manual inspection (Wayback Machine) and Python-based web scraping, a unique historical dataset was created covering nearly **400 hotels in Valais**. The analysis reconstructs the timeline of how hotels progressively embraced digital tools over the last two decades.

The first wave of innovation—**hotel websites**—began in the early 2000s and accelerated until around 2010. This foundational step paved the way for more complex functionalities. **Booking engines** were first observed in 2003 but remained rare until a broader uptake started after 2012, coinciding with more accessible tools. In contrast, **social media** links (especially Facebook) began appearing from around 2005, gaining significant traction from 2010 onward and quickly surpassing booking engines in adoption. This pattern suggests that visibility-oriented innovations were prioritized over more operationally complex systems.

1. Managerial summary (II)

While higher-category hotels tended to lead the adoption of more complex tools like booking engines and social media integration, the adoption of basic websites was more evenly distributed across hotel sizes—particularly in the early 2000s. In some cases, smaller hotels were early adopters of web presence, possibly due to more agile decision-making or reliance on individual initiative. This nuance highlights that technology adoption patterns vary by type of innovation, with basic tools sometimes spreading in a more grassroots manner than resource-intensive features. By 2025, digital adoption has reached saturation in terms of basic presence, but important gaps remain in depth, integration, and quality—especially among resource-constrained hotels.

This research yields three key takeaways for public-private stakeholders:

- **Digital maturity is progressive:** Website presence is the foundational first step, upon which more advanced features like booking engines and CRM systems are built. Transformation must be staged and context-sensitive.
- **Generic support tools are insufficient:** Programs must be tailored to the specific sectoral and regional realities. Hotels in remote areas or with fewer resources need differentiated support models.
- **Strategic readiness matters:** Organizational alignment, leadership, and operational capacity are as important as access to technology when it comes to successful digital transformation.

By retracing the digital evolution of Valais hotels, this study contributes to evidence-based regional digital policy, helping actors anticipate future needs, close adoption gaps, and co-design smarter, more resilient tourism systems.

1. Managerial summary (III)

Limitations: Several limitations must be acknowledged when interpreting the results, particularly regarding the timing of website adoption, which was the earliest digital innovation studied. First, the sample only includes hotels that were still active at the time of data collection; hotels that ceased operations in the last two decades are therefore missing from the analysis. Second, changes in hotel ownership over 25 years often led to name changes and domain migrations, making it difficult to trace the digital history of some properties. Third, during the early 2000s, many hotels used shared platforms or tourism portals (e.g., www.rhone.ch/hotelexample) rather than independent domains, complicating detection through the Wayback Machine. Lastly, newer hotels that opened more recently naturally adopted digital tools later, not due to reluctance, but simply because they were only established once technologies like social media or booking engines were already widespread.

2. Study

This study was conducted by HES-SO Valais-Wallis within the framework of the Resilient Tourism project. The Resilient Tourism Flagship (www.resilienttourism.ch), supported by Innosuisse, aims to promote the datafication of Switzerland's tourism and travel sector, fostering the development of resilient, digitally-supported services, processes, and business models. The project received support and input from several tourism stakeholders in Valais, including www.digitourism.ch (Cimark) and local destination organisations (Anniviers Tourism, Crans-Montana Tourism, Nendaz Tourism, Sierre-Anniviers Marketing).

The main goal of this empirical study is to better understand the diffusion of digital innovations - in particular, the adoption of websites, booking engines and social media platforms - across the hotel sector in Valais. By tracing the timing and patterns of adoption across different hotel categories, the study provides a foundation for assessing digital maturity and identifying the dynamics of the innovation process.

2. Methodology (I)

To trace the evolution of digital adoption in the Valais hotel sector, we manually analysed **396 hotel websites** provided by the Valais Tourism Observatory (www.tourobs.ch). This work was conducted by student teams from HES-SO Valais-Wallis, who systematically inspected archived versions of each hotel's website using the [Wayback Machine](#) to determine the approximate **year of website creation**.

To automate the identification of booking engine integration and social media links on Wayback Machine, we developed a custom Python-based web-scraping approach. Due to data quality constraints (e.g., missing or corrupted archives), the automated analysis could only be run on a validated **sub-sample of 270 hotels**.

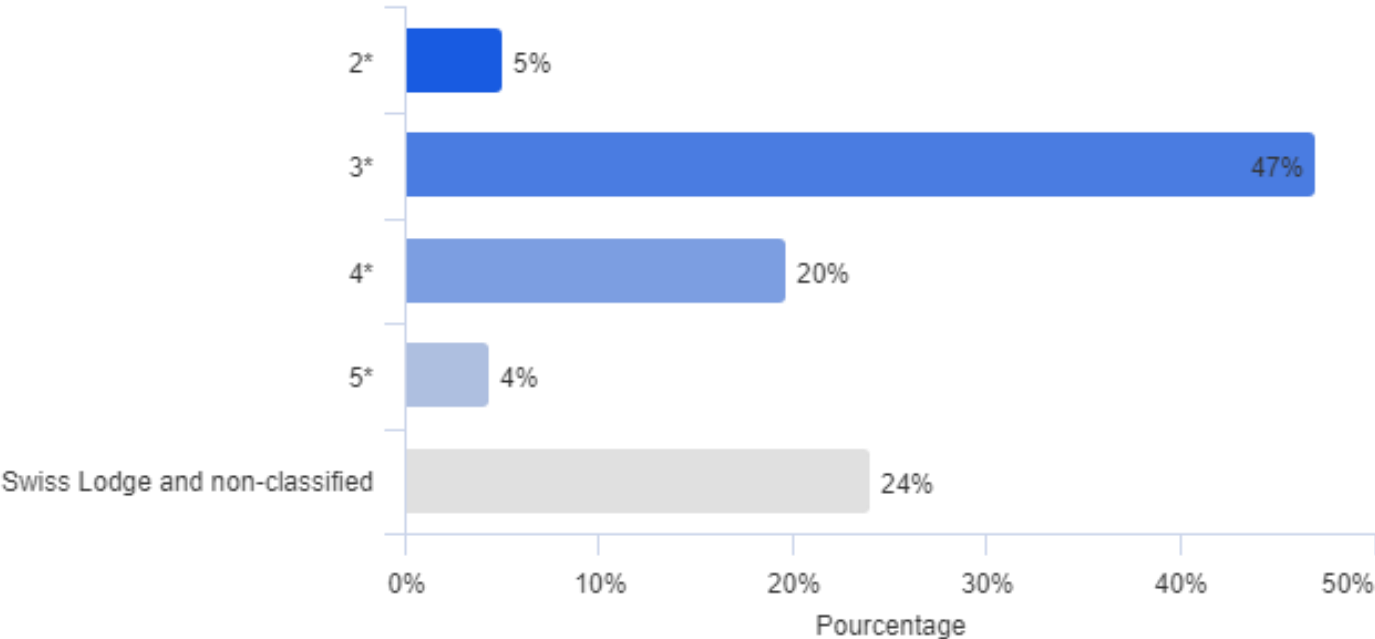
- **Booking Engine Detection Script:** The script queried archived snapshots of each hotel's website on the Wayback Machine to detect the earliest integration of a real-time booking engine. When automated detection was inconclusive—such as in cases of broken or missing archive links—manual verification was conducted to ensure accuracy. Out of the 270 hotels in the analyzed database, 165 had both a booking engine and a reliably identified implementation date.
- **Social Media Integration Script:** A similar script was used to detect the presence and first appearance of direct links to social media platforms (e.g., Facebook, Instagram, YouTube) on hotel websites, based on historical web snapshots. As with booking engines, it was not always possible to determine the exact implementation date due to incomplete or missing archives. In total, for 216 hotels—most commonly for Facebook—it was possible to identify a reliable date of first social media integration out of the 270 analyzed websites.

2. Methodology (II)

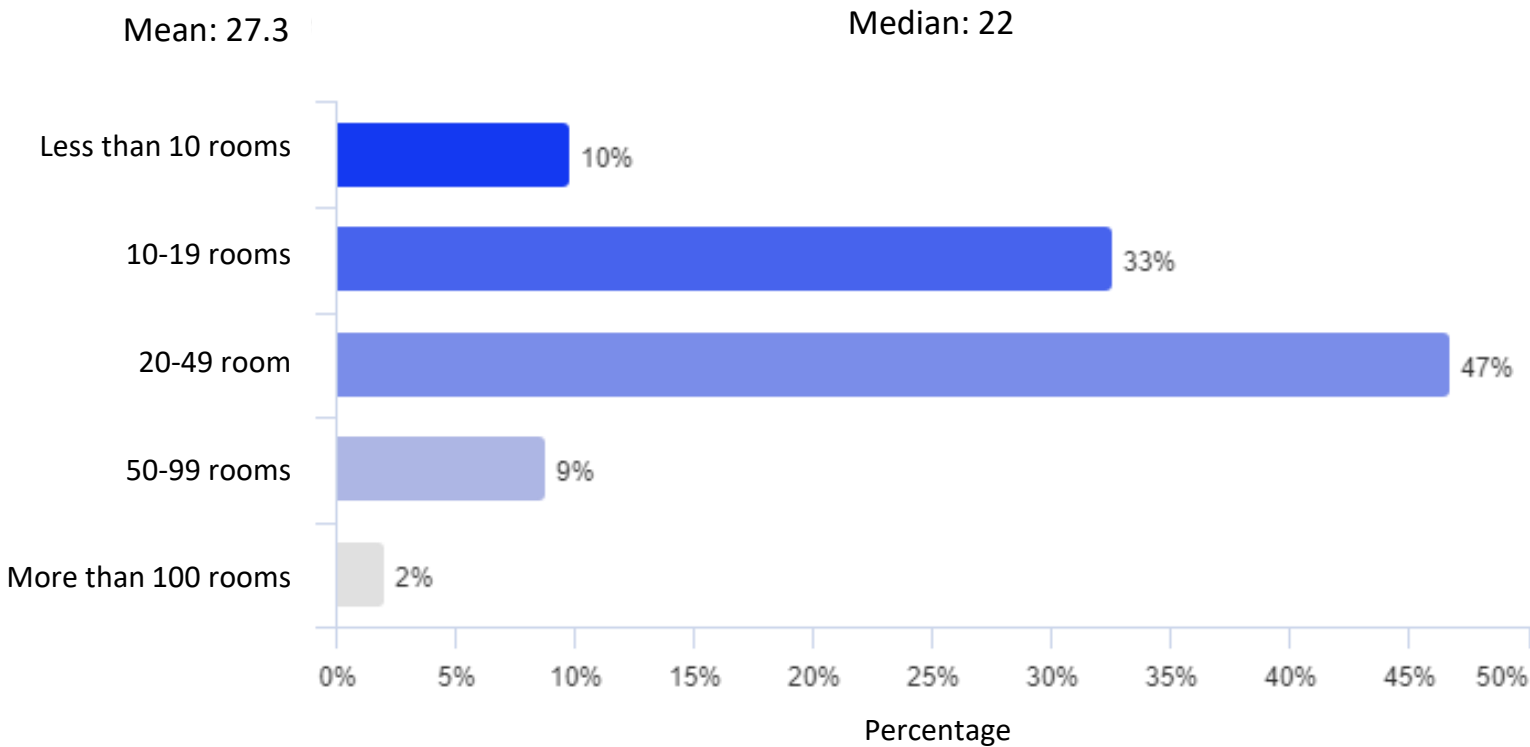
- This mixed-methods approach allowed us to construct a timeline of digital innovation adoption, from the creation of the first websites to the integration of direct booking and social media tools. Despite certain limitations (e.g., missing snapshots or broken links), the dataset provides an unprecedented historical view of digital transformation in the Valais hospitality sector.
- **Limitations**: Several limitations must be acknowledged when interpreting the results, particularly regarding the timing of website adoption, which was the earliest digital innovation studied. First, the sample only includes hotels that were still active at the time of data collection; hotels that ceased operations in the last two decades are therefore missing from the analysis. Second, changes in hotel ownership over 25 years often led to name changes and domain migrations, making it difficult to trace the digital history of some properties. Third, during the early 2000s, many hotels used shared platforms or tourism portals (e.g., www.rhone.ch/hotelexample) rather than independent domains, complicating detection through the Wayback Machine. Lastly, newer hotels that opened more recently naturally adopted digital tools later, not due to reluctance, but simply because they were only established once technologies like social media or booking engines were already widespread.

2. Sample: Classification

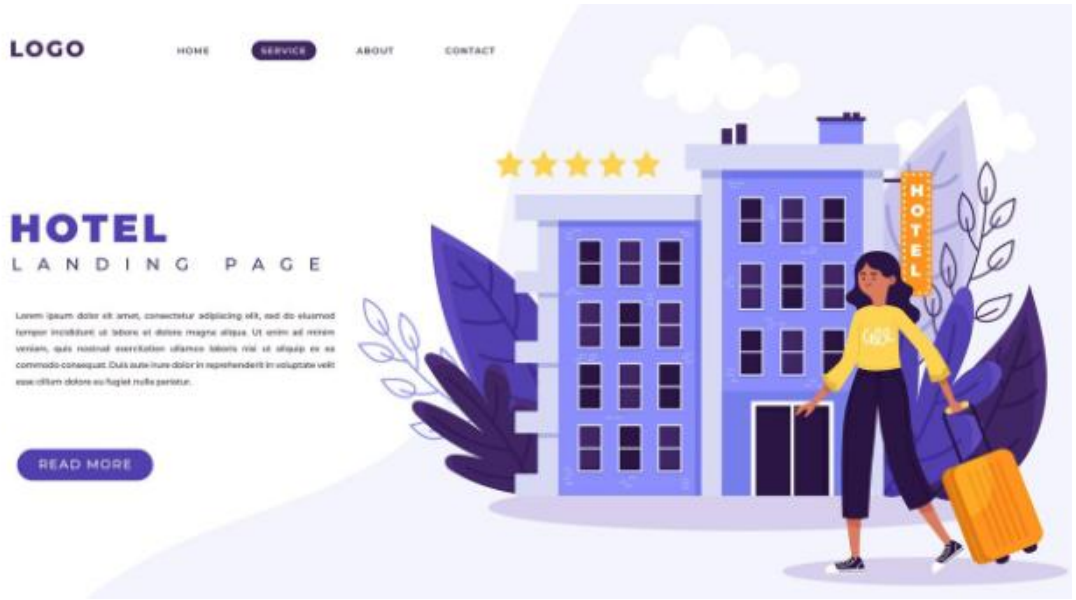
Réponses effectives : 396



2. Sample: Size of Hotel (# rooms)



3. Adoption of Websites by Hotels in Valais

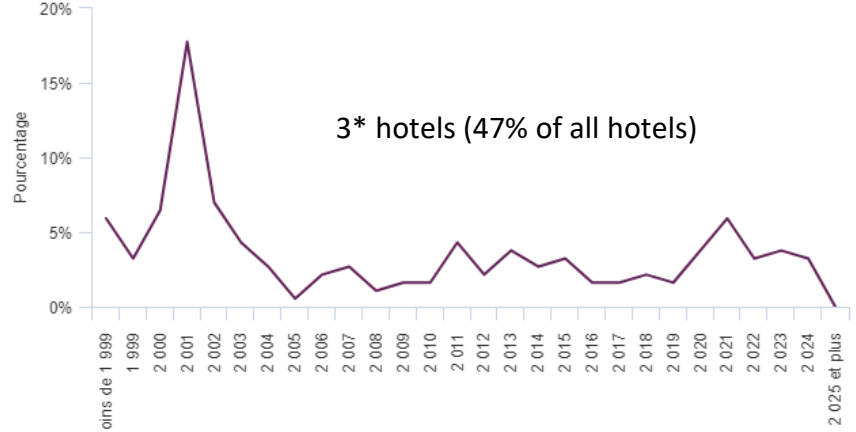
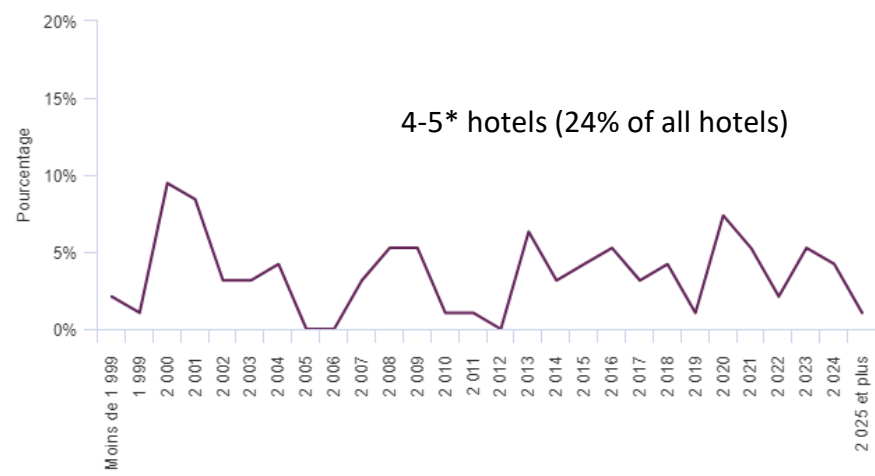


3. Evolution of Website Adoption Among Valais Hotels (1999–2025)



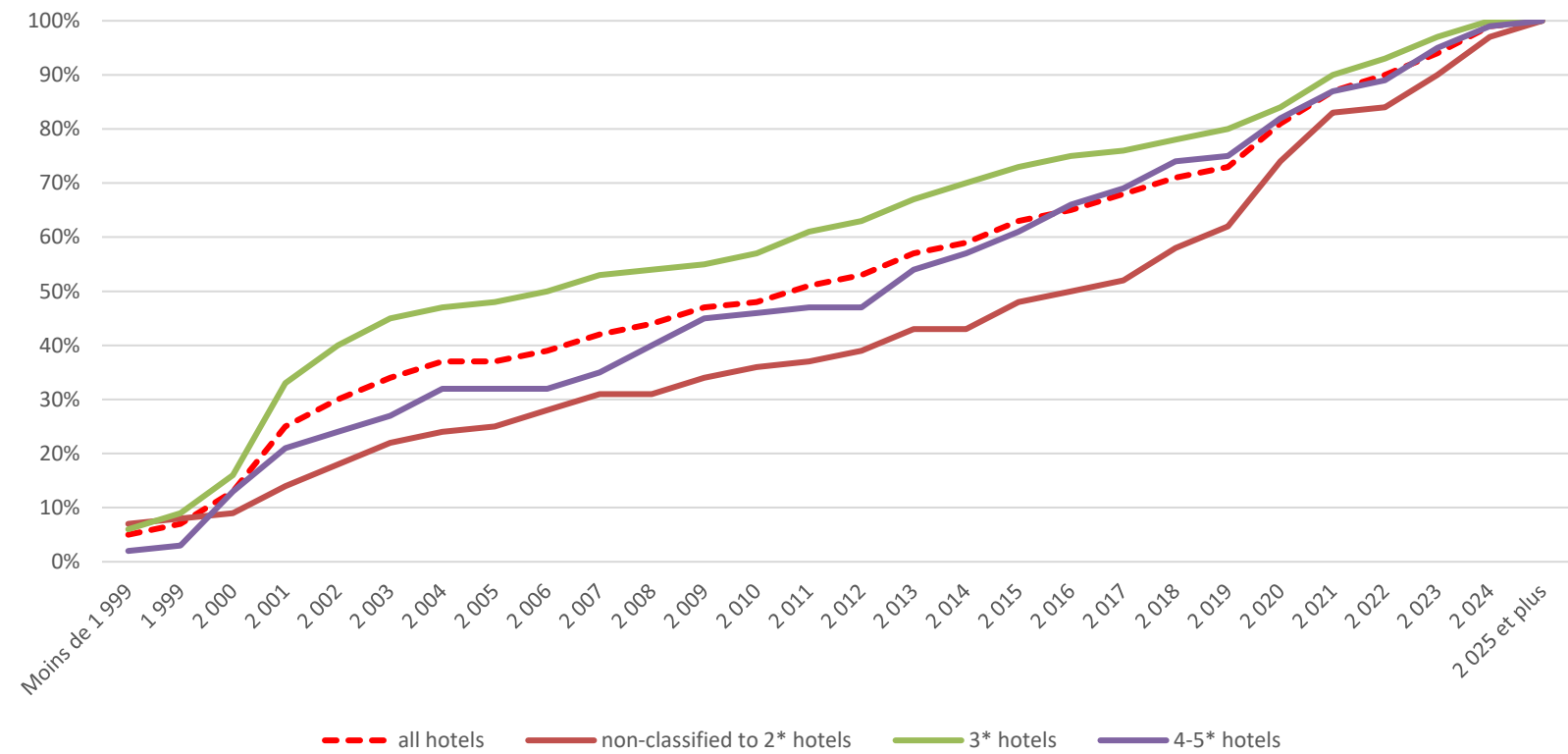
This chart reveals the gradual but steady diffusion of websites among Valais hotels from 1999 to 2025. Adoption accelerated significantly between 2000 and 2005, followed by consistent growth at a slower pace. By 2025, nearly all hotels have established a web presence. Yearly variations show early peaks in the early 2000s—likely linked to the first digital wave—while recent years display smaller, yet stable increases. This indicates that digital presence has become standard in the sector, with only a few late adopters remaining.

3. Evolution of Yearly Website Adoption Among Hotels in Valais (1999–2025) by Category



Source: Manual website inspection of 396 hotel websites in 2025

3. Cumulative Evolution of Website Adoption Among Hotels in Valais (1999–2025) by Category



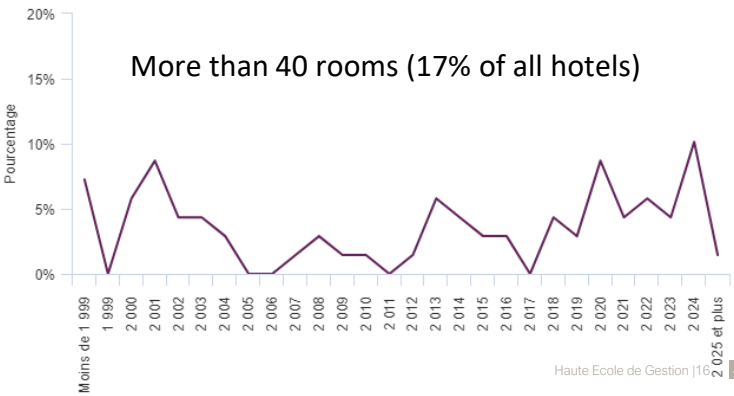
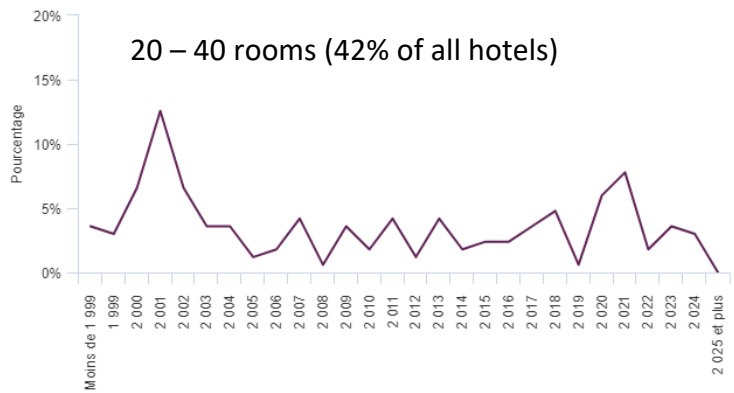
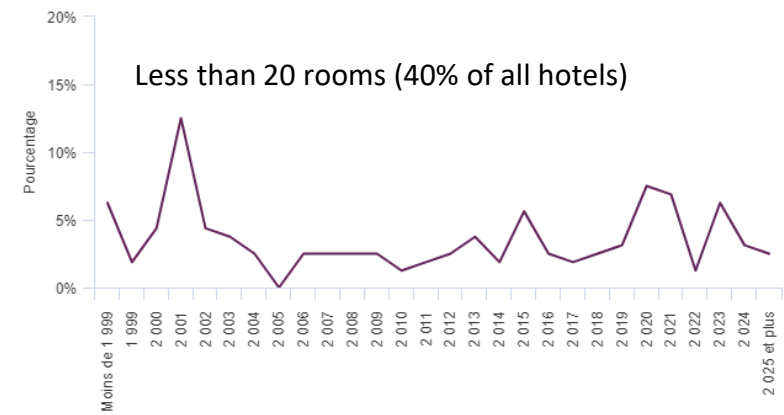
3. Evolution of Website Adoption Among Hotels in Valais (1999–2025) by Category

The analysis of website adoption among Valais hotels from 1999 to 2025 shows differentiated dynamics between hotel categories, both in terms of timing and progression patterns.

- **Three-star hotels** were clearly the frontrunners in digital adoption. They embraced websites early and broadly, with rapid cumulative growth beginning around 2000 and maintaining a lead over other categories for much of the period. This consistent upward curve suggests that mid-range hotels recognized early the necessity of a professional online presence to remain competitive, particularly in light of OTA pressures and changing consumer behaviors.
- **Four- and five-star** hotels followed a slightly more gradual trajectory, but one that became increasingly steep in the last decade. After a slower start compared to 3* hotels, they showed a steady and robust catch-up pattern. This likely reflects more deliberate strategic planning and continuous reinvestment in digital infrastructure. Their late acceleration may also correspond to website relaunches or enhancements rather than first-time adoptions.
- **Lower-end and non-classified hotels** started from a significantly lower baseline and lagged behind until the mid-2010s. However, they showed the strongest growth rates in the last five to seven years, narrowing the gap with other categories. This late surge suggests growing accessibility of digital tools, external support programs (e.g., public incentives), or rising pressure from digitally literate travelers.

By 2025, the adoption levels across all categories have largely converged—indicating that digital presence is now seen as a basic requirement across the board, regardless of size or positioning.

3. Evolution of Yearly Website Adoption Among Hotels in Valais (1999–2025) by Hotel Size (rooms)



Source: Manual website inspection of 396 hotel websites in 2025

3. Cumulative Evolution of Website Adoption Among Hotels in Valais (1999–2025) by Hotel Size (rooms)



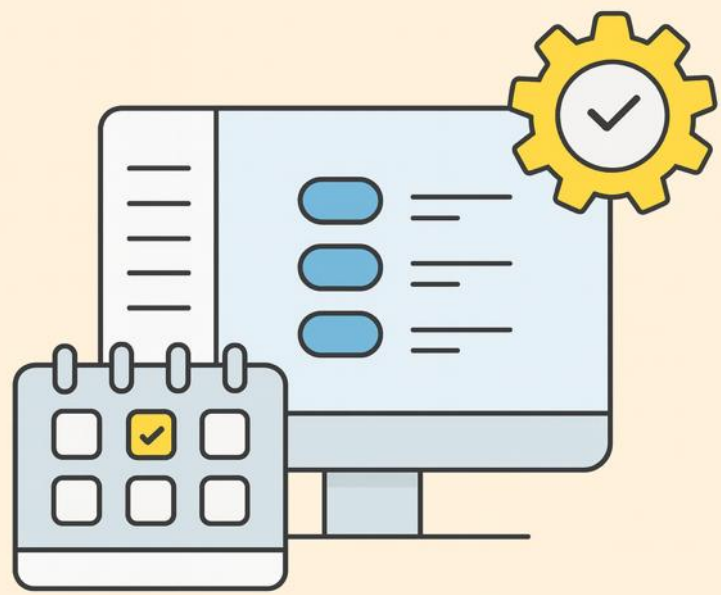
Source: Manual website inspection of 396 hotel websites in 2025

3. Evolution of Website Adoption Among Hotels in Valais (1999–2025) by Hotel Size (rooms)

The website adoption among Valais hotels between 1999 and 2025 shows distinct patterns when analyzed by hotel size (measured by number of rooms), although all segments ultimately converge toward universal adoption.

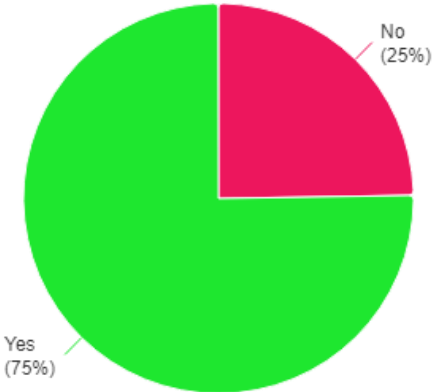
- **Medium-sized hotels** (20–40 rooms), which make up the largest share of the sample (42%), consistently led the adoption curve. Their digital transition began early and steadily accelerated throughout the period, suggesting both resource availability and an operational scale that made investing in digital visibility particularly worthwhile. This segment maintained its lead until the end of the period, reaching full adoption just ahead of other size categories.
- **Small hotels** (fewer than 20 rooms), which represent 40% of the hotels, followed a similar but slightly slower trajectory. Their initial digital uptake was almost parallel to that of medium-sized hotels until around 2010, after which the pace slowed somewhat. However, a clear acceleration is observable from around 2017 onward, allowing them to close the gap. This pattern may reflect improved accessibility of website-building tools and increased awareness of digital importance, even among more resource-constrained businesses.
- **Larger hotels** (more than 40 rooms), accounting for 17% of the sample, lagged behind during the middle phase of the diffusion process—especially between 2010 and 2019—despite their assumed resource advantages. Their slower cumulative curve suggests that many larger properties may have relied initially on centralized booking platforms (chains, groups, or tour operators) and were slower to develop individualized online presences. However, their digital adoption gained significant momentum after 2019, likely in response to shifts in distribution strategies and the growing importance of direct bookings and customer engagement online.

4. Adoption of Booking Engines by Hotels in Valais

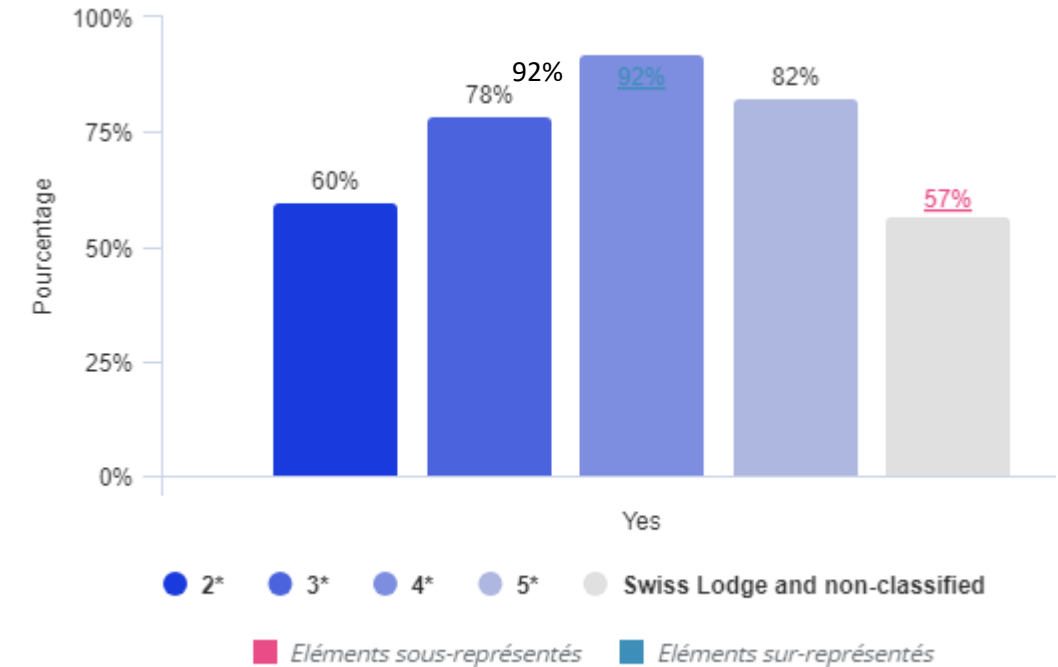


Booking Engine

4. Adoption of Booking Engines on Websites of Hotels in Valais 2025

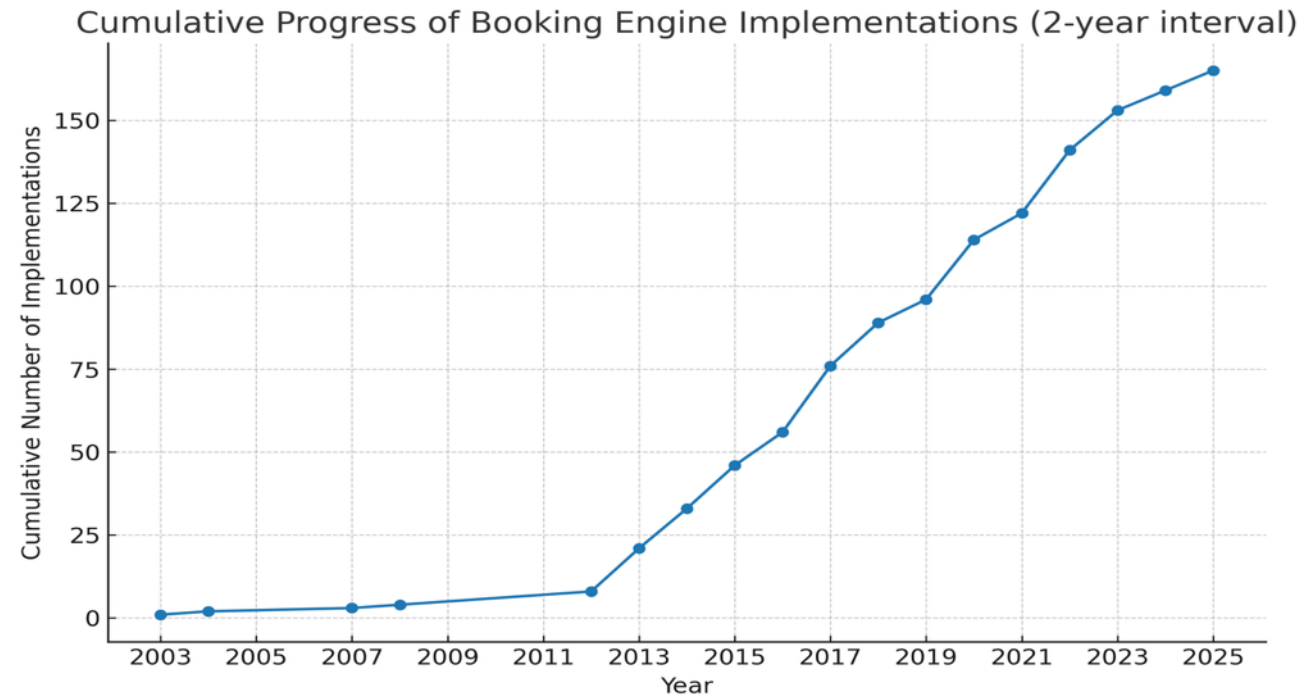


In 2025, 75% of Valais hotels had integrated a booking engine on their website, demonstrating widespread adoption of direct booking tools. However, the integration rate varies significantly by classification: while over 90% of 5-star hotels and 82% of 4-star hotels have booking engines, only 57% of non-classified and Swiss Lodge hotels do. This highlights a clear digital divide, where lower-category hotels remain under-equipped with transactional tools despite the general diffusion of digital practices.



La relation est très significative. $p\text{-value} = < 0,01$; $\text{Khi}^2 = 33,5$; $\text{ddl} = 4$.

4. Evolution of Booking Engine Adoption Among Hotels in Valais (2003–2025)



Although the first booking engines emerged in the 1990s, hotels in Valais began adopting this technology only in the early 2000s, with the first implementation (Hotelpac) recorded in October 2003. Adoption remained extremely limited for nearly a decade.

A turning point occurred around 2013, when the availability of more affordable and user-friendly solutions triggered a rapid uptake, resulting in exponential growth through to the early 2020s before gradually plateauing as the technology reached maturity.

4. Booking engine integration in Hotels in Valais

Seekda, the Austrian distribution platform—used by Booking Valais via its KUBE/Officialbookings engine—is the leading booking engine provider in Valais, powering **32%** of hotels in the sample. This dominance is largely due to preferential membership conditions negotiated by the **Valais Hotel Association**, which promotes a centralized and subsidized platform for its members.

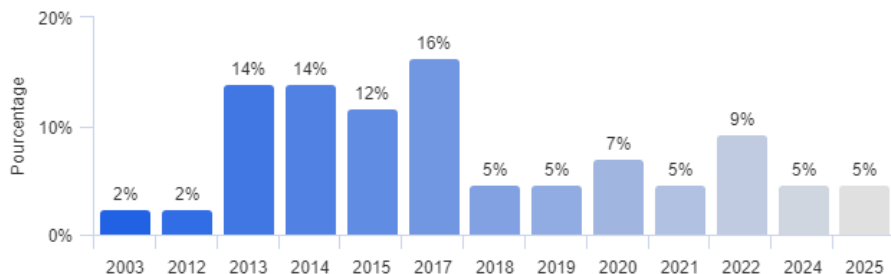
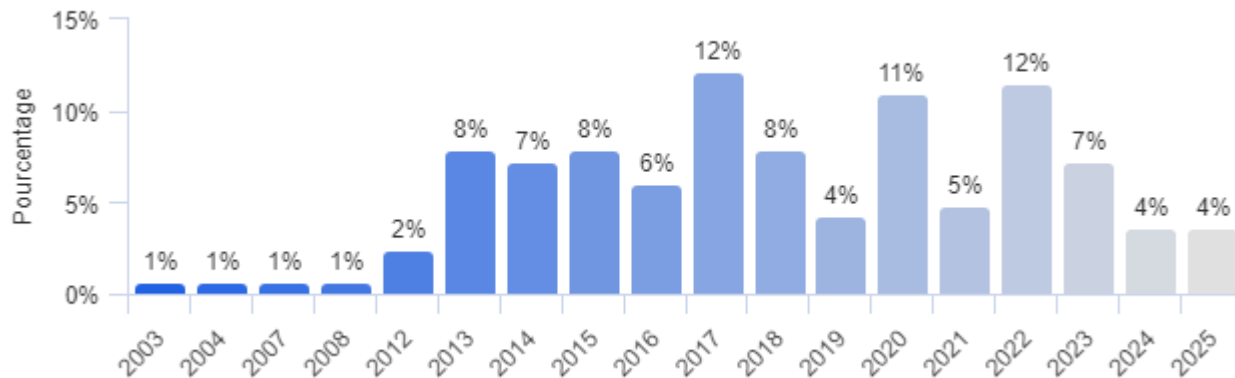
In second place, **Simplebooking** is used by **15.6%** of hotels.

Despite the dominance of the top players, the landscape remains **highly fragmented**, with over 30 additional providers serving specific needs.

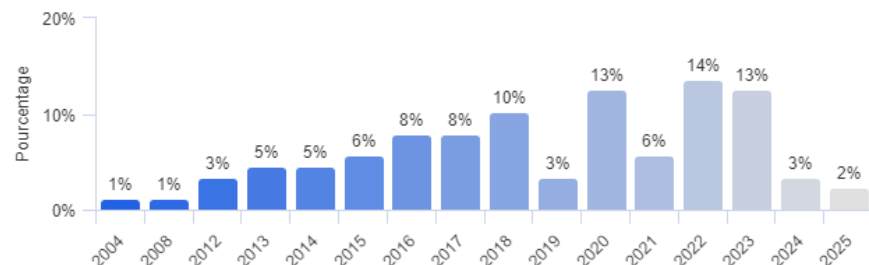
Many still do not offer any real-time booking solution. Instead, they rely on static contact forms or require guests to call directly to make a reservation—suggesting untapped potential for further digitalisation in the region.

4. Adoption of Booking Engines by Hotel Category

all hotels with data on booking engines (n=165)



4*-5* hotels (27% of sample)



3* hotels (51% of sample)

4. Adoption of Booking Engine by hotel category

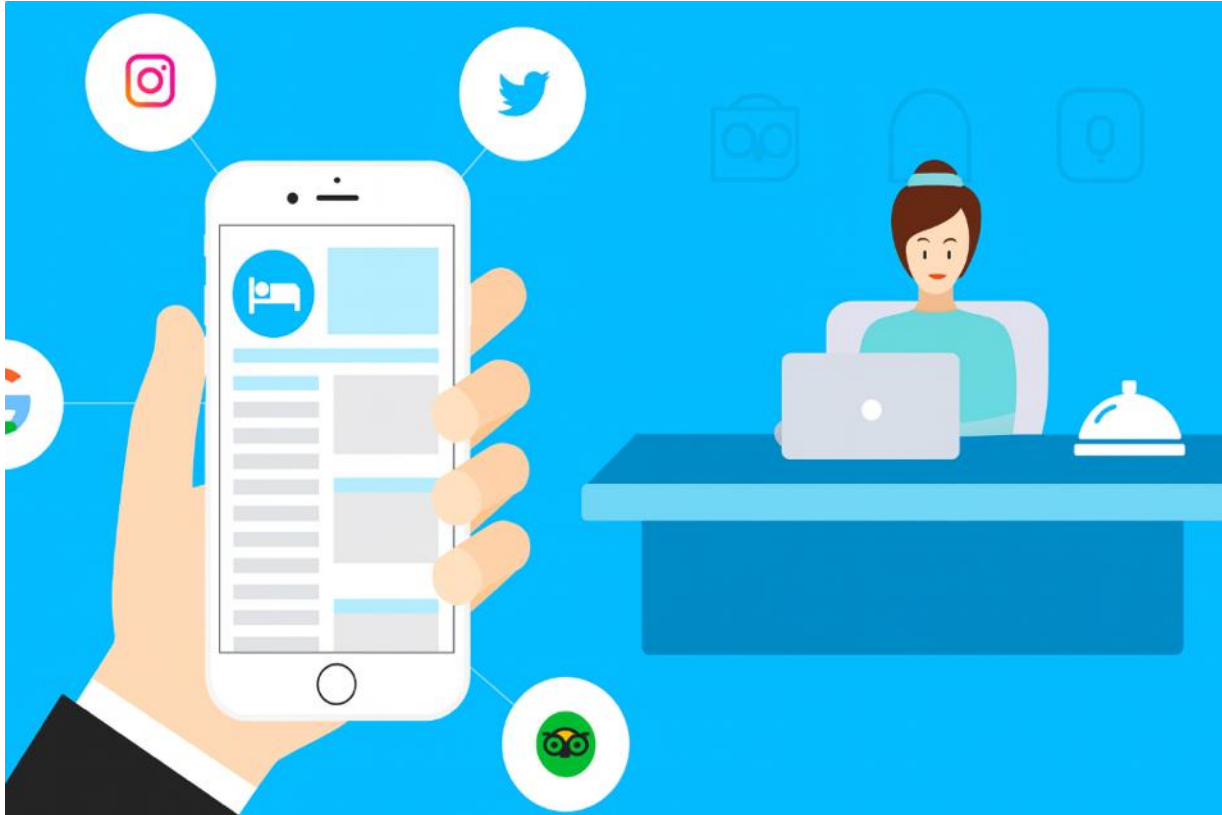
While there is no dramatic gap between categories, some clear trends emerge:

- **4*–5* Hotels:** Luxury hotels began adopting booking engines earlier and more intensively than others, with a clear concentration between 2013 and 2017 (over 55% of all 4*/5* hotel adoptions occurred during this 5-year period). Adoption peaked in 2017 (16%), suggesting that high-end properties were early movers, likely due to greater resources and strategic focus on online distribution. After 2017, adoption continues but slows significantly, indicating that most upscale hotels were already equipped by that time.
- **3* Hotels:** Midscale hotels had a slower start but showed steady growth in adoption from 2011 onwards, with a strong increase between 2015 and 2022. Notably, 2021–2023 represent a second strong wave of adoption, with annual rates exceeding 10% in some years. This may reflect both increasing affordability of booking technologies and greater pressure from OTAs and customer expectations.

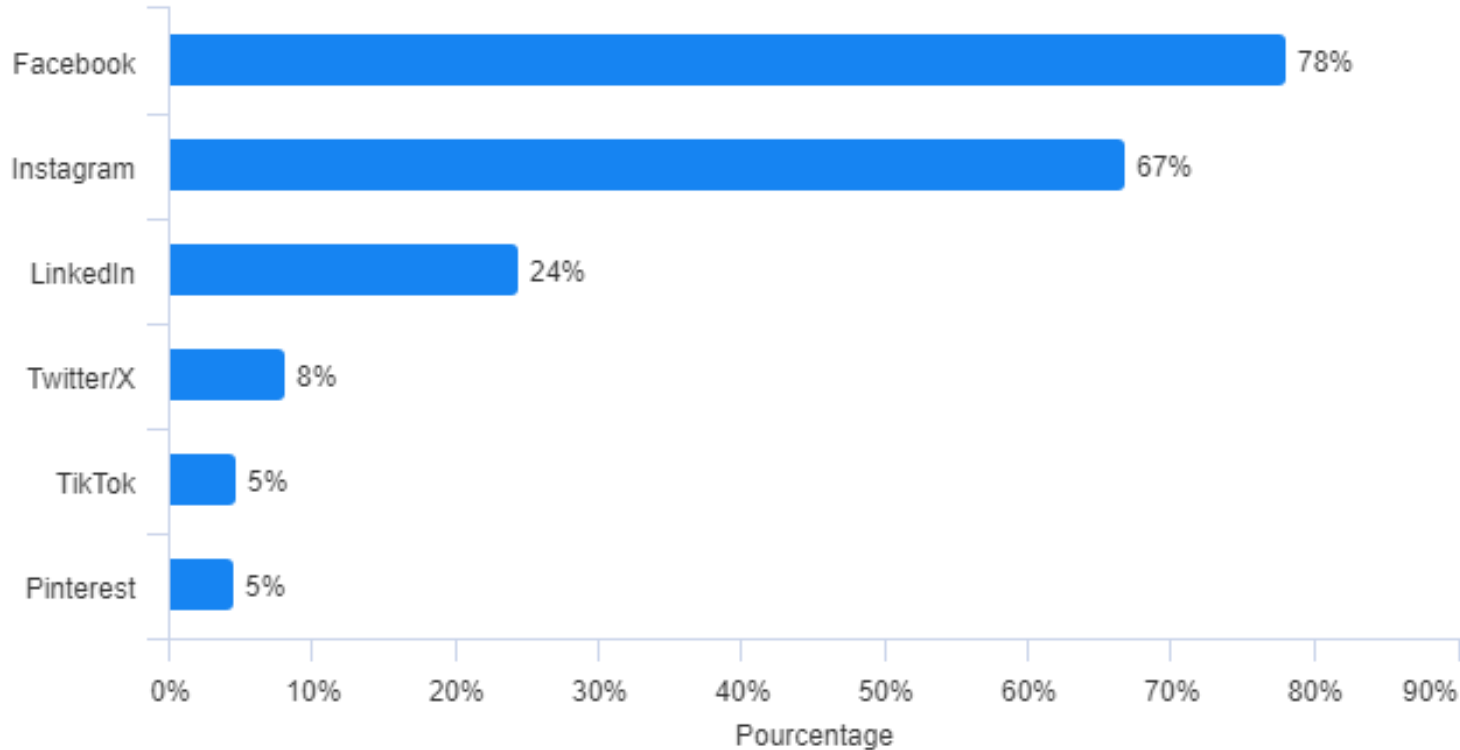
Key Takeaways

- Booking engine adoption accelerated in waves, with 4*/5* hotels leading early (2013–2017) and 3* hotels catching up later (2018–2023).
- The recent slowdown (2024–2025) suggests that the majority of hotels are now equipped with a booking engines.
- These patterns indicate both a digital maturation process in Valais hospitality and varying adoption speeds across hotel categories, shaped by budget, strategic priorities, and external triggers.

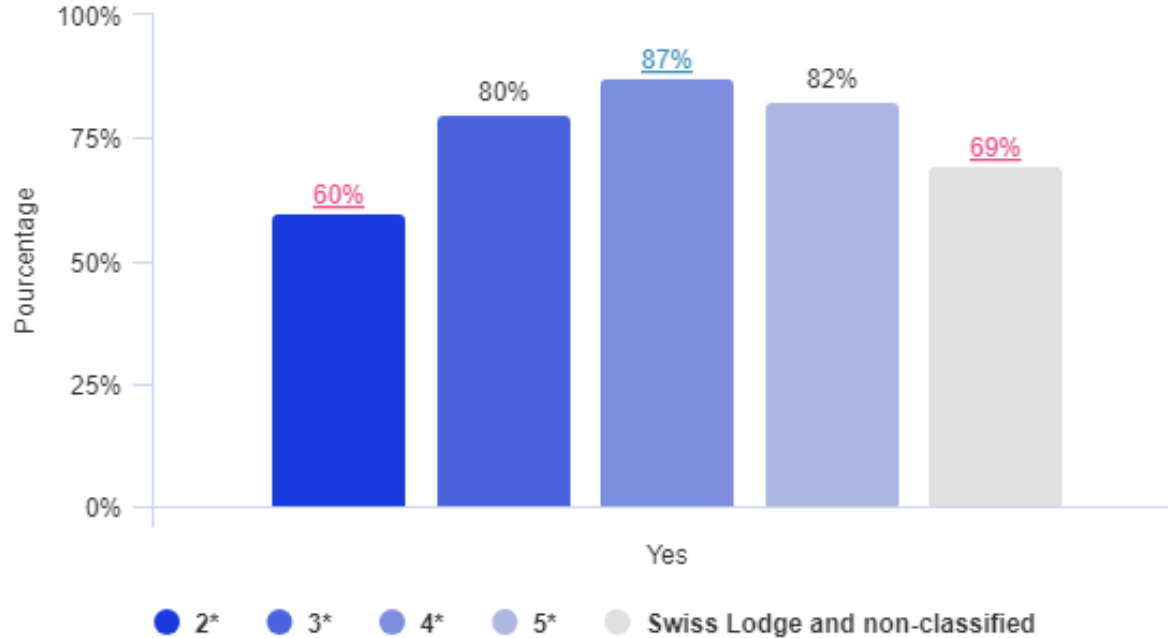
5. Adoption of social media



5. Use of Social Media by Hotels in Valais in 2025



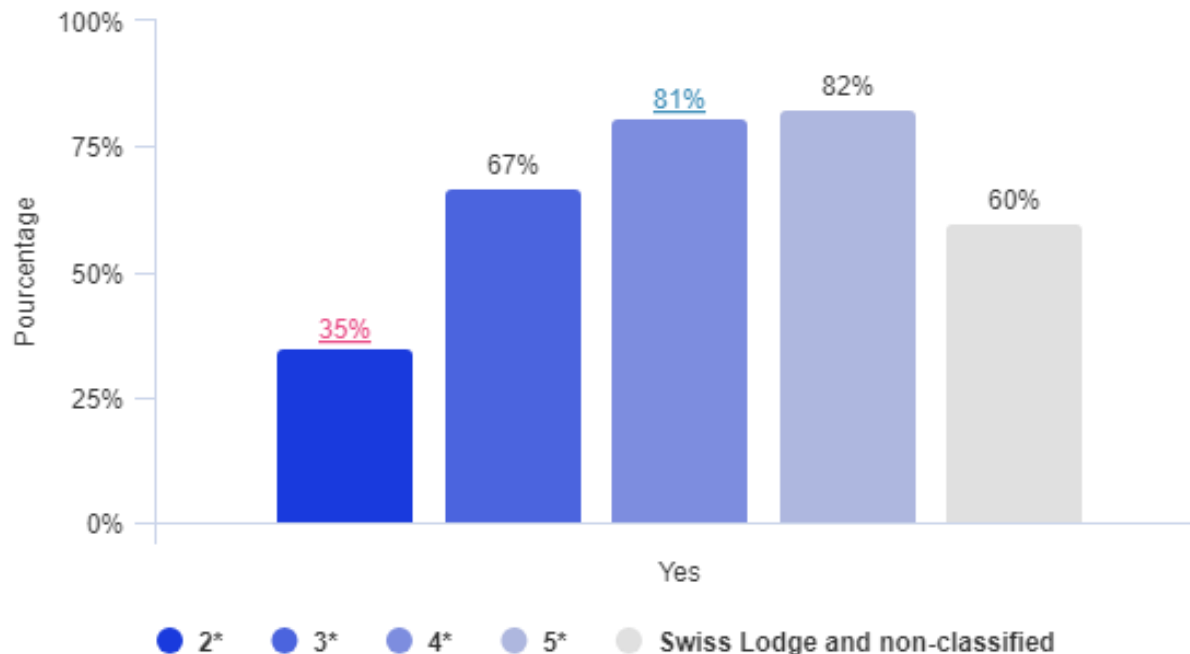
5. Use of Facebook by Hotel Category



■ *Eléments sous-représentés* ■ *Eléments sur-représentés*

La relation est significative. $p\text{-value} = 0,0$; $\text{Khi}^2 = 12,3$; $\text{ddl} = 4$.

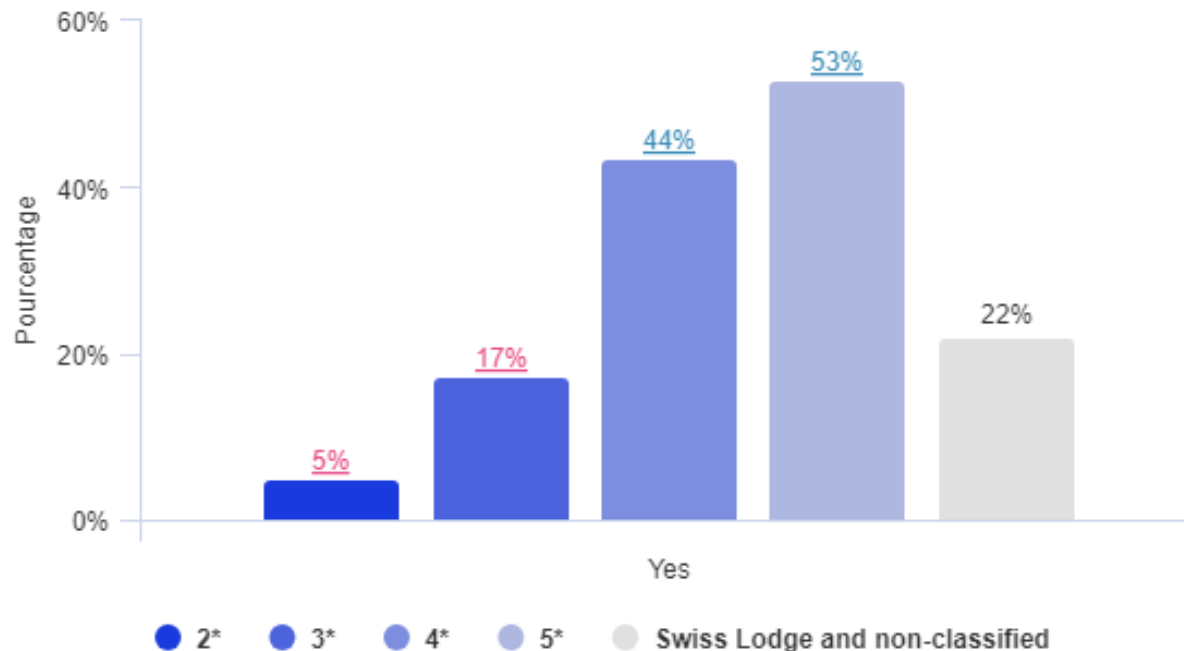
5. Use of Instagram by Hotel Category



■ *Eléments sous-représentés* ■ *Eléments sur-représentés*

La relation est très significative. $p\text{-value} = < 0,01$; $\text{Khi}^2 = 19,9$; $\text{ddl} = 4$.

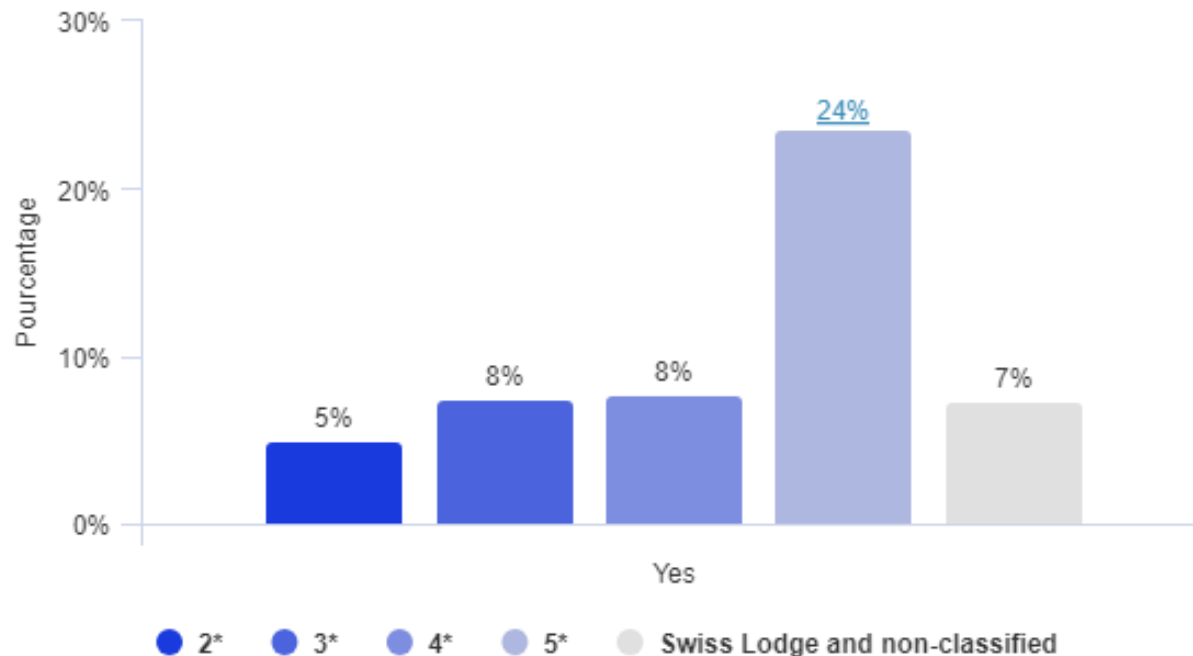
5. Use of LinkedIn by Hotel Category



■ *Eléments sous-représentés* ■ *Eléments sur-représentés*

La relation est très significative. $p\text{-value} = < 0,01$; $\chi^2 = 32,6$; $ddl = 4$.

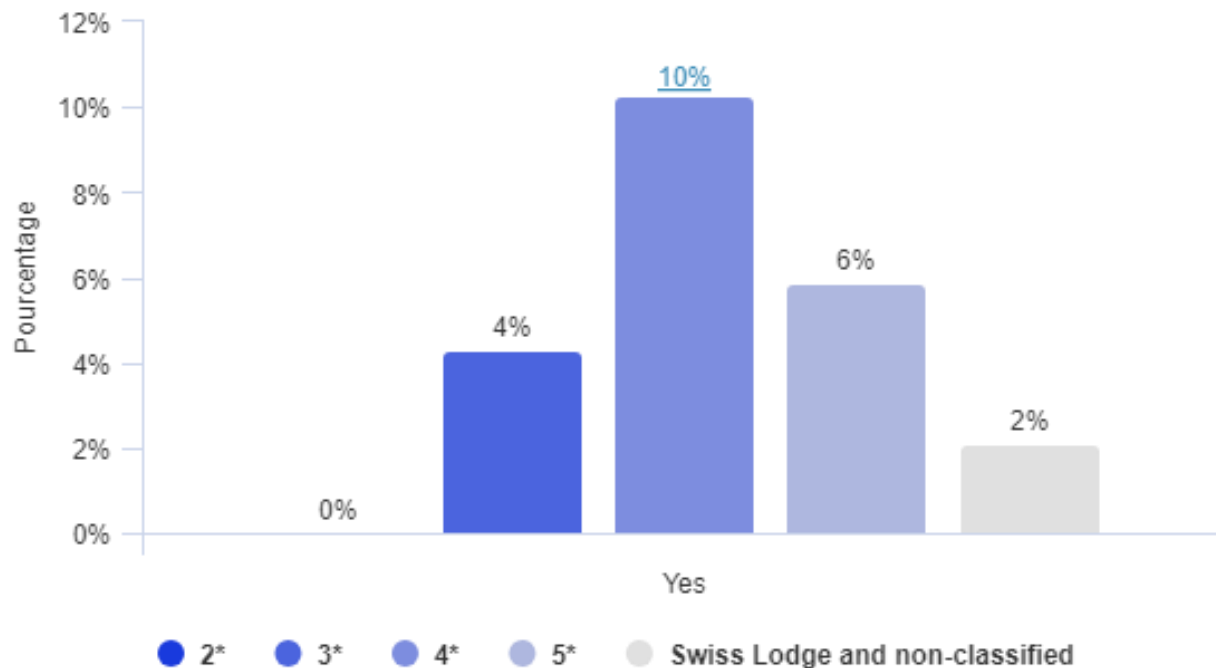
5. Use of Twitter / X by Hotel Category



■ *Eléments sous-représentés* ■ *Eléments sur-représentés*

La relation n'est pas significative. $p\text{-value} = 0,2$; $\text{Khi}^2 = 5,9$; $\text{ddl} = 4$.

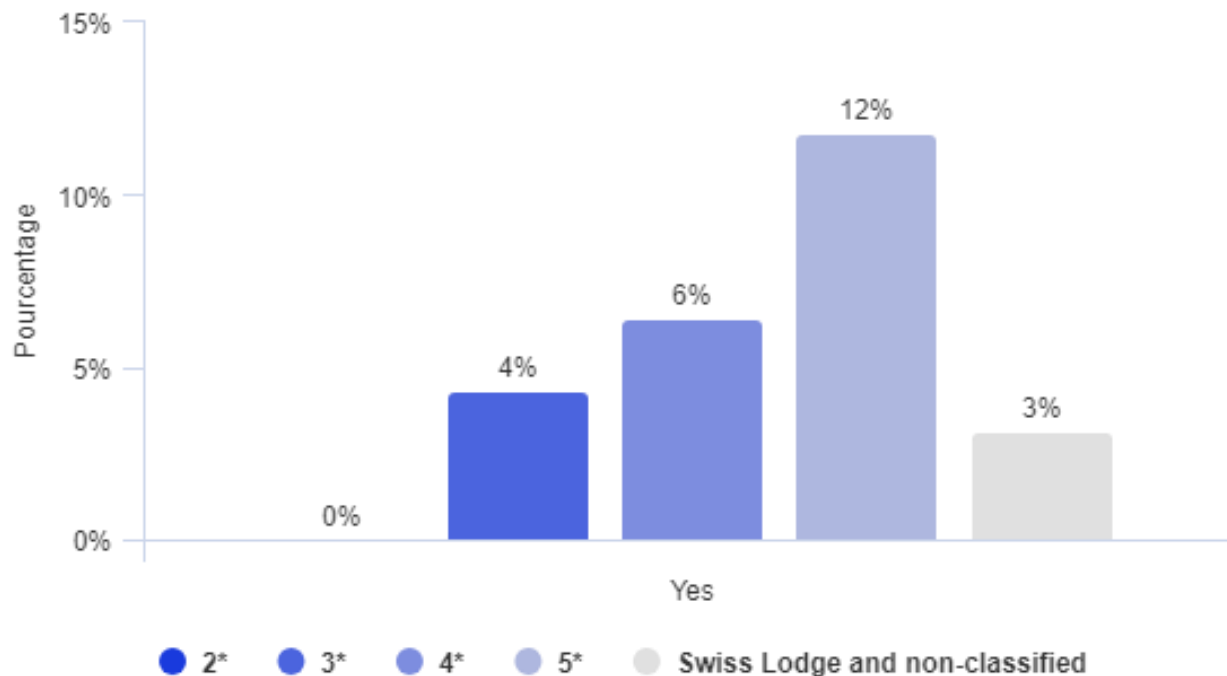
5. Use of TikTok by Hotel Category



■ *Eléments sous-représentés* ■ *Eléments sur-représentés*

La relation est peu significative. $p\text{-value} = 0,1$; $\text{Khi}^2 = 7,7$; $\text{ddl} = 4$.

5. Use of Pinterest by Hotel Category



■ *Eléments sous-représentés* ■ *Eléments sur-représentés*

La relation n'est pas significative. $p\text{-value} = 0,4$; $\text{Khi}^2 = 4,1$; $\text{ddl} = 4$.

5. Use of Social Media by Hotels in Valais in 2025: Key Patterns and Segmentation

Overall Adoption Levels

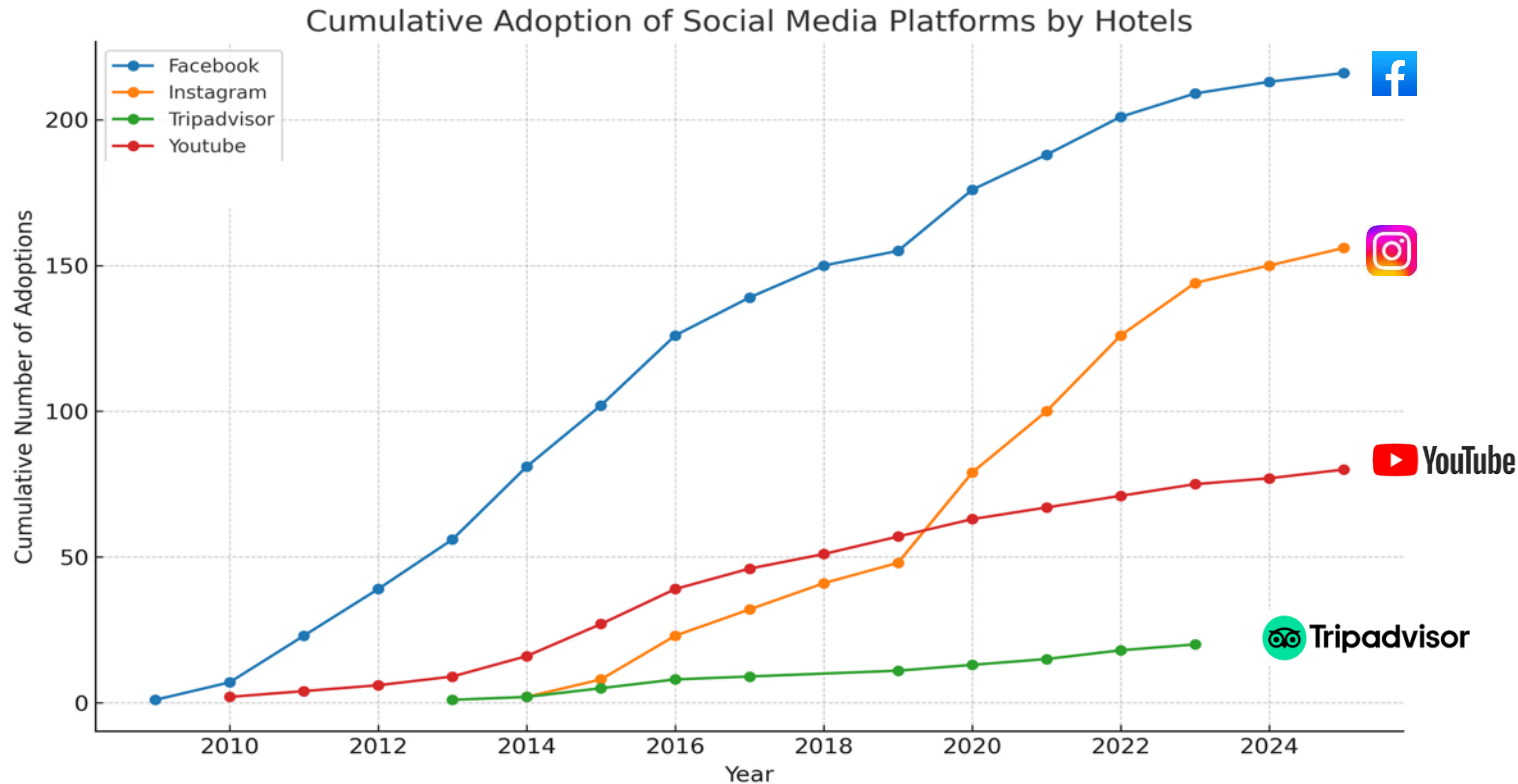
- As of 2025, the integration of social media by hotels in Valais shows a clear preference for platforms with high visual impact and broad reach:
 - Facebook is the most widely adopted platform, used by 78% of hotels.
 - Instagram follows closely at 67%, reflecting its growing importance in tourism marketing.
 - LinkedIn is used by 24% of hotels, suggesting a more niche, B2B-oriented adoption. Other platforms such as Twitter/X (8%), TikTok (5%), and Pinterest (5%) remain marginal.
- These figures illustrate that while hotels in Valais are actively leveraging social media, adoption is heavily concentrated on a few dominant platforms, with newer or more youth-oriented networks like TikTok still in early stages of diffusion.

5. Use of Social Media by Hotels in Valais in 2025: Key Patterns and Segmentation

Adoption by Hotel Category: A Clear Hierarchy

- A breakdown by hotel category reveals a consistent and significant correlation between classification level and social media use:
 - Higher-category hotels (4 and 5) consistently lead in adoption**, with up to 87% using Facebook and Instagram, and 53% using LinkedIn.
 - 2* hotels are systematically under-represented across all platforms (e.g., only 60% use Facebook, 5% LinkedIn).
 - Swiss Lodge and non-classified hotels show mid-level adoption, e.g. 69% on Facebook, 22% on LinkedIn.
- These patterns suggest that resource availability, marketing professionalism, and target clientele (international vs. domestic, leisure vs. business) strongly influence the likelihood of engaging on each platform.

5. Adoption of Social Media Platforms on Hotel Websites in Valais between 2009 and 2025



5. Trends in the Integration of Social Media Platforms on Hotel Websites in Valais (2009–2025)

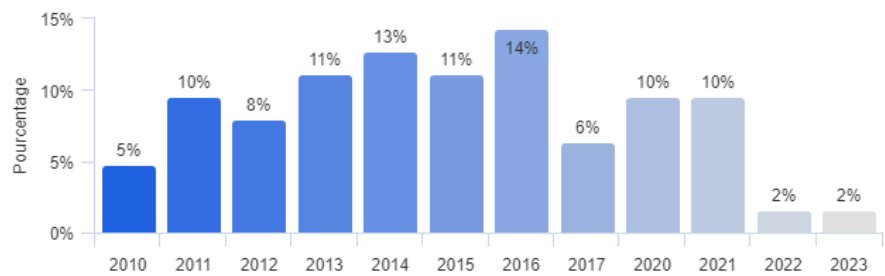
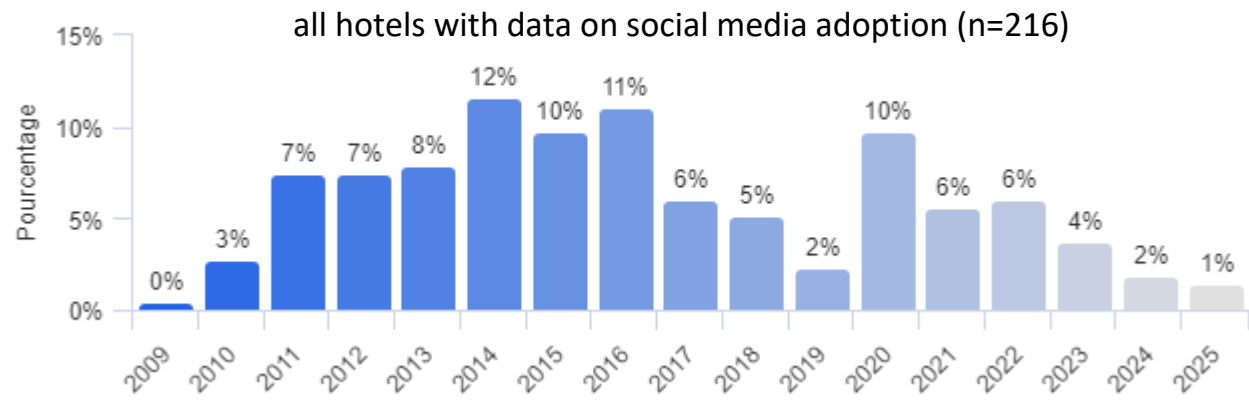
- **Facebook** was the first and most widely integrated platform on hotel websites, with steady growth from 2010 to 2020. After reaching over 210 website integrations, growth slowed down, indicating market saturation. Facebook remains the dominant social media link featured on hotel websites.
- **Instagram** experienced rapid growth starting around 2018, reflecting its rising importance in hotel marketing strategies. By 2025, Instagram links appear on over 150 hotel websites, making it the second most integrated platform.
- **Tripadvisor** links started appearing around 2014 and have grown steadily, with presence on about 80–90 hotel websites by 2025. This confirms the platform's role in managing reputation and guest reviews.
- **YouTube** links have been progressively added since 2012, reaching over 80 hotel websites by 2025. The more moderate adoption rate likely reflects the higher effort required for video production and maintenance.

5. Trends in the Integration of Social Media Platforms on Hotel Websites in Valais (2009–2025)

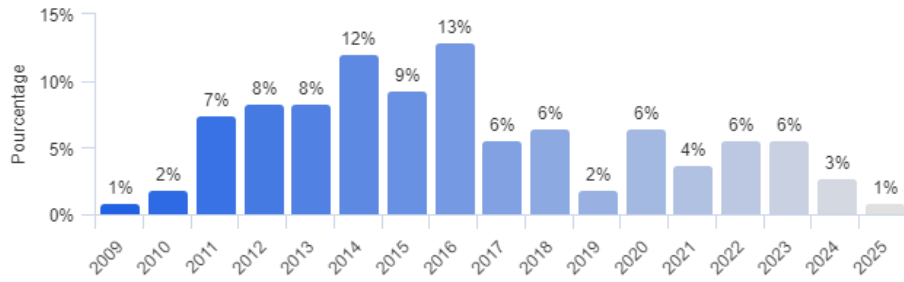
Key Insights:

- The data shows a **shift toward visual and review-driven platforms**, with Instagram and Tripadvisor gaining significant ground in recent years.
- While **Facebook** still dominates in terms of presence, its **growth has plateaued**, leaving room for newer platforms.
- The **diversification of social media presence signals** an increasing digital maturity among hotels in Valais and a strategic effort to reach different audiences through multiple channels.

5. Adoption of Social Media Platforms (2009-2025) by Hotel Category: Case Facebook



4*-5* hotels (27% of sample)



3* hotels (51% of sample)

Source: Automated analysis run on a validated sub-sample of 270 hotels

5. Adoption of Social Media Platforms (2009-2025) by Hotel Category: case study Facebook

The adoption of Facebook began gradually in 2010, reaching its first major peak in 2014 (12%) and stabilizing through 2015–2016 (10–11%). After a dip in 2018–2019, a small rebound occurred during 2020, possibly in response to the COVID-19 crisis, when hotels may have relied more heavily on direct customer communication. Since then, adoption has slowed significantly, with declining rates from 2021 onward, likely due to market saturation and possibly declining interest or effectiveness of Facebook in marketing strategies.

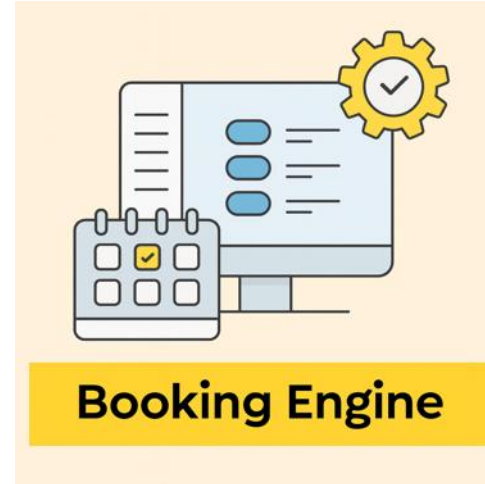
- **4* and 5* Hotels:** Higher-category hotels were early adopters of Facebook, with strong adoption rates between 2011 and 2016, peaking at 14% in 2016. This suggests that luxury hotels were faster to integrate social media as part of their brand communication and customer engagement strategy. After 2016, adoption dropped considerably, stabilizing around 2–3% per year, indicating that most 4*-5* hotels had already implemented Facebook by that time.
- **3* Hotels:** Midscale hotels showed a slower but steadier adoption curve, beginning around 2010 and growing consistently until 2016, with a notable peak in 2015 (13%). Unlike 4*-5* hotels, the 3* segment maintained a more continuous adoption rhythm even beyond 2016, albeit at lower rates (e.g., 6% annually from 2020–2022). This reflects a catch-up phase where smaller hotels gradually embraced Facebook, possibly encouraged by its perceived low-cost visibility benefits.

5. Adoption of Social Media Platforms (2009-2025) by Hotel Category: case study Facebook

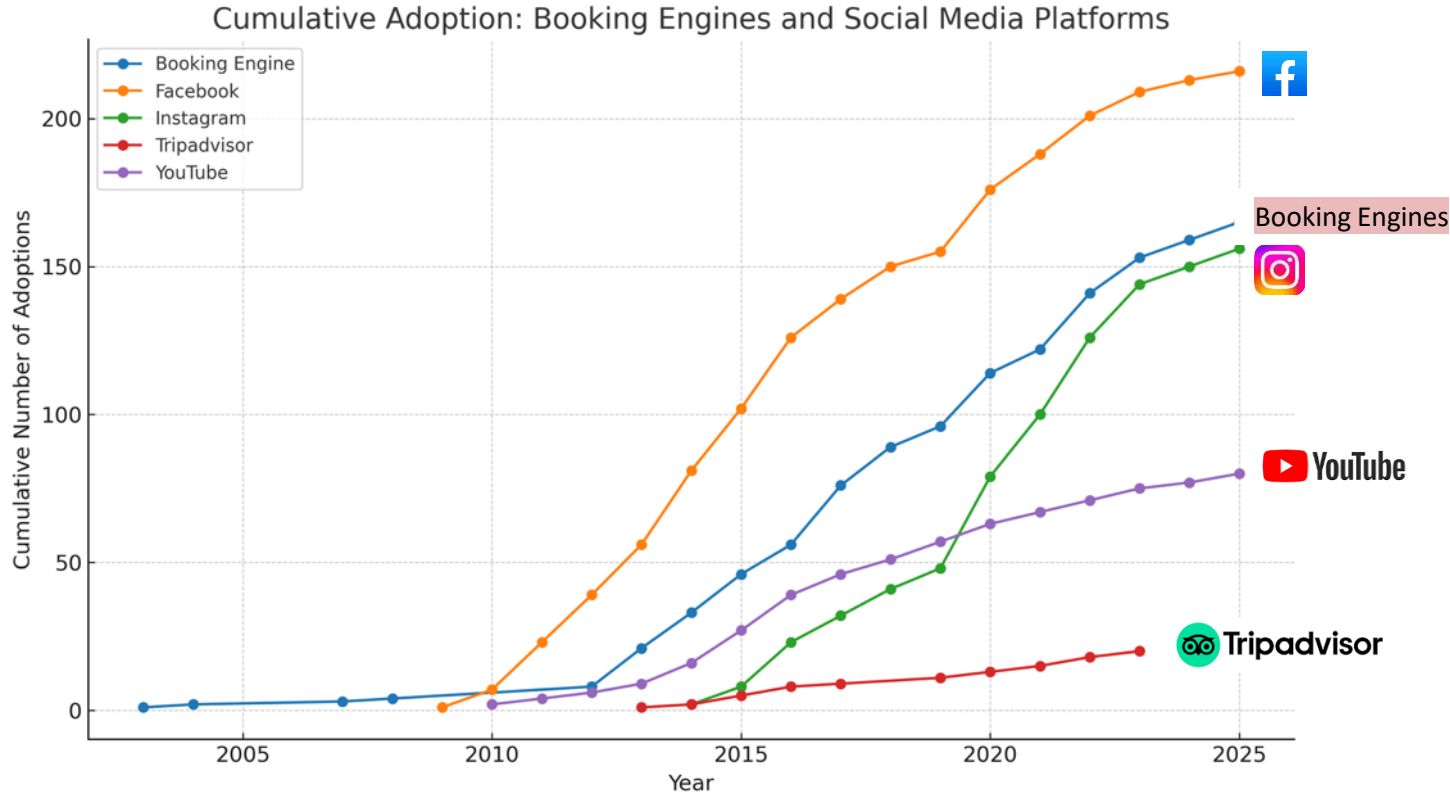
Key Takeaways

- Facebook integration on hotel websites peaked around 2014–2016, with declining adoption in recent years. 4* and 5* hotels led adoption early, while 3* hotels followed with more gradual integration and longer adoption tail.
- The slowdown post-2020 suggests a mature phase, where most hotels that wanted to integrate Facebook have already done so.
- The shift may also reflect changing digital strategies, with some hotels possibly prioritizing other platforms like Instagram or re-evaluating the ROI of social media visibility on websites.

6. Adoption of Social Media compared to Booking Engine



6. Adoption of Social Media compared to Booking Engine



Source: Automated analysis run on a validated sub-sample of 270 hotels

6. Comparative Analysis: Booking Engine vs. Social Media Adoption

The longitudinal data highlights a distinct **two-phase pattern** in the digital transformation of hotels in Valais. While booking engines were technically introduced earlier, social media platforms—particularly Facebook—achieved more rapid and widespread adoption within a shorter time frame. This divergence reflects different strategic priorities in the digitalisation process of hospitality businesses.

- **Phase 1: Early Booking Engine Adoption (2002–2015):** The first signs of digitalisation came through the **integration of booking engines** on hotel websites, with gradual growth starting from the early 2000s. However, despite their early technical availability, adoption remained limited until around 2015. This slow uptake was likely due to high costs, limited awareness, technological complexity, and the dominance of traditional booking channels (phone, email, tour operators). Hotels were cautious and often lacked the resources or know-how to implement online reservation systems, resulting in a very flat adoption curve over this period.
- **Phase 2: Social Media Surge (2011–2020):** The turning point came with the **rise of social media**. Facebook, launched in the mid-2000s, began appearing on hotel websites in Valais around 2010–2011 and experienced a steep adoption curve. By 2016, Facebook presence had surpassed the number of hotels using booking engines. This surge reveals that hotels prioritized enhancing online visibility, brand awareness, and engagement with potential guests over enabling direct transactional capabilities. Instagram followed a similar pattern with a time lag, taking off around 2016 and growing rapidly after 2019. Its visual-first nature made it particularly attractive for tourism marketing. YouTube and Tripadvisor were adopted more slowly and to a lesser extent, possibly because of higher content production demands (in the case of YouTube) or the passive nature of Tripadvisor presence (which doesn't necessarily require strategic posting).

7. Discussion and conclusions



7. Discussion and conclusions: Key Findings & Diffusion Patterns

This study reconstructs the historical diffusion of digital innovations—websites, booking engines, and social media—across Valais hotels over a 25-year period. The longitudinal perspective shows that digital transformation in hospitality did not follow a uniform trajectory but rather unfolded in successive, uneven waves. Website adoption began in the early 2000s and progressed gradually, with saturation reached in the early 2020s. Booking engines and social media followed different patterns: while booking tools showed slow and delayed uptake until after 2012, social media links (especially Facebook and Instagram) spread rapidly from 2010 onward. These dynamics suggest a strategic prioritization: hotels focused first on visibility and reach before integrating more operationally complex tools like direct booking systems.

The data also reveals segmentation effects, though not uniformly across all tools. For websites, adoption was broadly distributed, with smaller and non-classified hotels in some cases moving online as early as their higher-rated counterparts. By contrast, *larger and higher-category hotels (3*, 4*, 5*)* clearly led the adoption of more advanced functionalities, such as booking engines and social media integration, reflecting greater managerial capacity and strategic focus. The COVID-19 period marked a visible acceleration across all segments, as hotels sought to strengthen direct booking channels and maintain online visibility amidst disruptions in traditional distribution networks. However, the recent slowdown in new adoptions since 2022 suggests that basic digital tools have reached maturity, shifting the focus toward quality improvements, system integration, and next-generation technologies.

7. Discussion and conclusions: Methodological Innovation & Data Contributions

The study illustrates the added value of digital archaeology and hybrid research methods. By combining manual website inspections, systematic use of the Internet Archive's Wayback Machine, and Python-based web scraping and coding of current website features, the analysis offers a high-resolution dataset covering nearly 400 hotels. The method allows for temporal reconstruction of adoption dynamics at the individual property level—revealing not only if a tool is present but when it was integrated.

This longitudinal depth is rarely achieved in tourism digitalization research, which often relies on cross-sectional surveys or platform-provided aggregates. The approach used here can serve as a model for similar regional studies, especially in contexts where platform data access is limited. Moreover, the alignment of observed adoption curves with classic innovation diffusion models (e.g. Bass model S-curves) reinforces the relevance of using segmentation logic when designing support programs for digital transformation.

7. Recommendations & Strategic Outlook

As basic digital tools have now reached near-universal adoption, the next frontier is **quality, integration, and smart functionalities**. Many hotel websites still rely on outdated booking engines or static content. Digital transformation support initiative should shift focus toward improving **performance, usability, and back-office integration** (e.g. booking systems linked with channel managers, CRM platforms, dynamic pricing engines, or AI-based chat tools). The study suggests four main takeaways:

- I. **Digital transformation is staged and segmented** – Adoption occurs in waves (web → social media → booking), with different timing depending on size, category, and resources. Support strategies must be tailored accordingly.
- II. **Quick wins pave the way** – Hotels were more inclined to add social media links than adopt full booking solutions. Awareness campaigns and funding should emphasize low-threshold, high-impact actions that build momentum.
- III. **Resource disparities persist** – Smaller and lower-category hotels often lag. Targeted support (e.g. subsidized audits, shared tools, capacity-building) remains critical to avoid digital exclusion.
- IV. **Saturation ≠ maturity** – High adoption rates hide quality gaps. Many hotels use outdated or poorly integrated tools. The focus should now be on **enhancing digital maturity**, not just digital presence.

By understanding the historical pathways of digital adoption, stakeholders can better guide future transitions in a way that is inclusive, evidence-based, and aligned with long-term competitiveness and resilience in the tourism sector.

Contact

Prof. Roland Schegg

University of Applied Sciences of Western Switzerland Valais (HES-SO Valais)

School of Management

Institute of Tourism (ITO)

TechnoPôle 3

CH-3960 Sierre/Siders, Switzerland

Tel: +41 (0)58 606 90 83

Mail: roland.schegg@hevs.ch

LinkedIn: <https://www.linkedin.com/in/rolandschegg/>

Web: www.hevs.ch

