

Strategic Evolution of Ancillary Revenue Streams in Commercial Aviation: A Systematic Perspective on Business Models and Consumer Dynamics

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Abstract

In today's competitive aviation landscape, marked by evolving consumer expectations and economic volatility, airlines increasingly rely on ancillary revenues to sustain profitability beyond traditional fares. This study presents a systematic literature review of peer-reviewed academic sources to examine the strategic evolution and implementation of ancillary revenue mechanisms across various airline business models. It contrasts how full-service, low-cost, and ultra-low-cost carriers adopt these strategies, focusing on consumer behavior, willingness-to-pay, and regional differences in response to unbundled services. Findings highlight that successful ancillary revenue generation depends not only on cost-efficient distribution but also on dynamic pricing, service personalization, and digital integration. Airlines that embrace technological innovation—especially in pricing algorithms and tailored service offerings—consistently outperform competitors in per-passenger revenue. Moreover, the study underscores the importance of aligning revenue strategies with customer expectations to avoid eroding brand trust. By synthesizing insights across global markets, the article provides a comprehensive framework for understanding how ancillary revenues function as levers for competitive advantage, financial resilience, and strategic differentiation in modern commercial aviation.

Keywords: *Strategic Revenue Management; Ancillary Revenue Optimization; Business Strategy; Service Unbundling in Aviation; Consumer Behavior.*

Introduction

In an era defined by structural transformations in the global aviation sector, compounded by intensifying market liberalization, growing digitalization of distribution channels, and increasingly volatile macroeconomic contexts, airline operators have been compelled to revise and adapt their revenue-generation strategies beyond the conventional paradigms of ticket-based pricing mechanisms. As traditional fare revenues face mounting pressures due to heightened competition, shifting consumer expectations, and operational cost escalations, the strategic emphasis has progressively shifted toward exploring innovative and often underutilized avenues of income, with ancillary revenues emerging as one of the most promising levers in the pursuit of financial sustainability and differentiation in the airline industry.

The concept of ancillary revenue, broadly defined as any revenue derived from sources beyond the core transportation service, encompasses a diverse array of monetizable offerings such as fees for checked baggage, seat selection, in-flight amenities, premium services, and loyalty programs, as well as income from third-party partnerships and co-branded products. What was once considered supplementary income has evolved into a fundamental dimension of strategic airline management, particularly as operators transition from legacy models to more modular, unbundled service configurations that allow for greater pricing flexibility and customer segmentation. While the importance of ancillary revenue has been widely recognized in industry reports and commercial analyses, academic literature has only recently begun to systematically dissect the managerial implications and consumer response patterns associated with such revenue strategies, revealing critical gaps in understanding the effectiveness and scalability of these approaches across different operational models and market segments.

This research is situated precisely at the intersection of airline business model evolution, consumer behavior analysis, and strategic revenue management, aiming to elucidate the extent to which ancillary revenue mechanisms contribute to the financial performance and strategic positioning of airlines in increasingly

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competitive environments. The study adopts a systematic literature review methodology to rigorously examine empirical and conceptual studies published in the last two decades, focusing on high-impact academic work indexed in global databases. By synthesizing and critically evaluating existing knowledge, the study seeks to unpack the complexities of revenue diversification strategies, shedding light on the organizational, technological, and behavioral dimensions that underpin successful ancillary revenue generation.

The central problem underpinning this investigation lies in the inconsistent performance outcomes of ancillary revenue strategies across different types of airline business models—particularly between full-service carriers and low-cost or ultra-low-cost operators—raising fundamental managerial questions about which structural, operational, and market-related factors condition the effectiveness of such strategies. Additionally, the growing role of digital distribution channels and dynamic pricing algorithms introduces new challenges for revenue management teams, particularly in terms of balancing customer satisfaction with commercial performance, as poorly calibrated service unbundling can erode brand equity and customer loyalty.

In addressing this problem, the study formulates the following research questions: How are ancillary revenue strategies being deployed across different airline business models to enhance total revenue performance? What factors influence passengers' willingness to pay for unbundled services, and how do these vary according to flight type, regional context, and demographic profile? To what extent does technological sophistication in distribution and pricing systems mediate the success of ancillary revenue programs? By exploring these questions, the study contributes to the refinement of strategic management practices in commercial aviation and offers a theoretically grounded framework for understanding revenue innovation in a high-stakes service industry.

The main objective of the study is to analyze the role of ancillary revenues in enhancing overall airline profitability and strategic flexibility, with specific emphasis on how distinct business models operationalize these strategies to align with market demands and operational constraints. More specifically, the study aims to: (i) identify the most effective ancillary revenue mechanisms in use across different airline typologies; (ii) examine the interplay between service unbundling and customer value perception; and (iii) evaluate the technological and organizational enablers that support scalable ancillary revenue models.

The structure of the article is designed to guide the reader through a comprehensive academic exploration of the theme. Following this introductory section, the literature review presents a synthesis of scholarly work related to ancillary revenue in air transport, covering its evolution, typologies, consumer behavior correlations, and business model alignment. The methodology section details the systematic approach used to select, evaluate, and analyze the body of literature, including inclusion criteria, data sources, and analytical tools. The results and discussion section presents key findings, contrasting empirical patterns and drawing theoretical implications for management. The article concludes with a critical reflection on the study's contributions, limitations, and avenues for future research, emphasizing the practical relevance of ancillary revenue strategies in contemporary airline management.

Literature Review

The liberalization of the global air transport market and the resulting surge in competition, coupled with increasing consumer price sensitivity and the commoditization of core air travel services, have collectively exerted unprecedented pressure on airlines to diversify their income structures. Consequently, the notion of ancillary revenue—originally perceived as a marginal component of airline profitability—has gained considerable scholarly and managerial attention, emerging as a core strategic pillar in both full-service and low-cost business models (Sorensen, 2018; OAG, 2023). This evolution in revenue architecture is not merely a financial imperative but also a reflection of broader transformations in consumer preferences, digital marketing practices, and airline service design strategies.

Ancillary revenues encompass all earnings generated through non-ticket services, which range from baggage fees, seat selection, and on-board sales to more sophisticated offerings like branded fares, premium

upgrades, and co-branded financial products (Belobaba et al., 2015). The academic discourse on this topic has evolved significantly, with early studies focusing on descriptive case analyses (Doganis, 2006), gradually transitioning toward more robust empirical investigations into consumer behavior, pricing dynamics, and the effectiveness of revenue management systems (Chiambaretto et al., 2021; Yong & Yu, 2017). Recent research reveals that the strategic importance of ancillary services extends beyond financial metrics, influencing brand differentiation, customer loyalty, and even regulatory considerations (Wittman & Belobaba, 2017).

The rise of low-cost carriers (LCCs) has been instrumental in institutionalizing ancillary revenue strategies, as their unbundled service models inherently support modular pricing and greater monetization opportunities (Bachwich & Wittman, 2017). LCCs have consistently demonstrated higher ancillary revenue per passenger ratios compared to full-service carriers (FSCs), leveraging digital distribution, simplified product offerings, and aggressive pricing tactics to drive uptake of optional services (Babic et al., 2019). However, recent studies also indicate that FSCs are increasingly integrating ancillary models into their legacy frameworks, albeit through more segmented and brand-sensitive approaches (Statista Research Department, 2023).

A central theme in the literature pertains to consumer willingness-to-pay (WTP) for ancillary services, which has been shown to vary widely across demographic profiles, travel motivations, and flight characteristics. Chiambaretto et al. (2021) employ a conjoint analysis approach to reveal that business travelers demonstrate a higher WTP for premium seating and priority services, whereas leisure passengers are more price-sensitive but responsive to bundled offers. Similarly, Leon and Uddin (2017) found that frequency of travel and purpose of trip significantly influence purchasing behavior, suggesting that personalization and contextual marketing are critical to maximizing ancillary revenues.

Technological enablers such as New Distribution Capability (NDC) protocols and artificial intelligence-based recommendation engines have further transformed the revenue landscape by enabling airlines to deliver customized offers at scale (Bouwer et al., 2019; FLYR + Skift, 2022). These digital tools enhance both pricing precision and consumer targeting, allowing airlines to present ancillary products in a manner that aligns with individual preferences, thereby increasing conversion rates. Moreover, the shift toward direct-to-consumer digital channels reduces reliance on Global Distribution Systems (GDS), thereby improving margin capture on ancillary sales (Ozmec-Ban et al., 2022).

Despite these advancements, the literature also cautions against the over-commercialization of air travel, highlighting risks related to consumer backlash, perception of unfair pricing, and erosion of brand trust (Warnock-Smith et al., 2017). Several studies argue that transparency, simplicity, and value communication are indispensable components of successful ancillary revenue strategies, especially in markets where consumer protection regulations are stringent or where cultural norms discourage overt monetization of basic services (Zhao et al., 2021). In this regard, airlines must carefully calibrate their pricing and communication strategies to maintain a balance between revenue optimization and customer satisfaction.

Another important dimension explored in recent academic work concerns the operational and organizational challenges of implementing ancillary revenue programs. Research by Sorensen (2018) and Bouwer et al. (2019) emphasizes the role of frontline staff in driving in-flight ancillary sales, arguing that effective training and incentivization of cabin crew can significantly increase per-flight revenue generation. Furthermore, the integration of ancillary strategies into broader revenue management systems remains a complex task, requiring cross-departmental coordination and investment in data infrastructure (Granados et al., 2008).

Cross-regional comparisons also reveal interesting disparities in the adoption and effectiveness of ancillary revenue strategies. For instance, studies indicate that North American and European carriers tend to lead in monetization maturity, whereas airlines in Asia-Pacific and Latin America are still experimenting with various models due to regulatory constraints or differing consumer expectations (Babic et al., 2019). These regional nuances underscore the importance of contextual intelligence and strategic flexibility in deploying ancillary offerings.

The academic literature converges on the view that ancillary revenue has transcended its supplementary status to become a fundamental component of modern airline business strategy. However, its successful implementation hinges on a multitude of interdependent factors—including consumer behavior, technological infrastructure, organizational design, and market-specific considerations—all of which must be orchestrated coherently to deliver sustainable financial and strategic outcomes. This comprehensive perspective sets the stage for the empirical and analytical developments presented in the subsequent sections of this article.

Methodology

This research adopts a methodological approach grounded in the principles of a Systematic Literature Review (SLR), a rigorous and transparent form of secondary research designed to identify, evaluate, and synthesize the available body of knowledge on a clearly articulated research question. This method allows for the consolidation of both conceptual and empirical insights related to ancillary revenue in commercial aviation, with the objective of generating a structured and critically informed overview of the state of the art. In this study, the SLR was deployed not merely as an aggregative exercise but as a means of exposing underlying contradictions, trends, and methodological limitations across existing literature, to offer refined analytical insights for scholars and practitioners.

The review process was informed by the methodological guidelines proposed by Booth, Sutton, and Papaioannou (2016) and adhered to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, which provides a standardized structure for the identification, screening, eligibility, and inclusion of literature. In practical terms, the research design involved the development of a comprehensive search strategy that combined controlled vocabulary and free-text keywords to maximize the breadth and relevance of the search. Databases such as ScienceDirect, Scopus, Web of Science, and Google Scholar were utilized due to their extensive coverage of high-impact peer-reviewed journals in the fields of air transport management, economics, and strategic marketing.

The primary inclusion criteria were as follows: (i) publications must be peer-reviewed academic articles, books, or conference proceedings; (ii) they must have been published between 2005 and 2024, with an emphasis on the most recent five years to ensure contemporary relevance; (iii) they must explicitly address issues related to ancillary revenue, business model innovation in aviation, or consumer behavior in airline services; and (iv) they must be written in English. Exclusion criteria included articles that focused exclusively on cargo operations, private aviation, or revenue accounting without strategic analysis.

The initial search yielded approximately 385 records, which, after deduplication and screening based on titles and abstracts, were reduced to 73 potentially relevant studies. Full-text analysis led to the final inclusion of 48 studies, which were subjected to a qualitative synthesis process. The studies were systematically coded based on variables such as airline type (full-service carrier, low-cost carrier, ultra-low-cost carrier), geographic focus, methodological design (quantitative, qualitative, or mixed methods), and key themes such as willingness-to-pay, service unbundling, technological enablement, and strategic implications.

In addition to the SLR, this research integrates a descriptive analytical component, as the selected studies were not merely catalogued but analyzed for emergent patterns and theoretical convergence. This approach enabled the triangulation of insights, particularly in regard to how ancillary revenue strategies are embedded within broader business model frameworks and consumer response dynamics. While no primary data collection was conducted, the methodological rigor of the SLR, combined with a structured analytical lens, ensures the validity and reliability of the conclusions drawn.

The research question that guided this methodological process was: *How are ancillary revenue strategies being deployed across different airline business models to enhance total revenue performance, and what are the key enablers and constraints of their success?* Sub-questions included the exploration of regional and demographic variations in consumer acceptance of ancillary services, the role of digital platforms in distribution efficiency, and the comparative effectiveness of ancillary strategies between legacy and low-cost operators.

The decision to utilize a SLR was particularly appropriate given the fragmented and at times contradictory nature of existing literature on ancillary revenue. As noted by Galvão and Pereira (2014), when confronted with diverging empirical results in a growing research field, it becomes methodologically imperative to rely on the highest-quality studies and apply structured analytical criteria to synthesize them meaningfully. The present study echoes this principle, employing quality appraisal criteria adapted from the Critical Appraisal Skills Programme (CASP) to assess the methodological robustness and relevance of each included study.

To enhance the analytical clarity, a bibliometric tool, VOSviewer, was used to visualize co-authorship networks and keyword co-occurrence, thereby allowing for a meta-level assessment of how scholarly discourse on ancillary revenue is evolving. This bibliometric mapping revealed a concentration of research in North America and Western Europe, with emerging contributions from Asia-Pacific regions, especially in relation to digital personalization and AI-based pricing strategies.

Regarding the characterization of the sample, it is important to note that while no empirical survey was conducted, the "sample" in this context consists of the 48 rigorously selected academic studies forming the empirical substrate of this SLR. These studies collectively represent a wide spectrum of methodologies: 29 are quantitative, including econometric modeling and conjoint analysis (e.g., Chiambaretto et al., 2021); 11 are qualitative case studies of airlines across various regions; and 8 employ mixed-method designs. These works provide substantial evidence on ancillary revenue implementation, passenger behavior, and strategic adaptation.

The descriptive scope of this study does not preclude theoretical generalization. On the contrary, by integrating empirical results from diverse airline contexts and reconciling them with theoretical frameworks from marketing, revenue management, and organizational design, the research facilitates conceptual extrapolation and contributes to theory-building. This is particularly relevant in aviation, where real-world constraints such as cost structures, regulation, and consumer heterogeneity pose unique challenges to strategy execution.

It is important to delineate what this methodology does not attempt. It does not propose to evaluate operational KPIs from proprietary airline data, nor does it attempt to test hypotheses through experimental or quasi-experimental design. Rather, it positions itself within the tradition of theory-informed synthesis, intended to illuminate strategic patterns and provide structured insight into complex managerial phenomena.

This robust methodological foundation thus underpins the subsequent presentation of results and discussion, where patterns and divergences will be critically examined in light of the research questions and theoretical lens previously articulated.

Results and Discussion

The findings obtained through the systematic analysis of selected studies indicate a consistent and notable shift in the strategic orientation of airlines across various business models, with a clear trend toward the growing institutionalization of ancillary revenue streams as a core pillar of financial sustainability. Evidence suggests that low-cost carriers (LCCs), by virtue of their simplified cost structures and operational flexibility, have been particularly successful in implementing highly granular and aggressively monetized ancillary strategies, primarily centered around charges for checked baggage, pre-assigned seating, and legroom upgrades, while full-service carriers (FSCs) tend to emphasize loyalty programs and premium service bundling to extract additional value from higher-yield segments.

This distinction in approach reveals a broader divergence in strategic logic: whereas LCCs prioritize revenue maximization through modularization and dynamic a la carte pricing, FSCs seek to preserve brand equity and perceived value by selectively offering ancillary services aligned with their service quality positioning. Importantly, the analysis confirms the hypothesis that cost efficiency in distribution and service delivery significantly enhances the financial viability of ancillary models, particularly when coupled with advanced pricing algorithms and direct-to-consumer digital platforms.

Furthermore, passenger behavior studies across various empirical samples consistently point to the critical role of perceived value and contextual relevance in determining willingness-to-pay (WTP) for ancillary services. Products directly associated with essential travel needs, such as baggage allowance, food and beverages, and seat allocation, consistently exhibit higher WTP, while commission-based services or those perceived as optional luxury tend to underperform. This behavioral pattern underscores the strategic imperative of precise market segmentation and tailored offer configuration, especially given that passengers demonstrate heterogeneous preferences depending on trip purpose, flight duration, socio-demographic profile, and regional norms.

Comparative data also reveal that, in recent years, the contribution of ancillary revenues to total airline income has grown exponentially, in some cases exceeding 30% of total revenue for certain LCCs. This surge is attributed not only to product diversification but also to greater consumer acceptance of unbundled pricing structures, particularly in short-haul and point-to-point routes where service expectations are lower. Conversely, the implementation of similar strategies in long-haul or premium-heavy markets remains more complex, as passengers place higher importance on inclusiveness and transparency, thus requiring more nuanced approaches from FSCs to avoid brand dilution or customer attrition.

In terms of technological integration, recent developments in artificial intelligence, data analytics, and New Distribution Capability (NDC) systems have allowed for a more sophisticated deployment of ancillary offers. Airlines capable of leveraging these tools for real-time personalization and dynamic pricing optimization consistently outperform their peers in revenue per passenger metrics. The literature affirms that predictive modeling based on behavioral data, booking history, and contextual variables can significantly enhance conversion rates and customer satisfaction, provided that such strategies are implemented within a transparent and ethically sound framework.

Nevertheless, the discussion must also account for limitations and challenges inherent in ancillary revenue strategies. While the financial benefits are evident, particularly in cost-conscious market segments, the reputational risks associated with perceived over-commercialization or pricing opacity remain salient. Several studies caution that lack of clarity in service terms or aggressive upselling practices may provoke regulatory backlash or consumer dissatisfaction, thereby offsetting short-term gains with long-term trust erosion. Airlines are therefore urged to strike a careful balance between maximizing revenue opportunities and preserving the integrity of the passenger experience.

A final consideration emerging from the synthesis of results pertains to organizational alignment and cross-functional coordination. Successful ancillary revenue programs are rarely the product of isolated marketing initiatives but instead require cohesive integration across revenue management, digital commerce, customer service, and IT systems. This demands a cultural shift within airline organizations, fostering innovation, data literacy, and continuous feedback loops to refine offer portfolios and pricing strategies in response to evolving customer preferences and competitive pressures.

The results of this research affirm that ancillary revenues are not merely peripheral supplements to airline income but have become a strategic cornerstone of business model innovation in the aviation industry. However, their effective exploitation depends on the confluence of technological sophistication, behavioral insight, operational agility, and brand-consistent service design. These findings set the stage for the concluding section of the article, where limitations, implications, and directions for future research will be critically examined.

Conclusions, Limitations and Future Research Directions

As the commercial aviation sector continues to evolve under the pressures of market liberalization, digital transformation, and post-pandemic operational challenges, the pursuit of revenue diversification has emerged not only as a financial strategy but as a cornerstone of strategic positioning for airlines globally. This study set out to investigate the strategic relevance and operational mechanisms of ancillary revenue, particularly as deployed across different airline business models, and the findings reveal a nuanced and

multifaceted landscape of opportunities and challenges that collectively shape the modern aviation revenue architecture.

One of the principal conclusions of this research is that ancillary revenue has transcended its peripheral role to become a structural element of the airline business model, especially among low-cost and ultra-low-cost carriers, for whom it constitutes a significant proportion of total operating revenue. The strategic logic underpinning ancillary revenue deployment is anchored in the modularization of service offerings, which allows carriers to monetize individual components of the travel experience that were traditionally bundled under a single fare, thus enabling more granular pricing and enhanced consumer segmentation.

Moreover, the findings demonstrate that while low-cost carriers have operationalized ancillary revenues with higher per-passenger efficiency, full-service carriers have begun to implement sophisticated hybrid models that preserve elements of service inclusiveness while experimenting with unbundled pricing structures in specific market segments. The success of these initiatives hinges on the alignment between revenue management systems, digital distribution capabilities, and real-time personalization technologies that allow for context-aware pricing and offer optimization. In this regard, the integration of data analytics, artificial intelligence, and New Distribution Capability (NDC) frameworks is not merely a technical innovation but a strategic imperative for airlines seeking to compete effectively in high-yield ancillary categories.

From a behavioral standpoint, the literature and synthesized evidence confirm that willingness-to-pay for ancillary services is significantly influenced by a range of variables, including flight type (short-haul vs. long-haul), travel purpose (leisure vs. business), passenger profile, and cultural expectations. Services that address functional travel needs—such as baggage, seating, and priority boarding—garner higher consumer acceptance, while commission-based or luxury add-ons often suffer from low conversion rates unless carefully framed within a personalized, value-based marketing narrative. These patterns underline the necessity for airlines to invest in market segmentation, behavioral analytics, and agile product development processes that can adapt ancillary portfolios in line with evolving consumer expectations.

Despite the promising financial implications, the implementation of ancillary revenue strategies is not without risks. There is a growing body of literature that warns against over-commercialization, where aggressive upselling, opaque pricing structures, or lack of transparency in bundled offers can erode brand trust, provoke regulatory scrutiny, and ultimately damage customer satisfaction and loyalty. The perception of fairness—particularly in services previously included in base fares—emerges as a decisive factor in long-term consumer relationships. Airlines must, therefore, strive for an equilibrium between profitability and perceived value, leveraging customer feedback loops and ethical design in revenue management systems to foster trust and loyalty rather than mere short-term gains.

In terms of managerial implications, the study highlights the importance of organizational integration and interdepartmental collaboration. Effective ancillary revenue strategies demand synchronized operations among marketing, pricing, IT, customer service, and flight operations. This requires not only technological infrastructure but also a cultural shift toward data-driven decision-making, agile experimentation, and customer-centricity. Airlines that can operationalize this integration stand to gain significantly in both financial resilience and competitive differentiation.

However, this study is not without limitations. Firstly, it is based exclusively on secondary data collected through a systematic review of academic sources. While this approach allows for a broad and theoretically grounded understanding of the phenomenon, it lacks the granularity and contextual depth that primary empirical research might provide. In particular, the absence of proprietary airline performance data restricts the capacity to quantitatively assess the direct financial impact of specific ancillary strategies under different operational contexts.

Secondly, the rapidly evolving nature of technology and consumer behavior in the aviation sector implies that some of the findings, especially those concerning digital personalization and distribution tools, may become outdated over a relatively short period. This necessitates ongoing empirical validation and

theoretical revision to ensure the continued relevance and applicability of strategic recommendations derived from current literature.

Lastly, the studies included in the systematic review exhibit a disproportionate focus on North American and European carriers, with limited representation from emerging markets in Asia, Latin America, and Africa. This geographical imbalance may obscure cultural or economically contingent factors that influence consumer responses to ancillary services. Future studies should address this gap by conducting comparative cross-regional analyses to capture the full diversity of airline business environments.

Building on these limitations, several avenues for future research are proposed. Firstly, empirical investigations using airline-specific performance data—particularly panel data across time—would enhance the precision of conclusions regarding financial impact, ROI, and customer lifetime value derived from ancillary strategies. Secondly, behavioral experiments that simulate pricing transparency, bundling options, and offer personalization would shed light on the psychological and economic mechanisms driving purchase decisions in ancillary markets. Thirdly, future research should investigate the long-term effects of ancillary revenue strategies on brand perception, loyalty metrics, and regulatory outcomes, particularly in jurisdictions with stricter consumer protection regimes.

Additionally, with the acceleration of digital transformation in air travel, the role of emerging technologies such as blockchain, advanced recommendation systems, and predictive analytics deserves closer academic scrutiny. These tools not only enable operational efficiency but also raise new ethical and strategic questions regarding data governance, algorithmic bias, and the commodification of the travel experience. Studies exploring the governance structures and ethical frameworks within which these technologies are deployed will contribute to a more holistic understanding of value creation in the digital airline economy.

The insights derived from this research affirm the strategic importance of ancillary revenue in contemporary airline business models and offer a robust conceptual and empirical foundation for both managerial action and academic inquiry. By addressing the identified limitations and pursuing the recommended research directions, scholars and practitioners can contribute to the refinement of ancillary revenue as a strategic discipline, thereby supporting the evolution of the air transport industry toward greater financial sustainability, technological sophistication, and consumer alignment.

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