

# The SEA Collapse Model in the Hotel Industry

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## Abstract

This study proposes a Stability–Efficiency–Adaptability (SEA) perspective to identify early signals of organizational collapse in the hotel industry. Rather than conceptualizing collapse as a sudden failure, the paper frames it as a gradual process driven by imbalance between stability, efficiency, and adaptability. Using a qualitative research design, semi-structured interviews were conducted and analyzed through content analysis to uncover the underlying dimensions of each SEA component. The findings reveal that stability, efficiency, and adaptability each consist of four interrelated dimensions, which together provide the basis for developing theoretically grounded key performance indicators (KPIs). These KPIs are used to trace latent collapse signals that may remain invisible in conventional performance metrics. By translating qualitative insights into a structured analytical framework, the study contributes a diagnostic approach for understanding fragility and delayed collapse in hotel organizations.

*Keywords: Collapse, SEA Model, Theory of Saturation, Hotel, Stability, Efficiency, Adaptability, KPI*

## 1. Introduction

The hotel industry plays a pivotal role in the global economy, serving as a cornerstone of the broader travel and tourism sector. The sector contributes approximately 10 % of global GDP, generating over USD 10–11 trillion annually, and supports hundreds of millions of jobs worldwide, including direct, indirect, and induced employment effects (World Travel & Tourism Council [WTTC], 2024–2025). In 2024 alone, travel and tourism accounted for around USD 10.9 trillion in global economic output and supported roughly 357 million jobs, representing one in ten jobs globally.<sup>1</sup> This substantial economic footprint, coupled with the industry’s role in stimulating infrastructure development, facilitating cultural exchange, and supporting local community livelihoods, underscores the strategic importance of hotel management as both a professional practice and an academic field. Consequently, hotel management has evolved into a prominent discipline, now widely offered through dedicated university programs and specialized training curricula worldwide.

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<sup>1</sup> World Travel & Tourism Council (WTTC). Economic Impact Research Reports, 2024–2025. See <https://www.travelandtourworld.com/>

Hotel management requires in-depth knowledge across a wide range of disciplines, including finance, operations, marketing, human resource management, organizational learning, and several related areas. This broad and interconnected scope accounts for the constant emergence of new research in the field. Recent studies, for example, have examined emerging issues in finance (Arnejo and Sarsale, 2025; Mehta and Solanki, 2024), operations (Szende et al., 2021; Ofori, 2024; Arenhart and Souza, 2025; Xue and Ivanov, 2025), marketing (Han et al., 2024; Bilgihan and Ricci, 2024; George, 2025), and human resource management (Berjozkina and Garanti, 2025; Mistry et al., 2025). In this highly dynamic and people-centric industry, effective human resource management plays an especially critical role in driving operational success and ensuring long-term resilience. Two particularly important areas of expertise are understanding diverse leadership styles (for example, Manafi et al., 2025), which directly influence employee motivation, team cohesion, and the overall quality of guest service, as well as mastering robust performance evaluation systems (for example, Hojabri et al., 2013), which promote accountability, support employee development, and align individual contributions with broader organizational goals. By developing these competencies, hotel leaders are better equipped to address persistent industry challenges such as high staff turnover, multicultural teams, and seasonal demand fluctuations, thereby maintaining competitiveness, delivering consistent guest satisfaction, and securing sustainable success in a demanding global market.

However, Manafi's Theory of Saturation (2025) and its Collapse (SEA) Model introduce a novel, unifying perspective that transcends traditional disciplinary boundaries, offering fresh diagnostic tools for analyzing systemic pressures across sciences—and particularly in the hotel industry. By framing crises not as isolated failures but as outcomes of progressive saturation (where demands exceed adaptive capacity), the SEA Model—mapping trajectories along **Stability** (coherence and endurance), **Efficiency** (resource optimization and output), and **Adaptation** (learning, flexibility, and renewal)—provides a geometric framework for understanding how imbalances lead to phased decline: avoidance, compromise, and eventual collapse. This study aims to explore the application of the SEA Model in hotel management, with the goal of predicting potential collapse and crises by identifying early saturation signatures in core operational, human, and structural dimensions, thereby enabling proactive resilience strategies in an industry prone to chronic pressures such as labor volatility, resource constraints, and demand fluctuations.

## 2. The Theory of Saturation and Collapse (SEA) model

The Theory of Saturation and Collapse (SEA) model (Manafi, 2025) conceptualize organizational failure not as a sudden breakdown or the result of poor performance, but as a gradual process emerging from sustained imbalance between stability (S), efficiency (E), and adaptability (A). Drawing on systems theory, organizational resilience, and complexity economics, the model argues that organizations tend to prioritize stability and efficiency as indicators of success, particularly in mature or competitive environments. Over time, however, the continuous optimization of routines, cost structures, and control mechanisms leads to saturation, a condition in which the system becomes internally coherent and efficient but increasingly rigid. In this state, feedback signals are weakened, learning slows, and the organization's capacity to reconfigure in response to

environmental change diminishes, even while conventional performance indicators remain strong.

Within the SEA framework, collapse is understood as the delayed and often misinterpreted outcome of adaptive failure rather than operational incompetence. When adaptability erodes below a critical threshold, organizations compensate by intensifying efficiency or reinforcing stability, inadvertently accelerating systemic fragility. This dynamic explains why collapse frequently occurs in organizations that appear well managed, financially sound, and operationally disciplined prior to failure. The SEA model therefore reframes collapse as a structural and temporal phenomenon, emphasizing imbalance and feedback suppression rather than crisis events or managerial error. By explicitly distinguishing and interrelating stability, efficiency, and adaptability, the model provides a lens for identifying early warning signals of decline and contributes to ongoing debates in management and economics regarding resilience, over-optimization, and the unintended consequences of sustained success.

### **3. Method and Results**

This study adopted a qualitative approach to investigate the Saturation and Collapse (SEA) model within the hotel industry, with a particular focus on its core components: Stability, Efficiency, and Adaptability.

Six open-ended interview questions were developed based on the central theoretical framework of the SEA model. These questions were intentionally designed to explore key barriers and opportunities across various functional domains of hotel management, including finance, operations, marketing, human resource management, and broader economic dynamics.

To ensure content validity and relevance, the interview guide was reviewed and validated by three university professors specializing in hotel and tourism management.

Between November 2025 and January 2026, semi-structured interviews were conducted online (via video conferencing) with five experienced professionals based in Portugal, Spain, and Germany. The participants comprised four CEOs of international hotel chains and one university professor specializing in hotel management.

Each interview lasted between 40 and 60 minutes, was conducted with the participant's informed consent, audio-recorded, and later transcribed verbatim. The resulting transcripts were then subjected to thematic analysis.

The experts were asked the following questions:

Q1: Think about a major disruption your hotel has faced (e.g., demand drop, cost shock, operational crisis). How did the hotel respond in the short term, and what trade-offs were made between maintaining operations, controlling costs, and changing the way things were done?

Q2: When the hotel is very busy or under strong pressure, how do daily operations actually function compared to what is formally planned, and what happens when problems repeatedly occur?"

Q3: How do employees typically react to efficiency targets or performance controls, and how does management decide whether these measures should be kept, adjusted, or abandoned over time?

Q4: Which guest segments, distribution channels, or market conditions does the hotel currently rely on most, and how has this dependence shaped pricing, service design, or operational efficiency over time?

Q5: Can you describe a situation where guest feedback, staff concerns, or performance data challenged existing practices, and explain what actually changed as a result?

Q6: Looking ahead, what do you believe the hotel must protect at all costs, what it must continuously optimize, and what it must be willing to change — even if it is currently working well?

After analyzing the interview responses through content analysis, we conclude that each component of the SEA model consists of four underlying dimensions that enable the development of corresponding KPIs. For example, stability is decomposed into financial stability, operational stability, market and demand stability, and governance and decision stability. Efficiency and adaptability are structured in a similar multidimensional manner. Table 1 summarizes all resulting dimensions and their associated indicators.

The KPIs identified in this research are designed to help trace early signals of organizational collapse. These indicators do not merely reflect performance outcomes but also capture underlying structural imbalances within the system. The signs of collapse identified through the analysis are explicitly described in the description column and are referred to as “collapse signals,” highlighting conditions under which stability or efficiency is achieved at the expense of adaptability and long-term resilience.

The results of this research can be formally represented using mathematical expressions.

$$S = f(F_S + O_S + M_S + G_S)$$

$$E = f(F_E + O_E + M_E + D_E)$$

$$A = f(F_A + O_A + M_A + L_A)$$

Where:

- $F_S$  = Financial Stability,  $F_E$  = Financial Efficiency, and  $F_A$  = Financial Adaptability
- $O_S$  = Operational Stability,  $O_E$  = Operational Efficiency, and  $O_A$  = Operational Adaptability
- $M_S$  = Market Stability,  $M_E$  = Market Efficiency, and  $M_A$  = Market Adaptability
- $G_S$  = Governance and Decision Stability,  $D_E$  = Decision and Process Efficiency, and  $L_A$  = Learning and Cognitive Adaptability

**Table 1. Components of Stability, Efficiency, and Adaptability in the SEA Model (Hotel Context)**

SEA Dimension	Component	Description	KPIs
<b>Stability (S)</b>	<b>Financial Stability</b>	<p>The hotel’s ability to maintain solvency and liquidity over time, absorb revenue volatility, and continue operating during demand shocks without exhausting critical financial resources or increasing structural fragility.</p> <p><i>Collapse signal:</i></p> <ul style="list-style-type: none"> <li>Stable revenue but declining liquidity → false stability</li> <li>High annual RevPAR + extreme volatility → brittle stability</li> </ul>	<ul style="list-style-type: none"> <li>Operating Cash Flow Ratio</li> <li>Cash Buffer (Months)</li> <li>Debt Service Coverage Ratio (DSCR)</li> <li>Fixed-Cost Ratio</li> <li>Revenue Volatility Index</li> <li>Off-Season RevPAR Retention</li> <li>Revenue Source Diversification Index</li> </ul>
	<b>Operational Stability</b>	<p>The capacity of daily operations and service delivery processes to remain coherent and reliable under normal and peak conditions, including workforce continuity and tolerance to operational strain.</p> <p><i>Collapse signal:</i></p> <ul style="list-style-type: none"> <li>Cost efficiency ↑ while turnover ↑ → stability erosion</li> <li>Good average ratings but sharp drops during stress → latent instability</li> </ul>	<ul style="list-style-type: none"> <li>Annual Staff Turnover Rate</li> <li>Sick Leave Frequency</li> <li>Employee Engagement Score</li> <li>Training Continuity Ratio</li> <li>Service Deviation Rate</li> <li>Peak-Stress Service Drop</li> <li>Repeat Guest Ratio</li> </ul>
	<b>Market &amp; Demand Stability</b>	<p>The degree to which the hotel’s revenue base is diversified across guest segments, channels, and markets, reducing exposure to sudden changes in demand or market-specific shocks.</p> <p><i>Collapse signal:</i></p> <p>High occupancy driven by one segment → structural fragility</p>	<ul style="list-style-type: none"> <li>Market Concentration Ratio</li> <li>Geographic Demand Diversity</li> <li>Length-of-Stay Variance</li> </ul>
	<b>Governance &amp; Decision Stability</b>	<p>The consistency and credibility of decision-making processes, including the presence of effective feedback loops, trust in management, and the ability to maintain organizational coherence without suppressing negative signals.</p> <p><i>Collapse signal:</i></p> <ul style="list-style-type: none"> <li>High reporting + no policy change → symbolic stability</li> </ul>	<ul style="list-style-type: none"> <li>Complaint-to-Change Ratio</li> <li>Decision Lag Time</li> <li>KPI Revision Frequency</li> <li>Process Exception Rate</li> <li>Crisis Protocol Activation Rate</li> <li>Policy Override Frequency</li> </ul>
<b>Efficiency (E)</b>	<b>Financial Efficiency</b>	<p>The effectiveness with which financial resources, assets, and costs are converted into revenue and operating margins, reflecting capital utilization and cost discipline rather than financial resilience.</p> <p><i>Collapse signal:</i></p> <ul style="list-style-type: none"> <li>Rising margins + declining staff/asset condition → efficiency cannibalizing stability</li> </ul>	<ul style="list-style-type: none"> <li>GOP Margin</li> <li>Cost per Occupied Room (CPOR)</li> <li>Revenue per Employee</li> <li>Asset Turnover Ratio</li> <li>Energy Cost per Room</li> </ul>
	<b>Operational Efficiency</b>	<p>The extent to which operational processes minimize waste, delays, and redundancy, enabling smooth service delivery with optimal use of labor, time, and physical resources.</p> <p><i>Collapse signal:</i></p>	<ul style="list-style-type: none"> <li>Average Check-in / Check-out Time</li> <li>Housekeeping Productivity</li> <li>Process Rework Rate</li> <li>Room Downtime Ratio</li> </ul>

		<ul style="list-style-type: none"> <li>High utilization + rising errors → over-optimization</li> </ul>	<ul style="list-style-type: none"> <li>Staff Utilization Rate</li> </ul>
	<b>Market Efficiency</b>	<p>The ability to convert market access into profitable demand through effective pricing, channel management, and marketing investments, rather than relying on volume or discount-driven occupancy.</p> <p><i>Collapse signal:</i></p> <ul style="list-style-type: none"> <li>High occupancy driven by discounts → market inefficiency disguised as success</li> </ul>	<ul style="list-style-type: none"> <li>Net RevPAR (after distribution costs)</li> <li>Direct Booking Ratio</li> <li>Marketing ROI</li> <li>Price Realization Rate</li> <li>Discount Dependency Ratio</li> </ul>
	<b>Decision &amp; Process Efficiency</b>	<p>The speed and clarity with which information is translated into decisions and actions, including low bureaucratic friction, limited redundancy in controls, and efficient coordination across managerial levels.</p> <p><i>Collapse signal:</i></p> <ul style="list-style-type: none"> <li>Many reports, few decisions → efficiency theater</li> </ul>	<ul style="list-style-type: none"> <li>Decision Cycle Time</li> <li>Approval Layers Count</li> <li>Process Automation Ratio</li> <li>KPI Redundancy Index</li> <li>Meeting-to-Action Ratio</li> </ul>
<b>Adaptability (A)</b>	<b>Financial Adaptability</b>	<p>The hotel’s capacity to reallocate financial resources, adjust cost structures, and modify investment priorities in response to changing conditions without destabilizing core operations.</p> <p><i>Collapse signal:</i></p> <ul style="list-style-type: none"> <li>Strong cash position + zero budget flexibility → adaptive paralysis</li> </ul>	<ul style="list-style-type: none"> <li>CapEx Flexibility Ratio</li> <li>Variable Cost Share</li> <li>Contract Rigidity Index</li> <li>Speed of Budget Reallocation</li> <li>Revenue Model Diversity Index</li> </ul>
	<b>Operational Adaptability</b>	<p>The ability to reconfigure processes, roles, and service designs when conditions change, supported by modular procedures, cross-skilled staff, and experimentation in operations.</p> <p><i>Collapse signal:</i></p> <ul style="list-style-type: none"> <li>Perfect SOPs + zero experimentation → rigid excellence</li> </ul>	<ul style="list-style-type: none"> <li>Cross-Skill Coverage Ratio</li> <li>Process Modularity Score</li> <li>Time-to-Operational-Pivot</li> <li>Pilot-to-Scale Conversion Rate</li> <li>Temporary Structure Usage Rate</li> </ul>
	<b>Market Adaptability</b>	<p>The capacity to reinterpret guest needs, adjust offerings, and engage new or evolving market segments through innovation in pricing, experiences, and value propositions.</p> <p><i>Collapse signal:</i></p> <ul style="list-style-type: none"> <li>Strong brand + declining relevance → identity lock-in</li> </ul>	<ul style="list-style-type: none"> <li>New Segment Activation Rate</li> <li>Offering Evolution Frequency</li> <li>Price-Model Experiment Rate</li> <li>Localization Index</li> <li>Experience Refresh Cycle</li> </ul>
	<b>Learning &amp; Cognitive Adaptability</b>	<p>The organization’s ability to detect weak signals, learn from failure and feedback, revise assumptions, and update decision logic, enabling change before performance deterioration becomes visible.</p> <ul style="list-style-type: none"> <li>Plenty of data + unchanged beliefs → epistemic saturation</li> </ul>	<ul style="list-style-type: none"> <li>Signal Detection Lag</li> <li>Failure-to-Insight Ratio</li> <li>Experiment Survival Rate</li> <li>Feedback Integration Rate</li> <li>Assumption Revision Frequency</li> </ul>

#### 4. Conclusion

In the SEA framework, stability (S), efficiency (E), and adaptability (A) are conceptualized as multidimensional constructs composed of four interrelated components each. Stability is defined as a function of financial stability, operational stability, market and demand stability, and governance and decision stability. Together, these components capture the hotel's capacity to maintain organizational coherence, solvency, and continuity under conditions of uncertainty and stress. Importantly, stability is not treated as a simple aggregation of its components; weakness in any single dimension—such as governance or market dependence—can undermine overall stability even when other dimensions remain strong.

Similarly, efficiency and adaptability are modeled as composite functions of distinct but interconnected dimensions. Efficiency is expressed as a function of financial efficiency, operational efficiency, market efficiency, and decision and process efficiency, reflecting how effectively the organization converts resources, processes, and information into service value while minimizing waste and friction. Adaptability, in turn, is defined as a function of financial adaptability, operational adaptability, market adaptability, and learning and cognitive adaptability, capturing the system's ability to detect change, learn from feedback, and reconfigure structures and assumptions over time. Consistent with the Theory of Saturation and Collapse, both efficiency and adaptability follow a non-additive logic, whereby over-optimization or rigidity in any single component can constrain overall system performance and contribute to imbalance, thereby increasing the risk of delayed organizational collapse.

The KPIs identified in this research enable hotel management to continuously monitor stability, efficiency, and adaptability in a real-time context, thereby allowing early collapse signals to be detected. Moreover, future research can extend this framework to other industries or apply it at the firm level to examine organizational collapse dynamics in different contexts.

***AI Disclosure:** The authors declare that generative artificial intelligence tools (ChatGPT and Grok) were used solely for the purpose of improving the clarity, grammar, and academic English of the manuscript. These tools were not used for data analysis, interpretation of results, theory development, or the generation of original scientific content. All conceptual contributions, analyses, and conclusions presented in this article are entirely the responsibility of the authors.*

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