CHAPTER 9

MAJOR FINDINGS, DISCUSSION, AND CONCLUSION

9.1 Introduction

This chapter provides major findings of this research and adds some more insights into the preparedness of the CEP service providers in times of disruptions. Comparison between CPI and CSQI is discussed for a better understanding of the service gap. Then, a comparison between private and public courier services is demonstrated. The perspectives of individual and organizational customers are also illustrated. The study's conclusion is also presented in this chapter.

9.2 Objective 1: To identify product/service innovations being implemented by CEP service providers in times of disruptions

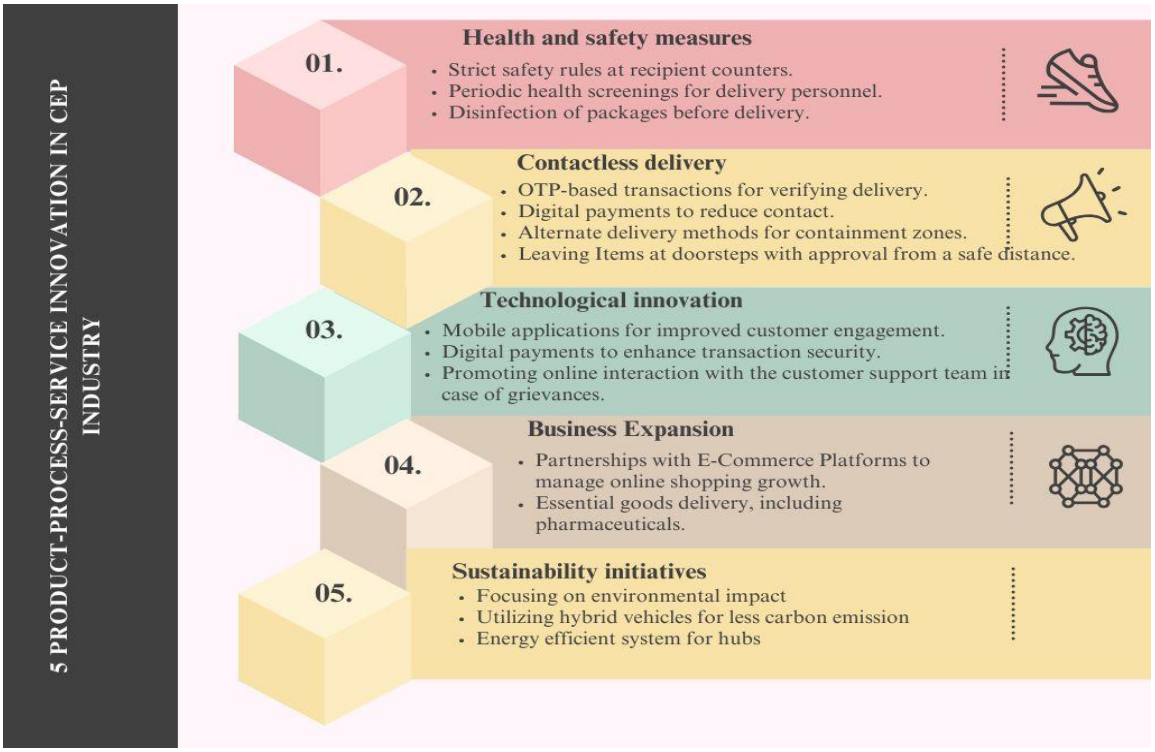


Figure 9.1 Product-process-service innovation in CEP sector

a) ***Impact of innovation parameters on overall business performance****:*

Regression analysis results showed that innovation indicators positively influence business performance.

- *Advancement in organizational processes* (β = 0.745) and adapted operational processes (β = 0.726) are the most significant drivers of firm performance, explaining over 50% of the variance. These findings highlight the importance of internal optimization and strategic restructuring in enhancing firm performance.
- *Technological advancement* (β = 0.687) also plays a crucial role, showcasing the importance of digital platforms, mobile applications, and automated systems in improving operational efficiency.
- *Novel delivery solutions* (β = 0.555) positively influence performance but have a relatively lower impact compared to other factors, suggesting their role as complementary rather than primary drivers.

b) ***Impact of innovation on specific business performance metrics****:*

- *Profitability* (β = 0.752) is the most impacted metric, with more than half of its variance explained by innovation, highlighting its role in driving financial success.
- *Customer satisfaction* (β = 0.715) ranks second, emphasizing the capacity for innovation to enhance customer experiences.
- *Sales growth* (β = 0.683) and Market Reach (β = 0.623) are also positively influenced, underscoring the broad applicability of innovation across performance domains.

c) ***Strategic implications****:*

- Firms focusing on organizational and operational process improvements supported by technological advancements are likely to achieve the most significant performance gains.
- While novel delivery methods contribute to customer safety and trust, their primary value lies in complementing other innovations rather than being standalone drivers.

In summary, five product-process-service innovations (Figure 9.1), namely health and safety measures, contactless delivery, technological innovation, business expansion, and sustainability initiatives, were identified from this study. Additionally, innovation emerges as a critical enabler of the business performance of CEP services, establishing its central role in sustaining competitive advantage. Hence, H1 is accepted.

9.3 Objective 2: To determine the areas of competitive advantage of the CEP service providers in times of disruptions

The findings underscore the importance of a multi-faceted approach to resilience. CEP service providers gain a competitive advantage by investing in innovation, synergistic adaptation, and operational excellence, supported by logistics excellence and disruption preparedness. This integrated strategy allows CEP service providers to navigate disruptions effectively and sustain competitive performance.

- *Innovation* (β = 0.252): Innovation emerged as the most significant factor influencing business performance, highlighting its role in driving adaptability and customer-focused improvements during disruptions.
- *Synergistic adaptation* (β = 0.223): The ability to harmonize resources and processes to adapt to challenges was the second most significant driver, emphasizing the importance of organizational flexibility.
- *Operating efficiency* (β = 0.221): Streamlined operations and efficient workflows positively impacted firm performance, showcasing their relevance during uncertain environments.
- *Logistics excellence* (β = 0.203): Efficient logistics practices provided a moderate advantage, emphasizing timely and reliable delivery as a cornerstone of service quality.
- *Disruption preparedness* (β = 0.199): Firms need to focus on the anticipation and mitigation of disruptions for better maintenance of performance during disruptive events.

The partial least square structural model demonstrated a strong predictive ability with an R^2=0.853, indicating that 85.3% of the variance in performance is explained by the

five constructs. The predictive relevance of the model was supported by high Q^2=0.801, demonstrating robust performance in evaluating endogenous components. Hence, H2 (H2a to H2e) is accepted.

9.4 Objective 3: To assess the operating efficiency of the CEP service providers in times of disruptions

Efficient CEP providers leverage adaptability, time-sensitive deliveries, and cost management to maintain operational continuity and achieve superior performance during disruptions. By addressing inefficiencies in flexibility, responsiveness, and processing time, low-performing providers can improve their operational benchmarks and competitiveness. Top-performing CEPs (e.g., CEP16, CEP14) exhibit superior flexibility, quick processing, and proficiency in managing express deliveries, positioning them as reliable service providers during disruptions. Bottom-performing CEPs (e.g., CEP6, CEP44) face challenges in flexibility, express delivery capabilities, and processing efficiency, leading to vulnerabilities during high-demand periods or crises. The overall industry operating efficiency score is found to be 4.78. Approximately 54% of CEPs perform above the average, while 20% fall below, indicating significant variability in operational efficiency. Hence, H3 is accepted.

Significance of operating efficiency Indicators*:*

- Express/time-sensitive deliveries hold the highest weight (0.67), demonstrating their critical importance for operational efficiency, especially during disruptions when urgent deliveries (e.g., medical supplies or perishables) become paramount.
- Followed by operational flexibility, cost-effectiveness, and delivery agent efficiency, emphasizing adaptability and balance between cost and quality service during crises.
- Short processing time is also significant but slightly less impactful, highlighting the importance of streamlined processes and skilled agents for successful last-mile deliveries.

Impact on Business Performance

Regression analysis results showed that operational efficiency indicators positively influence business performance.

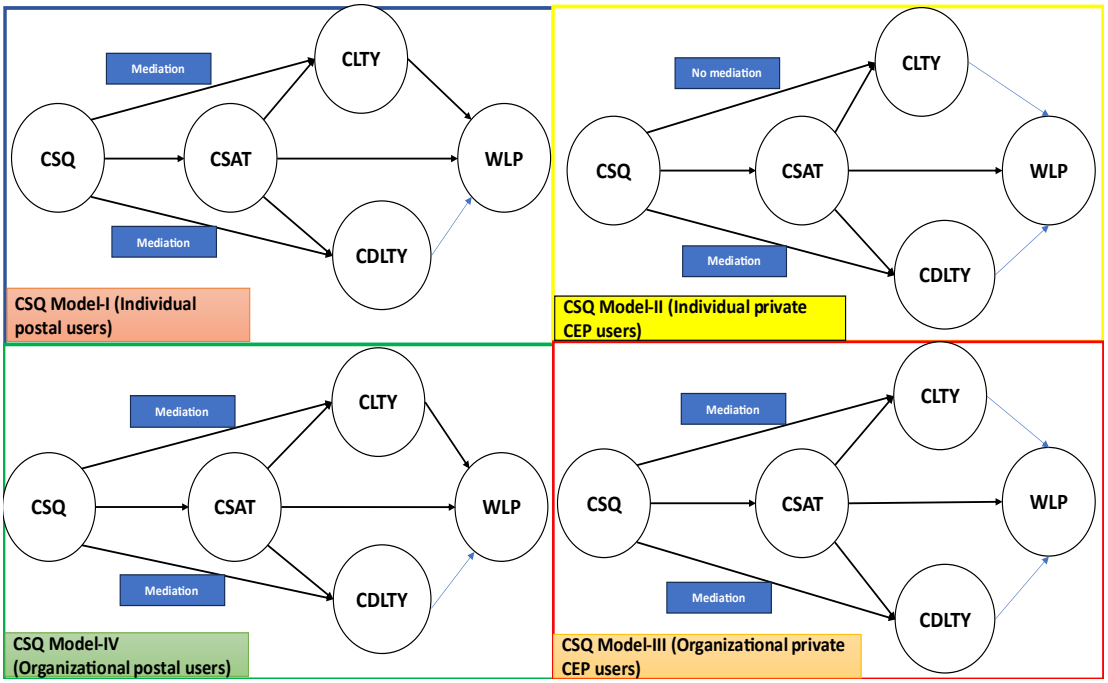
- Profitability shows the strongest relationship (β = 0.922), driven by cost-effective operations and efficient delivery agents.
- Sales Growth is significantly impacted (β = 0.778) by operational flexibility and quick deliveries.
- Customer Satisfaction (β = 0.732) and Market Reach (β = 0.657) are also highly dependent on efficient processes and responsiveness.

9.5 Objective 4: To determine the factors influencing customer satisfaction levels from CEP service providers in times of disruptions

This objective explores the perception of customers on customer satisfaction from the CEP service. There are four customer segments (I, II, III, IV) for which data was collected and analysed. Courier service quality factors are identified (Table 9.1) through factor analysis. Then the structural equation models are created using the partial least square approach (Figure 9.2) for all the customer segments. Hence, H4 (H4a to H4i) is accepted.

Table 9.1 Courier service quality factors

Customer segments	Factors of service quality influencing customer satisfaction
Individual Users of Postal Services I	Operational efficiency, dynamic adaptability, service interface, competitiveness, discrepancy mitigation, innovativeness, technological adaptability, customer involvement, and logistics efficiency.
Individual Users of Private CEP Services II	Delivery performance, operational efficiency, dynamic adaptability, service interface, competitiveness, discrepancy mitigation, innovativeness, technological adaptability, customer involvement, and logistics efficiency.
Organisational Users of Postal Services IV	Innovativeness, operational efficiency, flexibility, logistics efficiency, customer involvement, dynamic adaptability, discrepancy mitigation, competitiveness, technological adaptability, and logistics reach resilience
Organisational Users of Private CEP Services III	Dynamic adaptability, discrepancy mitigation, competitiveness, technological adaptability, logistics reach resilience, Innovativeness, operational efficiency, flexibility, logistics efficiency, and customer involvement



Source: Authors own creation

Figure 9.2 Structural equation models of courier service quality (CSQ)

The results of CSQ models reveal that improved service quality results in more satisfied customers. Improved service quality and satisfied customers continue to use the services. Due to improved service quality, satisfied customers will not switch to other service providers (disloyalty). Satisfied and loyal customers are willing to pay more for improved services. Loyal customers of postal services are willing to pay more for improved services than the private CEP users. However, there is no evidence that customer disloyalty negatively affects customers' willingness to pay.

9.6 Objective 5: To develop a framework mechanism for gauging differentiation and competitive preparedness by CEP service providers in times of disruptions

Two indices are computed for this study as shown in Figure 9.3.

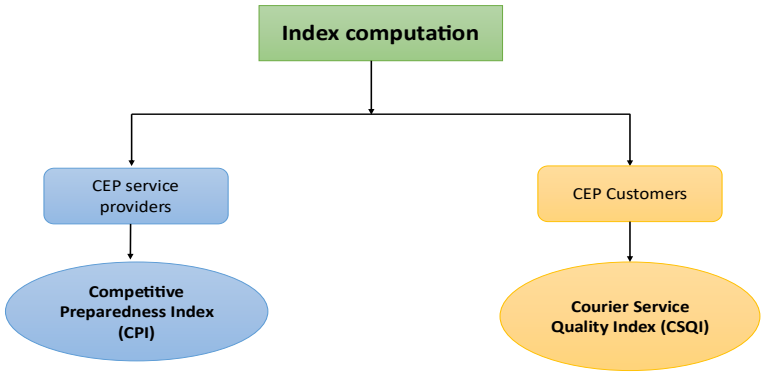
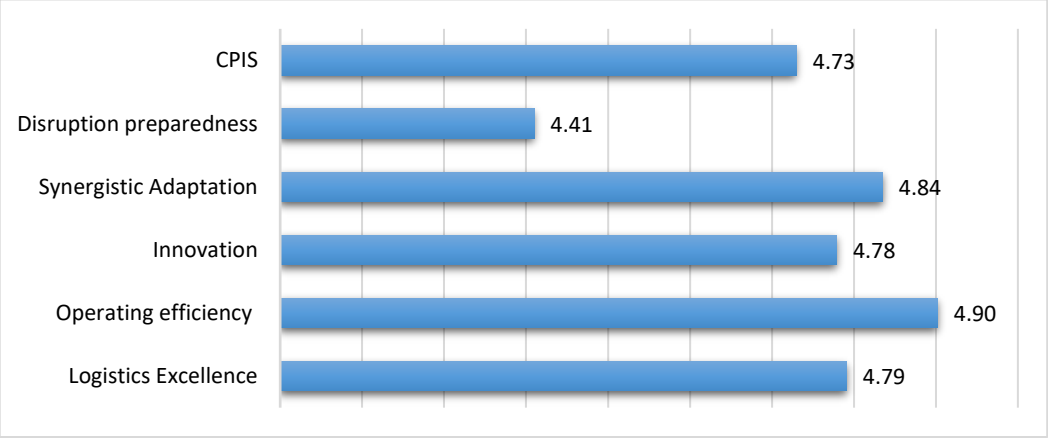


Figure 9.3 Types of indices computed

a) ***Competitive Preparedness Index***: The calculated average industry CPI score is 4.73. 48.92% of CEPs are above average, with the highest score of 6.60. 52.08% of CEPs are below average, with the lowest score of 2.60. *Operating efficiency* ranks highest, indicating it has the most significant impact on overall service quality, followed by *Synergistics adaptation* in second place, which shows a strong contribution. *Logistics efficiency* is ranked third, highlighting its important role, while *innovation* holds the fourth position, demonstrating its relevance, though not as critical as the top three parameters. *Disruption preparedness* ranks fifth, suggesting a lower readiness in this aspect, as unforeseen disruptions always have a greater impact than predicted so far (Figure 9.4).



Source: Author's own calculation

Figure 9.4 Analysis of competitive preparedness across different parameters

a) ***Courier Service Quality Index-I (Individual postal users)***: The study reveals a moderate CSQI score of 3.43, indicating that individual customers perceive postal services as moderately satisfactory. Among the service quality parameters, the *service interface* ranks highest, highlighting the critical need for reliable and user-friendly communication channels during uncertain times, followed by *competitiveness*, which emphasizes the importance of matching private couriers in pricing, speed, and customer service. *Dynamic adaptability, logistics efficiency, and operational efficiency* emerge as key contributors to resilience, showcasing the sector's ability to adapt, ensure timely deliveries, and optimize resources. Factors like *innovativeness and technological adaptability* are identified as vital for driving digital transformation and service enhancements. Although *discrepancy mitigation* and *customer involvement* are ranked lower, they remain important for trust-building and post-disruption recovery. The balanced distribution of sub-indicator weights reflects a methodical design, ensuring no single factor disproportionately impacts the index. Overall, the findings emphasize the postal sector's need to prioritize adaptability, efficiency, and innovation to enhance resilience and better meet customer expectations during disruptions.

b) ***Courier Service Quality Index-II (Individual private CEP users)***: The study reveals a moderate CSQI score of 3.50, indicating that individual customers perceive private courier services as moderately satisfactory during disruptions. Among the parameters, *technological adaptability* ranks the highest, underscoring the critical role of leveraging technology to navigate uncertainty and ensure resilience. *Delivery performance* ranks second, highlighting the importance of timely and reliable operations in maintaining customer trust and continuity during disruptions. L*ogistics efficiency* and *operational efficiency* are also highly ranked, emphasizing their role in ensuring cost-effective and seamless processes under volatile conditions. *Dynamic adaptability* and *service interface* received mid-level rankings, reflecting the need for flexibility and user-friendly interactions, though they are less prioritized compared to operational and technological strategies. Lower-ranked factors like *customer involvement, innovativeness*, and *competitiveness* suggest these elements play a secondary role in disruption management. The lowest-ranked *discrepancy mitigation* highlights the preference for preemptive flexibility and efficiency over reactive error resolution. Overall, the findings emphasize that private courier services must prioritize technological

integration, operational excellence, and delivery reliability to strengthen their preparedness and customer satisfaction during disruptions.

c) ***Courier Service Quality Index-III (Organizational private CEP users):*** The calculated CSQI score of 4.60 indicates moderate satisfaction levels among organizational customers of private courier services during disruptions. *Innovativeness* ranks the highest, highlighting the critical role of creative solutions and adaptability in ensuring sustainability in a rapidly evolving environment. *Resilience reach logistics,* and *flexibility* follow closely, underscoring the importance of maintaining extensive logistics capabilities and swiftly adjusting strategies to address disruptions. *Discrepancy mitigation* and *customer involvement* are also significant, emphasizing the need to resolve inconsistencies and maintain transparent communication to foster trust. *Dynamic adaptability* is central to enduring disturbances but requires continuous organizational adjustments, which may pose challenges for some firms. While *Logistics efficiency* and *operational efficiency* remain important, their relative significance diminishes in favor of adaptability and innovation during crises. *Technological adaptability* ranks lower, possibly due to delays in implementing technological solutions under disruptive conditions. *Competitiveness* is ranked lowest, reflecting a shift in focus from outperforming competitors to sustaining operations and customer satisfaction. Overall, the findings emphasize that adaptability, resilience, and innovation are paramount for navigating disruptions, with traditional metrics like efficiency and competitiveness playing a secondary role.

d) ***Courier Service Quality Index-IV (Organizational postal users)*****:** The study reveals a CSQI score of 3.92, indicating moderate satisfaction levels among organizational users with postal services during disruptions. *Flexibility* ranks highest, emphasizing its critical role in enabling rapid adjustments to evolving customer demands and unforeseen circumstances. *Dynamic adaptability* follows, highlighting the importance of swift decision-making and resource reallocation to address disruptions effectively. *Resilient reach logistics* secures a high rank, underscoring the need for robust supply chain networks and backup strategies to maintain uninterrupted operations. *Logistics efficiency* and *operational efficiency* are pivotal in optimizing resources, reducing delivery times, and ensuring cost-effectiveness during crises. Lower-ranked dimensions, such as *discrepancy mitigation,* stress the need for robust tracking and dispute resolution mechanisms

to build customer trust. *Technological adaptability* and *innovativeness* are essential for integrating digital solutions and developing creative responses to market needs. *Customer involvement*, although ranked lowest, remains vital for aligning services with user expectations and enhancing loyalty through feedback mechanisms. Overall, the findings emphasize that investments in flexibility, logistics, technology, and innovation are essential for strengthening the postal sector's resilience and sustaining customer satisfaction amidst disruptions.

9.7 Ranking of CEP service providers based on CPI

The rankings highlight distinct strengths and weaknesses among courier and express service providers (CEPs) across multiple performance parameters. For example, CEP11 consistently ranks as a top performer, leading in logistics excellence, synergistic adaptation, disruption preparedness, and the overall CPI, reflecting its well-rounded capabilities in managing logistics, adapting to collaborative processes, preparing for disruptions, and maintaining a competitive edge. CEP14 also stands out, leading in operating efficiency and innovation, suggesting its focus on resource optimization and innovative practices. CEPs such as CEP37, CEP46, and CEP18 follow closely, indicating strong logistics and operating efficiencies. Mid-ranked providers like CEP23 and CEP16 show stable performance across parameters but have opportunities for enhancement in some areas. Meanwhile, lower-ranked CEPs, such as CEP44 and CEP26, rank consistently low across parameters, particularly in logistics and operating efficiencies, which could signify challenges in resource management, delivery reliability, or responsiveness to disruptions. These rankings offer a clear comparative view, guiding potential strategic improvements for each provider based on their specific performance gaps.

Table 9.2 Performance matrix of CEP service providers on key Competitive Preparedness dimensions

Ranking of the CEPs parameter-wise											
CEPs	**LE**	**CEPs**	**OE**	**CEPs**	**INV**	**CEPs**	**SA**	**CEPs**	**DP**	**CEPs**	**Competitive Preparedness Index**
CEP11	1	CEP14	1	CEP14	1	CEP11	1	CEP11	1	CEP11	**1**
CEP37	2	CEP16	2	CEP16	2	CEP12	1	CEP14	2	CEP14	**2**
CEP46	3	CEP11	3	CEP13	3	CEP18	3	CEP16	3	CEP16	**3**
CEP18	4	CEP3	4	CEP48	4	CEP14	4	CEP25	4	CEP18	**4**
CEP8	5	CEP18	5	CEP18	5	CEP8	4	CEP8	5	CEP8	**5**
CEP48	6	CEP23	6	CEP11	6	CEP37	4	CEP23	6	CEP23	**6**
CEP23	7	CEP8	7	CEP42	6	CEP16	7	CEP18	7	CEP48	**7**
CEP16	8	CEP34	8	CEP46	8	CEP23	7	CEP47	8	CEP12	**8**
CEP13	8	CEP48	9	CEP8	9	CEP-G20	7	CEP30	9	CEP46	**9**
CEP12	10	CEP4	9	CEP12	10	CEP48	10	CEP12	10	CEP37	**10**

Ranking of the CEPs parameter-wise											
CEPs	**LE**	**CEPs**	**OE**	**CEPs**	**INV**	**CEPs**	**SA**	**CEPs**	**DP**	**CEPs**	**Competitive Preparedness Index**
CEP14	11	CEP37	11	CEP47	11	CEP46	10	CEP48	11	CEP13	**11**
CEP19	12	CEP17	12	CEP37	12	CEP27	12	CEP46	12	CEP25	**12**
CEP45	13	CEP40	12	CEP7	12	CEP25	13	CEP37	13	CEP47	**13**
CEP2	13	CEP22	14	CEP15	14	CEP34	14	CEP13	14	CEP15	**14**
CEP47	15	CEP15	15	CEP25	15	CEP1	14	CEP22	15	CEP30	**15**
CEP25	16	CEP13	16	CEP45	15	CEP17	14	CEP15	16	CEP34	**16**
CEP15	17	CEP46	17	CEP40	17	CEP36	14	CEP34	17	CEP19	**17**
CEP30	18	CEP12	18	CEP19	18	CEP3	14	CEP24	18	CEP35	**18**
CEP31	19	CEP30	19	CEP23	19	CEP5	19	CEP31	19	CEP22	**19**
CEP34	20	CEP27	20	CEP2	19	CEP35	20	CEP21	20	CEP21	**20**
CEP35	21	CEP47	21	CEP21	21	CEP47	21	CEP6	21	CEP1	**21**
CEP33	22	CEP36	22	CEP31	22	CEP43	21	CEP35	22	CEP42	**22**
CEP9	23	CEP19	23	CEP43	22	CEP15	23	CEP1	22	CEP45	**22**
CEP21	24	CEP33	24	CEP32	22	CEP30	23	CEP19	24	CEP31	**24**
CEP32	25	CEP25	25	CEP36	25	CEP13	25	CEP45	24	CEP17	**24**
CEP3	26	CEP21	26	CEP22	26	CEP31	25	CEP5	24	CEP2	**24**
CEP5	27	CEP9	27	CEP29	26	CEP10	27	CEP42	27	CEP5	**27**
CEP42	28	CEP35	28	CEP1	28	CEP28	28	CEP28	28	CEP36	**28**
CEP1	29	CEP2	29	CEP-G20	29	CEP42	29	CEP2	29	CEP3	**29**
CEP27	30	CEP1	30	CEP35	30	CEP21	30	CEP36	30	CEP27	**30**
CEP22	31	CEP42	31	CEP4	30	CEP33	31	CEP17	31	CEP33	**31**
CEP17	31	CEP28	32	CEP9	30	CEP19	32	CEP4	32	CEP4	**32**
CEP41	33	CEP45	33	CEP33	33	CEP4	33	CEP9	33	CEP9	**33**
CEP7	34	CEP7	33	CEP30	34	CEP32	33	CEP40	34	CEP-G20	**34**
CEP28	35	CEP24	35	CEP24	34	CEP24	35	CEP43	35	CEP28	**35**
CEP4	36	CEP43	36	CEP44	36	CEP45	36	CEP7	36	CEP7	**36**
CEP-G20	37	CEP5	37	CEP34	37	CEP39	36	CEP39	36	CEP40	**36**
CEP38	38	CEP-G2(	38	CEP41	38	CEP2	38	CEP41	38	CEP43	**38**
CEP44	39	CEP38	39	CEP38	39	CEP22	39	CEP10	39	CEP32	**39**
CEP29	40	CEP31	40	CEP5	40	CEP7	40	CEP33	40	CEP24	**40**
CEP39	41	CEP29	41	CEP27	41	CEP40	40	CEP3	41	CEP41	**41**
CEP36	42	CEP26	42	CEP17	42	CEP26	40	CEP-G20	42	CEP39	**42**
CEP40	43	CEP32	43	CEP28	43	CEP29	43	CEP32	42	CEP38	**42**
CEP6	44	CEP41	44	CEP10	44	CEP9	44	CEP27	44	CEP29	**44**
CEP43	45	CEP10	45	CEP6	45	CEP6	45	CEP44	45	CEP10	**45**
CEP26	46	CEP39	46	CEP39	46	CEP38	46	CEP38	46	CEP6	**46**
CEP24	47	CEP44	47	CEP3	47	CEP44	47	CEP29	47	CEP44	**47**
CEP10	48	CEP6	48	CEP26	48	CEP41	48	CEP26	48	CEP26	**48**

Source: Authors own calculation

Tables 9.2 provide a deep analysis of indices and comparative ranks of various CEPs across five key parameters. Following equations (9) and (10), scores are calculated and ranks are given accordingly.

a) Logistics excellence index score: *Top performers* (e.g., CEP11, CEP37, CEP46, CEP18, CEP8) excel in logistics, suggesting efficient supply chain management, technological integration, and possibly superior last-mile delivery capabilities. *Bottom performers* (e.g., CEP6, CEP43, CEP26, CEP24, CEP10) rank at the bottom, indicating significant challenges in logistics operations, which might stem from underinvestment in infrastructure or inefficient supply chain practices.

b) ***Operating efficiency index score:*** *Top performers* (e.g., CEP14, CEP16, CEP11) demonstrate high operating efficiency, likely achieved through streamlined processes, effective resource utilization, and continuous improvement initiatives. *Bottom performers* (e.g., CEP29, CEP6, CEP26) are the lowest performers in this category, possibly struggling with high operational costs, inefficient processes, and inadequate resource management.

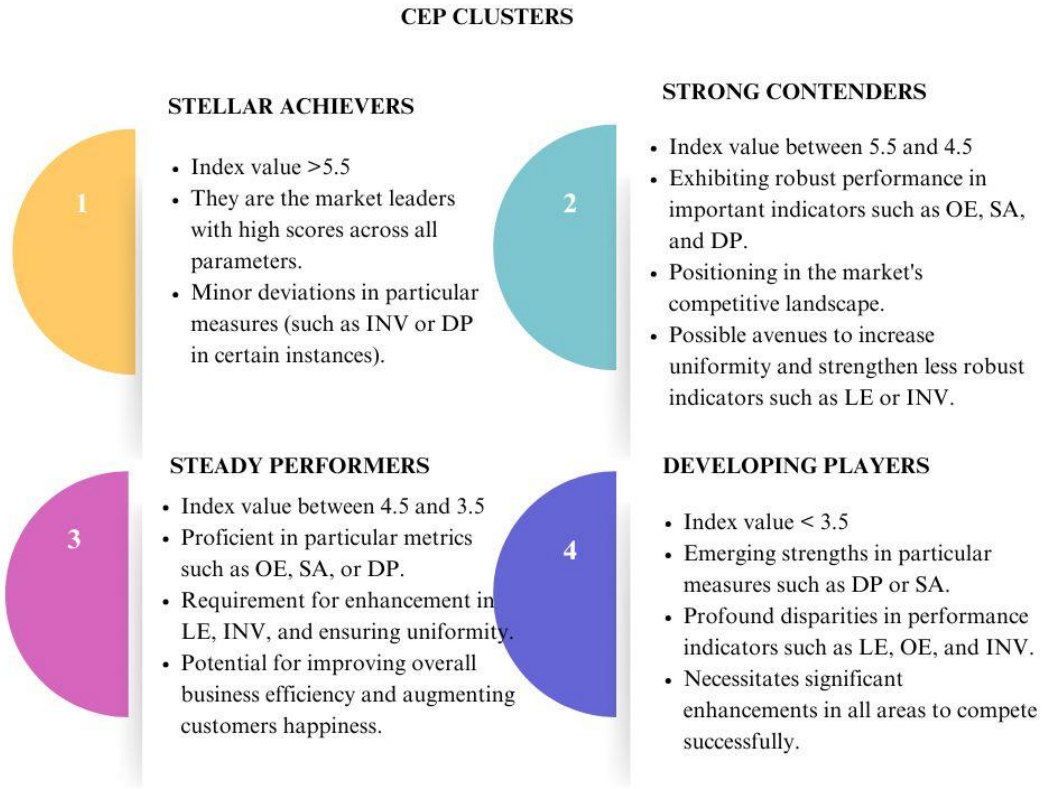
c) ***Innovation index score: Top performers*** (e.g., CEP14, CEP16, CEP11) are leaders in innovation, reflecting their commitment to adopting new technologies, exploring new business models, and staying ahead of industry trends. *Bottom performers* (e.g., CEP10, CEP6, CEP26) have the lowest innovation scores, suggesting a significant lag in adopting new technologies and processes, which could hinder their competitiveness in a rapidly evolving market.

d) ***Synergistic adaptation index score:*** *Top performers* (e.g., CEP11, CEP12, CEP18) lead in synergistic adaptation, indicating their ability to effectively integrate and adapt within existing networks, enhancing their overall operational flexibility. *Bottom performers* (e.g., CEP41, CEP39, CEP38) rank lowest, likely struggling with integrating new processes or collaborating effectively within their ecosystems, which could reduce their adaptability in dynamic market conditions.

e) ***Disruption preparedness index score:*** *Top Performers* (e.g., CEP11, CEP14, CEP16) are the most prepared for disruptions, indicating strong contingency planning, resilient operations, and possibly superior technological infrastructure. *Bottom performers* (e.g., CEP10, CEP6, CEP26) again are the least prepared, indicating a consistent pattern of underperformance across multiple dimensions, which could pose significant risks to their long-term viability.

9.8 Clustering of CEPs based on CPI

The clustering of the CEPs was done in four groups based on the arithmetic division of the obtained values. Interpretation was done on CPI cluster-wise wise namely *Steller Achievers*, *Strong Contenders, Steady Performers, and Developing Players* (Figure 9.5).



Source: Author's own work

Figure 9.5 Clusters of CEP service providers

- ***Stellar Achievers:*** These CEPs exhibit index scores significantly higher than the average industry CPI score, indicating not just competence but excellence. They are the industry leaders, surpassing benchmarks due to their robust service quality, operational efficiencies, and innovation. They are in a position to capitalize on their strengths, potentially expanding market share or entering new markets. They may also be in a good position to invest in further innovation to maintain their leading edge. Their performance suggests a well-rounded, high-functioning operation that excels across multiple dimensions of service delivery. These companies likely set the standard for best practices and customer satisfaction in the industry.
- ***Strong Contenders:*** These CEPs have index scores slightly above or around the average industry CPI score, reflecting solid performance. They demonstrate competitiveness within the industry, with strong operational foundations, though not necessarily at the pinnacle of excellence. Their scores suggest that while they are competitive, they may lack the distinctive features or consistent excellence seen in the *stellar achievers*. They may be strong in certain areas but have room to

improve in others. They should focus on targeted improvements or innovations to break into the upper echelon of performance. By addressing specific weaknesses or amplifying their strengths, they could transition into the *Stellar Achievers* category.

- ***Steady Performers:*** These CEPs align closely with the average industry CPI score, reflecting average industry performance. Their performance is stable and reliable, though not particularly distinguished by exceptional quality or innovation. This indicates consistency and reliability but also suggests a potential vulnerability to market shifts or competitive pressures. They are meeting industry standards but not exceeding them. They should consider differentiation strategies to stand out in the market. Without significant improvement, they risk stagnation, especially as competitors advance. Strategic investments in technology, customer service, or operational efficiency could elevate their performance.
- ***Developing Players:*** These CEPs fall below the average industry CPI score, indicating underperformance relative to industry standards. Their scores suggest significant challenges, which could include operational inefficiencies, poor service quality, or a lack of innovation. The gap between their scores and the industry average signals a need for substantial improvement. They may be struggling to meet customer expectations or keep up with industry trends. They must prioritize turnaround strategies to avoid further decline. This could involve reevaluating their business models, investing in operational improvements, or enhancing their customer service offerings. Without significant changes, they risk being left behind in a competitive market.

9.9 ANOVA test for finding cluster differences

ANOVA analysis (Table 9.3) across all dimensions (CPI, LE, OE, INV, SA, DP), *Steller Achievers* consistently show the highest mean scores, indicating superior performance across all competitive preparedness indicators. Conversely, *Developing Players* consistently score the lowest. The high F-values, particularly for CPI, indicate that a substantial proportion of the variance in scores is attributable to cluster differences. Significant differences exist between almost all pairs of clusters across all dimensions. A few key insights: *Steller Achievers* outperform all other clusters significantly across every variable. The gap between *Steller Achievers* and *Developing Players* is the largest in most

dimensions, e.g., CPI (mean difference = 2.96), LE (mean difference = 3.32), and SA (mean difference = 3.60). Differences between *Strong Contenders* and *Steady Performers* are smaller and not always significant (e.g., OE and INV). Hence, H5 is accepted.

Table 9.3 ANOVA analysis for CEP cluster difference

		Sum of Squares	*df*	*Mean Square*	*F*	*Sig.*
CPI	Between Groups	43.903	3	14.634	173.692	.000
	Within Groups	3.707	44	0.084		
	Total	47.61	47			
LE	Between Groups	58.778	3	19.593	40.894	.000
	Within Groups	21.081	44	0.479		
	Total	79.859	47			
OE	Between Groups	27.369	3	9.123	23.848	.000
	Within Groups	16.832	44	0.383		
	Total	44.2	47			
INV	Between Groups	30.343	3	10.114	22.78	.000
	Within Groups	19.536	44	0.444		
	Total	49.879	47			
SA	Between Groups	63.683	3	21.228	19.373	.000
	Within Groups	48.213	44	1.096		
	Total	111.897	47			
DP	Between Groups	52.036	3	17.345	45.55	.000
	Within Groups	16.755	44	0.381		
	Total	68.791	47			

9.10 Comparison of CPI and CSQI

There is a noticeable disagreement between how consumers and courier service providers perceive index values (Figure 9.6). Customers give lower ratings than the claimed disruption preparation levels stated by courier service entities. This discrepancy implies a lack of agreement between the way customers perceive the quality of service and how courier service providers evaluate their own preparedness to deliver that service. This investigation demonstrates that although courier service providers differ in their level of readiness for uncertainty, the perceived quality of service remains generally similar throughout the market. As leaders in preparedness, *Stellar Achievers* have the chance to utilize this capability to improve customer experiences. In order to maintain competitiveness, *Strong Contenders* and *Steady Performers* should prioritize specific enhancements to strengthen their resilience and service distinction. Conversely, *Developing Players* must promptly resolve their deficiencies in preparedness.

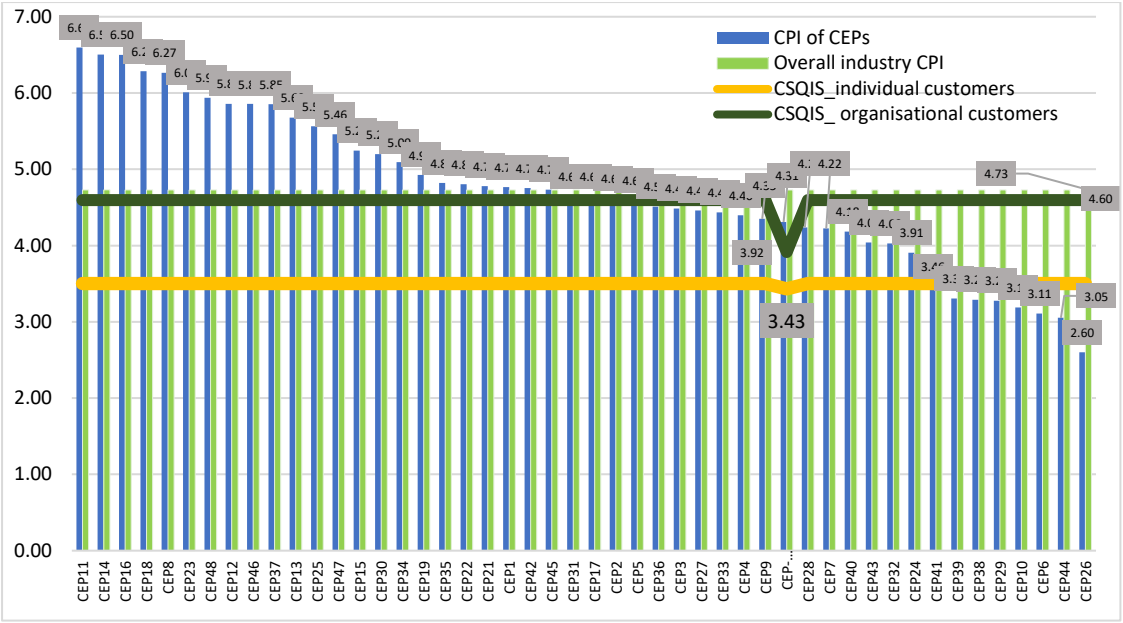


Figure 9.6 Gap between CPI and CSQI

a) Steller Achievers

- *Stellar Achievers* are positioned as leaders in managing uncertainty, but they could explore ways to translate this strength into a more distinctive customer experience, potentially improving their CSQI scores.
- **CPI:** They significantly exceed the industry benchmark, with CPI scores ranging from 5.56 to 6.60. This suggests these providers are exceptionally well-prepared for operational uncertainties, likely due to robust risk management strategies, strong contingency planning, and superior adaptability.
- **CSQI:** Despite their high preparedness, their CSQI (4.0 for individual and 3.9 for organizational customers) scores are below the industry average score of 4.726. This indicates that while these providers excel in uncertainty management, there might not be a significant perceived difference in service quality from the customer perspective.

b) Strong Contenders

- Strong Contenders should focus on enhancing their uncertainty management capabilities to move into the *Stellar Achievers* category. Additionally, they should consider strategies to differentiate their service quality to stand out from competitors.
- **CPI:** They show solid, though not exceptional, preparedness, with CPI scores close to or slightly above the industry average (ranging from 4.51 to 5.46). This suggests

these providers are competent in handling uncertainties but may lack the advanced strategies or flexibility seen in *Stellar Achievers*.

- **CSQI:** Similar to *Stellar Achievers*, their service quality scores below average than the average industry index score. This consistency across the board reflects a reliable but not standout customer experience.

c) Steady Performers

- *Steady Performers* should aim to strengthen their risk management and preparedness strategies to avoid potential pitfalls during disruptions. Improving service quality could also help them transition into the *Strong Contenders* category.
- **CPI:** These CEPs have CPI scores slightly below the industry average (ranging from 3.91 to 4.48), indicating adequate but not exceptional preparedness. They likely maintain stable operations but may be more vulnerable to disruptions compared to higher-performing clusters.
- **CSQI:** Their CSQI scores are aligned with the industry average, suggesting a consistent but less fulfilling service experience. The slight dip seen in CEP-G20 (3.432 for individual customers) suggests potential areas of concern.

d) Developing Players:

- *Developing Players* must prioritize enhancing their preparedness for uncertainty to avoid further performance declines. They should also leverage their adequate service quality as a foundation for broader improvements in their operations.
- **CPI:** These CEPs have CPI scores well below the industry average (ranging from 2.60 to 3.46), highlighting significant challenges in preparedness. These providers may struggle with operational disruptions, indicating a need for substantial improvements in risk management and adaptability.
- **CSQI:** Despite their low CPI, their CSQI scores remain consistent with the industry average. This suggests that while they may be underprepared for uncertainty, customers perceive their service quality to be on par with industry standards.

9.11 India Post vs private CEP service providers

9.11.1 Preparedness of India Post compared to private CEPs: India Post has a CPI of 4.31, placing it in the *Steady Performers* cluster. This score is slightly below the overall industry benchmark of 4.73, indicating that while India Post is relatively

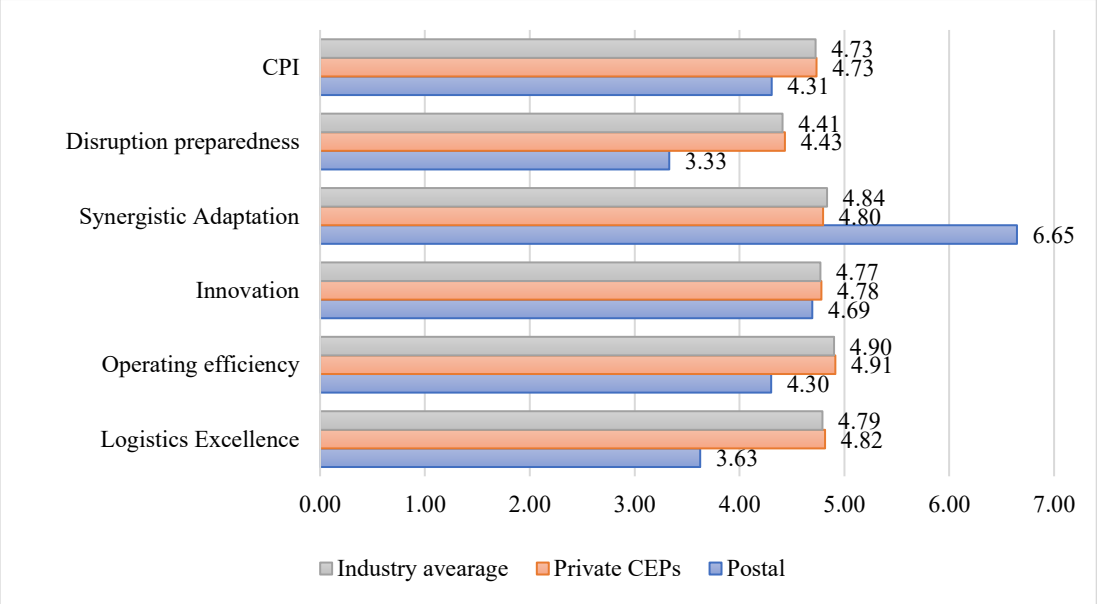
stable, it lags behind in terms of preparedness when compared to many private players in the industry. 33 courier service providers have a higher performance score than India Post, while 14 providers have a lower performance score. While this doesn't indicate a significant shortfall, it does suggest that India Post is less prepared for uncertainties as compared to some of its private competitors, especially those in the *Stellar Achievers* cluster, who score significantly higher (ranging from 5.56 to 6.60). This gap highlights potential vulnerabilities in India Post's operational or strategic planning processes that might hinder its ability to adapt to unforeseen challenges. The higher CPI scores among private players reflect their likely investment in advanced technologies, risk management practices, and agile operational models. These factors are crucial in a rapidly changing market where adaptability and resilience are key to maintaining service quality and customer satisfaction. The ranking of parameters for both the sectors is given in Table 9.4.

Table 9.4 Ranking of CPI parameters for India post and Private CEP service providers

Parameters	***Index Score***			
	India Post	**Rank**	**Private CEPs**	**Rank**
Logistics Excellence	3.63	4	4.82	2
Operating efficiency	4.30	3	4.91	1
Innovation	4.70	2	4.78	4
Synergistic Adaptation	6.65	1	4.80	3
Disruption preparedness	3.33	5	4.43	5

Source: Author's own calculation

The overall industry CPI score indicates a moderate level of preparedness for uncertainties. Private CEPs scoring slightly higher show they are marginally better equipped to handle uncertainties compared to the overall industry (Figure 9.6). Compared to the industry average, the postal department showed less preparedness for uncertainties. This could be due to bureaucratic constraints, slower adaptability, or outdated processes compared to more agile private competitors.



Source: Authors own calculation

Figure 9.7 Competitive preparedness of postal and Private CEP service providers

a) ***Logistics Excellence:*** Private CEPs demonstrate strong capabilities in managing logistics efficiently, likely driven by advanced technology, better resource allocation, and optimized supply chain management. The postal department lags significantly. This disparity suggests that it struggles with logistical challenges, possibly due to its vast network, legacy systems, or inefficiencies in resource management.

b) ***Operating Efficiency:*** Private CEPs reflect highly optimized operations that likely benefit from streamlined processes and modern technology. The postal department's operating efficiency is below industry standards. This indicates potential inefficiencies in its operations, which may stem from legacy systems, less agile processes, or a more extensive and complex network.

c) ***Innovation:*** Both the overall industry and private CEPs have similar innovation scores, showing a general trend towards embracing new technologies and innovative practices in the sector. Postal department's innovation score, while close to the industry average, is still lower, suggesting that while it is making efforts to innovate, it may not be keeping pace with the rapid changes and advancements embraced by private players.

d) ***Synergistic Adaptation:*** *The* Postal department's highest strength during disruption is in integrating its services with existing systems and networks, leveraging its extensive reach and governmental support. This strength could be attributed to its

ability to synergize operations with other public services and its adaptability in leveraging its vast infrastructure. While private CEPs indicate strong adaptability but with less emphasis on leveraging synergies across broader public networks.

e) ***Disruption Preparedness*:** Private CEPs have slightly higher disruption preparedness, likely due to their investment in contingency planning, technology, and flexible operations. The postal department faces more difficulty during periods of crisis or unexpected disruptions, possibly due to slower decision-making processes, reliance on traditional methods, or lack of rapid-response infrastructure.

9.11.2 Courier (Postal) Service Quality Index (CSQI)

India Post's CSQI scores—3.43 for individual customers and 3.92 for organizational customers—are slightly lower than the industry average for most other providers. This lower perception of service quality may be contributing to its weaker preparedness score. The slight deviation suggests that both individual and organizational customers may perceive India Post's service as less responsive or efficient compared to private players. Customer service quality is often a reflection of an organization's overall operational efficiency. Lower *CSQI* scores may indicate issues such as slower response times, less personalized service, or outdated infrastructure, which can directly impact an organization's ability to manage uncertainties effectively.

As a *Steady Performer*, India Post demonstrates a level of consistency that is commendable, especially given its role as a government entity with vast reach. However, consistency in this context also suggests a potential lack of innovation or agility, especially when compared to private companies that are setting new benchmarks in preparedness and service quality during uncertain times. India Post's vast scale and reach, while a significant strength, also pose challenges in terms of agility. To improve its CPI, India Post might need to balance its extensive network with more agile and flexible operations that can quickly adapt to changes in the market or unexpected disruptions.

a) Perspective of individual customers on the preparedness of CEP service providers:

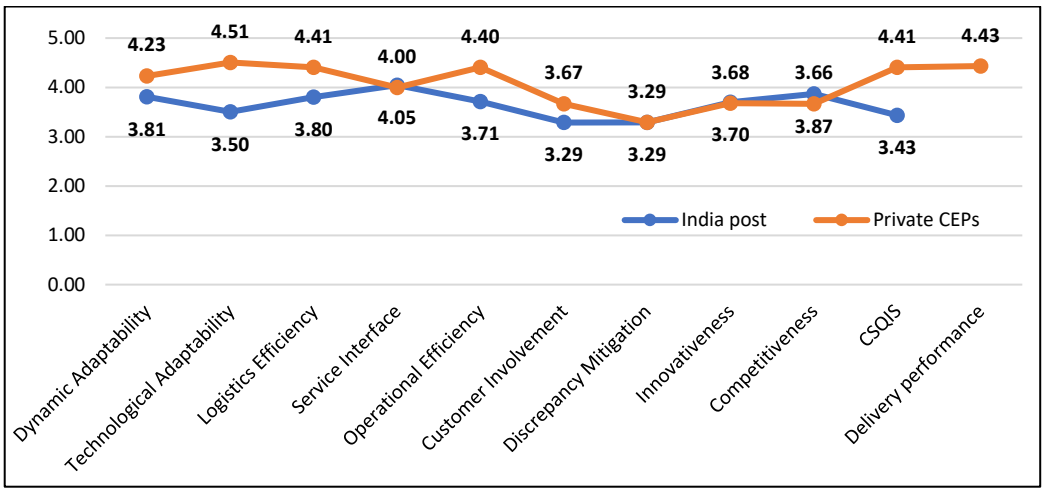


Figure 9.8 Comparison of India Post and private CEPs from the perspective of individual customers

Individual customers' opinions reveal intriguing disparities. Private CEPs markedly surpass India Post in dynamic adaptability, technological adaptation, logistics efficiency, and operational efficiency (Figure 9.8). This indicates that private services are regarded as more technologically sophisticated, flexible, and efficient in their logistics and business operations. India Post exhibits strengths in Service Interface and Competitiveness, suggesting that individual customers may like the service experience and perceive greater cost-effectiveness in these domains. Both services exhibit nearly identical scores in Innovativeness, indicating equivalent perceptions of innovation amongst them. Private CEPs have superior performance in customer involvement and discrepancy minimization, indicating enhanced customer interaction and issue resolution capabilities. The customer service quality index (CSQI) score underscores the private sector's superiority over India Post. Delivery performance is another domain in which private services dominate. The data indicates that, although India Post retains competitiveness in specific domains, individual customers perceive Private CEPs as more efficient, adaptive, and technologically savvy.

b) *Perspective of organizational (B2B and B2C) customers on the preparedness of CEP service providers:*

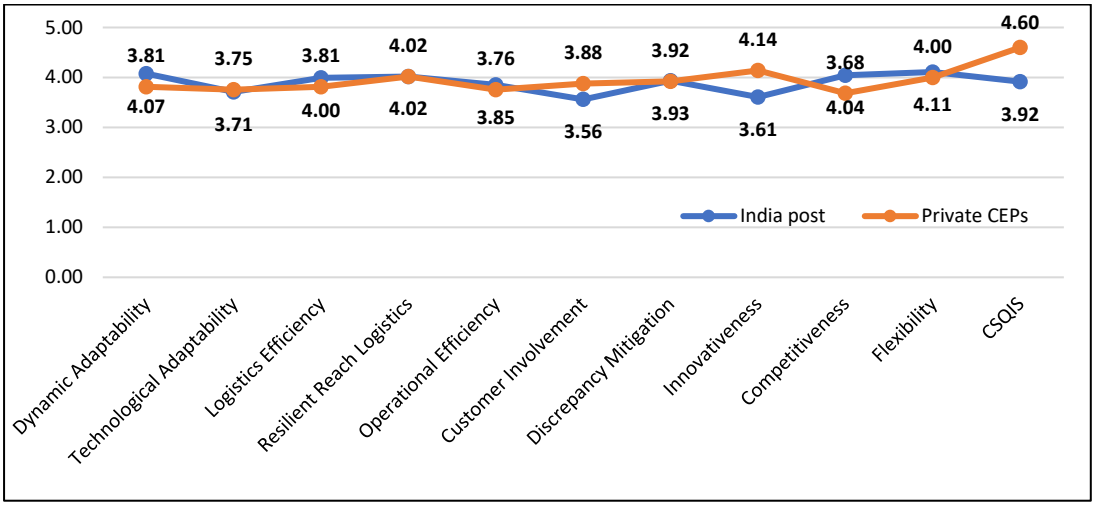


Figure 9.9 Comparison of India Post and private CEPs from the perspective of organizational customers

The analysis of index values for organizational customers indicates that India Post typically outperforms private CEPs in multiple critical dimensions. India Post excels in *dynamic adaptability, logistical efficiency*, and *flexibility*, suggesting that organizational clients regard it as more responsive to evolving logistical requirements than private CEPs (Figure 9.9). Conversely, private CEPs excel in *innovativeness* and *customer involvement*, indicating that they are regarded as more innovative and more effective in involving customers during the delivery process. The scores for *technological adaptation* are comparable, suggesting analogous views on technological integration from both parties. Both services possess an equivalent score in *resilient reach logistics* and *discrepancy mitigation*, indicating comparable efficacy in maintaining logistical resilience and managing service failures. India Post is perceived as more competitive, maybe indicating more cost-effectiveness or value for corporate users. The *CSQI score* indicates a somewhat superior performance for India Post, suggesting that organizational clients exhibit a modest preference for India Post over Private CEPs in terms of overall service quality and, in turn, readiness to handle any disruptive event. During disruptions, the extensive and accessible infrastructure enables postal services to enhance communication with customers, particularly with government support, leading to improved service performance. Conversely, private CEPs may have had disruptions in communication with customers owing to logistical limitations. Postal services often function with governmental support and may possess pricing advantages against private CEPs, particularly during crises when they are anticipated to deliver essential services. Although Private CEPs

prioritize profitability and efficiency, postal services maintain operations with reduced costs, adaptable pricing, and even subsidies during the pandemic, enhancing their competitiveness. Moreover, postal services sometimes possess universal service duties, guaranteeing reliable coverage even when private courier and express parcel providers are compelled to reduce operations in less lucrative areas or encounter supply chain interruptions.

9.12 Factors affecting CEP service delivery during pandemic disruptions

Key factors impacting the CEP sector during COVID-19 have been outlined in Figure 9.10.

- ***Customer Expectations:*** With people staying indoors during COVID-19, there is a growing demand not only for fast delivery but also for same-day delivery, impacting the efficiency of last-mile delivery services. COVID-related restrictions have also led some customers to pick up orders from local hubs, complicating the process. Additionally, insufficient information provided by customers can further hinder effective last-mile delivery.
- ***Health Concerns:*** Health considerations have become paramount during COVID-19, driving a surge in e-commerce. Last-mile delivery workers are particularly vulnerable in this scenario, as they remain in direct contact with the logistics chain, making them more susceptible.
- ***Delivery Density:*** Lockdowns and restricted access have increased order volumes, creating challenges for last-mile drivers to manage high-density deliveries effectively under pandemic constraints.
- ***Cost of Last-Mile Delivery:*** The rising costs of fuel and health-related safety measures due to COVID-19 have posed significant challenges for many companies in maintaining efficient last-mile deliveries.
- ***Types of Goods:*** The nature of certain goods can present additional challenges, especially for bike couriers transporting them across various locations, as not all items can be sanitized effectively.

Fig. 9.10 Factors affecting last-mile delivery

- ***Routing Efficiency:*** COVID-19 lockdowns and heightened order volumes complicate efficient route planning, making it more challenging to complete last-mile deliveries smoothly.
- ***Infrastructure:*** Last-mile deliveries often involve navigating long, inefficient routes, which can lead to unplanned detours and increase fuel costs, impacting overall delivery efficiency.
- ***Unpredictable Transit Conditions:*** With COVID-19 lockdowns implemented unpredictably, delivery timelines are often disrupted when areas are suddenly locked down after an order is placed.
- ***Meeting deadlines:*** Missing delivery deadlines can be costly for brands, both immediately and in the long run. Limited resources, high demand, and numerous constraints during COVID-19 have made it even more challenging to meet delivery timelines in the last mile

9.13 Changes made in the Postal sector so far

There is a visible difference between India Post's CSQI from the perspectives of individual and organizational customers. The sluggish implementation of service quality methodologies in the public sector has had an effect on key performance indicators (KPIs) and market standing. India Post is trying to persevere in delivering exceptional services, enhancing key performance indicators (KPIs) by implementing the mail network optimization project (MNOP). All while maintaining strict compliance with government laws, rules, and regulations. In recent times, the Indian postal industry has prioritized the implementation of *e-services* to improve the quality of service, improve user-friendliness, and boost customer satisfaction.

- ***Core service:*** The postal department has improved its primary services and broadened its range of services to encompass savings accounts, insurance, gold bond investments, Aadhaar enrollment and updates, bill payments, academic fee payments, and passport services. In addition, it offers money remittance services such as Western Union money transfer and money orders, as well as a range of mail services including Inland Letter Cards (ILC), business post, logistics post, direct post, data post, and media post, and Book Now Pay Later (BNPL). India Post is now working on expanding its operating hours in order to enhance service quality. This will be achieved by providing various time slots, including 8:30 a.m. to 4:30 p.m., 9:00 a.m. to 5:00 p.m., and 9:30 a.m. to 5:30 p.m. Additionally, it is possible to make reservations at the primary sorting facilities until 7:30 p.m. Moreover, in larger urban areas, this service may potentially be accessible during nighttime hours.
- ***Changes in business model:*** To stay ahead in a market that is always changing, India Post needs to focus on its fundamental business model, which is mail services. Diversification is good, but these new businesses shouldn't take away from India Post's main business, which has been its identity for a long time. Focusing on mail services is important because this is still the organization's main strength and an important service, especially in a big country like India, where many places still use the mail. India Post can protect its image and meet customer needs by making mail services faster, more reliable, and more efficient. This is especially important in a market where private courier companies are becoming more popular. Also, the mail service industry isn't staying the same; it can be

innovative by taking advantage of its unique competitive advantage, such as it's large network and renowned brand.

- ***Process systematization in postal:*** As of 2017, the Indian mail service had a well-established tracking system with strong centralized control that was put in place in 2008. A digital signature feature was added the same year, but it had to be put on hold for a while because of the COVID-19 pandemic. The mail service puts fixing any delivery problems or mistakes at the top of its list of priorities and is very strict about it, even firing employees who break contracts. India Post has put up surveillance cams to keep an eye on the mail delivery process all the time to make things clearer. The process starts at a post office with booking. Next, receipts are made, sorted, and sent out at big sorting centers. Finally, the delivery office manages the final delivery along a set route. India Post has recently switched from the "Maghdoot" Management System to the Delivery Post Management System (DPMS). "Maghdoot" was stand-alone software. DPMS, on the other hand, is built on SAP (System Applications and Products) and was made by TCS to deliver articles. The main server is in Navi Mumbai, and the recovery server is at the Center for Excellence in mail Technology (CEPT) in Bengaluru. This system is linked to an online server network that covers the whole Indian mail service. Kerala, Tamil Nadu, and Mysuru. New postal workers in Assam and the northeastern area can get 30 to 45 days of training at the Postal Training Centre (PTC) in Guwahati. Training is given to people based on their educational background and merits, with a focus on office workers and inspectors. Also, workers who need to get updates on delivery article software get two weeks of training at the postal service in their area. This in-depth training makes sure that employees are ready to meet the changing needs of the mail system and keep up high standards of service and efficiency.
- ***Improved services:*** In order to improve operational performance, the workplace environment, and social practices, the Indian postal department recently started using lean manufacturing methods at the NSH Mangalore office and the RMS office in Chennai. They looked at eight different plans and chose the most workable one using advanced MCDM techniques like AHP, TOPSIS, Fuzzy TOPSIS, GRA, DEA, and Heuristics (Murugesan et al., 2020; Vadivel et al., 2020). After spending about 3.5 lakhs to redesign the plan, production has greatly improved, cycle times

have been cut, floor space has been used more efficiently, and the post office looks better overall. As part of a better cleaning plan, visual signboards were put up to make the workplace even better. As well as better lighting in the sorting area and better ventilation, the office now has a newer air conditioning system and better visual comfort (Vadivel, 2020). These improvements are in line with the mail service's long-term plan to improve service quality (SQ) over the next few decades. Getting to the top of the business mail service market in the country is the goal, along with raising the general quality of service. Along with these changes, the department is thinking about spending more on teaching employees in lean management and providing excellent customer service. This all-around method aims to not only improve operational efficiency but also make employees more engaged and productive, which will help India Post reach its long-term strategic goals.

- ***Automation in sending or receiving consignments:*** In recent years, Western postal companies have made significant investments in research and development, which has resulted in innovations that have fortified their market position (Madlenakova et al., 2019). These endeavors encompass the implementation of advanced monitoring technologies such as RFID and NFC, the automation of sorting processes, the optimization of networks, and the upgrading of transport fleets (Vaculik et al., 2012). Although the primary objective has frequently been to enhance last-mile delivery, certain organizations are also enhancing first-mile collection to comply with Universal Service quality standards (Vaculik et al., 2012; Turska et al., 2019). Furthermore, they are investigating the potential of AI and machine learning (Murugesan et al., 2020; Vadivel et al., 2020) to enhance customer service and streamline operations, thereby ensuring their competitiveness in a market that is swiftly evolving.

9.14 Challenges ahead for CEP service providers

The market is changing quickly, which is hard for companies that are already in it because they have to deal with leftover costs and traditional methods of doing business. At the same time, competitors are moving quickly to take advantage of new possibilities. Here are three important parts of the market and challenges in this sector (Figure 9.11).

- ***E-commerce Customer preference*:** More and more, customers want faster, clearer, and more convenient package service at the same or lower prices. Even though there are new premium services like same-day delivery, about 70% of people still want free shipping, and they're buying more things online, change in buying patterns.
- ***E-commerce Retailers*:** Big e-commerce companies like Amazon are taking over the online shopping business, making it more concentrated. These leaders plan to offer many delivery choices, such as packages at specific times and advanced tracking, which have quickly become standard in the industry.
- ***New B2C Parcel Competitors*:** As new B2C competitors, such as well-funded start-ups, join the market, it's hard for CEPs to cover the costs of new products. Newcomers to e-commerce are ready to give up short-term profits to get a bigger share of the market. This puts pressure on logistics partners to cover costs or risk losing business to in-house logistics providers or multiple third-party logistics providers.
- ***Logistics Cost:*** It's getting harder for postal services to compete because customers are becoming pickier. It's also hard for market leaders to compete because they have to deal with legacy costs like 20-31 percent higher labor costs and rigid workforce structures. Some rules, like the universal service obligation (USO), require a lot of service to be provided at set prices. This makes it hard to lower these costs.
- ***Capabilities:*** The slow internet connectivity and power outage hinder the digital capabilities of CEPs in implementing advanced tracking systems, mobile applications, and real-time delivery updates are now perceived to be inferior in comparison to emerging e-commerce competitors. Encumbered by antiquated and intricate information technology systems, they encounter difficulties in promptly implementing digital advancements. The slower pace and risk-averse nature of their corporate cultures, specially for the postal sector, coupled with the absence of a well-defined and targeted digitalization plan, pose additional obstacles to their capacity to effectively compete, particularly in light of the erosion of their conventional competitive advantages by newer market participants.
- ***Geographical bottleneck:*** There is a substantial risk that courier express and parcel (CEP) service providers will face in Northeast India because of the political

instability, geographical challenges, and socioeconomic problems that are present there. Supply chains and delivery routes are disrupted as a result of ongoing hostilities, which, when combined with the rugged terrain of the region and the regular occurrence of natural disasters, lead to delays and an increase in operating costs. Inadequate infrastructure, which includes things like inadequate road networks and restricted digital access, makes logistics even more complicated and makes it more difficult to use various advanced tracking technologies. In addition, the region's economic stagnation restricts the chances for commerce, and the security dangers posed by insurgent activities increase concerns about the safety of commodities that are in transit. CEP providers are placed in a high-risk environment as a result of these variables, which makes it difficult for them to maintain dependable services, manage expenses, and satisfy the expectations of their customers. This might potentially affect their future operations and capacity for expansion in the region.

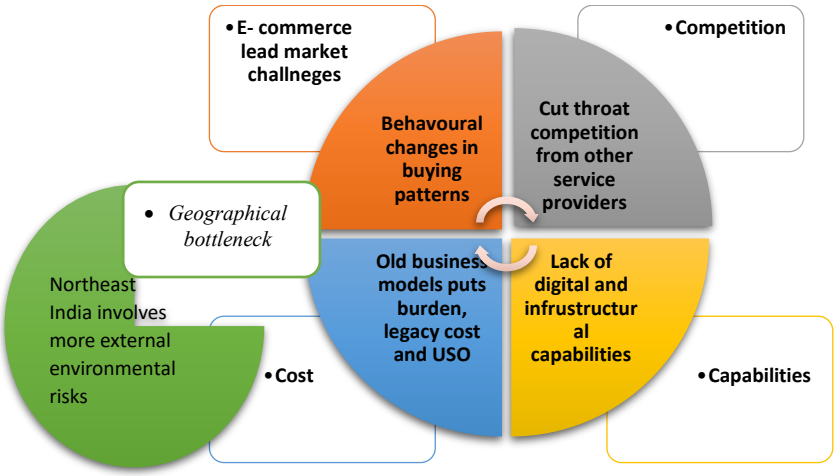


Figure 9.11 Key challenges for CEP service providers

9.15 Conclusion

Conventional organizational models and structures may lack the adaptability necessary for the current rapid and unpredictable environment. Disruptions to be considered for the new age, organizational leaders require specific advice to navigate the distinct problems posed by such disruptions, the recovery phase, and subsequent periods. Damage to long-term planning came from disruptions to regular routines and the revelation of system vulnerabilities. Adaptability, creativity, and resilience are the qualities that can help us overcome disruptions. The recent global pandemic is a sobering reminder that unexpected

obstacles can happen at any time, requiring united efforts to mitigate their effects and construct a future that is stronger and more adaptable. Of all the sectors hit hard by the pandemic, courier services were an absolute lifesaver, allowing essential goods and services to keep flowing. Disruptions presented challenges, but also provide opportunities for innovation and transformation in the sector. Ensuring service continuity and maintaining economic stability requires a robust courier infrastructure.

The purpose of this study is to assess the courier, express, and parcel industry's resilience to disruptions, with an emphasis on determining the aspects of uncertainty readiness and service quality that support overall resilience. This study provides insight into the industry's resilience in a number of areas by employing a data-driven methodology. An approach is proposed to calculate CEP's resilience from survey results and construct composite indices. This study conducted a comprehensive analysis of the resilience and competitive positioning of courier and express service providers (CEPs) in a rapidly evolving market environment.

Objective 1, identified the products-process-services innovation that CEPs introduce beyond their core offerings to meet changing market demands. The results are presented utilizing graphs, figures, and regression analysis. *Objective 2*, focused on identifying and evaluating the resources, capabilities, and value additions that significantly enhance a CEP provider's competitive advantage, using factor analysis and partial least square structural equation modeling (PLS-SEM) for a robust examination. *Objective 3,* examined operating efficiency, revealing opportunities for CEPs to optimize productivity. This analysis employed regression, line graphs, and tables to visually and statistically represent efficiency levels. *Objective 4*, provided insights into service quality dimensions, perceived customer satisfaction, and behavioral intentions from the customer's perspective, with findings derived through factor analysis and PLS-SEM. The study also investigated the linkages among courier service quality dimensions and customer satisfaction, as well as the links between customer satisfaction, loyalty, and disloyalty dimensions. Furthermore, it investigates the relationship with willingness to pay. Finally, *Objective 5*, introduced composite indices to gauge market competitiveness and address the supply-demand gap among CEP providers. This framework leveraged current market data of CEP service providers to calculate the Competitive Preparedness Index (CPI) and service quality data to compute the Courier Service Quality Index (CSQI) for both individual and organizational users. Analytical tools, including one-way ANOVA, line diagrams, and

tables, were employed, with verification through statistical metrics such as R^2, RMSE, MSE, MAE, MAPE, and Bland-Altman plot. This study has made several contributions, which are discussed in the next chapter.