BHARAT HERALD

Ad Hoc Business Requests – Media Analytics

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Date : September 2025

All Queries : .Sql File Download

Introduction

*This document answers selected ad-hoc business requests using SQL queries on media datasets (**fact_print_sales, fact_ad_revenue, fact_city_readiness, fact_digital_pilot, dim_city, dim_ad_category**). The insights aim to help identify circulation declines, revenue concentration, efficiency leaders, readiness growth, multi year decline and digital engagement outliers.*

Business Request – 1 : Quaterly Circulation Drop Check

Objective

Generate a report showing the top 3 quater (2019–2024) where any city recorded the sharpest quarter-over-quarter decline in net circulation.

Data Used

- print_circulation_new
- city_new

SQL Query

```
WITH cleaned AS (
SELECT c.city AS city_name,
pc.Year AS year, UPPER(pc.quater) AS quater, pc.copies_sold,
CASE UPPER(pc.quater)
WHEN 'Q1' THEN 1
WHEN 'Q2' THEN 2
WHEN 'Q3' THEN 3
WHEN 'Q4' THEN 4
END AS q_num
FROM print_circulation_new pc
JOIN city_new c ON pc.City_ID = c.city_id
WHERE pc.Year BETWEEN 2019 AND 2024
),

base AS (
SELECT city_name, year, quater, q_num,
SUM(copies_sold) AS net_circulation
```

```
FROM cleaned
GROUP BY city_name, year, quater, q_num
),
with_lag AS (
SELECT city_name, year, quater, net_circulation,
LAG(net_circulation) OVER (
PARTITION BY city_name
ORDER BY year, q_num
) AS prev_net
FROM base
)
SELECT city_name, year, quater, net_circulation,
(prev_net - net_circulation) AS drop_amount_from_previous_quater
FROM with_lag
WHERE prev_net IS NOT NULL
AND net_circulation < prev_net
ORDER BY drop_amount_from_previous_quater DESC
LIMIT 3;
```

city_name	year	quater	net_circulation	drop_amount_from_previous_quater
Varanasi	2020	2020-Q2	1280371	122217
Varanasi	2024	2024-Q2	1023475	120815
Kanpur	2020	2020-Q3	1024739	119158

Insights

- The sharpest quarterly circulation drop was observed in **Varanasi (2020-Q2)** with a decline of **122,217 copies** compared to the previous quarter.

- Another significant decline occurred in **Varanasi (2024-Q2)** with a drop of **120,815 copies**, indicating a recurring challenge in this city.

- **Kanpur (2020-Q3)** also recorded a major decline of **119,158 copies**, highlighting regional circulation pressures during 2020.

- These consistent declines in Varanasi suggest that the city may face **systemic circulation challenges**, whereas Kanpur's decline appears to be **event-driven in 2020**.

- Business teams should investigate **external market conditions, seasonal demand shifts, or operational inefficiencies** during these quarters to prevent similar sharp declines in future.

Business Request – 2 : Yearly Revenue Concentration by Category

Objective

Identify ad categories that contributed > 50% of total yearly ad revenue.

Data Used

- ad_revenue_new
- ad_category_new

SQL Query

```
WITH category_yearly AS (
SELECT ar.year, ac.standard_ad_category AS category_name,
SUM(ar.final_revenue_inr) AS category_revenue
FROM ad_revenue_new ar
JOIN ad_category_new ac ON ar.ad_category = ac.ad_category_id
GROUP BY ar.year, ac.standard_ad_category
),
year_totals AS (
SELECT year, SUM(category_revenue) AS total_revenue_year
FROM category_yearly
GROUP BY year
)
SELECT cy.year, cy.category_name, cy.category_revenue, yt.total_revenue_year,
ROUND((cy.category_revenue / yt.total_revenue_year) * 100, 2) AS pct_of_year_total
FROM category_yearly cy
JOIN year_totals yt ON cy.year = yt.year
```

ORDER BY pct_of_year_total DESC;

year	category_name	category_revenue	total_revenue_year	pct_of_year_total
2019	Government	127431229.61	358568488.14	35.54
2021	Real Estate	125182011.38	361503812.26	34.63
2023	Real Estate	115140971.15	369515410.53	31.16
2022	Real Estate	108812135.88	355200016.13	30.63
2024	Real Estate	112062792.67	365999318.17	30.62
2022	Government	108544305.50	355200016.13	30.56
2020	Government	106000917.63	348775525.08	30.39
2024	Government	106241487.72	365999318.17	29.03
2020	Real Estate	97915144.71	348775525.08	28.07
2021	Government	101027625.19	361503812.26	27.95
2023	Government	102644598.54	369515410.53	27.78
2020	Automobile	91398560.89	348775525.08	26.21

Insights

- Across all years (2019–2024), **no single ad category contributed more than 50%** of the yearly ad revenue.
- The **highest concentration observed** was from the **Government** category in 2019 (35.54%), still far below the 50% threshold.
- Other strong contributors include **Real Estate**, with shares ranging from ~27% to 34% across multiple years, indicating consistency.
- A diversified ad revenue base is **healthy for long-term stability**, but it also implies **no single category dominance** — growth strategies may need to focus on **broadening multiple categories** rather than relying on one.

Business Request – 3 : Print Efficiency Leaderboard (2024)

Objective

For 2024, rank cities by print efficiency = net_circulation / copies_printed. Return top 5.

Data Used

- print_circulation_new
- city_new

SQL Query

```
WITH city_efficiency AS (
SELECT c.city AS city_name,
SUM(pc.Copies_print) AS copies_printed_2024,
SUM(pc.Copies_print - pc.Copies_wastage) AS net_circulation_2024,
SUM(pc.Copies_print - pc.Copies_wastage) / SUM(pc.Copies_print) AS efficiency_ratio
FROM print_circulation_new pc
JOIN city_new c ON pc.City_ID = c.city_id
WHERE pc.Year = 2024
GROUP BY c.city
)
SELECT city_name, copies_printed_2024, net_circulation_2024,
ROUND(efficiency_ratio, 4) AS efficiency_ratio,
RANK() OVER (ORDER BY efficiency_ratio DESC) AS efficiency_rank_2024
FROM city_efficiency
ORDER BY efficiency_rank_2024
LIMIT 5;
```

city_name	copies_printed_2024	net_circulation_2024	efficiency_ratio	efficiency_rank_2024
Ranchi	2200753	2092062	0.9506	1
Ahmedabad	2896757	2746691	0.9482	2
Patna	2379688	2252819	0.9467	3
Jaipur	4361397	4128641	0.9466	4
Varanasi	4357583	4123611	0.9463	5

Insights

- **Ranchi** leads the 2024 print efficiency leaderboard with a **95.06% efficiency ratio**, meaning almost all printed copies were successfully circulated.
- **Ahmedabad (94.82%)**, **Patna (94.67%)**, **Jaipur (94.66%)**, and **Varanasi (94.63%)** follow closely, showing a **narrow efficiency gap** among the top 5 cities.
- The **difference between Rank 1 (Ranchi) and Rank 5 (Varanasi)** is less than **0.5 percentage points**, indicating **high consistency in efficiency** across the leading cities.
- Ranchi's performance demonstrates **operational excellence in circulation management**, while the close margins suggest that **other cities are nearly as efficient**, leaving little room for differentiation.
- For business strategy, the focus should shift from improving efficiency (already >94% in top cities) to **expanding circulation volumes** or **boosting ad revenue** in these high-efficiency cities.

Business Request – 4 : Internet Readiness Growth (2021)

Objective

For each city, compute the change in internet penetration from Q1-2021 to Q4-2021 and identify the city with the highest improvement.

Data Used

- city_readiness_new
- city_new

SQL Query

```
SELECT c.city AS city_name, cr.year,

ROUND(AVG(CASE WHEN cr.quater = 'q1' THEN cr.internet_penetration END), 2) AS
internet_penetration_rate_q1,

ROUND(AVG(CASE WHEN cr.quater = 'q4' THEN cr.internet_penetration END), 2) AS
internet_penetration_rate_q4,

ROUND((AVG(CASE WHEN cr.quater = 'q4' THEN cr.internet_penetration END) -

AVG(CASE WHEN cr.quater = 'q1' THEN cr.internet_penetration END)), 2

) AS delta_internet_penetration_rate

FROM city_readiness_new cr

JOIN city_new c ON cr.city_id = c.city_id

WHERE cr.year = 2019 AND cr.quater IN ('q1','q4')

GROUP BY c.city, cr.year

ORDER BY delta_internet_penetration_rate DESC;
```

city_name	year	internet_penetration_rate_q1	internet_penetration_rate_q4	delta_internet_penetration_rate
Kanpur	2019	74.50	76.65	2.15
Patna	2019	66.51	67.74	1.23
Bhopal	2019	66.77	67.37	0.60
Varanasi	2019	74.61	75.06	0.45
Mumbai	2019	74.58	75.01	0.43
Lucknow	2019	56.53	56.94	0.41
Delhi	2019	48.58	48.62	0.04
Jaipur	2019	10.00	10.00	0.00
Ranchi	2019	63.90	63.88	-0.02
Ahmedabad	2019	76.09	74.26	-1.83

Insights

- **Kanpur** recorded the **highest improvement** in internet penetration in 2019, with a **+2.15 percentage point increase** from Q1 (74.50%) to Q4 (76.65%).

- **Patna (+1.23)** and **Bhopal (+0.60)** also showed steady growth, signaling **positive digital adoption trends** in these regions.

- Major metros like **Varanasi, Mumbai, and Lucknow** experienced only **marginal improvements (~0.4–0.5)**, suggesting that penetration levels may already be **nearing saturation**.

- **Ranchi (-0.02)** and **Ahmedabad (-1.83)** witnessed **declines**, with Ahmedabad showing a significant drop. This could be due to **data inconsistencies, temporary market disruptions** in these areas.

- The results highlight **smaller cities like Kanpur and Patna as fast growing digital markets**, while larger urban centers may need **policy or infrastructure boosts** to sustain growth.

Business Request – 5 : Consistent Multi-Year Decline (2019→2024)

Objective

Find cities where both net_circulation and ad_revenue decreased every year from 2019 through 2024 (strictly decreasing sequences).

Data Used

- print_circulation_new
- city_new

SQL Query

```
WITH

net AS (

SELECT pc.City_ID AS city_id, pc.Year  AS year,

SUM(pc.copies_sold) AS yearly_net_circulation

FROM print_circulation_new pc

WHERE pc.Year IN (2019, 2024)

GROUP BY pc.City_ID, pc.Year

),

edition_city AS (

SELECT DISTINCT edition_ID, City_ID AS city_id, Year AS year

FROM print_circulation_new

WHERE Year IN (2019, 2024)

),

ad_by_city AS (

SELECT ec.city_id, ar.year AS year,

SUM(ar.final_revenue_inr) AS yearly_ad_revenue
```

```
FROM ad_revenue_new ar
JOIN edition_city ec ON ar.edition_id = ec.edition_id
AND ar.year = ec.year
WHERE ar.year IN (2019, 2024)
GROUP BY ec.city_id, ar.year
),
combined AS (
SELECT cy.city_id, cy.year,
COALESCE(n.yearly_net_circulation, 0) AS yearly_net_circulation,
COALESCE(a.yearly_ad_revenue, 0) AS yearly_ad_revenue
FROM (SELECT city_id, year FROM net
UNION
SELECT city_id, year FROM ad_by_city) cy
LEFT JOIN net n ON cy.city_id = n.city_id AND cy.year = n.year
LEFT JOIN ad_by_city a ON cy.city_id = a.city_id AND cy.year = a.year
),
pivoted AS (
SELECT c.city AS city_name,
MAX(CASE WHEN year = 2019 THEN yearly_net_circulation END) AS net_2019,
MAX(CASE WHEN year = 2024 THEN yearly_net_circulation END) AS net_2024,
MAX(CASE WHEN year = 2019 THEN yearly_ad_revenue END)     AS ad_2019,
MAX(CASE WHEN year = 2024 THEN yearly_ad_revenue END)     AS ad_2024
FROM combined co
JOIN city_new c ON co.city_id = c.city_id
GROUP BY c.city
)
SELECT city_name,
net_2019 AS circulation_2019,
net_2024 AS circulation_2024,
```

```
(net_2024 - net_2019) AS circulation_changed,
ad_2019  AS ad_revenue_2019,
ad_2024  AS ad_revenue_2024,
(ad_2024 - ad_2019) AS revenue_changed,
CASE
WHEN (net_2024 - net_2019) < 0 THEN 'YES'
ELSE 'NO'
END AS declining_print,
CASE
WHEN (ad_2024 - ad_2019) < 0 THEN 'YES'
ELSE 'NO'
END AS declining_adrevenue,
CASE
WHEN (net_2024 - net_2019) < 0 AND (ad_2024 - ad_2019) < 0 THEN 'YES'
ELSE 'NO'
END AS declining_both

FROM pivoted
ORDER BY revenue_changed DESC;
```

city_name	circulation_2019	circulation_2024	circulation_changed	ad_revenue_2019	ad_revenue_2024	revenue_changed	declining_print	declining_adrevenue	declining_both
Patna	3020231	2252819	-767412	40350836.00	47745174.01	7394338.01	YES	NO	NO
Varanasi	5531144	4123611	-1407533	25659052.15	32258238.41	6599186.26	YES	NO	NO
Jaipur	5589285	4128641	-1460644	36759453.43	41147917.94	4388464.51	YES	NO	NO
Lucknow	2336155	1763256	-572899	37332719.38	40550226.67	3217507.29	YES	NO	NO
Ranchi	2775795	2092062	-683733	38652487.88	39746147.82	1093659.94	YES	NO	NO
Bhopal	3268206	2418567	-849639	38410415.70	37200256.86	-1210158.84	YES	YES	YES
Mumbai	4742773	3569229	-1173544	36530190.99	34633463.24	-1896727.75	YES	YES	YES
Ahmedabad	3624541	2746691	-877850	37238300.79	35181141.05	-2057159.74	YES	YES	YES
Kanpur	4345778	3250179	-1095599	34221885.70	31411562.47	-2810323.23	YES	YES	YES
Delhi	4354258	3252010	-1102248	33413146.12	26125189.70	-7287956.42	YES	YES	YES

Insights

- **All cities experienced a decline in print circulation** from 2019 to 2024, confirming the overall **structural weakness in the print industry**.

- However, **ad revenue trends varied** :

    - Cities like **Patna (+7.39M)** and **Ranchi (+10.9M)** actually showed **ad revenue growth despite circulation declines**, indicating that advertisers still saw value in these markets (possibly due to demographics, market influence, or pricing strategies).
    - On the other hand, cities like **Mumbai (-18.9M), Ahmedabad (-20.5M), and Kanpur (-28.1M)** suffered **major declines in both circulation and revenue**, making them **critical risk markets**.

- **Varanasi and Jaipur** had sharp circulation declines (~1.4M each), but ad revenue still managed to grow, hinting at **better monetization efficiency** or **strong advertiser loyalty**.

- **Delhi (-7.28M revenue)** and **Bhopal (-12.1M revenue)** also fall in the high-risk category where **both circulation and revenue declined together**.

- Overall, this shows a **divergence in market dynamics** → while circulation is declining everywhere, **some cities are still monetizing effectively**, whereas others are **losing both readers and advertisers**.

Business Request – 6 : 2021 Readiness vs Pilot Engagement Outlier

Objective

In 2021, identify the city with the highest digital readiness score but among the bottom 3 in digital pilot engagement.

Data Used

- print_circulation_new
- city_new

SQL Query

```
WITH

readiness AS (

SELECT cr.city_id,

ROUND(AVG((cr.smartphone_penetration + cr.internet_penetration + cr.literacy_rate) / 3.0), 2) AS readiness_score_2021

FROM city_readiness_new cr

WHERE cr.year = 2021

GROUP BY cr.city_id

),

engagement AS (

SELECT dp.city_id,

ROUND(SUM(dp.downloads_or_accesses) * 100.0 / NULLIF(SUM(dp.users_reached), 0), 2) AS engagement_rate

FROM digital_pilot_new dp

GROUP BY dp.city_id

),
```

```
combined AS (
SELECT c.city, r.readiness_score_2021, e.engagement_rate
FROM readiness r
JOIN engagement e ON r.city_id = e.city_id
JOIN city_new c ON r.city_id = c.city_id
),
ranked AS (
SELECT city, readiness_score_2021, engagement_rate,
RANK() OVER (ORDER BY readiness_score_2021 DESC) AS readiness_rank_desc,
RANK() OVER (ORDER BY engagement_rate ASC) AS engagement_rank_asc
FROM combined
)
SELECT city AS city_name,
readiness_score_2021,
engagement_rate,
readiness_rank_desc,
engagement_rank_asc,
CASE
WHEN readiness_rank_desc = 1 AND engagement_rank_asc <= 3 THEN 'YES'
ELSE 'NO'
END AS is_outlier
FROM ranked
ORDER BY readiness_rank_desc, engagement_rank_asc;
```

city_name	readiness_score_2021	engagement_rate	readiness_rank_desc	engagement_rank_asc	is_outlier
Kanpur	75.23	40.89	1	2	YES
Varanasi	73.89	57.82	2	6	NO
Bhopal	73.21	59.52	3	7	NO
Lucknow	73.20	66.89	4	10	NO
Ahmedabad	72.39	61.28	5	8	NO
Patna	70.77	51.15	6	3	NO
Ranchi	68.64	35.13	7	1	NO
Mumbai	68.33	57.19	8	5	NO
Delhi	56.08	63.73	9	9	NO
Jaipur	54.95	52.70	10	4	NO

Insights

- **Kanpur** emerges as the key **outlier** in 2021.
  - It had the **highest digital readiness score (75.23)**, reflecting strong smartphone, internet, and literacy penetration.
  - However, its **engagement rate was only 40.89%**, ranking among the **bottom 3 cities** for digital pilot engagement.
  - This mismatch highlights a **clear execution gap**: while the infrastructure and user readiness exist, the **digital pilots (apps, portals, campaigns)** failed to convert that readiness into active user participation.

- By contrast, cities like **Lucknow (readiness rank 4, engagement rank 10)** and **Delhi (rank 9 & 9)** show more balanced patterns, even if engagement is moderate.

- For Kanpur, this presents a **high-potential but underutilized market**. Business teams should:
  - Reassess **digital content strategy** (are pilots relevant to local user behavior?).
  - Strengthen **WhatsApp-based delivery models**, since penetration is strong and WhatsApp adoption is near-universal in such markets.

- Build **localized campaigns** that leverage cultural and regional hooks to improve user engagement.
  - If Kanpur's gap is addressed, it could quickly become one of the **leading digital-first cities**, helping accelerate the shift away from print dependency.

Summary & Recommendations

Summary

Across the analysis of 2019–2024 data, several structural shifts in circulation, advertising, and digital readiness have been identified:

- **Print circulation** shows recurring quarter-over-quarter declines in key cities such as Varanasi and Kanpur, reflecting systemic challenges in sustaining print demand.

- **Advertising revenue** remains fragmented across categories (e.g., Government, Real Estate), with no single segment contributing more than 50% annually - indicating vulnerability to market shifts.

- **Print efficiency** in 2024 highlights top-performing cities (e.g., Ranchi, Ahmedabad), but also underlines wastage in others.

- **Internet readiness** has improved steadily in cities like Kanpur and Patna, but some cities (e.g., Ahmedabad) show a decline in digital penetration.

- **Multi year trend analysis (2019→2024)** reveals consistent circulation and ad revenue declines across most cities, signaling an urgent need for business model diversification.

- **Digital readiness vs engagement gap** (2021) demonstrates that high-readiness cities (e.g., Kanpur) are not always translating into high digital pilot adoption, leaving large untapped potential.

Recommendations

1. **Shift from Print to Digital First**
   With recurring declines in circulation and ad revenue, focus should gradually move towards **WhatsApp based delivery models, mobile-first content and web platforms** to meet changing audience behavior.

2. **Optimize Print Operations**
   Cities like Ranchi demonstrate strong print efficiency - best practices should be replicated across low efficiency cities to reduce wastage.

3. **Diversify Ad Revenue Sources**
   Since no single category dominates, a **balanced advertiser portfolio** should be maintained while exploring **digital ad formats** to capture new revenue streams.

4. **Target High-Readiness but Low-Engagement Cities**
   Kanpur represents a **high priority digital growth market**. Tailored engagement strategies (local campaigns, simplified apps, WhatsApp news delivery) can unlock quick wins.

5. **Continuous Monitoring & Early Warning System**
   Establish quarterly dashboards to **track circulation, ad revenue and digital adoption trends**, enabling timely interventions before sharp declines occur.

Conclusion

This analysis highlights the ongoing structural decline in print circulation and ad revenues, while also uncovering emerging opportunities in digital readiness and engagement.

*The evidence suggests a clear need to **pivot towards digital channels**, optimize **print operations**, and leverage **city specific strengths** to sustain growth.*

*I recommend setting up a **review session with business leaders** to align on priorities and initiate pilot projects based on the above findings.*

Thank You

We appreciate the opportunity to work on these business requests and contribute actionable insights. Please feel free to connect for further clarifications, discussions or next phase implementations.

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