Comprehensive Insights from IMDb Top 100 Movies EDA

1. **Profit Analysis**
   a. **Profit vs. Budget:** Most high-budget movies do not guarantee high profits, except for outliers like Star Wars: Episode VII (profit: $691M).
   b. **Negative Profit:** 11 movies incurred losses, including Tangled (-$60M) and The Little Prince (-$80M). Lower-budget films like Tucker and Dale vs Evil also struggled.
2. **Ratings and Critic-Audience Alignment**
   a. **Universal Acclaim:** Movies like Whiplash (Avg. Rating: 8.65) and Django Unchained (8.25) were highly rated by both critics (MetaCritic) and audiences (IMDb).
   b. **Rating Conversion:** MetaCritic scores were scaled to 10, and movies with <0.5 difference between IMDb and MetaCritic scores were identified.
3. **Actor Popularity**
   a. **Top Trios by Facebook Likes:**
      i. **Initial Top Trio:** Dev Patel, Nicole Kidman, Rooney Mara (total likes: 138,800).
      ii. **Valid Trio (after filtering):** Ginnifer Goodwin, Jason Bateman, Idris Elba (likes: 74,818).
      iii. **Condition:** No actor's likes <50% of the other two.
4. **Runtime and Genre Trends**
   a. **Runtime:** Most movies cluster around 120–130 minutes (2 hours).
   b. **R-Rated Movies:** Despite restrictions, under-18 voters participated. Top R-rated films included Deadpool and Interstellar.
5. **Demographic Analysis**
   a. **Gender Preferences:**
      i. Males voted more than females across all genres.
      ii. Sci-Fi was most popular among males (18–29 age group), while Romance was least favored.
      iii. Females showed higher ratings for Animation and Biography.
   b. **Age Groups:** Voters aged 45+ were less active, with lower vote counts.
6. **Genre Performance**
   a. **Top Genres by Votes:**
      i. Sci-Fi, Action, Thriller, and Adventure dominated among the top 1,000 voters.
      ii. Romance was the least popular genre among top voters.
   b. **Genre Counts:** Drama had the highest representation (65 movies), followed by Comedy (23) and Action (31).
7. **US vs. Non-US Movies**
   a. **Vote Counts:** US movies received significantly more votes (median CVotesUS: ~180K vs. non-US: ~80K).
   b. **Ratings:** Non-US movies had comparable ratings from both US and non-US audiences (~7.7–7.9).

8. **Visualization Highlights**
    a. **Heatmaps:** Showed males dominated voting, especially for Sci-Fi and Action. Females rated Animation and Drama higher.
    b. **Box Plots:** US films had higher vote counts but similar ratings to non-US films.
    c. **Bar Charts:** Sci-Fi led in CVotes1000, while Romance trailed.

Actionable Recommendations
1. **Focus on Sci-Fi/Action Genres:** These resonate with key demographics (18–29 age group) and top voters.
2. **Cast Popular Trios:** Ensure actors have balanced social media popularity to maximize appeal.
3. **Optimize Budgets:** High budgets don't guarantee profits; balance with content quality.
4. **Leverage Critic-Audience Alignment:** Promote universally acclaimed movies (Whiplash, Django Unchained) for broader appeal.
5. **Target Under-18 Demographics:** Despite restrictions, R-rated films like Deadpool attracted young voters, suggesting strategic marketing opportunities.

Checkpoint Validations
- **Profit vs. Budget:** Confirmed outliers exist.
- **Runtime:** Majority are ~2 hours.
- **Genre Popularity:** Drama is most frequent, but Sci-Fi/Action drive engagement.
- **Romance:** Least popular among top voters.

Conclusion
This analysis provides a roadmap for filmmakers to align content, casting, and marketing strategies with audience preferences and market trends.