Complementor Evolution, Power-Dependence and Performance: Evidence from the Video-game Industry

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Background

Platform ecosystems play a pivotal role in today's economy, with giants like **Netflix**, **Amazon**, **Apple**, and **Meta** (formerly Facebook) leading the way. These platforms not only create and capture value through their content or products but also thrive due to the networks of users and complementors that engage with them.

1. **Platform Ecosystems Defined:**
   - Platform ecosystems consist of three key actors: **platform providers**, **complementors**, and **consumers**.
   - Complementors enhance the value proposition by providing complementary goods.
   - The success of a platform depends on active complementors who stimulate user demand.

2. **Maximizing Value**:
   - Complementors are vital for a value proposition to materialize.
   - However, individually, they may not significantly shape the ecosystem dynamics.
   - Platforms should aggressively attract both end-users and complementors.

3. **Reducing External Dependency**:
   - Complementors seek to maximize profits while limiting reliance on the platform.
   - Balancing external dependency helps complementors maintain their own power within the ecosystem.

In summary, platform ecosystems thrive through collaboration, network effects, and strategic balance between platform providers and complementors.

Abstract

Complementor Evolution and **Power-Dependence** impact on **Performance** is the result of competition between platforms facilitating the interaction of different groups using a certain service or product.

Since many platforms compete with one another for performance, it's important to analyze their mode of **evolution** through complements and promotion strategies.

Our goal in this project is to investigate how the complementors can **rebalance their relationships within power dependence** to finalize a power-dependence theory. We explore the evolution of the network to create power balance between competitive ecosystems. The study we conducted analyzes over **14,000 games** across **multiple platforms** to examine and find relationships between the complementor evolution and platform dependence.

The **linear regression** provides support for our theory indicating how complementor evolution and platform dependence impact complementor performance.
Overall, this study stands to contribute to power dependence theory by enhancing dependence strategies. It also generates practical implications to create an effective solution for navigating ecosystem dynamics.

Methods

In this project, we analyzed sales data for **over 14,000 video game titles** spanning the period from **1977 to 2019**. The dataset was sourced from two primary repositories:

1. **VGChartz**: This dataset provides comprehensive information on video game sales, including data from the United States, United Kingdom, and Japan. It covers not only sales figures but also includes critics' scores and users' scores for these games.
2. **Vgsales**: Focusing on console sales, this dataset cross-references information from firms' annual reports and media publications. It provides valuable insights into the performance of various gaming consoles over time.

The study employed a **Fixed-Effects Regression Model** as the primary estimation technique. Key variables considered include sales (as the dependent variable), network type (categorized as single, multi, or integrated), platform expansion (measured by the number of platforms), and several control variables such as handheld console type, console generation, console sales, game publisher, game developer, and platform fixed effects. By carefully examining these variables, the we aimed to uncover patterns and relationships that contribute to video game sales success.

Conclusion

We find base support for our theory, but the **conclusion** section of the presentation is currently **under development**. Here are the key points:

1. **Data & Methods**:
   - Limited observations of Network integration (crossplay) which began in 2018. More data to be collected.
   - An evolutionary approach necessitates a longitudinal design.

2. **Missing Variable**:
   - **Dependence**, as supported by Casciaro & Piskorski (2005), Sutton and colleagues (2021), and other we will introduce the variable as a concentration of sales.

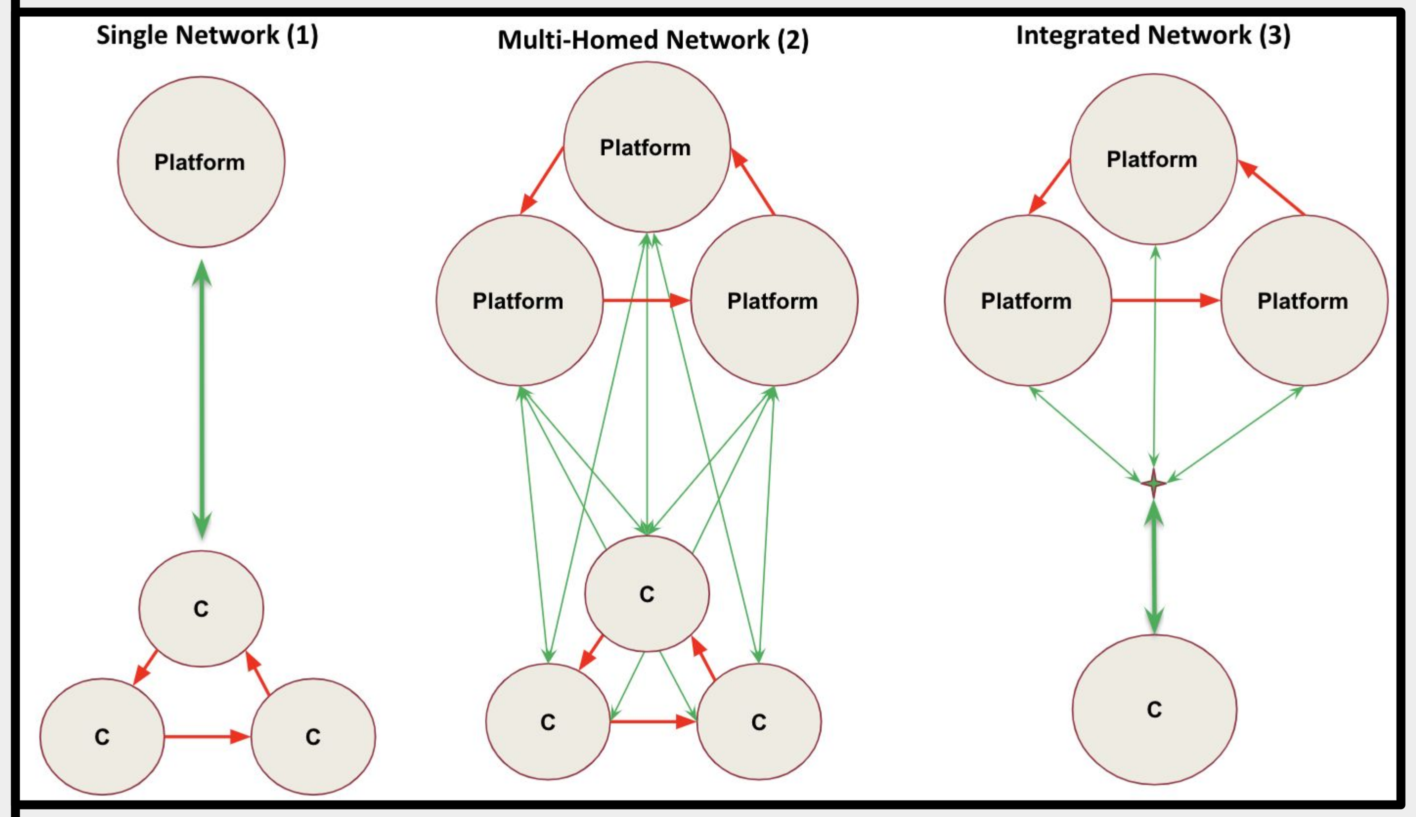
Despite these insights, the conclusion remains **incomplete** and subject to further refinement. The title "Under Development" aptly reflects this ongoing process.

Results

With a **descriptive analysis** on sales across **32 unique platforms**, here are the key points:

- **Impact on Platforms**:
  - There has been a decline in sales across these platforms related to complementor network evolution.
  - The analysis involved a Kruskal-Wallis Rank Sum Test.
    - Chi-Squared: 122.83 ($p < 0.0001$)
- **Average Platform Sales** (in Millions):
  - Single Only: $101.01 million
  - Multi & Single: $89.86 million
  - All: $85.99 million

Figure 1 depicts the network types described in the research regarding network evolution.



Hypothesis 1 (H1): Network type will have a **positive relationship** with performance.

- The coefficient for **Network Type** is **0.08**, with a **p-value** less than 0.001 and a **standard error** of 0.017.
- Meaning for an increase of 1 in the IV (network type) there is a corresponding increase in sales of 80,000 units on average.
- **H1 was supported**, indicating that network type positively affects performance.

	(1)		(2)		(3)	
	b	*se*	*b*	*se*	*b*	*se*
Intercept	14.28***	(4.382)	12.94***	(29.613)	15.08***	(4.396)
Network Type			0.08***	(0.017)	-0.171*	(0.075)
Platform Expansion					-0.316*	(0.141)
NT*PE					0.18**	(0.071)
Platform Sales	-0.001	(0.001)	-0	(0.001)	-0.001	(0.001)
Handheld Console	0.48***	(0.147)	0.46***	(0.147)	0.51***	(0.147)
Platform Generation	-1.56***	(0.476)	-1.42***	(0.476)	-1.62***	(0.477)
Platform Age	-0.26***	(0.080)	-0.23***	(0.080)	-0.26***	(0.080)
Complement Age	0.012***	(0.003)	0.1***	(0.003)	0.014***	(0.003)
Publisher Controls	YES		YES		YES	
Developer Controls	YES		YES		YES	
Platform Fixed Effects	YES		YES		YES	
Number of Observations	17693		17693		17693	
Adjusted R^2	0.321		0.322		0.324	
F-Statistic	3.66		3.68		3.69	

Standard errors in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Hypothesis 2 (H2): The study posits that the relationship between network type and performance will be **positively moderated** by the number of platforms.

- The **interaction term** (Network Type * Platform Expansion) has a coefficient of **0.18**, with a **p-value** of 0.01 and a **standard error** of 0.071.
- Meaning that for each additional platform expanded to increases the original relationship by a factor of 18% on average.
- **H2 was supported**, indicating that the number of platforms influences the impact of network type on performance.

Both models explain more than **32%** of the variance in the DV.

	(1)		(2)		(3)	
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