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# Application Digital Economics and AI Tutorial

**by Merle Uhl**

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## Required Information

I am a Ph.D. student in Management at the Institute for Strategy, Technology, and Organization, led by Prof. Tobias Kretschmer, at Ludwig-Maximilians-Universität München. In addition, I am a research associate with the "Digital Economy, Internet Ecosystem, and Internet Policy" research group at the Weizenbaum Institute, where I contribute to independent, interdisciplinary research on digitalization. Previously, I held several roles at Germany's leading digital industry organization, where I was responsible for AI-related initiatives and policy matters.
I officially started my Ph.D. program this year after completing a Master's degree in Economics from Freie Universität Berlin in 2021 (details of my graduate coursework are included in the "Education" section). The first projects of my dissertation focus on dynamics of digital platforms, with the gaming ecosystem as my empirical setting (more details in the "Ongoing Projects" section).

## Positions

**Research Associate** 7/2023 –

*Weizenbaum-Institut e.V., Berlin*

- Conducting econometric and machine learning analyses on digital platform data to uncover dynamics and data-driven competitive advantages.
- Authoring studies on data, AI and digital platforms (e.g. AI as a General Purpose Technology) as well as presenting findings on scientific conferences (e.g. ITS Asia-Pacific 2023).
- Collaborating in the interdisciplinary research group "Digital Economy, Internet Ecosystem, and Internet Policy" led by Dr. Volker Stocker and Prof. Dr. Stefan Schmid.

**Head of Artificial Intelligence** 01/2023 – 06/2023

*Bitkom e.V., Berlin*

- Directed all AI-related activities and KPIs for Germany's leading digital association.
- Led the cross-sectoral Artificial Intelligence Working Group with 1,200 members, managing strategic planning, regular meetings, and ongoing communication.
- Represented the association in media appearances to articulate AI's transformative potential (e.g., interview with rbb).

**Policy Officer for Artificial Intelligence** 10/2021 – 12/2022

*Bitkom e.V., Berlin*

- Coordinated the creation of 10+ publications and position papers on AI trends, innovations, and regulatory frameworks (e.g., AI Act).
- Facilitated stakeholder alignment on legislative initiatives and effectively communicated key insights during 20+ strategic meetings with policymakers.
- Organized and led 20+ strategic discussions and meetings, connecting over 800 members to explore AI use cases and address operational, regulatory, and technical challenges.
- Coordinated the Big-Data.AI Summit, fostering partnerships and curating content to highlight AI's transformative impact as well as aligning 60+ sessions with organizational goals and a €150,000 budget.

## Education

**Ludwig-Maximilians-Universität München** 05/2024 –

*PhD (Dr. oec. publ.) at the School of Management*

- Supervised by Prof. Dr. Tobias Kretschmer, Institute for Strategy, Technology and Organization.

**Freie Universität Berlin** 10/2019 – 11/2021

*M.Sc. Economics* *Final Grade: A-*

- Semester abroad at Copenhagen Business School (2020), Denmark.
- Thesis "Investigating the Mothers' Pension - Exploring Heterogeneous Effects Using Difference-in-Differences" (1.7/5) supervised by Prof. Dr. Peter Haan.
- Courses: Advanced Microeconomics, Advanced Macroeconomics, Econometric Analysis, Economics of Innovation and Innovation Policies, Selected Topics in Microeconomics, US Economic Policy, Univariate Time Series Analysis, Multivariate Methods, New Methods in Statistics, Current Research Topics in Econometrics, Current Research Topics in Microecnomics, Welfare Economics, Selected Topcis in Social Policy, Economics of Education.

**Justus-Liebig-Universität Gießen** 10/2015 – 09/2019

*B.Sc. Business & Economics* *Final Grade: A-, top 3%*

- Semesters abroad at Université de Montpellier (2017/2018), France, and Universidad de Granada (2019), Spain.
- Thesis "The Effect of Firms' Communication of Data Handling on Trust and Adoption Intention in the Context of Innovative Apps - The Moderating Role of Price" (1.0) supervised by Prof. Dr. Monika C. Schuhmacher.

## Research Interests

Digital Platforms, Data, Artificial Intelligence

## Ongoing Projects

**Backseat Gaming: How Complementor Design Affects Inter-Platform Complementarity** *with Dr. Johannes Loh and Dr. Joe Ploog*

Extensive research has been conducted on inter-platform competition (e.g., Cennamo, 2021; Corts & Lederman, 2009; McIntyre & Srinivasan, 2017; Subramanian, Mitra, & Ransbotham, 2021; Zhu & Iansiti, 2012; Zhu, Li, Valavi, & Iansiti, 2021) and intra-platform competition (e.g., Boudreau, 2012; Boudreau, Jeppesen, & Miric, 2022; Cennamo & Santalo, 2013; Rietveld & Eggers, 2018; Rietveld, Ploog, & Nieborg, 2020). However, there is a surprising lack of attention paid to inter-platform complementarity, a critical yet underexplored factor in understanding platform ecosystems.

This gap is significant because inter-platform complementarity constitutes one of the four dimensions crucial for understanding platform value creation and capture: inter-platform competition, intra-platform competition, intra-platform complementarity, and inter-platform complementarity. Ignoring inter-platform complementarity risks not only misclassifying platform competition but also overlooking an essential piece of the puzzle that explains platform dominance and success. In this paper, we adopt a demand-side perspective (Priem, 2007; Ye, Priem, & Alshwer, 2012) to theorize inter-platform complementarity between two platforms hosting information goods. We propose that understanding information goods is a critical boundary condition for our framework, as their inherent characteristics shape how users perceive value across platforms.

Our theory centers on the end users' perceived value proposition, which we argue is a function of both standalone and network value (Ploog & Rietveld, 2024; Shankar & Bayus, 2003; Srinivasan, Lilien, & Rangaswamy, 2004). Standalone value refers to the utility an end-user derives from the product when used in isolation, independent of external factors. In contrast, network value captures the benefits a user experiences through social interactions and connections enabled by the product. Network value is typically a function of the number of users in the network and the mechanisms provided by the product for facilitating such interactions. However, since the number of users at the time of product launch is typically zero, network products are inherently subject to higher demand uncertainty compared to standalone products. This uncertainty arises because network effects, which contribute significantly to the product's value, can only materialize over time as the user base grows. Therefore, predicting initial adoption and the potential for network growth becomes significantly more complex for network products (Ploog & Rietveld, 2024). The value proposition of standalone information goods, on the

other hand, primarily hinges on two key aspects: the novelty of the content and its fit with individual user preferences.

Additional information plays a dual role for such products. On the one hand, it can reduce demand uncertainty by helping users better assess whether the product aligns with their preferences (a positive effect). On the other hand, excessive information can diminish the perceived novelty of the content, thereby reducing its appeal (a negative effect). Similarly, additional information has a double-edged impact on network products. While it can help alleviate the demand uncertainty associated with network effects by providing users with clarity about the product's value and potential, it may also inadvertently detract from the product's core value proposition. Specifically, the process of consuming additional information may divert attention and engagement away from the product itself, potentially delaying or stifling the realization of network effects. As a result, managing the provision of information becomes a critical consideration in balancing these opposing forces and maximizing the product's overall value. This nuanced perspective sheds light on how platforms can create synergies rather than solely competing for market share.

To test our arguments, we examine the video game industry, focusing on the interaction between Steam and Twitch. This context is especially suitable because it is not immediately clear whether these platforms compete or complement each other. We use monthly data on Twitch streaming and Steam player engagement, combined with static game characteristics. We employ cross-sectional and panel regressions, as well as matching techniques to ensure robustness of our results. Our findings indicate a positive relationship between streamed hours and average players: for single-player games, a 1% increase in streamed hours is associated with a 0.46% rise in average players, while for multiplayer games, this effect is slightly stronger, with a coefficient of 0.56%. This study offers meaningful contributions by advancing our understanding of inter-platform complementarity, a neglected dimension of platform ecosystems. It holds important implications for theory, industry practice, and policy-making, particularly in how platforms can foster collaboration and drive sustainable economic value.

**Investigating Platform Competition: The Power of Platform Purchase Data in User Information Prediction**

A key mechanism driving digital platforms' competitive advantage is their ability to predict user characteristics from collected data (Ullrich et al. 2023), enhancing targeted advertisements and product development. However, validating the effectiveness of such data for making user assumptions is challenging without access to demographic data. I leverage the recently published „Open e-commerce 1.0" data set by Berke et al. (2024), which includes five years of crowdsourced U.S. Amazon purchase histories with user demographics. This data set offers a unique opportunity to explore how purchase data and its characteristics affect an algorithm's performance in predicting user information, thereby generating valuable insight into how data shapes the competitive advantage of the company owning the data.

To achieve this, the first step is to link the purchase data with detailed product information. Next, I will select an appropriate prediction algorithm (e.g., XGBoost, as used by Ullrich et al. (2023)) and determine the relevant purchase data categories (e.g., type of product) and characteristics (e.g., volume of data) for the prediction. Finally, I will compare different data categories' and characteristics' potential to improve prediction accuracy. This will shed light on the nuanced relevance of data for platforms seeking a competitive advantage and inform policy makers who strive for contestable digital markets.