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THE ECONOMIES OF TYING AND BUNDLING IN DIGITAL PLATFORMS

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INTRODUCTION

In today's world, the digital economy has completely transformed the manner in which products and services are provided to customers. Unlike traditional markets, digital platforms no longer operate through isolated products; rather, they function through interconnected ecosystems where multiple services are integrated into a single technological environment. In this context, tying and bundling have emerged as dominant business strategies adopted by major technology companies such as Google, Apple, Microsoft, and Amazon.

Earlier, tying and bundling were viewed primarily as pricing strategies. However, in digital markets, these practices have evolved into mechanisms for ecosystem expansion, user retention, and data consolidation. Modern platforms no longer compete merely through products; they compete through entire digital environments that shape user behaviour, consumer attention, and market access. Services which are being provided to consumers such as cloud storage, search engines, payment systems, messaging applications, AI assistants, and streaming platforms are increasingly interconnected, making it difficult for them to separate from one service to another.

Digital tying and packaging, however, provide a complex legal and financial dilemma. On the one side, integration increases innovation, lowers transaction costs, and improves convenience whereas on the other side, it can also prevent competition, strengthen domination, and produce unseen types of consumer reliance. Therefore, the challenge for competition law lies in distinguishing efficient integration from exclusionary conduct in rapidly evolving digital markets.

DEFINITIONS: TYING AND BUNDLING

Tying and bundling might appear a bit similar to each other but they are quite different from each other. Tying, specifically refers to a purchase of one product being conditioned upon another product. For example, Amazon has a feature called the 'Buy Box' which is a small button that says 'Buy Now' or 'Add to Cart' where it provides its own delivery and warehouse services so that customers could get better visibility and higher ranking. Bundling, however, involves combining multiple products or services into a package. For example, OTT Subscription Packs where customers are given one-to-one offers. It may be pure, where products are only available together, or may be mixed, where they are available separately as well. In digital markets, technological tying has become especially significant because services are integrated directly into software architecture and operating systems.

The economics of digital markets changes how tying and bundling affect competition. Unlike traditional markets which mainly focused on increase in price, digital platforms often offer zero-price services and rely on data, network effects, and multi-sided ecosystems. Many platforms have started earning through advertising, user data, and engagement which means that the market power today depends not just on pricing, but also on control over data, attention, and user behaviour.[1]

"Attention bundling" is a very significant but unexplored phenomenon where the goal of digital platforms is to keep people in one environment for extended periods of time. Super-apps and integrated ecosystems incorporate social interaction, commerce, entertainment, communications, and money onto a single platform. The objective is to monopolize consumer attention rather than just generate income. The platform's capacity to strengthen network effects increases with the amount of time users spend within a single ecosystem. As a result, attention itself turns into a financial resource that can be packaged and sold.

ECONOMIC RATIONALES BEHIND DIGITAL BUNDLING

Digital platforms justify tying and bundling on several economic grounds. Few major rationales that exist are as follows:[2]

1. Economies of scope

[1] Matthew Lane, Antitrust in 60 Seconds: Tying and Bundling, Disruptive Competition Project (Apr. 23, 2019), https://project-disco.org/competition/042319-antitrust-in-60-seconds-tying-bundling/

[2] Yannis Bakos & Erik Brynjolfsson, The Economics of Digital Bundling, 42 Commc'ns ACM 67 (1999), https://cacm.acm.org/research/the-economics-of-digital-bundling/

In digital markets, the same technological infrastructure can support multiple complementary services at relatively low marginal cost. A single cloud infrastructure, for instance, may simultaneously support email services, AI tools, productivity software, and storage systems. This enables firms to provide integrated services more efficiently than separate competitors.

2. Data Synergy

Data has become one of the most valuable assets in digital economies, and bundling allows firms to combine datasets generated across multiple services. Search engines, maps, payment systems, and advertising tools collectively generate detailed consumer profiles that improve targeted advertising and predictive analytics. In this sense, data itself becomes the bundled commodity. The economic value of integration therefore extends beyond products and into the realm of behavioural intelligence.

3. Cross-subsidization

It plays a major role in digital bundling strategies. Platforms frequently offer one service free of cost in order to strengthen dominance in another market. Free email services, browsers, and cloud storage are often designed to attract users into broader ecosystems where monetization occurs indirectly through advertising, subscriptions, or premium services. Such practices may appear consumer-friendly in the short term while simultaneously creating long-term dependency.

Additionally, bundling lowers search and transaction costs for customers, because interconnected ecosystems provide ease of use, interoperability, and a smooth user experience which ultimately makes consumers favor them. For instance, productivity suites streamline collaboration, storage, and communication through a single interface. But the same ease of use might also deter customers from looking into other options, which would increase market concentration.

BEHAVIOURAL ECONOMICS AND DIGITAL NUDGING

An important aspect of digital bundling is behavioural economics. Digital platforms often influence consumers through default settings, interface design, and convenience rather than direct coercion. Since users rarely change pre-installed apps or default services, platforms gain

major advantages in user acquisition and data collection. This is why default search engines and pre-installation agreements have attracted competition law scrutiny globally.[3]

Platforms also create "convenience lock-in" by designing interconnected ecosystems of cloud storage, payment systems, subscriptions, and synced devices. Consumers may continue using one platform not because switching is impossible, but because changing services becomes inconvenient and disrupts habits, data, and user experience. Over time, subscription ecosystems further strengthen this dependency and increase consumer reliance on a single platform.

AI AND ALGORITHMIC BUNDLING: THE NEW FRONTIER

One of the most significant developments which we are undergoing is the emergence of algorithmic bundling, where machine learning systems continuously analyze how consumers behave, their purchasing history, its market conditions, and willingness-to-pay in order to optimize bundle offerings. Research also says that AI systems are no longer dependent on historical sales patterns. Instead, they process real-time data such as customer interactions, inventory levels, competitor pricing, seasonal trends, and behavioural signals to dynamically modify bundles and prices.

AI-driven bundling is considered very useful and powerful as it allows platforms to move from optimization to adaptation. Traditional pricing models were largely static and incapable of responding instantly to changing market conditions. AI systems, however, continuously learn and adjust. Reinforcement learning models, for instance, are capable of experimenting with multiple price combinations and gradually identifying the pricing structures that maximize long-term platform revenue. The best part of these systems is that they not only optimize immediate sales, but also predict future behavioural responses, customer retention patterns, and ecosystem engagement.[4]

Another important aspect of AI bundling is personalized ecosystem integration. Rather than offering the same bundle to every consumer, platforms increasingly create customer-specific bundles using clustering algorithms and behavioural segmentation. AI systems analyze factors

[3] Vagish Mishra & Kaveri Khound, Nudging in Digital Environments: A Review of Behavioral Economics Interventions and Consumer Decision-Making, 2 Advances in Consumer Research 2810 (2025), https://acr-journal.com/article/nudging-in-digital-environments-a-review-of-behavioral-economics-interventions-and-consumer-decision-making-1378/

[4] Varun Krishna,Why Modern AI InfrastructureDemands Model Bundling,NotOne-Model-Per-Node Thinking,SambaNova(Dec22,2025), https://sambanova.ai/blog/modern-ai-infrastructure-demands-model-bundling

such as purchase frequency, feature usage, response to previous discounts, and price sensitivity in order to determine which combination of products a particular user is most likely to purchase. This creates a highly individualized form of tying where users are subtly directed toward ecosystem dependency through personalized convenience.

ANTI-COMPETITIVE RISKS OF DIGITAL BUNDLING[5]

Digital bundling and tying have created significant anti-competitive risks where dominant platforms use their market power in one sector to expand control into adjacent markets. In digital ecosystems, platforms often bundle essential or widely used services with complementary products, thereby reducing consumer choice and limiting market access for smaller competitors. Such practices can gradually foreclose competition because rivals may find it difficult to compete against integrated ecosystems that already possess a massive user base, extensive data access, and strong network effects. Scholars have argued that digital markets are particularly vulnerable to these practices because consumers are often nudged toward supplementary services through technological integration and default settings rather than explicit coercion.

Another major risk is the leveraging of dominance across interconnected digital markets. Large platforms frequently act as "gatekeepers" controlling access to consumers, app stores, cloud infrastructure, or search visibility. By tying or bundling products together, these firms can extend their dominance from one market into another, making it increasingly difficult for emerging competitors to gain scale. The presence of network effects and economies of scope further amplifies this problem because dominant firms are able to integrate multiple services while simultaneously benefiting from shared data and infrastructure. As a result, smaller rivals may be excluded not through direct prohibition, but because they are unable to match the efficiencies and visibility enjoyed by dominant ecosystems.

Digital bundling may also suppress innovation and interoperability. When dominant platforms integrate their own services deeply within operating systems or digital ecosystems, independent firms may lose incentives to innovate due to limited market access and reduced consumer reach. In many instances, bundled ecosystems discourage interoperability with third-party applications, thereby increasing user dependency on a single platform. This creates behavioural

[5] D. Mandrescu, Tying and Bundling by Online Platforms—Distinguishing Between Lawful Expansion Strategies and Anti-Competitive Practices, 40 Computer L. & Sec. Rev. 105559 (2021), https://www.sciencedirect.com/science/article/pii/S0267364920301047

and technological lock-in where consumers remain within one ecosystem because alternative services become inconvenient or less functional. Such ecosystem dependency may ultimately reduce long-term competition even if consumers initially benefit from lower prices or greater convenience.

An additional concern is that anti-competitive harm in digital markets is often subtle and difficult to detect. Unlike traditional tying arrangements, digital platforms may use algorithmic rankings, pre-installation agreements, interface design, and recommendation systems to favour their own bundled products. Consumers may technically retain freedom of choice, yet platform architecture makes competing services less visible or less convenient. Consequently, exclusion in digital markets increasingly operates through behavioural nudging and ecosystem design rather than overt restrictions. This evolution has broadened the traditional doctrine of tying and bundling into a wider theory of digital leveraging capable of influencing consumer behaviour, market structure, and innovation itself.

CONCLUSION

Thus, the economies of tying and bundling, reflect the broader transformation from product-based competition to ecosystem-based competition in modern markets. Digital platforms no longer sell products together; they integrate services, data, infrastructure, and user behaviour into interconnected technological environments. While such integration generates efficiencies, innovation, and convenience, it also creates new forms of market power capable of influencing consumer choice and restricting competition.

The rise of behavioural nudging, AI integration, attention bundling, and data synergies shows that digital tying extends far beyond traditional economic frameworks. In many cases, users become locked into ecosystems not through direct coercion but through convenience, habit, and technological dependence. Consequently, the challenge for modern competition law is not simply to prohibit bundling but to distinguish beneficial integration from exclusionary ecosystem control.

Ultimately, the future of digital competition policy will depend upon achieving a careful balance between innovation and openness. As digital ecosystems continue to expand, competition law must evolve beyond industrial-era assumptions and address the realities of data-driven, AI-powered platform economies where control over ecosystems increasingly determines control over markets themselves.