

THE ECONOMICS OF IP ASSET DEPLETION IN CROSS IP COLLABORATION

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Abstract: Cross-IP collaboration has become a regular commercial strategy in character merchandise, entertainment, games, fashion and collectible markets. Firms combine independently controlled intellectual properties to create new products, events and consumption settings. This paper studies a specific economic problem within this practice: a firm may rationally expand cross-IP collaboration even when repeated collaboration places pressure on the long-term value of the focal IP. Drawing on brand equity, brand extension, co-branding fit and brand dilution research, the paper develops an exogenous parameter model in which a firm chooses collaboration intensity by comparing short-term collaboration benefit, development cost and long-term IP asset depletion loss. The model derives the equilibrium condition for development intensity and shows how weak internalization of long-term asset loss can move a firm above a sustainable collaboration boundary. The paper then translates the model into an operational scoring framework using public indicators, including secondary-market premium, release-window attention, product-count intensity, price volatility, background attention decline and focal-IP revenue concentration. The weights in this framework are introduced as exogenous diagnostic parameters, with their economic meaning and normalization rules stated explicitly. Pop Mart cross-IP products are used as an exploratory case setting. The case evidence suggests that cross-IP collaboration can generate visible market value and asset pressure at the same time. The paper contributes a definition of IP asset depletion, a tractable theoretical model and a replicable public-data pathway for future empirical research.

Keywords: Cross-IP collaboration; IP asset depletion; Brand dilution; Exogenous parameters; Secondary market; Attention economy

1 INTRODUCTION

Cross-IP collaboration is now a visible business practice across content and consumer-product industries. Firms place characters, story worlds, brand symbols, event identities and platform-based cultural assets into shared products or experiences. The commercial appeal is clear. A familiar IP lowers the cost of explaining a new product, gives consumers a recognizable meaning structure and can redirect an existing audience toward a new purchase occasion. In collectible markets, cross-IP products can also become event goods, especially when launch timing, limited availability and resale expectations are combined.

This paper focuses on a narrower question. When cross-IP collaboration creates short-term value, why might firms still move toward excessive development? The question matters because IP assets have a different economic structure from ordinary product inventory. Their value depends on symbolic clarity, emotional attachment, narrative stability, market expectation and future monetization capacity. Each collaboration sends a new signal to the market. If the signal fits the focal IP, the asset may be strengthened. If signals become too dense, too varied or poorly translated into the focal product system, the same asset may be depleted.

The paper therefore treats cross-IP collaboration as a two-sided economic process. One side is value creation, observed through price premium, attention, user engagement and channel expansion. The other side is asset depletion, observed through weaker scarcity, blurred meaning boundaries, falling marginal response, unstable price support and rising reliance on a focal IP. A study that observes sales heat alone will understate long-term risk. A study that observes dilution risk alone will miss the commercial pressure that leads firms to keep collaborating.

An economic model is useful because the gains and losses of cross-IP collaboration appear on different time horizons. Sales, media exposure, channel feedback and secondary-market prices can appear quickly. Loss of IP clarity, consumer fatigue and reduced bargaining power often appear later. This timing difference can lead firms to overweight visible current benefits and underweight delayed asset loss. The paper models that gap through an exogenous parameter that measures how strongly the firm internalizes long-term depletion.

The main research question is: under what conditions will a firm rationally choose a cross-IP development intensity that may deplete the focal IP asset? Three subquestions follow. First, how can IP asset depletion be defined as an economic concept? Second, what equilibrium condition determines the firm's development intensity? Third, how can public data turn the theoretical model into an observable case analysis?

The paper proceeds in four steps. It first draws mechanisms from brand equity, brand extension, co-branding, perceived fit, brand dilution and attention-economy research. It then converts these mechanisms into a firm-level model of development intensity. Next, it derives propositions about equilibrium intensity, rational depletion and sustainable development boundaries. Finally, it uses public data from Pop Mart-related cross-IP products to show how the model can be operationalized. The aim is theoretical clarification supported by a transparent empirical illustration.

2 LITERATURE REVIEW AND THEORETICAL BACKGROUND

2.1 IP Assets and Brand Capital

An IP asset is an intangible asset whose value depends on market cognition, consumer memory and symbolic interpretation. Its carriers may include characters, stories, visual styles, worlds, competitions, platform identities and brand symbols. Keller's customer-based brand equity theory explains why brand knowledge stored in consumer memory changes responses to products and marketing actions [1]. Recent research on digital brand equity extends this logic to online engagement, electronic word of mouth and platform-based indicators, showing that brand equity is increasingly observable through digital behavior and communication outcomes [2].

Brand extension research offers a more specific mechanism for cross-IP collaboration. Aaker and Keller show that parent-brand evaluation, category fit and the explanation of an extension affect consumer acceptance [3]. Peng, Bijmolt, Volckner and Zhao confirm through meta-analysis that parent-brand equity and extension fit remain central conditions for brand-extension success [4]. Deng and Messinger further decompose brand-extension fit into features, function, resources, usage context, target market and image [5]. Their framework suggests that fit in cross-IP collaboration should be treated as a multi-dimensional construct, not as a single impression of similarity.

The measurement literature also matters. Simon and Sullivan show that brand equity can be inferred through observable market outcomes [6]. This paper adopts the same measurement logic with a narrower set of public proxies. Secondary-market price captures realized willingness to pay. Media attention captures event visibility. Product count captures development density. Revenue concentration captures the firm's reliance on a focal IP. These indicators cannot replace profit data, but they help researchers observe how the market interprets and reprices an IP asset.

2.2 Co-branding, Partner Relations and Perceived Fit

Cross-IP collaboration is closely related to co-branding research. Park, Jun and Shocker treat composite branding alliances as arrangements in which two brands enter the same product judgment context, creating both extension effects and feedback effects [7]. Ahn, Kim and Sung add that sensory fit affects consumer evaluation of co-branded products [8]. In character goods and collectibles, visual style, shape, color and material translation are therefore central to consumer judgment.

Paydas Turan's meta-analysis shows that the relationship between partner brands, fit and brand attitude contributes to co-branding outcomes [9]. Nguyen, Ross, Pancras and Phan examine 728 co-branded new products and find that co-branding does not create equal value for all participating firms [10]. Value creation and value appropriation may be asymmetric. This finding is important for cross-IP research because the observed heat of a collaboration may come from one partner's IP, from scarcity design or from channel execution. Researchers need to ask where the value comes from and how it is distributed.

This literature leads to the first theoretical premise of the paper. The value of cross-IP collaboration is conditional. Partner awareness, focal-IP strength, category fit and product translation all shape consumer response. A famous partner IP does not guarantee a high premium. A strong focal IP can also enter a stage of declining marginal response when it is used too often. The theoretical model therefore needs to include both benefit and depletion mechanisms.

2.3 Brand Dilution and IP Asset Depletion

Brand dilution research gives direct theoretical support to the concept of IP asset depletion. Bacchiega, Colucci, Denicolo and Magnani develop a theoretical model of brand dilution that places extension decisions, internal development, licensing choice and quality investment into the same framework [11]. Their model shows why a firm may expand even when brand damage is possible, because expansion converts existing brand capital into current returns.

Their model contains three mechanisms that are especially useful here: demand externalities from extension, specialization gains from licensing and moral hazard in licensing relationships. Demand externalities include a direct effect and a feedback effect. The direct effect captures the way parent-brand reputation raises demand for an extension product. The feedback effect captures how the quality of the extension product can affect the parent brand. In cross-IP collaboration, the focal IP can raise initial demand for the collaborative product, while the quality, frequency and market interpretation of that product can feed back into the focal IP asset.

A second implication is methodological. Observed correlation between licensing and dilution must be interpreted through firm selection. Firms may choose licensing when internal capability is limited, specialization gains are high or dilution risk is already salient. The same logic applies to cross-IP collaboration. Frequent collaboration may reflect current monetization opportunities, channel pressure and revenue dependence on a focal IP. Empirical analysis should therefore avoid treating frequent collaboration as a mechanically exogenous cause of depletion.

Cross-IP collaboration intensifies the dilution problem because collaborative products borrow symbolic resources from both the focal IP and the partner IP. Consumers use these products to update beliefs about the focal IP's style boundary, scarcity and quality signal. If collaboration frequency rises or translation quality falls, the focal IP may gradually lose distinctiveness. IP asset depletion can therefore be understood as the asset-level expression of brand dilution in a cross-IP setting.

Brand dilution theory also highlights the gap between the firm's current optimum and the long-term optimum of the IP asset. Managers, licensing teams and channel teams often face current revenue targets. Changes in long-term IP quality are slower and harder to observe. The model below uses λ to express this gap. A lower λ means that the firm gives less weight to future depletion; a higher λ means that the firm controls collaboration intensity more strictly.

2.4 Attention Economy and Collectible Markets

Cross-IP collaboration also belongs to the economy of attention. Announcements, launches, limited releases and social-platform discussion create short attention windows. Attention lowers consumer search costs and gathers dispersed audiences around the same event. Collectible markets amplify this mechanism because consumers evaluate use value, identity expression, scarcity and future resale possibility at the same time.

Research on limited-edition resale supports the use of secondary-market price as a proxy. Kim identifies demand, value, experience and environmental factors as drivers of limited-product resale [12]. Resale prices therefore absorb more than product function; they also contain scarcity, identity signaling and expected future exchange value. For cross-IP products, Last Sale premium can be used to observe whether the market pays extra for the collaborative symbol.

Attention can also be exhausted. When similar collaborations repeat, novelty can decline, media response may weaken and consumer discussion can lose intensity. Secondary-market prices may split within the same project: rare variants can remain expensive while ordinary items fall below retail price. For this reason, attention and price should be observed together.

2.5 Research Gap

Existing research explains brand equity, brand extension, co-branding and brand dilution. Recent IP co-branding studies also examine purchase intention and retention intention [13-14]. The remaining gap lies in the long-term asset consequence of repeated cross-IP collaboration. Existing studies seldom ask how collaboration changes the future quality of the focal IP asset or why firms may rationally choose high-frequency collaboration despite long-term risk.

This paper complements consumer-intention research by moving the unit of analysis from a single collaboration to cross-period asset use. Consumer research explains why a collaboration is liked, purchased or retained. This paper asks why firms continue to launch collaborations and how such repetition affects the focal IP's future value. The model below is built around that question.

3 DEFINITION OF IP ASSET DEPLETION

This paper defines IP asset depletion as the reduction in scarcity, cognitive stability, audience interpretation space and future development flexibility of a focal IP caused by short-term commercialization through cross-IP collaboration. This definition is the paper's conceptual contribution. Its theoretical foundation comes from brand equity, brand extension, co-branding and brand dilution research.

The definition follows four steps. First, the economic value of an IP asset depends on the market's continuing ability to identify its character, story, visual style and symbolic boundary. Second, cross-IP collaboration introduces external symbols into the focal IP's product system and changes the cues consumers use to interpret the focal IP. Third, high-frequency, low-fit or poorly translated collaboration increases the burden of interpretation. The market may find it harder to understand the focal IP's stable style and scarcity value. Fourth, when that burden accumulates, the focal IP's future marginal response, price support and licensing bargaining power may decline.

IP asset depletion is broader than a single product failure. A failed product may damage one SKU or one campaign. Depletion refers to a change in the focal IP's future earning capacity. It is also broader than simple negative brand evaluation. Consumers may still buy new products and may still like the IP. The more important change is a weaker scarcity signal, weaker attention response, a wider and less controlled collaboration boundary, and less stable secondary-market price support.

The concept explains an observable managerial problem. A collaboration can perform well at the project level and still add pressure to the focal IP. Short-term value creation and long-term asset depletion may arise from the same mechanism. Collaboration converts existing cognition into launch heat, but it also raises the frequency with which the focal IP is exposed and reinterpreted.

IP asset depletion cannot be directly measured through one public variable. This paper therefore uses a group of proxies. Development intensity (DI) captures how often the focal IP is commercially invoked. Price volatility (PV) captures the stability of secondary-market support. Income concentration (IC) captures the firm's reliance on the focal IP. Attention decline (AD) captures whether launch events translate into sustained background attention. Together, these variables form the empirical basis of the IP Risk Score used later in the paper.

4 THEORETICAL MODEL

4.1 Basic Setting

Following the modeling style of Bacchiega et al., the paper first specifies the economic environment, then defines the actor, choice variable and exogenous parameters [11]. The model contains three relationships: short-term benefit from cross-IP collaboration, development cost, and long-term depletion loss imposed on the focal IP asset.

Consider a firm that owns or controls a focal IP. In a given period, the firm chooses cross-IP development intensity d . The variable d may represent collaboration frequency, SKU count, release density or licensing expansion. The match and translation quality between the partner IP and the focal IP is denoted by m . The initial asset stock of the focal IP is denoted by A . The firm receives short-term benefit from collaboration while bearing development cost and asset depletion loss.

Short-term benefit is written as $B(d,m,A)$. Benefit increases with d because more collaborations create more products, channel events and exposure. Marginal benefit decreases because consumer attention is limited and repeated collaborations reduce novelty. Benefit also increases with m and A because strong fit and a strong focal IP are easier to convert into willingness to pay.

Development cost is written as $C(d)$. It includes design, production, approval, channel, marketing and coordination costs. $C(d)$ increases with development intensity. Depletion loss is written as $D(d,m,A)$. This loss includes weaker scarcity, blurred meaning, consumer fatigue, weaker secondary-market support and lower future licensing bargaining power. D increases with d and decreases with m .

The benefit term combines direct market benefit and feedback benefit. Direct benefit comes from sales, premium and attention generated by the collaborative product. Positive feedback benefit comes from improved reputation, audience entry and future licensing opportunities. Depletion loss captures negative feedback: consumers may interpret the focal IP less clearly, scarcity may weaken and future collaborations may produce lower marginal response.

The timing of B and D differs. B is often visible during launch, media exposure and channel sales. D may appear in later collaborations, secondary-market performance, consumer discussion and licensing negotiations. This timing gap is central to the paper's argument.

4.2 Firm Objective

The firm chooses d in a single period to maximize:

$$\Pi(d) = B(d,m,A) - C(d) - \lambda \times D(d,m,A) \quad (1)$$

The parameter λ measures how strongly the firm internalizes long-term IP asset depletion. A higher λ means the firm places more weight on long-term asset quality. A lower λ means current returns receive greater decision weight. Governance structure, managerial incentives, capital-market pressure, licensing contract horizon and financial targets can all affect λ .

The objective function is intentionally parsimonious. B , C and D summarize benefit, cost and asset depletion. λ determines how strongly future loss enters the current decision. The paper does not specify a more detailed functional form because its purpose is to derive directional results and build a transparent operational pathway. Structural estimation can be developed in later research when richer data become available.

The model assumes $B_d > 0$, $B_{dd} < 0$; $C_d > 0$, $C_{dd} \geq 0$; $D_d > 0$, $D_{dd} \geq 0$. These assumptions have direct economic meanings. Cross-IP development brings positive but diminishing benefit. Development cost rises with intensity. Asset depletion rises with intensity and may accelerate when consumer fatigue and scarcity loss accumulate.

λ captures governance and incentive conditions. A listed company may face revenue-growth expectations. Licensing teams may be evaluated by project count and current income. Retail channels may demand a steady flow of new products. These conditions can lower the internalization of long-term asset loss. A firm with strict brand committees, long-term licensing plans and a broader IP portfolio may have a higher λ .

4.3 Exogenous Parameters

The model treats m , A and λ as exogenous parameters. The purpose is to explain the economic mechanism of cross-IP collaboration and show how parameter changes alter firm choice. Current public data are insufficient for direct estimation of all structural parameters. An exogenous-parameter model therefore fits the paper's research stage.

The theoretical parameters should be separated from observable proxies. The parameters m , A and λ describe the environment in which the firm acts. The empirical variables RP , AL , DI , PV , IC and AD are proxies used in the case analysis. The first group drives comparative statics; the second group supports diagnosis.

This treatment is consistent with theoretical brand-dilution research. Bacchiega et al. use theoretical parameters to express quality, demand, licensing returns and dilution damage [11]. This paper imports the same modeling logic into cross-IP collaboration and places development intensity, collaboration fit and asset depletion within one firm-choice problem.

4.4 Framework and Proposition Plan

The framework has four components: external conditions, value mechanism, risk mechanism and outcome. External conditions include focal-IP asset stock A , collaboration match and translation quality m , internalization of long-term loss λ , and development intensity d . The value mechanism is $B(d,m,A)$, mainly expressed through price premium, attention lift and audience expansion. The risk mechanism is $D(d,m,A)$, mainly expressed through weakened scarcity,

blurred meaning boundaries, price instability and revenue concentration. The outcome is the firm's chosen development intensity d^* , and the distance between d^* and a sustainable boundary d_s .

The model turns concepts from the literature into propositions. Brand equity and fit research support the role of m . Brand dilution research supports the presence of D . Attention and collectible-market research explain why B appears quickly. Governance and incentive conditions explain why λ may be low. The next section derives the equilibrium condition, the rational-depletion proposition, the sustainable-boundary proposition and comparative statics.

5 EQUILIBRIUM ANALYSIS AND PROPOSITIONS

5.1 Single-Period Equilibrium

For an interior solution, the firm's optimal development intensity d^* satisfies:

$$B_d(d^*, m, A) = C_d(d^*) + \lambda \times D_d(d^*, m, A) \quad (2)$$

The condition states that the firm expands cross-IP collaboration until marginal benefit equals marginal development cost plus marginal asset depletion cost. The left side is the benefit from one additional unit of collaboration. The right side is the immediate cost plus the long-term asset cost of that additional unit.

The second-order condition is $B_{dd}(d^*, m, A) - C_{dd}(d^*) - \lambda \times D_{dd}(d^*, m, A) < 0$. Under diminishing marginal benefit and nondecreasing cost and depletion, the optimal intensity can be determined. The equilibrium is the firm's best response under given parameters and constraints. It is not necessarily the long-term asset-maximizing level.

5.2 Rational IP Asset Depletion

Proposition 1: High-frequency cross-IP collaboration can be a rational firm choice. When λ is low, the depletion term has less weight in the objective function. The right side of the first-order condition falls. The firm then raises d until marginal benefit falls to the new marginal-cost level. A firm may therefore increase development intensity even when repeated collaboration raises depletion risk.

This proposition moves the discussion away from a simple managerial-failure explanation. IP asset depletion can emerge from current profit maximization. When sales opportunities, media attention and channel demand are visible, a firm may give less weight to delayed asset loss. If short-term benefit is high enough, the firm can choose a development intensity above the sustainable level.

The proposition also distinguishes this paper from many marketing-effect studies. A single collaboration may raise purchase intention or brand attitude, yet repeated collaborations can accumulate asset pressure. Project success and long-term asset enhancement have a conditional relationship.

5.3 Sustainable Development Boundary

Let Λ denote the parameter that applies when the firm fully internalizes long-term asset value, with $\Lambda > \lambda$. Sustainable development intensity d_s satisfies:

$$B_d(d_s, m, A) = C_d(d_s) + \Lambda \times D_d(d_s, m, A) \quad (3)$$

Because Λ is higher than λ , the right side is higher, so d_s is lower than d^* . When the actual choice satisfies $d^* > d_s$, a project may still produce short-term returns, but the focal IP enters a depletion-risk zone. This result gives the later scoring framework its theoretical basis: project analysis must record both value creation and depletion risk.

The sustainable boundary also shows why governance matters. If a firm evaluates projects only through current sales and communication effects, d^* becomes the practical decision benchmark. If the firm adds long-term IP audits, scarcity indicators, consumer fatigue, licensing quality and secondary-market stability to approval, decisions move closer to d_s .

5.4 Comparative Statics

Proposition 2: Higher match and translation quality m expand the sustainable range of collaboration. A higher m raises $B(d, m, A)$ and lowers $D(d, m, A)$. High-fit collaboration can therefore create benefit while reducing depletion pressure.

Proposition 3: A higher focal-IP asset stock A can increase the incentive for high development intensity. A strong IP creates higher initial benefit, making collaboration more attractive. If the same IP also carries revenue-growth expectations, income concentration can raise pressure for repeated commercialization.

Proposition 4: Greater convexity in D raises long-term risk from overdevelopment. If consumer fatigue, scarcity loss and meaning dilution accelerate with development intensity, a small increase in d can raise future loss sharply.

Together, the propositions form the paper's theoretical claim. Cross-IP collaboration deserves use because it activates existing cognitive assets and creates short-term market value. It also requires discipline because the same mechanism increases exposure density and interpretation burden. The central managerial question is whether development intensity has crossed the sustainable boundary.

6 PUBLIC DATA OPERATIONALIZATION

6.1 Research Design

The empirical part uses an exploratory case design. The unit of analysis is a publicly identifiable cross-IP collaboration project. A project must meet three conditions: the focal IP and partner IP can be separated, official product records can be verified, and at least part of the market response can be observed through public sources. Pop Mart-related cases are selected because official product pages, collection pages, selected StockX records and the company annual report form a relatively complete public data chain.

The cases are chosen through theoretical sampling. THE MONSTERS x Hello Kitty and Friends shows how high fit can generate a strong value signal. THE MONSTERS x Coca-Cola shows premium and price volatility in the same project. THE MONSTERS x FIFA shows development-intensity pressure from a larger product count. DIMOO WORLD x Disney provides a comparison in which a strong partner IP enters a different focal-IP system.

Data processing follows the project sequence. The researcher first verifies collaboration status, launch timing, official price and product count. Secondary-market transaction prices are then recorded. Media attention and background pageviews are calculated around the launch window. Raw variables are converted into 0-100 scores and entered into the NCS framework. Missing values remain missing. When an item lacks attention or secondary-market data, the paper reports a partial diagnosis.

6.2 From Theoretical Variables to Observable Indicators

The theoretical variables B, C, D and lambda cannot all be observed with public data. The paper therefore builds an operational scoring framework. Short-term benefit B is proxied by secondary-market premium (RP) and project-level attention lift (AL). Depletion loss D is proxied by development intensity (DI), price volatility (PV), income concentration (IC) and background attention decline (AD). The correspondence between the theoretical variables and their observable proxies is summarized in Table A1.

Net Change Score is written as:

$$NCS_i(\theta) = VCS_i(\theta) - IRS_i(\theta) \quad (4)$$

Value Creation Score is:

$$VCS_i = \alpha_RP \times RP_i + \alpha_AL \times AL_i \quad (5)$$

IP Risk Score is:

$$IRS_i = \beta_DI \times DI_i + \beta_PV \times PV_i + \beta_IC \times IC_i + \beta_AD \times AD_i \quad (6)$$

Theta denotes the set of exogenous diagnostic weights. Alpha_RP and alpha_AL allocate weights on the value-creation side. Beta_DI, beta_PV, beta_IC and beta_AD allocate weights on the depletion-risk side. All weights lie between 0 and 1, and weights on each side sum to 1. This restriction keeps VCS and IRS on the same scale and makes NCS comparable across projects.

The baseline setting is $\alpha_RP = 0.60$, $\alpha_AL = 0.40$; $\beta_DI = 0.35$, $\beta_PV = 0.25$, $\beta_IC = 0.25$ and $\beta_AD = 0.15$. These weights are exogenous diagnostic parameters, not coefficients estimated by an existing cross-IP paper. RP receives a higher value-side weight because Last Sale records are closer to realized consumer payment. AL records communication strength, but attention still needs to become purchase. DI receives the highest risk-side weight because development intensity directly corresponds to d in the theoretical model. PV and IC record price-support instability and firm dependence on the focal IP. AD is used as a supplementary indicator of post-launch attention retention.

The weight-setting procedure has three steps. The theory first determines whether a variable belongs to the benefit side or the risk side. The baseline weight is then chosen according to how close the variable is to the theoretical object. Variables closer to realized payment, development intensity and asset dependence receive higher weight. Later studies can recalibrate theta through sensitivity analysis, expert surveys, analytic hierarchy process, panel regression or structural estimation. In this paper, the weights show how the model operates under transparent assumptions.

6.3 Standardization Rules

Each raw indicator is converted into a 0-100 score:

$$S_{\{i,k\}} = (x_{\{i,k\}} - L_k) / (H_k - L_k) \times 100 \quad (7)$$

L_k is the lower line for indicator k, and H_k is the upper line. The lower line represents no clear incremental value or a low-risk condition. The upper line represents a strong market signal or a high-risk condition. Scores below 0 are set to 0; scores above 100 are set to 100. The paper uses fixed thresholds because the case sample is small. If sample minima and maxima were used, adding or removing one case could change every score.

RP uses a 0% to 300% range. Zero percent means that the secondary-market transaction price is not above the official retail price. Three hundred percent indicates a very strong collectible or scarcity premium. AL uses a smoothed attention-lift range from 1 to 3. A value of 1 means that post-launch reporting does not exceed the pre-launch baseline. A value of 3 means reporting reaches three times the baseline. DI uses an official product-count range from 1 to 12, where one product represents low development density and twelve products approximate the high-intensity range observed in this case set.

PV uses a 0% to 50% range for the share of negative-premium products. If no observed item falls below retail price, price support is relatively stable. If half of observed items fall below retail price, the project shows marked internal price division. IC uses a 15% to 40% range for focal-IP revenue concentration. Fifteen percent indicates company-level relevance; forty percent indicates high dependence on a single IP. AD uses a drop to 0.5 times baseline pageviews as a

high-risk threshold. The raw data, standardization thresholds and scoring position of each indicator are summarized in Table A2.

The thresholds combine theoretical meaning, observed sample range and conservative interpretation. They are disclosed as research settings and should be recalculated in later work. A larger sample could replace them with percentiles, industry averages or estimated breakpoints. The key methodological contribution is the sequence: assign economic meaning to a variable, set lower and upper lines, then place the variable on a common score scale.

6.4 Data Sources

Each empirical indicator must be traceable to a public source and connected to a theoretical variable. Pop Mart official product pages and collection pages verify the existence of a collaboration, launch timing, official price and product count [15]. StockX public product pages provide Retail Price and Last Sale, allowing the paper to observe secondary-market premium [16]. The GDELT DOC API identifies directly relevant reporting around the release window [17]. The Wikimedia Pageviews API provides background attention [18]. Pop Mart's 2025 annual report is used to evaluate the importance of THE MONSTERS in the firm's revenue structure [19].

Public data cannot show the full internal profit statement. Real sales volume, licensing fees, marketing expenses, channel inventory, gross margin and long-term repeat purchase remain unobserved. The case analysis therefore makes a narrow claim. Public data support observation of market-value signals and asset-pressure direction. NCS should be read as an asset-direction score, not as a project-profit estimate.

The paper applies conservative data rules. News articles enter AL only when they directly refer to a specific cross-IP collaboration. Secondary-market price uses realized Last Sale instead of highest listing price. Project-level RP uses the median to reduce the influence of chase items, abnormal transactions and short-run speculation. Missing variables remain missing and are not filled with subjective scores.

7 CASE ILLUSTRATION

7.1 Pop Mart as a Case Setting

Pop Mart is suitable for exploratory analysis because its products often have identifiable official pages, selected items appear in public secondary-market records, and its annual report discloses revenue for major IP lines. The paper studies four collaborations: THE MONSTERS x Hello Kitty and Friends, THE MONSTERS x Coca-Cola, THE MONSTERS x FIFA and DIMOO WORLD x Disney. The input data for the four projects are reported in Table A3.

Company-level data provide the asset-concentration background. Pop Mart's 2025 annual report reports total revenue of RMB 371.2 billion and THE MONSTERS revenue of RMB 141.6 billion [19]. THE MONSTERS accounts for about 38.1% of company revenue. Under the IC standardization range of 15% to 40%, THE MONSTERS receives an income-concentration score of about 92.4.

7.2 THE MONSTERS x Hello Kitty and Friends

The Hello Kitty collaboration has the most complete data chain in the sample. The official sample includes 2 product records. StockX provides 4 secondary-market records. The median Last Sale premium is 193.0%, corresponding to an RP score of 64.3. The GDELT relevance coding records 1 directly relevant article before launch and 3 after launch within the thirty-day windows. The smoothed attention lift is 2.0, producing an AL score of 50.0.

With the baseline weights, the collaboration receives a VCS of 58.6. On the risk side, DI is 9.1, PV is 0.0, IC is 92.4 and AD is 23.3. The baseline IRS is about 29.8, and NCS is about 28.8. Within the limits of public data, the market-value signal is stronger than the depletion-risk score, while focal-IP revenue concentration remains a long-term pressure point.

7.3 Comparative Cases

The Coca-Cola collaboration shows high premium and high volatility in the same project. Its median StockX Last Sale premium is 156.2%, giving an RP score of about 52.1. At the same time, the negative-premium share reaches 50.0%, producing a PV score of 100.0. High transaction premium therefore needs to be read together with internal price division.

The FIFA collaboration is more useful for observing development intensity. The official sample includes 11 product records, giving a DI score of about 90.9. Its RP score is about 53.3, indicating that a secondary-market premium is still visible. The high DI score, however, shows a much denser use of the focal IP.

DIMOO WORLD x Disney provides a comparison between partner awareness and realized premium. The official sample includes 12 product records and a DI score of 100.0. Its RP score is about 21.6, lower than the THE MONSTERS collaborations in the sample. The result suggests that partner-IP strength must be translated through the focal product system before it becomes price premium.

7.4 Case Interpretation

The cases correspond closely to the model. The Hello Kitty collaboration suggests that higher m can raise benefit and limit depletion pressure when the partner IP has strong recognition and visual symbols that are easy to translate into collectible products. The Coca-Cola case shows that short-term premium can coexist with price volatility. The FIFA case shows that a larger product count can expand coverage while increasing development-intensity pressure. The DIMOO x Disney case shows that partner awareness alone does not guarantee a high NCS.

The cases support the central explanation of the paper. Short-term benefit is easier for firms to observe than long-term depletion. When a focal IP is in a growth stage and carries company-level revenue expectations, the firm has an incentive to keep raising development intensity. The exogenous parameter model formalizes this decision logic. The public-data scoring framework shows how the mechanisms can be connected to observable indicators.

The Pop Mart cases are used to illustrate relationships among variables, not to prove universal parameter values. Hello Kitty shows how high RP and AL increase VCS. Coca-Cola shows how high RP can be offset by high PV. FIFA shows how high DI raises the risk side. DIMOO x Disney shows how partner-IP awareness must pass through product-system translation before it becomes price premium.

8 DISCUSSION AND RESEARCH IMPLICATIONS

8.1 Main Findings

The first finding is that short-term value creation and long-term asset pressure can appear in the same cross-IP project. This finding extends co-branding and perceived-fit research. Prior studies explain how partner relations, brand strength and fit affect consumer evaluation. This paper adds an asset-level implication: when collaboration becomes a repeated launch mechanism, the same process increases the focal IP's exposure density and interpretation burden. Project success should therefore be evaluated together with asset consequence.

The second finding is that high-frequency development can arise from rational firm choice. Lambda represents the internalization of long-term asset loss. When lambda is low, current revenue, channel demand and market heat receive greater weight, and development intensity may exceed the sustainable boundary. This result echoes brand-dilution theory: firms facing visible current returns and delayed damage may choose expansion that serves current objectives.

The third finding concerns selection. Bacchiaga et al. remind researchers that the relationship between licensing and brand dilution may include firm self-selection [11]. Frequent cross-IP collaboration and IP asset pressure may follow a similar logic. High-frequency collaboration may occur when a firm most needs to monetize the focal IP, maintain product rhythm or compensate for limited alternative growth sources. Observed pressure is therefore both a potential outcome of collaboration and a reflection of project selection under commercial constraints.

The fourth finding comes from the cases. THE MONSTERS x Hello Kitty and Friends shows a clear value signal under high symbolic fit. THE MONSTERS x Coca-Cola shows the need to interpret premium together with price volatility. THE MONSTERS x FIFA shows that product-count expansion increases development-intensity pressure. DIMOO WORLD x Disney shows that a strong partner IP still requires focal-system translation, product design and scarcity management to become willingness to pay.

8.2 Theoretical Implications

The paper shifts cross-IP research from single-project marketing effect to cross-period asset use. Many existing studies ask whether consumers like a collaboration, form purchase intention or retain interest. This paper asks how firms repeatedly use the same focal IP across periods and how such use changes future marginal benefit and marginal risk. The perspective helps explain why a collaboration can be popular in the short run and still weaken scarcity and boundary clarity over time.

The paper also connects brand dilution theory with attention economics. Brand dilution research explains how asset quality can fall through expansion. Attention economics explains why firms continue to create event windows. Cross-IP collaboration sits at the intersection of these mechanisms. It converts stored recognition into launch attention while raising the burden placed on consumers' stable expectations of the focal IP.

The exogenous parameter model provides a compact theoretical language. The parameter m captures collaboration match and translation quality. A captures focal-IP asset stock. Lambda captures governance and internalization of long-term loss. The choice variable d captures development intensity. These symbols convert questions about partner selection, release density and repeated collaboration into a single marginal comparison.

8.3 Robustness and Future Empirical Pathways

The model can be tested for robustness in three ways. First, researchers can change theta. Equal-weight, price-oriented and risk-oriented scenarios can be compared to see whether conclusions depend too heavily on one set of weights. Second, future work can introduce a multi-period asset-stock equation:

$$A_{t+1} = A_t + \eta \times VCS_t - \mu \times IRS_t \quad (8)$$

This equation links single-period collaboration outcomes to long-term IP asset movement. Third, researchers can model partner choice. A firm may compare different m values across partners and evaluate the long-term difference between high-fit low-frequency collaboration and low-fit high-frequency collaboration.

Future empirical studies can expand the sample across collectibles, games, apparel, entertainment merchandise and platform events. Additional variables could include sales volume, sell-out speed, inventory, secondary-market transaction volume and price time series. If firm-level internal data are available, licensing fees, marketing cost, channel cost and gross margin can connect observable market value to net economic value.

With richer data, exogenous parameters can become estimated parameters. Feasible methods include panel regression, event studies, structural estimation, analytic hierarchy process and expert surveys. Public data support replicable case diagnosis. Internal data can estimate the actual weights among short-term benefit, development cost and long-term asset loss.

8.4 Managerial Implications

For firms, the central implication is to build a portfolio audit for cross-IP collaboration. Before launch, the firm can estimate expected RP, AL, DI, IC and AD to form an ex ante NCS. After launch, the firm can update the score using actual transaction prices, media coverage, pageviews and product-mix changes. This turns single-project heat into continuing asset monitoring.

Managers should separate project success from asset enhancement. A project can generate a high premium while using the focal IP more intensely. A steadier strategy controls collaboration rhythm and gives priority to partners with high fit, strong translation quality and real audience expansion.

The most important managerial signal is the pattern across projects. If one focal IP repeatedly shows falling RP, falling AL, rising DI and rising PV, the firm should reduce release density and raise collaboration-screening standards. If a collaboration direction produces stable premium, real audience expansion and low price volatility, it can be included in a longer licensing plan.

9 CONCLUSION

This paper examines the asset consequence of cross-IP collaboration. Existing research usually explains collaboration value through fit, consumer attitude, purchase intention and co-branding performance. This paper moves the discussion to the long-term asset level. Cross-IP collaboration can create price premium, media attention and audience expansion in the short run. The same results can also change the focal IP's exposure density, scarcity and market interpretation. Cross-IP collaboration is therefore a commercial choice involving both asset return and asset pressure.

The main theoretical result comes from the equilibrium condition for development intensity. A firm choosing d compares marginal benefit, marginal development cost and marginal asset depletion loss. If the firm weakly internalizes long-term asset loss, equilibrium development intensity can exceed the sustainable level. IP asset depletion can therefore arise from rational choice under commercial constraints. In periods of revenue pressure, product expansion and concentrated licensing opportunity, a higher collaboration intensity may satisfy current profit goals while accumulating long-term asset pressure.

The model also shows that collaboration outcomes depend on more than partner heat. Match quality, asset stock and the internalization of long-term loss all matter. When m rises, the collaboration is easier for consumers to interpret as a natural extension, short-term benefit rises and depletion risk falls. When A is high, the firm has stronger premium and attention capacity, but it may also rely more heavily on existing recognition. When λ is low, the firm is more likely to expand collaboration frequency. A firm should therefore evaluate partner appeal, translation quality, focal-IP capacity and governance discipline together.

The Pop Mart cases provide a replicable operational illustration. THE MONSTERS x Hello Kitty and Friends shows high secondary-market premium and some attention lift, producing a strong value-creation signal. THE MONSTERS x Coca-Cola also shows high premium, while price volatility and background-attention indicators point to greater event dependence. THE MONSTERS x FIFA has a larger product count, suggesting stronger development-intensity pressure. DIMOO WORLD x Disney shows that a famous partner IP must be translated through the focal product system before it becomes a high premium. Together, the cases support the paper's central claim: value creation and IP asset depletion can occur together, and their net direction depends on the parameter configuration.

The paper makes three contributions. It defines IP asset depletion as an asset-level consequence of repeated cross-IP commercialization. It builds an exogenous parameter model that places development intensity, match quality, asset stock and long-term loss internalization into one firm-choice framework. It also connects theoretical variables to public data and proposes NCS as an asset-direction score for exploratory case comparison.

The paper has clear limits. Public data can reveal market-value signals and asset-pressure direction, but real sales volume, licensing fees, marketing cost, inventory, gross margin and long-term repeat purchase remain difficult to observe. NCS should therefore be interpreted as an asset-direction score, not a profit estimate. Future research can estimate model parameters with larger samples, panel data or event studies, and can examine how internal cost and margin data change the conversion from short-term market value to long-term economic value.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

REFERENCES

- [1] Keller K L. Conceptualizing, measuring, and managing customer-based brand equity. *Journal of Marketing*, 1993, 57(1): 1-22. DOI: 10.1177/002224299305700101.
- [2] Enes Y S O, Demo G, Porto R B, et al. What is next for consumer-based brand equity in digital brands? Research itineraries and new challenges. *Sustainability*, 2024, 16(13): 5412. DOI: 10.3390/su16135412.
- [3] Aaker D A, Keller K L. Consumer evaluations of brand extensions. *Journal of Marketing*, 1990, 54(1): 27-41. DOI: 10.1177/002224299005400102.
- [4] Peng C, Bijmolt T H A, Volckner F, et al. A meta-analysis of brand extension success: The effects of parent brand equity and extension fit. *Journal of Marketing*, 2023, 87(6): 906-927. DOI: 10.1177/00222429231164654.
- [5] Deng Q C, Messinger P R. Dimensions of brand-extension fit. *International Journal of Research in Marketing*, 2022, 39(3): 764-787. DOI: 10.1016/j.ijresmar.2021.09.013.
- [6] Simon C J, Sullivan M W. The measurement and determinants of brand equity: A financial approach. *Marketing Science*, 1993, 12(1): 28-52. DOI: 10.1287/mksc.12.1.28.
- [7] Park C W, Jun S Y, Shocker A D. Composite branding alliances: An investigation of extension and feedback effects. *Journal of Marketing Research*, 1996, 33(4): 453-466. DOI: 10.1177/002224379603300407.
- [8] Ahn J, Kim A, Sung Y. The effects of sensory fit on consumer evaluations of co-branding. *International Journal of Advertising*, 2020, 39(4): 486-503. DOI: 10.1080/02650487.2019.1652518.
- [9] Paydas Turan C. Success drivers of co-branding: A meta-analysis. *International Journal of Consumer Studies*, 2021, 45(4): 911-936. DOI: 10.1111/ijcs.12682.
- [10] Nguyen H T, Ross W T, Pancras J, et al. Market-based drivers of cobranding success. *Journal of Business Research*, 2020, 115: 122-138. DOI: 10.1016/j.jbusres.2020.04.046.
- [11] Bacchiega E, Colucci M, Denicolo V, et al. Only the ugly face? A theoretical model of brand dilution. *Management Science*, 2024, 70(5): 3182-3199. DOI: 10.1287/mnsc.2022.00852.
- [12] Kim W. The critical factors affecting the consumer reselling of limited edition products: A case in the Korean fashion sector. *Sustainability*, 2020, 12(19): 8181. DOI: 10.3390/su12198181.
- [13] Huang D. Research on the influence of IP co-branding on consumers' purchase intention: Mediated by consumers' perceived value. *SHS Web of Conferences*, 2024, 181: 01026. DOI: 10.1051/shsconf/202418101026.
- [14] Kang Y, Feng Q. Impact of brand and IP co-branding on retention intention: Consumer perception perspective. *Procedia Computer Science*, 2024, 242: 243-248. DOI: 10.1016/j.procs.2024.08.249.
- [15] Pop Mart. Public product pages and collections for cross-IP products. 2026. <https://www.popmart.com/>.
- [16] StockX. Public product pages for Pop Mart cross-IP products. 2026. <https://stockx.com/>.
- [17] GDELT Project. GDELT DOC 2.0 API. 2026. <https://api.gdeltproject.org/api/v2/doc/doc>.
- [18] Wikimedia Foundation. Wikimedia Pageviews API. 2026. https://wikimedia.org/api/rest_v1/.
- [19] Pop Mart. Annual report 2025. 2026. https://prod-out-res.popmart.com/cms/ANNUAL_REPORT_2025_bd4e173872.pdf.

APPENDIX

Table A1 Theoretical Variables and Observable Proxies

Variable	Meaning	Observable Proxy	Interpretation
B	Short-term collaboration benefit	RP, AL	Price premium and news attention capture short-term market value
D	IP asset depletion loss	DI, PV, IC, AD	Product density, price volatility, revenue concentration and attention decline capture asset pressure
m	Match and translation quality	Case interpretation, product form, partner recognition	Higher m reduces meaning conflict and improves acceptance
lambda	Internalization of long-term loss	Theoretical parameter linked to governance and revenue pressure	Lower lambda makes high development intensity more likely

Source: Developed by the author based on Bacchiega et al. (2024), with the observable proxies defined through the theoretical and operational framework presented in Sections 4 and 6.

Table A2 Scoring Variables and Standardization Rules

Variable	Meaning	Raw Data	Standardization Rule	Position
RP	Secondary-market premium	Median StockX Last Sale premium	0% = 0; 300% = 100	VCS
AL	Project attention lift	GDELT relevant articles before and after launch	Smoothed lift 1 = 0; lift 3 = 100	VCS
DI	Development intensity	Official product count in the collaboration	1 item = 0; 12 items = 100	IRS
PV	Price volatility	Share of products with negative premium	0% = 0; 50% = 100	IRS
IC	Focal-IP revenue concentration	THE MONSTERS revenue share in Pop Mart	15% = 0; 40% = 100	IRS
AD	Background attention decline	Wikimedia post-launch/pre-launch pageview ratio	Fall to 0.5x baseline = 100	IRS

Source: Author's standardization framework using raw indicators from Pop Mart official product pages and collections, StockX public product pages, the GDELT DOC 2.0 API, the Wikimedia Pageviews API, and Pop Mart's Annual Report 2025. Thresholds and score direction are specified by the author in Section 6.

Table A3 Pop Mart Case Inputs

Project	Official Product Count	StockX Records	Median Last Sale Premium	RP Score	AL Score	NCS or Use
THE MONSTERS x Hello Kitty and Friends	2	4	193.0%	64.3	50.0	28.8
THE MONSTERS x Coca-Cola	2	4	156.2%	52.1	not available	partial diagnosis
THE MONSTERS x FIFA	11	4	159.9%	53.3	not available	partial diagnosis
DIMOO WORLD x Disney	12	4	64.8%	21.6	not available	partial diagnosis

Source: Author's compilation and calculations based on Pop Mart official product pages and collections, StockX public product pages, the GDELT DOC 2.0 API, the Wikimedia Pageviews API, and Pop Mart's Annual Report 2025. NCS is reported only for the case with complete inputs; the remaining projects are shown as partial diagnoses.