

# SDM Webinar

## The Incumbent's Dilemma

To fight, follow or flee the attacking  
innovation?

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# Outline

- Problem
- Methodology
  - Phase I
    - System Dynamics Model
    - Q&A, Session 1
  - Phase II
    - Empirical Cases
- Summary
- Q&A, Session 2

# Problem

## **Observation:**

The innovation and organizations literature has focused considerably on the question of, “why large firms fail.”

In real world, there are three distinct outcomes possible:

Disruption (entrants displace incumbents)

No-disruption (incumbents dispel entrants)

Coexistence (both entrants and incumbents share the market)

## **Question:**

*How to understand which of the three outcomes is most likely?*

(Since the answer to this question is what ought to dictate the appropriate competitive strategies)

# **METHODOLOGY**

# Overview of Methodology

## **Phase I:**

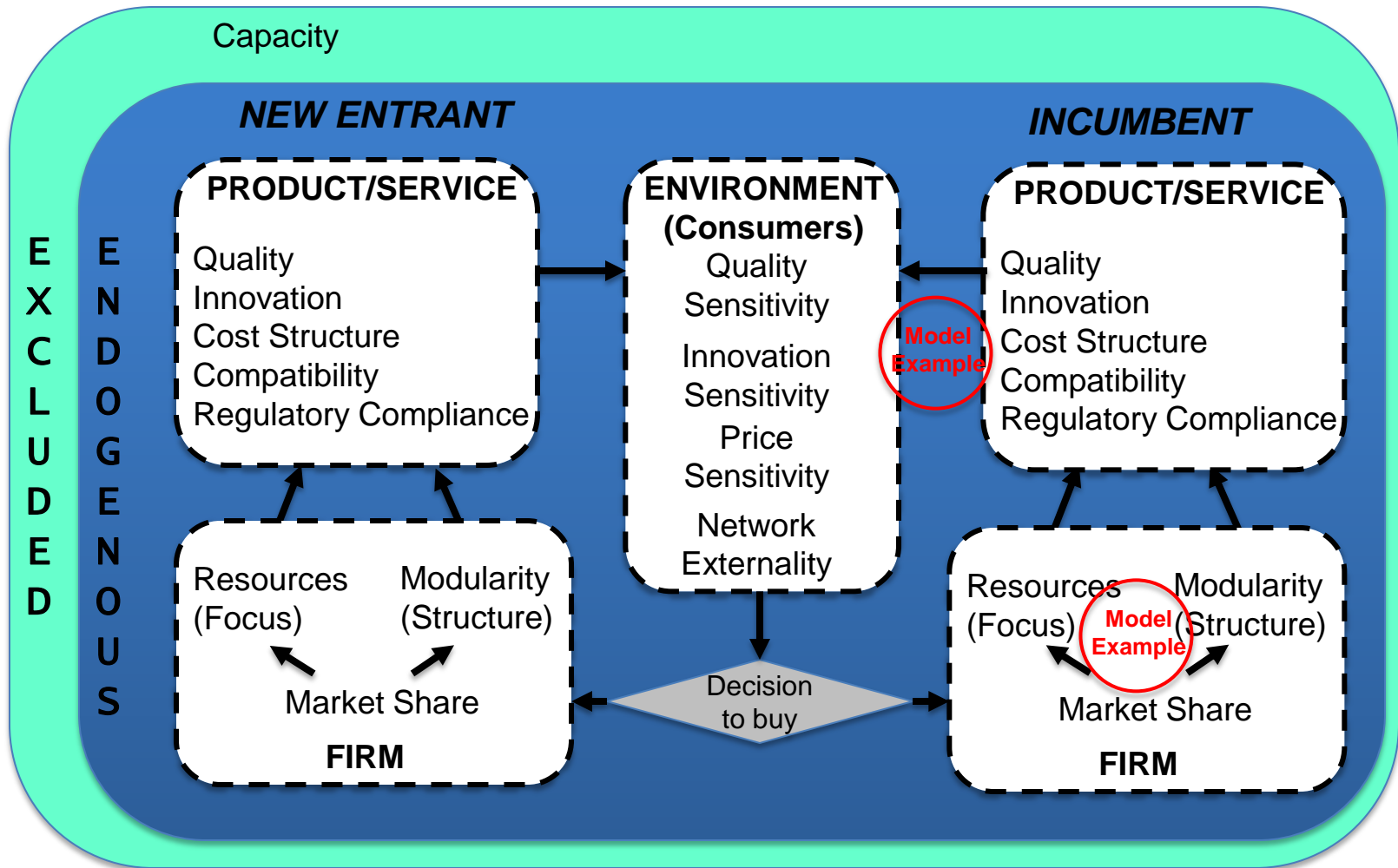
- A system dynamics model of disruption that integrates existing theories
- Model analysis
- Model-driven theory for causes of disruption, co-existence, and no-disruption

## **Phase II:**

- Empirical cases to validate model-based theoretical hypotheses

**PHASE I:  
A SYSTEM DYNAMICS MODEL OF  
DISRUPTION**

# Model Structure



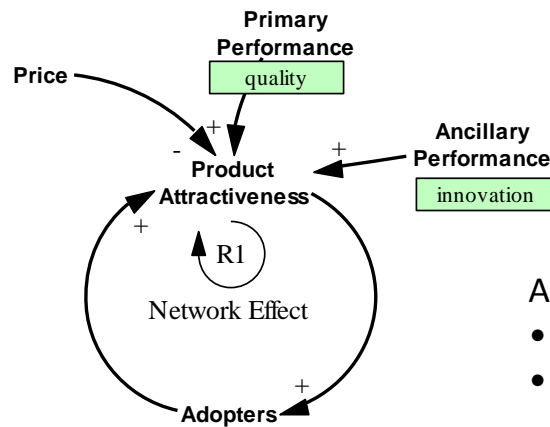
Model formulations rest upon:

1. Theories of adoption, innovation management, and technology strategy
2. Unstructured interviews with stakeholders

# Example: Model based on Theory

Christensen's Conditions for Disruptive Technology (Christensen 1997)

| Firm                  | Price | Primary Performance (Quality) | Ancillary Performance (Innovation) |
|-----------------------|-------|-------------------------------|------------------------------------|
| Incumbent (e.g. AT&T) | High  | High                          | Low                                |
| Entrant (e.g. Skype)  | Low   | Low                           | High                               |



Assumptions:

- 2 Firms – Incumbent, Entrant
- Each firm represents a typical firm in their industry

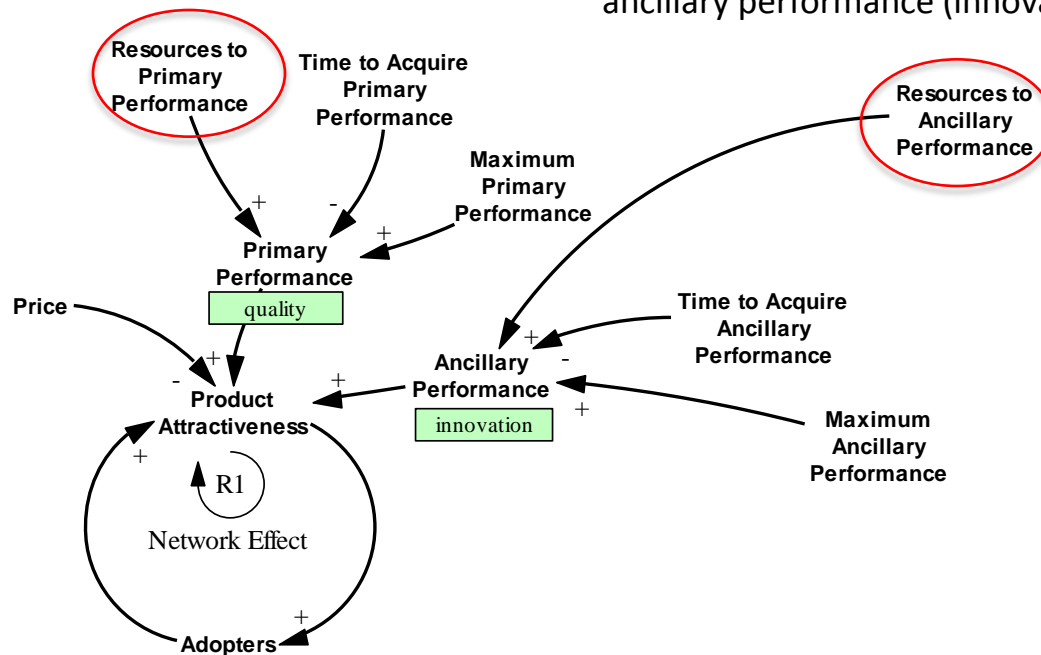
$$PA_i = \exp\left\{e_n \frac{N_i}{N^r}\right\} \exp\left\{-e_p \frac{P_i}{P^r}\right\} \exp\left\{e_q \frac{Q_i}{Q^r}\right\} \exp\left\{e_i \frac{I_i}{I^r}\right\}$$



# Example: Model based on Unstructured Interviews

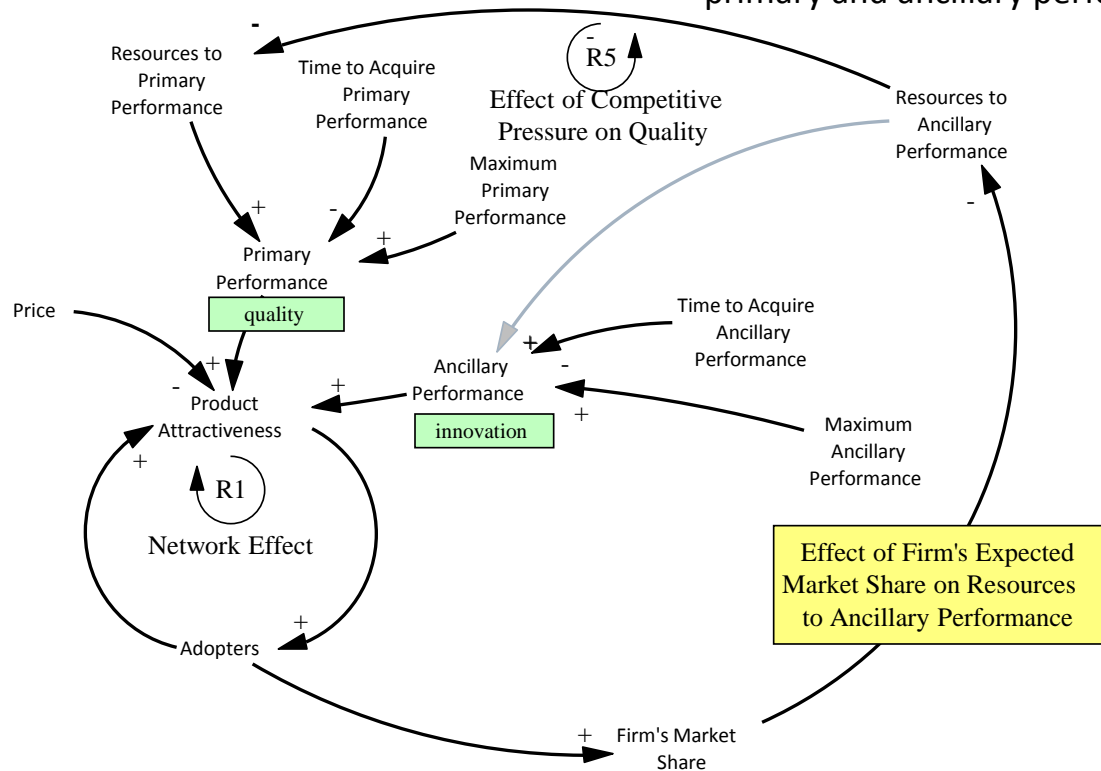
Assumption:

- Features of each service are separable into (identifiable as) primary performance (quality) and ancillary performance (innovation)



# Incumbent's Focus on Primary Performance (Quality)

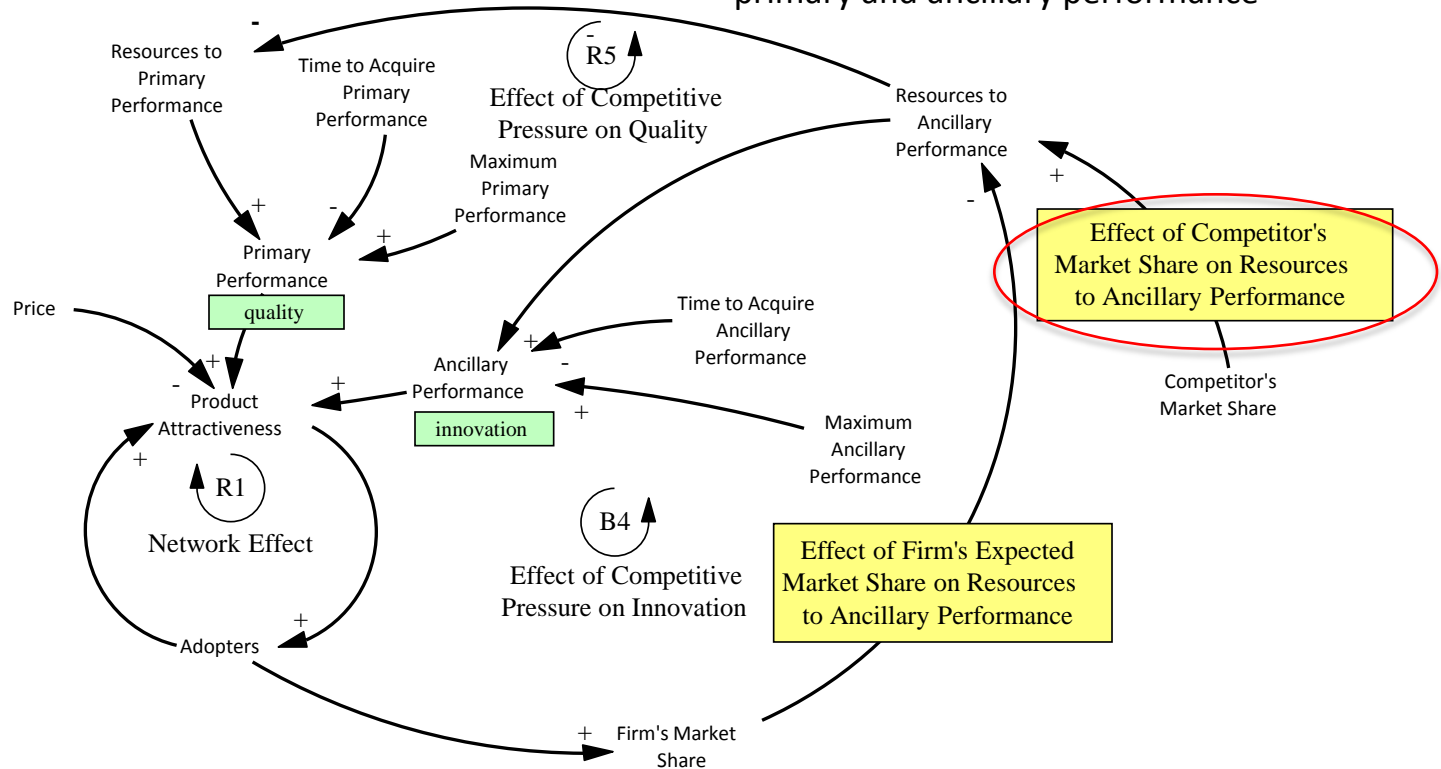
Assumption:  
Firms divide resources between compliance primary and ancillary performance



*"[Before the entrant] the only strategy was that of a monopolist. Incumbent A did not care what other features you want!"* Director, CTO Organization, Incumbent A

# Incumbent's Focus on Ancillary Performance (Innovation)

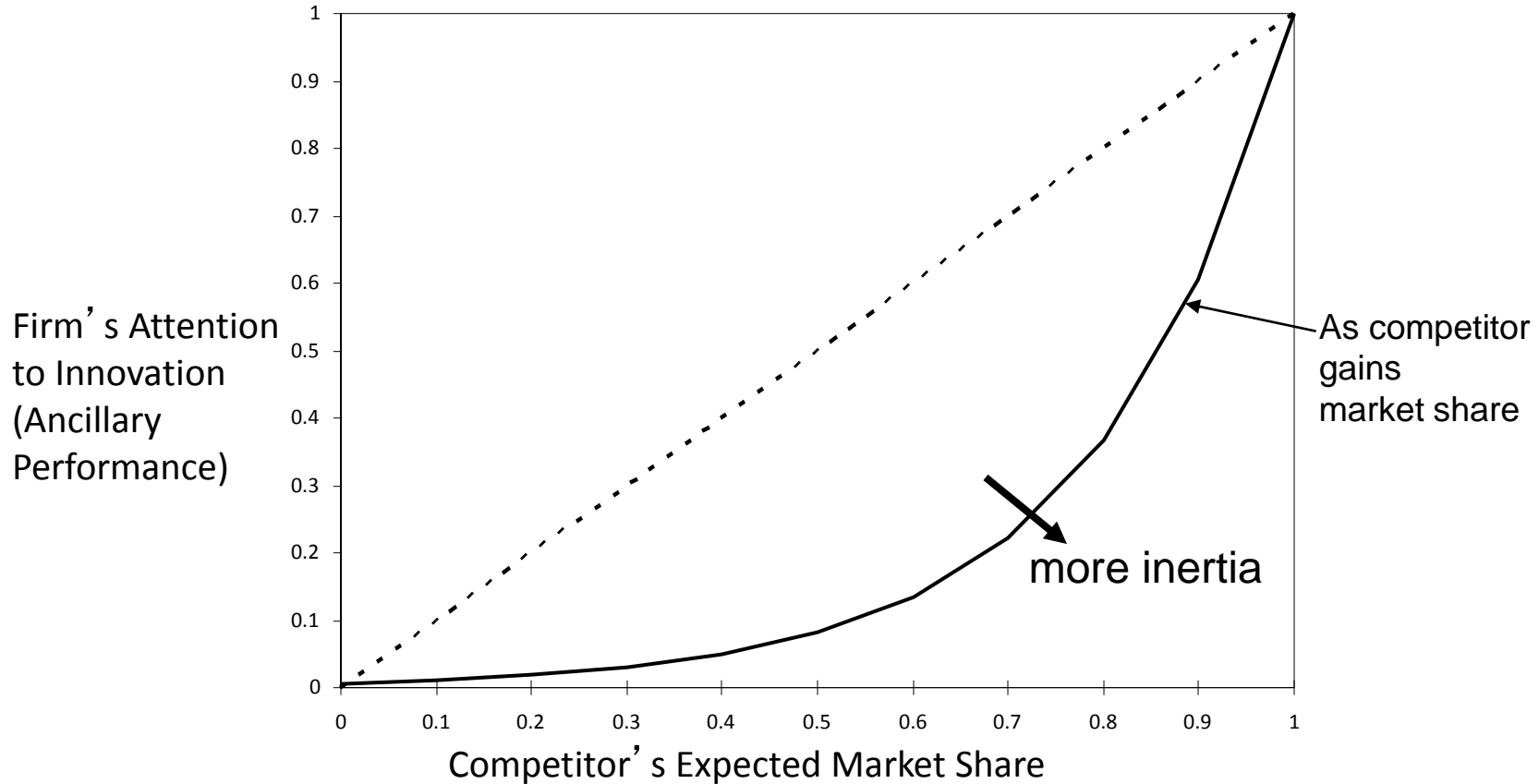
Assumption:  
Firms divide resources between compliance primary and ancillary performance



*“Incumbent cares about ancillary performance only with: the entry of the non-traditional competitor, and the growth of its market share.”*

*Director, CTO Organization, Incumbent A*

# Effect of Competitor's Market Share on Firm's Resources to Innovation

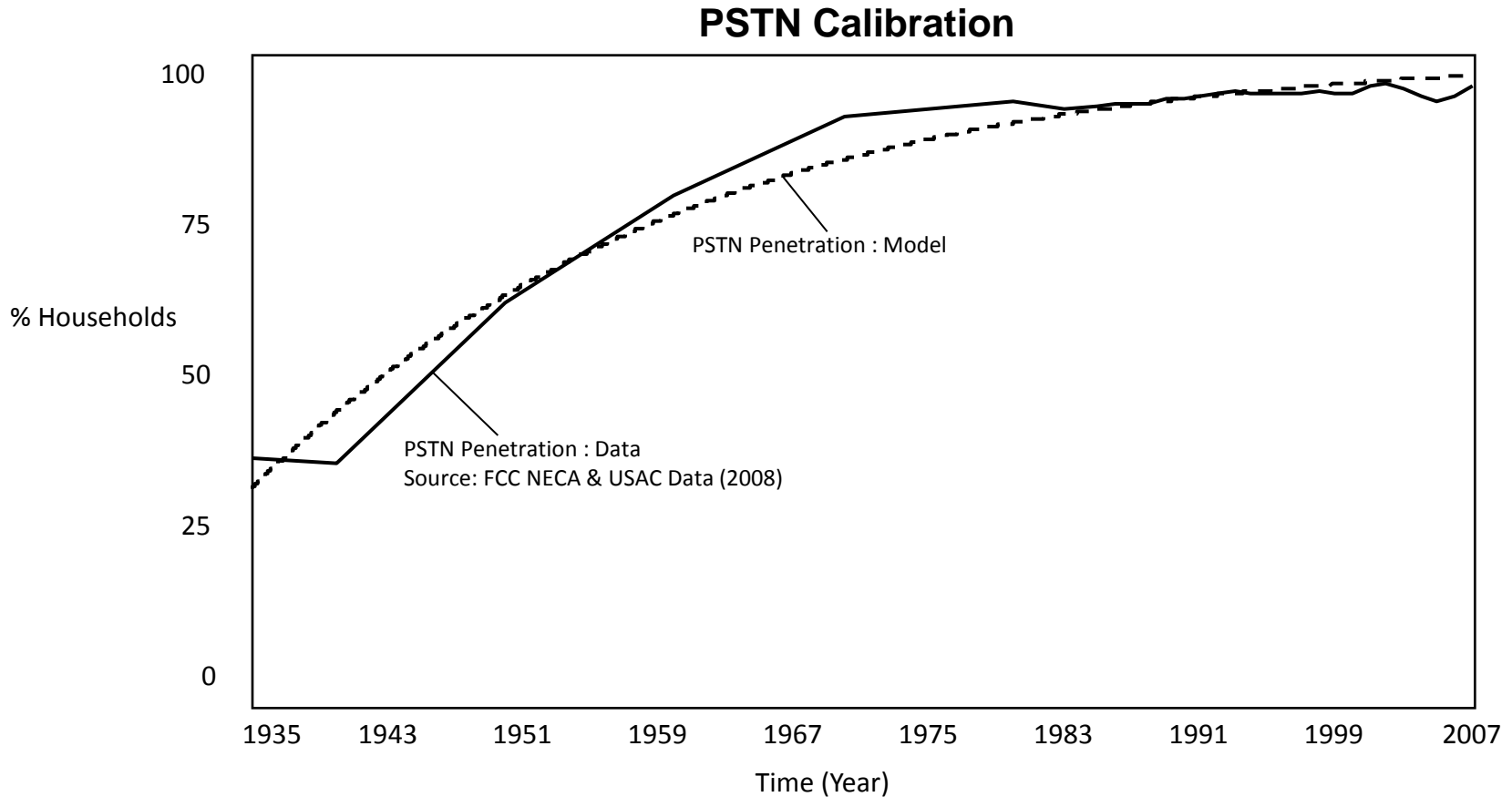


*"First [when the entrant enters] the question is whether this is a price game or a performance game. Then, you realize that the future is ancillary."*

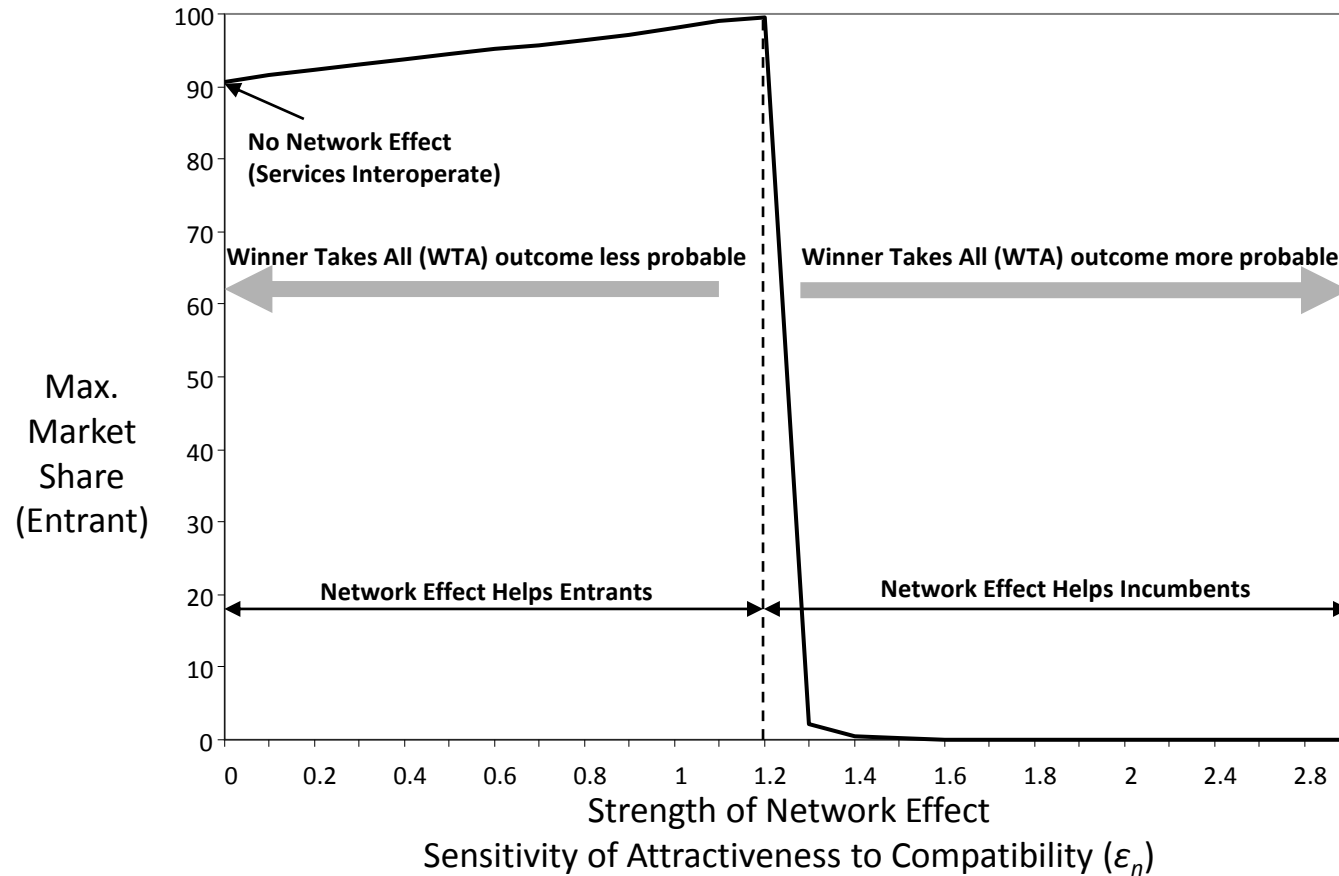
*Chief Strategist and Architect, Incumbent B*

# Model Validation

Through calibration with data, agreement with shared mental models of stakeholders, and expert opinion

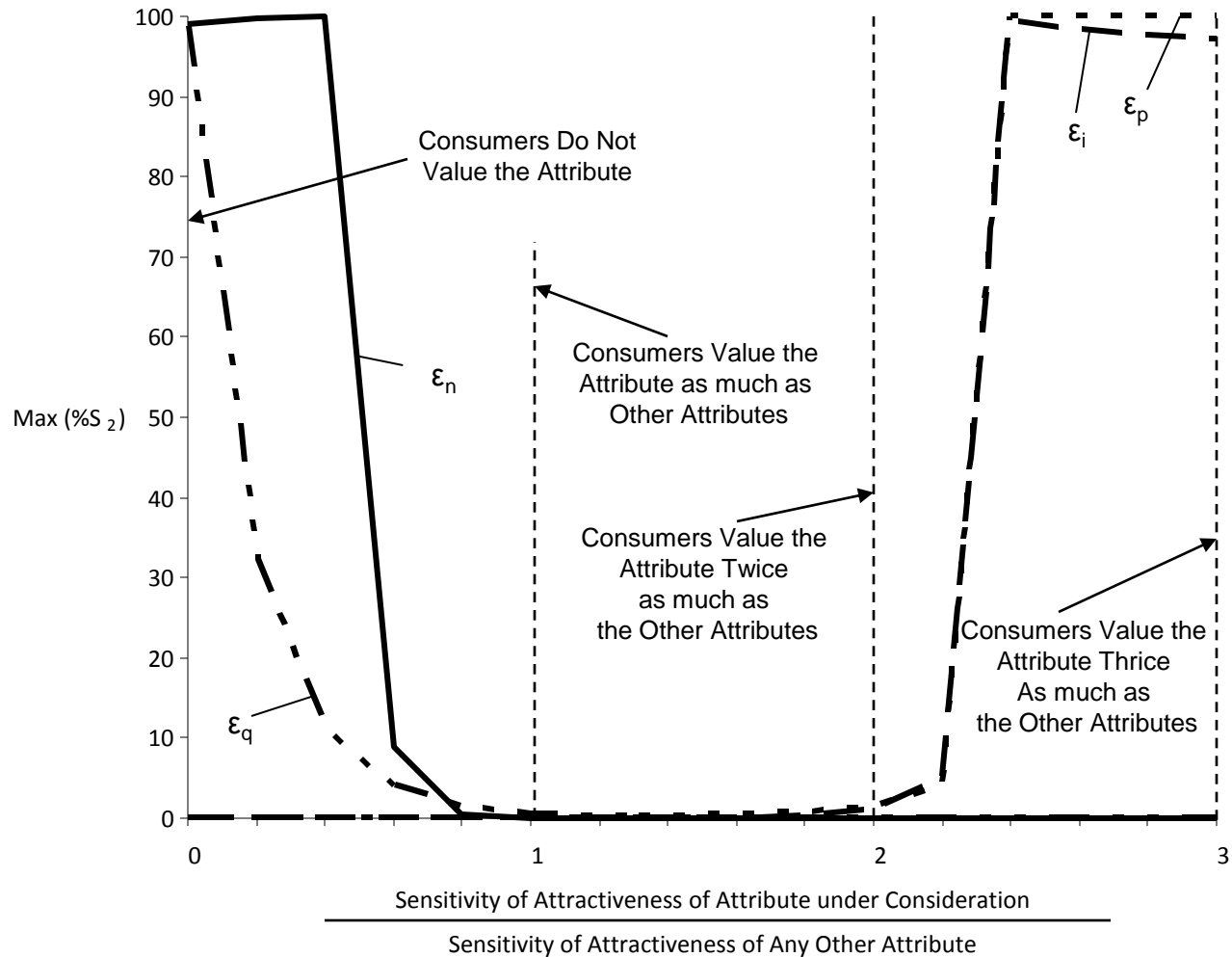


# Model Analysis: Uncertain Strength of Network Effect (Results from sensitivity analysis)



With network effects the equilibrium can be winner take all (WTA).  
The strength of network effect determines the winner

# Model Analysis: Uncertain Consumer Choice



# Theoretical Results

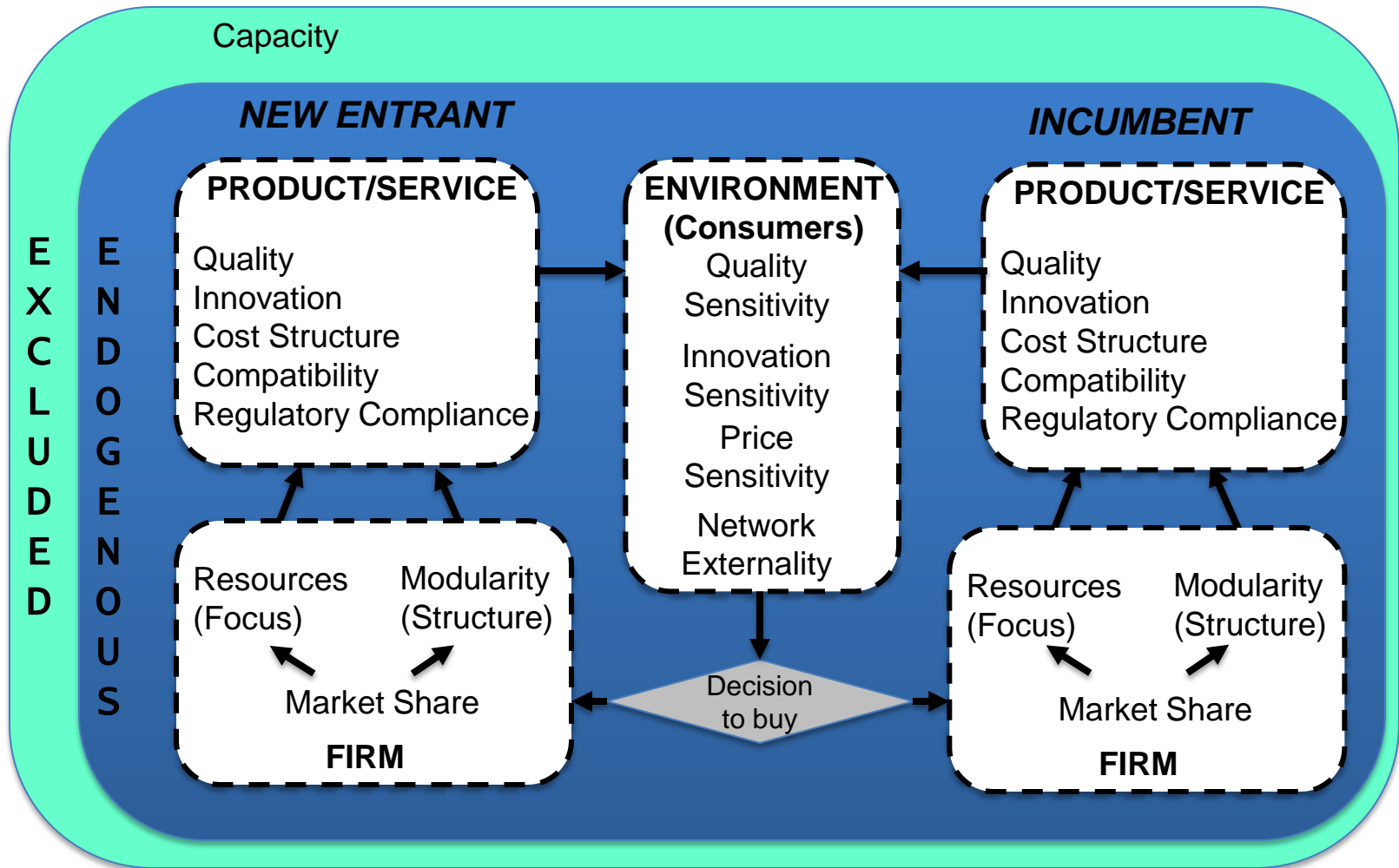
|                         | Disruption   | Co-existence   | No disruption  |
|-------------------------|--|--|--|
| Firm Factors            | Entrants have far superior cost structure  | Incumbents innovate, restructure while maintaining quality<br><br>Entrants struggle to offer quality due to lack of complementary assets or market power | Incumbents have far superior cost structure  |
| Product/Service Factors | Weak Network Effect<br><br>High Innovation and Quality   | No Network Effect<br><br>Incumbents can affect switching behavior heavily  | Strong Network Effect  |
| Environment Factors     | Consumers highly price sensitive and willing to adopt innovations with low quality and compatibility<br><br>(Alternatively) consumers value quality, but entrants introduce a product with strong network effect | Consumers value availability over quality/innovation, or are willing to tradeoff quality and innovation  | Consumers value quality and compatibility over innovation and low price<br><br>(Alternatively) consumers value innovation, but incumbent's product has strong network effect |



**PHASE II:**

**EMPIRICAL CASES TO VALIDATE MODEL-  
BASED THEORETICAL HYPOTHESES**

# Model Structure



# Case selection criteria

| Selection Logic  |          | Case  | Incumbent vs. Entrant         |
|------------------|----------|---|-------------------------------|
| Same Firm        | Pair I   | 1. Film photography (compared to) digital photography                   | Kodak vs. Sony                |
|                  |          | 2. Physical documents (compared to) digital documents                   | Xerox vs. Adobe               |
| Same Product     | Pair II  | 1. Linux in desktop market (compared to) Windows in desktop market      | Microsoft vs. Linux (desktop) |
|                  |          | 2. Linux in server market (compared to) Windows in server market        | Microsoft vs. Linux (server)  |
| Same Environment | Pair III | 1. Mobile handset market (basic phones)                                 | Motorola vs. Nokia            |
|                  |          | 2. Apple/Android (compared to) Symbian/Blackberry in smartphones market | Nokia/RIM vs. Apple/Google    |

# Cases performance

|                  | DISRUPTION  | COEXISTENCE                 | NO DISRUPTION                |
|------------------|---|-----------------------------|------------------------------|
| Same Firm        | Kodak vs. Sony                                    | Xerox vs. Adobe             |                              |
| Same Product     |   | Windows vs. Linux (servers) | Windows vs. Linux (desktops) |
| Same Environment | Nokia/RIM vs. Apple/Android<br>Motorola vs. Nokia |                             |                              |

# Investigation: Variables

| NEW ENTRANT                    |                        | ENVIRONMENTAL FACTORS                | INCUMBENT              |                                |
|--------------------------------|------------------------|--------------------------------------|------------------------|--------------------------------|
| Firm-level Factors             | Product-level Factors  |                                      | Product-level Factors  | Firm-level Factors             |
| <b>CURRENT POSITIONS</b>       |                        |                                      |                        |                                |
| <b>Fixed Costs</b>             | <b>Price</b>           | <b>Price Sensitivity</b>             | <b>Price</b>           | <b>Fixed Costs</b>             |
| 1                              | 6                      | 11                                   | 17                     | 22                             |
| <b>Marginal Costs</b>          | <b>Quality</b>         | <b>Quality Sensitivity</b>           | <b>Quality</b>         | <b>Marginal Costs</b>          |
| 2                              | 7                      | 12                                   | 18                     | 23                             |
| <b>Resources to Quality</b>    | <b>Innovation</b>      | <b>Innovation Sensitivity</b>        | <b>Innovation</b>      | <b>Resources to Quality</b>    |
| 3                              | 8                      | 13                                   | 19                     | 24                             |
| <b>Resources to Innovation</b> | <b>Network Effect</b>  | <b>Sensitivity to Installed Base</b> | <b>Network Effect</b>  | <b>Resources to Innovation</b> |
| 4                              | 9                      | 14                                   | 20                     | 25                             |
| <b>Modularity</b>              | <b>Switching Costs</b> | <b>Contact Rate</b>                  | <b>Switching Costs</b> | <b>Modularity</b>              |
| 5                              | 10                     | 15                                   | 21                     | 26                             |
|                                |                        | <b>Word of Mouth</b>                 |                        |                                |
|                                |                        | 16                                   |                        |                                |

| <b>DYNAMIC BEHAVIOR (RESPONSE to COMPETITION)</b>     |   |
|---|---|
| <b>Time to Develop Quality / Complementary Assets</b> | <b>Time to Develop Quality / Complementary Assets</b> |
| 27  | <sup>32</sup> N/A                                     |
| <b>Time to Innovate</b>                               | <b>Time to Innovate</b>                               |
| <sup>28</sup> N/A                                     | 33  |
| <b>Resource Reorientation Time</b>                    | <b>Resource Reorientation Time</b>                    |
| 29  | <sup>34</sup>   |
| <b>Rate of Modularization/Contracting</b>             | <b>Rate of Modularization/Contracting</b>             |
| 30  | <sup>35</sup>   |
| <b>Rate of Integration/Mergers</b>                    | <b>Rate of Integration/Mergers</b>                    |
| 31  | <sup>36</sup>   |



# Desktop Operating System



PRODUCT

PRODUCT

Network Externalities

Network Externalities

CUSTOMERS  
Network Sensitivity

Price Sensitivity

Quality Sensitivity

Innovation Sensitivity

Price

Quality

Innovation

Decision to buy

Decision to buy

Price

Quality

Innovation

Modularity

Market Share

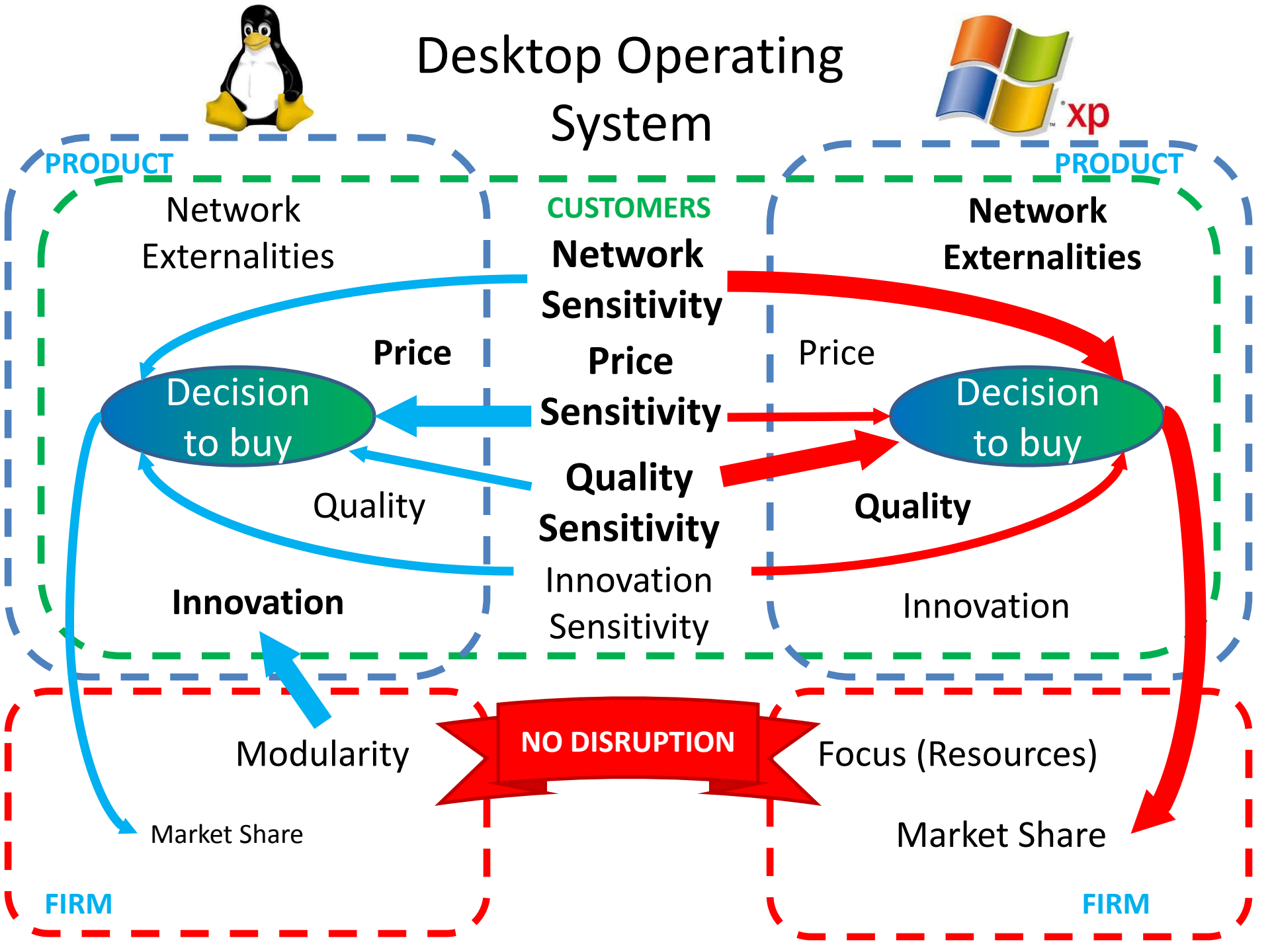
FIRM

**NO DISRUPTION**

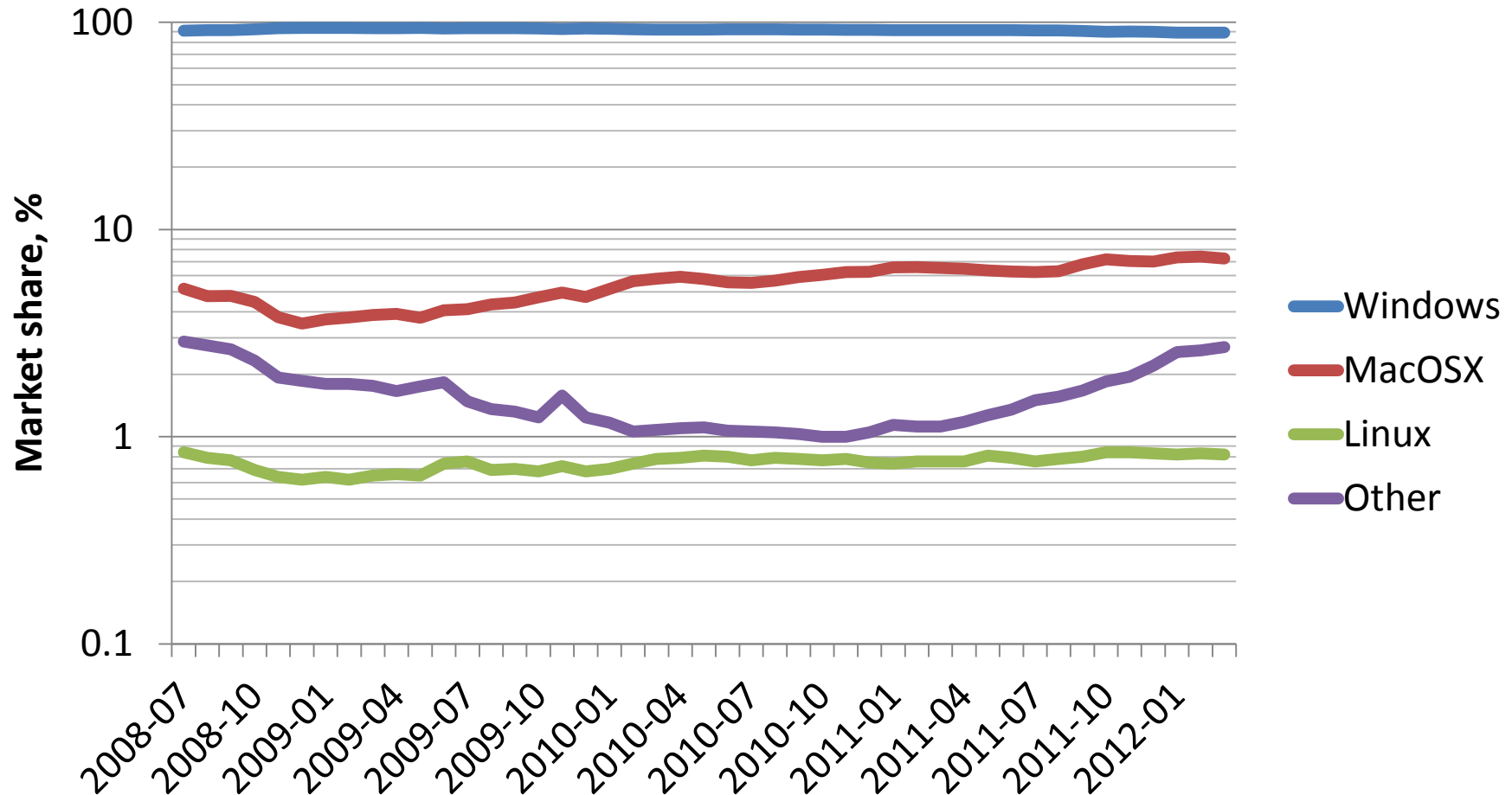
Focus (Resources)

Market Share

FIRM

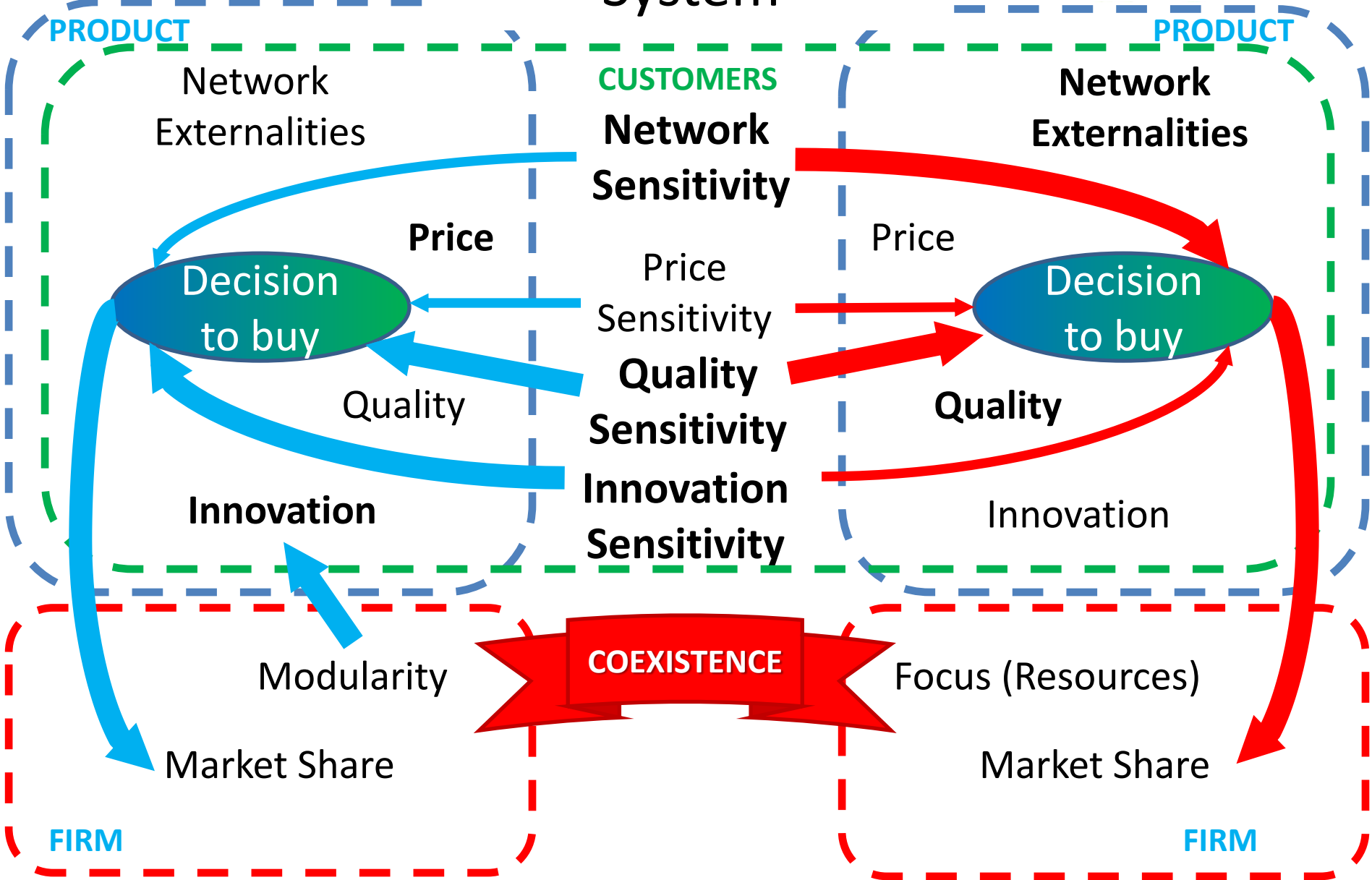


# Windows vs. Linux worldwide (on a logarithmic scale)





# Server Operating System





# What are we beginning to validate

|                         | Disruption  | Co-existence   | No disruption  |
|-------------------------|---|--|--|
| Firm Factors            | Entrants have far superior cost structure   | Incumbents innovate, restructure while maintaining quality<br><br>Entrants struggle to offer quality due to lack of complementary assets or market power (Linux Desktop) | Incumbents have far superior cost structure  |
| Product/Service Factors | Weak Network Effect<br><br>High Innovation and Quality (Apple/Android Phones)   | No Network Effect (Xerox, Motorola Basic Phones)<br><br>Incumbents can affect switching behavior heavily   | Strong Network Effect (Windows Desktop)  |
| Environment Factors     | Consumers highly price sensitive and willing to adopt innovations with low quality and compatibility (Sony Digital Photography)<br><br>(Alternatively) consumers value quality, but entrants introduce a product with strong network effect | Consumers value availability over quality/innovation, or are willing to tradeoff quality and innovation (Linux/Windows Server)   | Consumers value quality and compatibility over innovation and low price (Windows Desktop)<br><br>(Alternatively) consumers value innovation, but incumbent's product has strong network effect |

# Conclusions so far

- Better decision-making under a threat of disruption requires holistic understanding of all possible competitive outcomes (i.e., disruption, coexistence, and no disruption)
- Factors that cause the three competitive outcomes can be identified at three interconnected levels – firm-level, product-level, and environment-level
- Early lessons from cases
  - Many of our model-driven hypotheses about the three outcomes can be observed in our cases
  - Environmental factors may be more important than firm, product-level factors. A change in the environment can make or break a firm/product. This area of research is currently understudied.

# Contributions and Future Work

- For practitioners, we address more holistically the incumbent's dilemma in the face of an attacking radical innovation:
  - When to fight?
  - When to follow?
  - When to flee?
- For scholars, we integrate several strands of Strategy and Innovation Management Literature beyond what has been done before
- Next cases (Work-In-Progress):
  - Smartphone platforms
  - Tablet platforms
  - ?? Suggestions are welcome 😊

THANK YOU!