

Disruptive Innovation: An Appropriate Innovation Strategy For The Developing Countries

Prof Chang Chieh Hang

National Univ of S'pore

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Types of Innovation

Continuous

- Incremental

Discontinuous

- Radical (Breakthrough)
- Disruptive

Sustaining

- Incremental
- Radical

[Indigenous Capability/New Market Creation]

- Radical Innovation
- Disruptive Innovation

Indigenous Capability

- Radical (Breakthrough) Innovation
 - Established companies
 - High-tech Start-ups & University spin-offs

[All following the Advanced Economy model]

- Disruptive Innovation
 - New awareness even for the Advanced Economy
 - More attention needed in the Developing Countries

What Is Radical Innovation?

All successful companies need periodic infusion of **Discontinuous Innovation**. Radical Innovation is one major class of Discontinuous Innovation :

A **Radical Innovation** project is one with the potential to produce

one or more of the following [Book by Leifer, et.al, 2000] :

- An **entirely new** set of performance features;
- **Improvements** in known performance features of **five times** or greater;
- A significant (**> 30%**) **reduction** in cost

Great companies which last for many decades, such as IBM, GE, Motorola, HP, 3M, United Technologies, General Motors and Dupont, regularly **punctuate** ongoing incremental innovations with **radical innovations**.

But attempts at radical innovations (including those at the great companies) have produced **more failures** than successes. While there seem to be more examples of small, entrepreneurial firms generating radical innovations and taking them to market, the fact is that the majority of them have also failed.

Incremental vs Radical

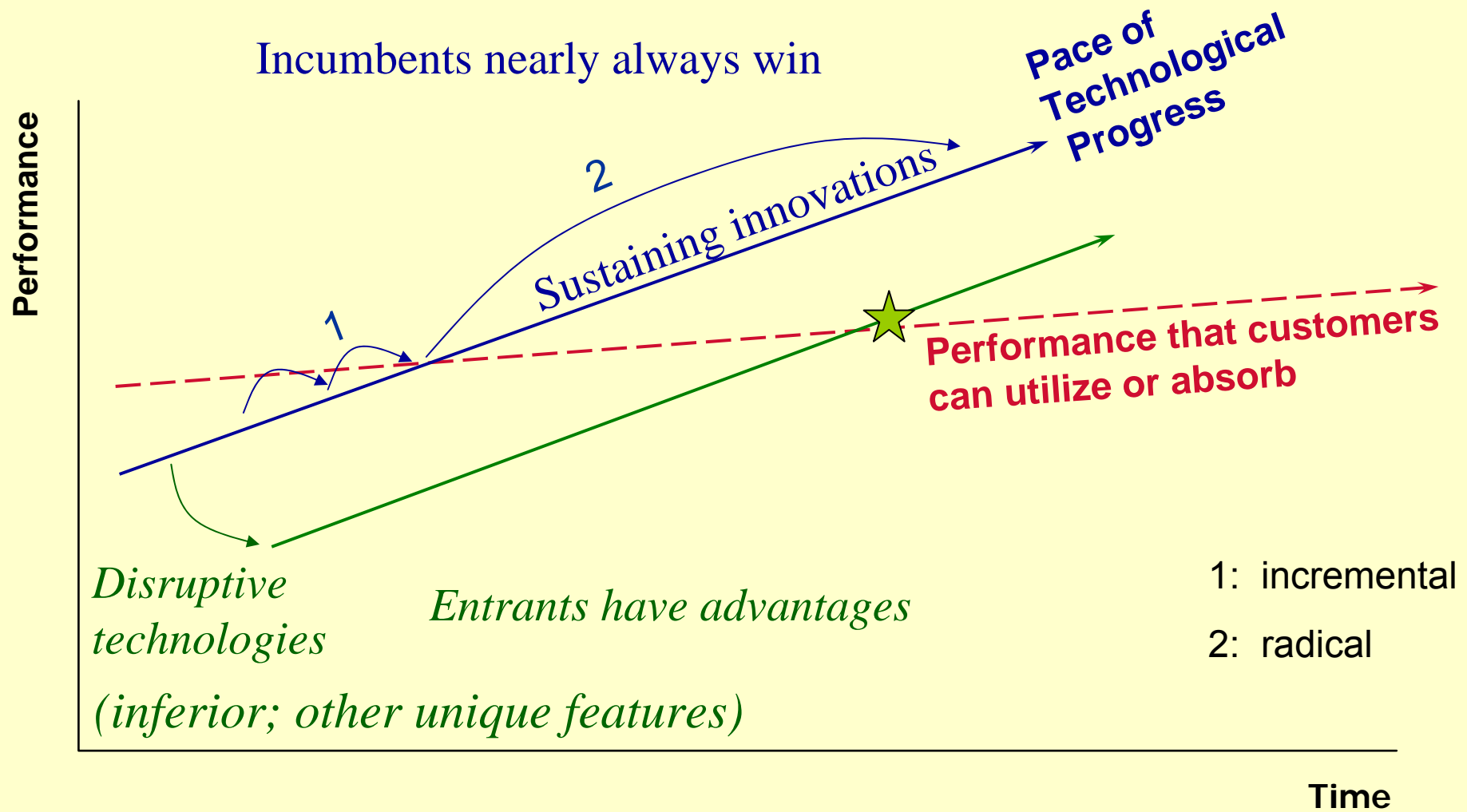
	Incremental	Radical
Project time line	Short term – 6 months to 2 years.	Long term – 10 years or more.
Trajectory	Continuous and predictable.	Multiple discontinuities; many starts and stops.
Idea generation and opportunity recognition	Occur at the front end; largely anticipated.	Occur sporadically throughout the life cycle; often in response to discontinuities.
Process	Formal and approved.	The formal process has real value only at later stages of development.
Business Case	Detailed plan.	The business model evolves through discovery-based technical and market learning .

	Incremental	Radical
The Players	Clearly assigned as cross-functional team members.	Key players come and go during the early stages; many are part of an informal network; key players tend to be “cross-functional” individuals.
Organizational Structure	Formal team within a business unit.	Project often starts in R&D, migrates into an incubating unit, and transits into a goal-driven project organization.
Resources and Competences	Standard based on past experience.	Creativity and skills in resource and competency acquisition are critical.
Operating Unit Involvement	Operating units are involved from the beginning.	Informal involvement of operating unit is useful; but must avoid becoming captive to an operating unit too early.

Remarks

- ❑ Radical innovation is extremely difficult to initiate and to manage. The **market size** must be large enough (e.g. >US\$250 M in market potential) to justify the sustained effort required, but the market potential may be unknown or not knowable in the early stages. Hence the need for “**Market Learning**”.
- ❑ Radical innovation needs **persistence and continuity**. Small, independent start-ups have little chance of succeeding (exceptions : ventures by extraordinary company founders such as Steve Jobs, Jim Clarke, Sim Wong Hoo, etc)

Disruptive Technologies (Ref. 1) (Performance Overshoot)



Conditions for Disruption :

- Performance Overshoot (i.e. current customers are over-served)
- Incumbents are attracted to higher-end/higher-margin markets; hence willing to run away (or relieved to get out) when attacked from “below”

e.g. personal computers

(40% → 20% on US\$2000)

minicomputers

(45% on US\$250,000)

(50% on US\$500,000)

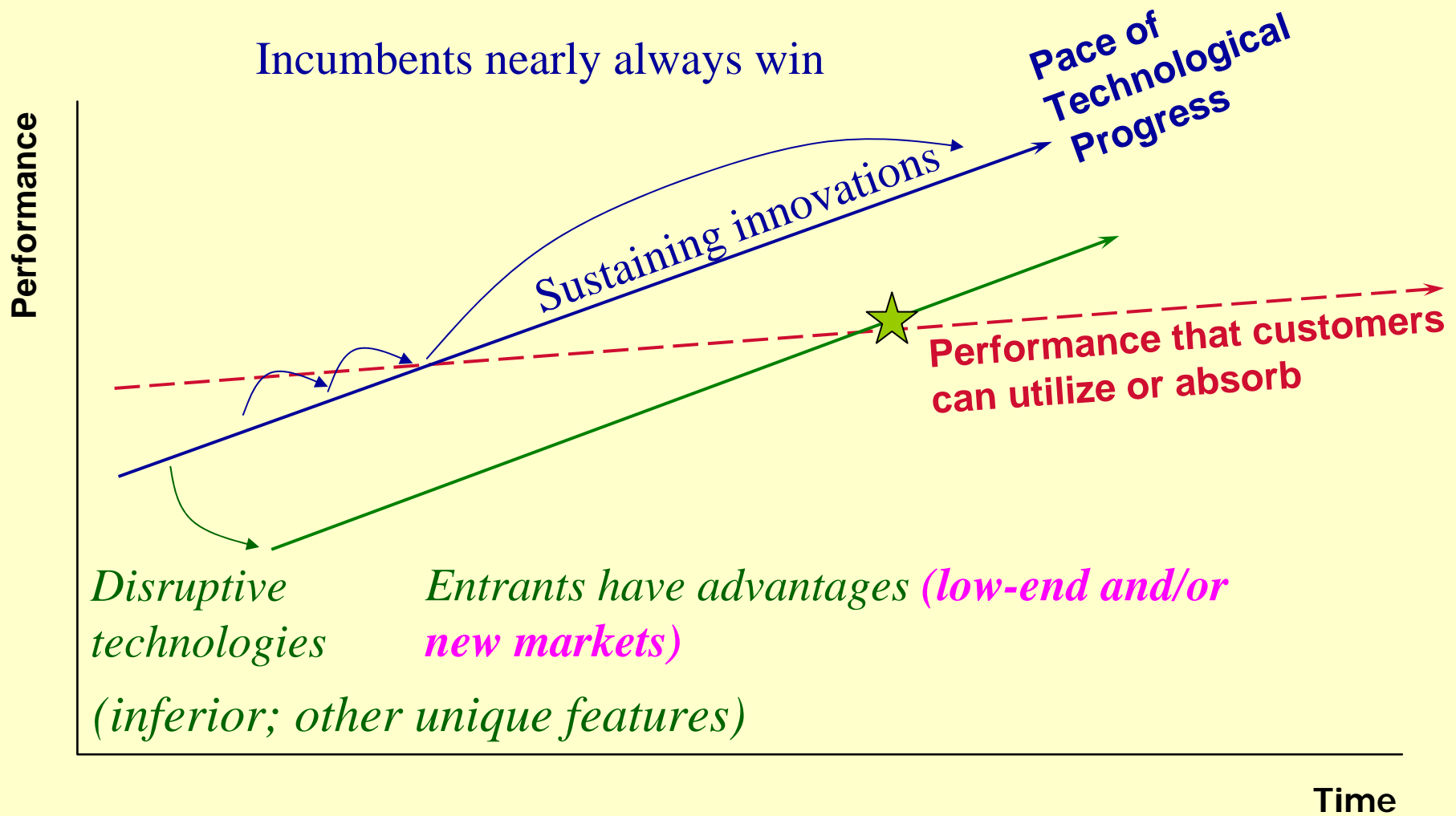
Disruptive Innovation is quite pervasive :

- Electronics (minicomputers, personal computers, wireless comms, PDAs, digital camera, internet appliances)
- Steel Industry (minimills)
- Electric Utility Industry (distributed power generation enabled by gas turbines, micro-turbines, fuel cells)
- Biomedical Devices (micro/nano technology)

Companies that want to create new growth businesses should seek disruptive opportunities because current industry leaders will not be motivated to pursue them.

According to research by Prof Clayton Christensen (world renowned Harvard Professor and author of Innovator's Dilemma and Innovator's Solutions), the probability of creating a successful, new growth business is 10 times greater if the innovators pursue a disruptive strategy rather than a sustaining one !

Disruptive Technologies (Ref. 1) (Performance Overshoot)



Questions To Ask :

Low-end disruption

- Are there customers at the low end of the market who would be happy to purchase a product with less (but good enough) performance if they could get it at a lower price (but still with a reasonable margin for us)?

New-market disruption

- Is there a large population of people who historically have not had the money, equipment, or skill to do this thing for themselves, and as a result have gone without it altogether or have needed to pay someone with more expertise to do it for them?

Both types of disruption

- Does our product or service help our targeted customers get a job done that they have always been trying to get done – but have not yet been able to do in simple, convenient way? (i.e. Job-to-be-done market analysis)

What Products Should We Develop?

- Using **“Job-to-be-done Market Analysis”** to Gain a Disruptive Foothold :
 - e.g. Dr Akio Morita of Sony was a master at watching what consumers were trying to get done and at marrying those insights with solutions that helped them do the job better; between 1950 and 1982, Sony successfully built 12 different new-market disruptive growth businesses (transistor radios; portable TV, VCR, Walkman,

- continue innovating to prolong the Disruption :

low-end → high-end

new market : not so clear cut; use job-to-be-done market analysis

(e.g. NTT DoCoMo's first success with I-Mode was followed by adding camera and photo-viewer to the mobile phone, etc because of its teenager customers)

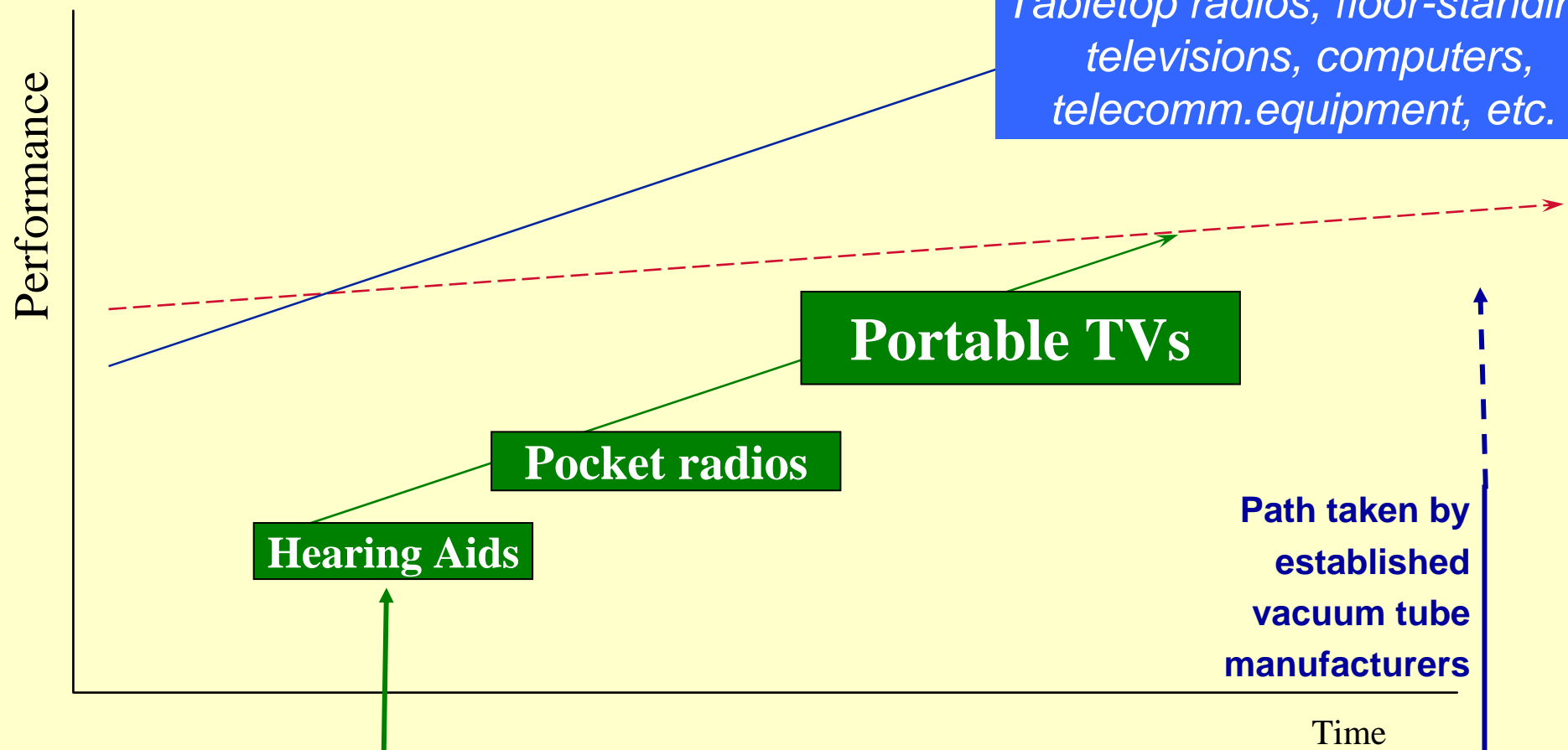
Who Are Our Initial Customers?

Case : Early transistors

- could not handle the power required for e-products of the 50s : table-top radios, floor-standing TVs, early digital computers, etc.
- while RCA engineers tried to improve the transistor performance, Sony applied it to pocket transistor radios (i.e. Sony chose to create new customers who appreciated the convenience and affordable “good-enough” products); RCA engineers spent money and did not create sales/revenue from transistors while Sony engineers celebrated initial success and obtained resources to do more R&D !

Non-consumers are the ideal initial target (Ref. 1)

Major Established Electronics Markets:
Tabletop radios, floor-standing televisions, computers, telecomm.equipment, etc.



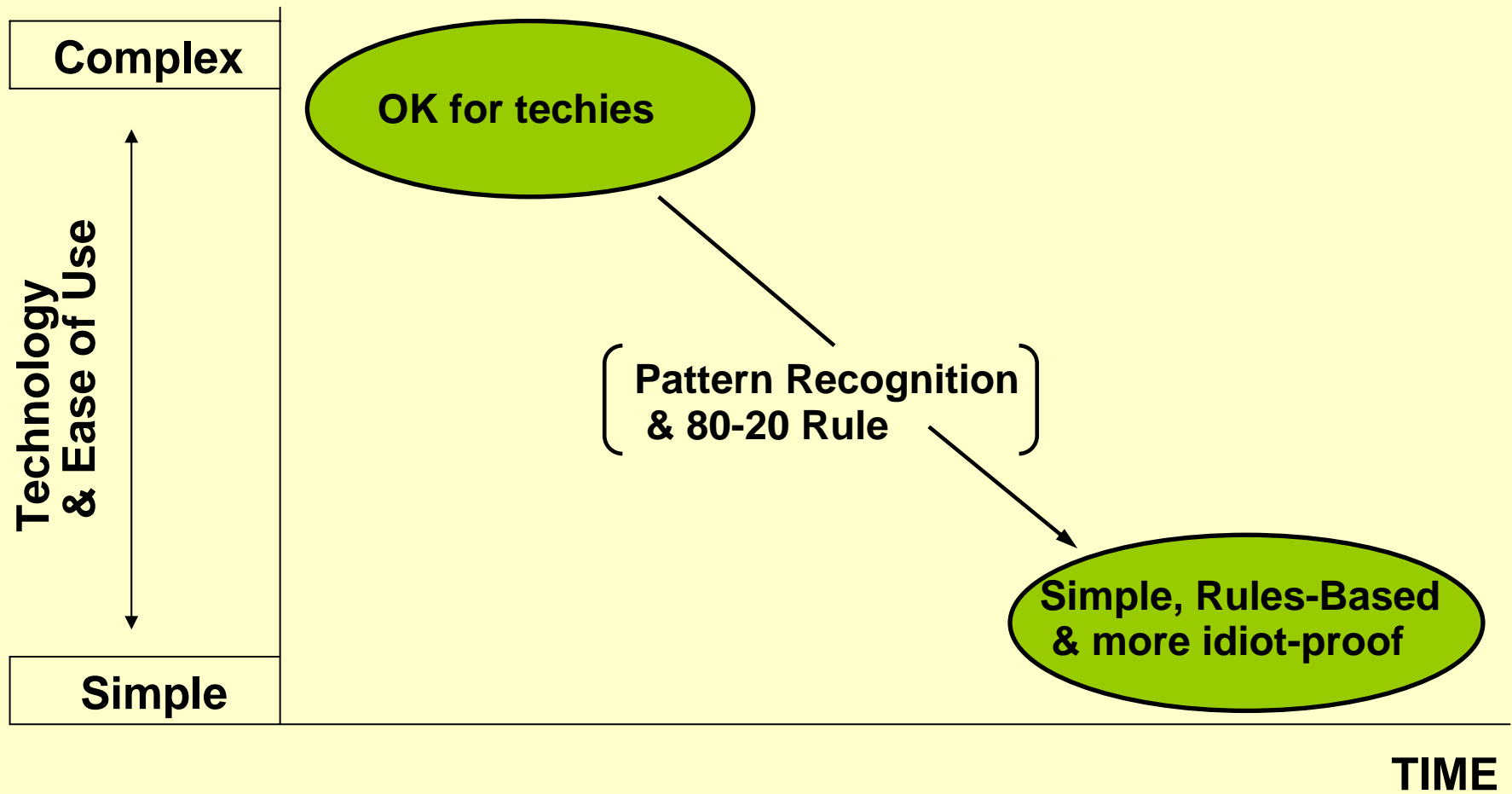
Disruptive technology: transistors vs. vacuum tubes

New-Market disruption enables less-skilled people to do more sophisticated things

Disruptive innovations could enable a larger population of less-skilled, ordinary people to do things in a more convenient, lower-cost setting, which traditionally could only be done by specialists. Disruption has been one of the fundamental causal mechanisms through which our lives have improved.

- **Personal Computers**
- **Mobile Phones**

Disruption is facilitated by “Good Enough” technology that makes things more idiot-proof

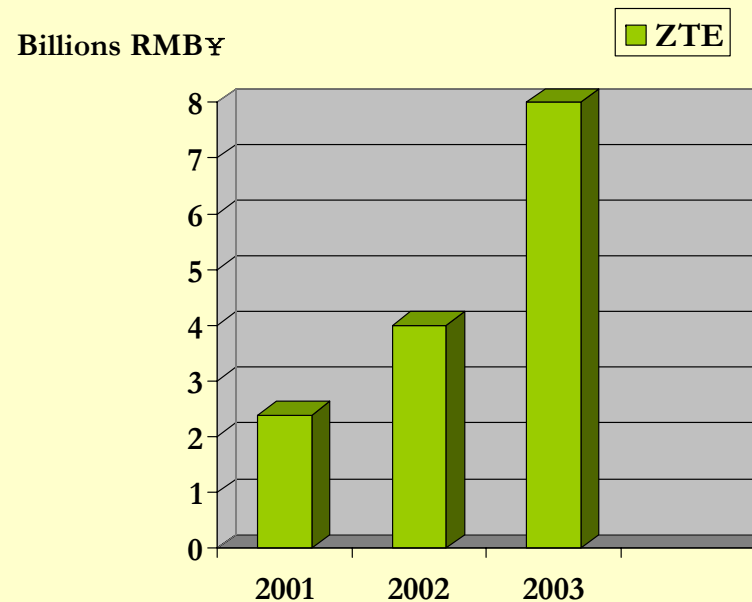
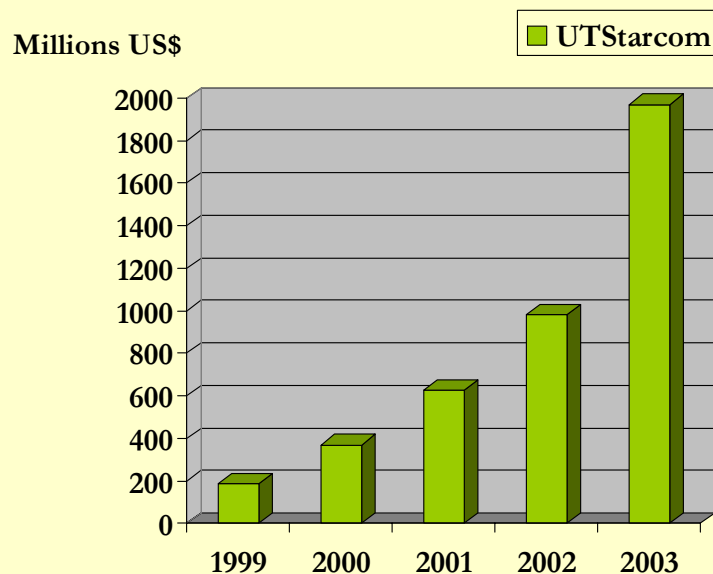


PAS/Little Smart

UTStarcom and ZTE are the two biggest suppliers in China's PAS equipment market. Most of the revenue of UTStarcom is due to PAS.

Revenue	1999	2000	2001	2002	2003
UTStarcom (million US\$)	188	369	627	982	1970
ZTE (Billion RMB ¥)	*	*	2.4	4	8

* Not available

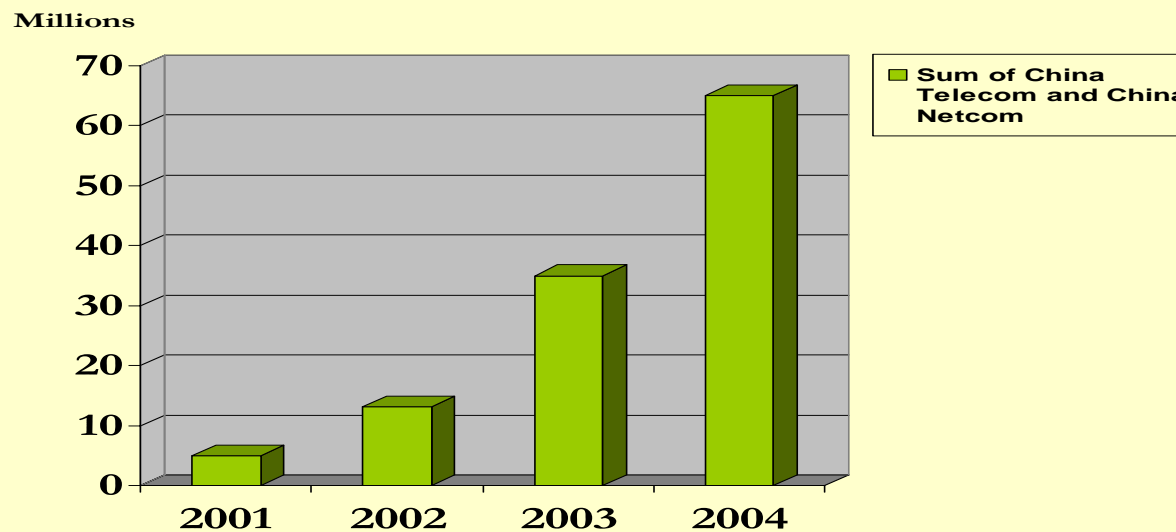


Data source: the homepages of UTStarcom and ZTE.

PAS Market

China Telecom and China Netcom are the two biggest carriers in China's PAS service market.

Number of Users	2001	2002	2003	2004(Nov)
Total (million)	5.11	13.14	35	64.94



Data source: the homepages of CMII and China Telecom and China Netcom.

Galanz Enterprise

- In 1992, developed a new **microwave oven for the tiny Chinese kitchens**;
- After winning the Chinese low-end market, moved upmarket to serve both local and global markets.
- In 2005, holds 75% of Chinese market and nearly 50% of global market in microwave ovens.
(**> 600 patents** in microwave technologies)
- Since 2004, has started to replicate the same strategy by developing **air-conditioners for tiny Chinese homes**.
Within 4 years, became No. 2 Chinese air-conditioner exporter.

Implications

- Disruptive Innovation could be used to create **new growth** businesses for established firms and entrepreneurs, in both developed as well as **developing** countries.
- Targetting at the **unserved and under-served** people in the developing countries (e.g. 2/3 of the world's population still do not have telephone of any kind!).
- Universities/RIs to add a role in **“reshaping”** or **“simplifying”** new/radical technologies for **disruptive innovation** ⇒ to capture opportunities in the developing markets, before moving up-market.