



# ***R&D STRATEGY ANALYSIS USING PATENT DATABASE***

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Ritsumeikan University**

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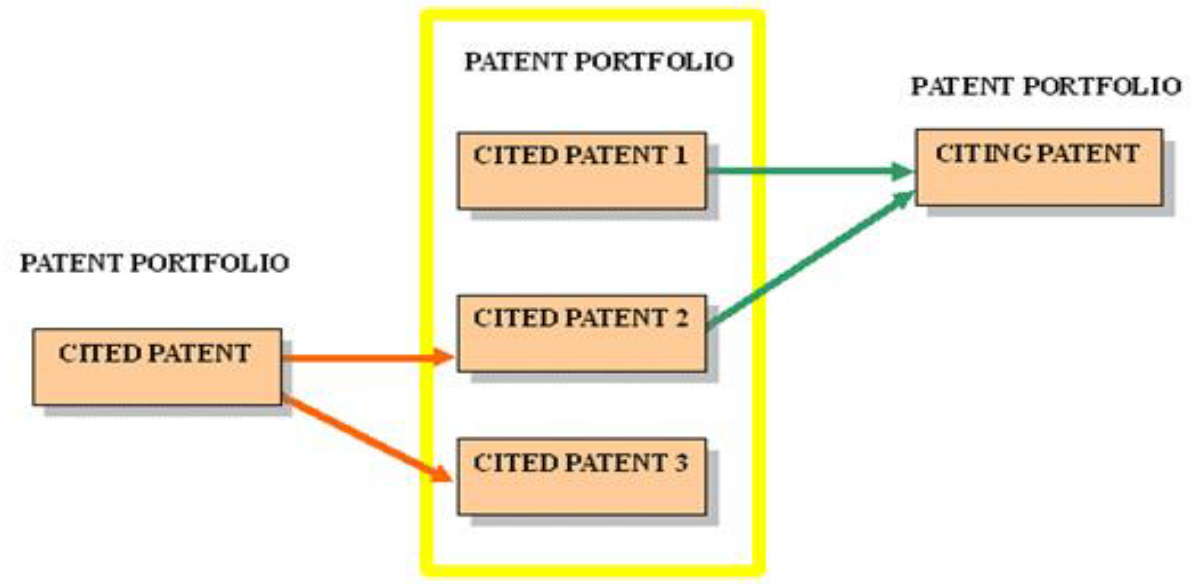
# Analysis of value of patents

- Evaluate value of patents for R&D strategy
- Close Innovation → Open Innovation (Chesbrough ,2003))
  - Introduce both internal and external output of R&D and implement them inside or outside the company for commercialization.
  - Evaluate value of patents in order to analyze both internal and external output of R&D
- Indicators of patent value
  - Number of citations (Carpenter *et al.*, 1981, Trajtenberg,1987, Alvert *et al.*, (1991))
  - Number of references to other patents (Harhoff *et al.*, 2003).
  - Number of references to non-patent documents (Science linkage) (Harhoff *et al.*, 2003).



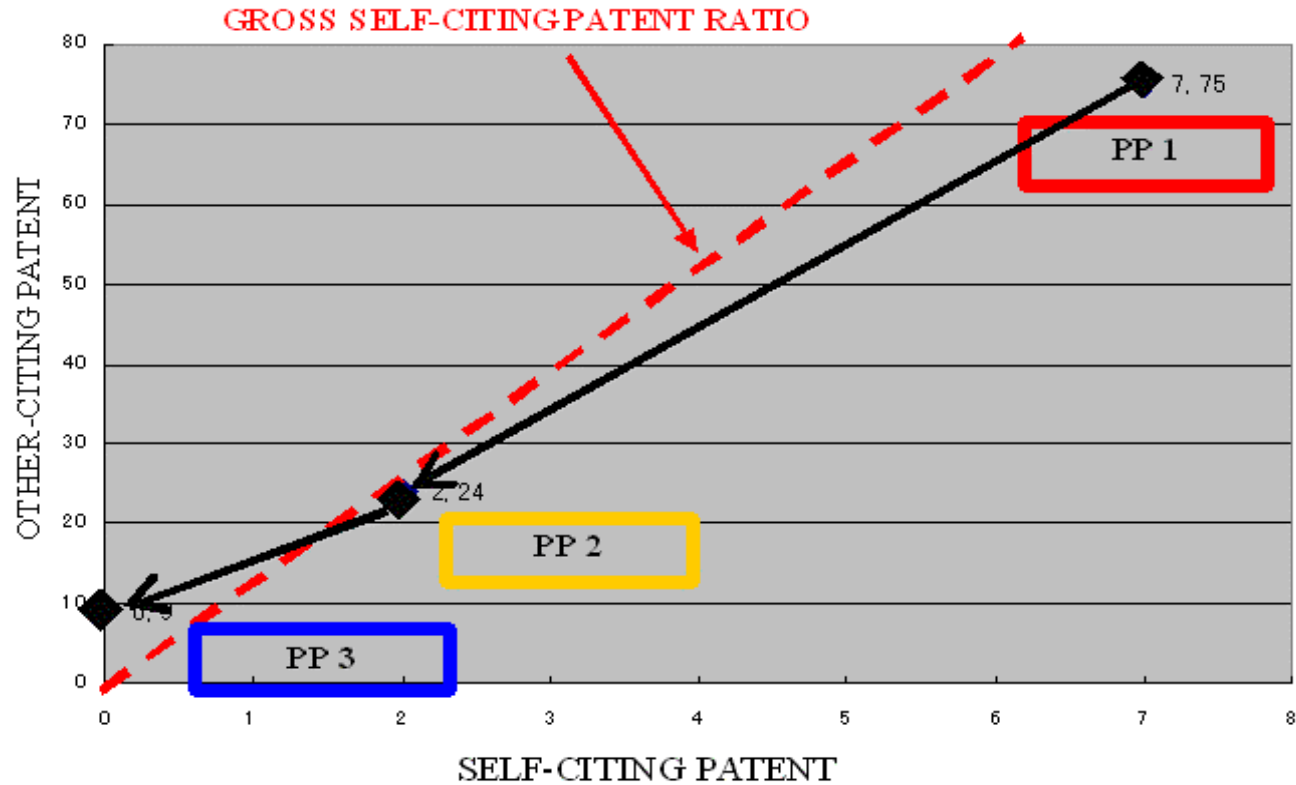
- 1. FRAMEWORK
- 2. IMPLEMENTATION
- 3. CONCLUSION

# PATENT PORTFOLIO



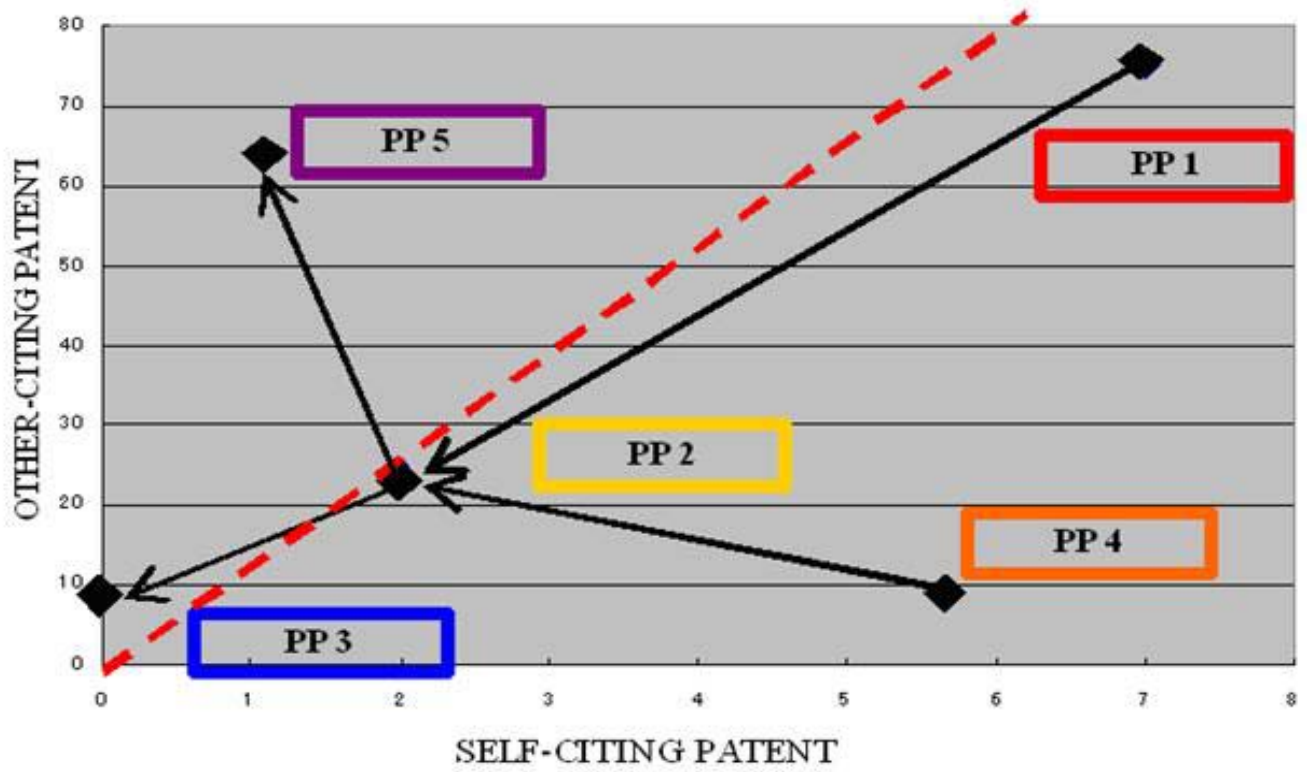
1. FRAMEWORK
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# CITATION ROUTE



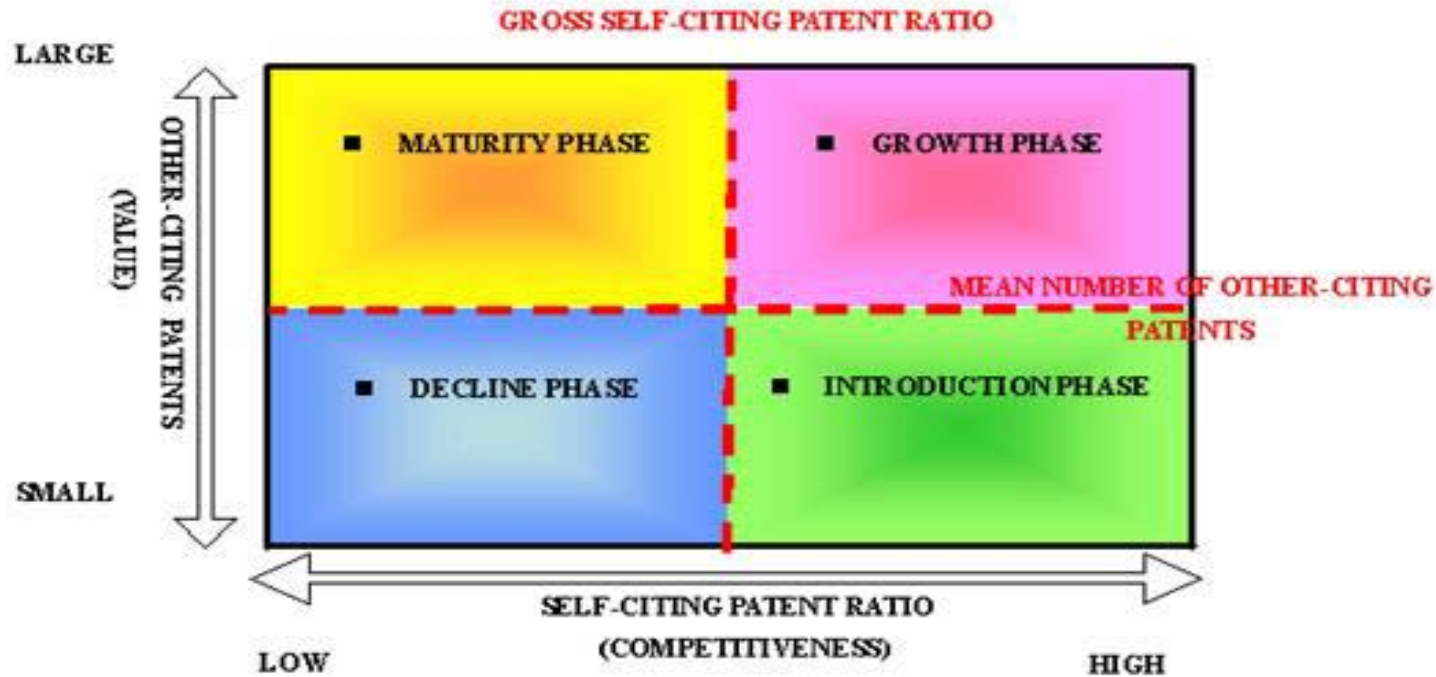
- 1. FRAMEWORK
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# MERGER TYPE DIVISION TYPE



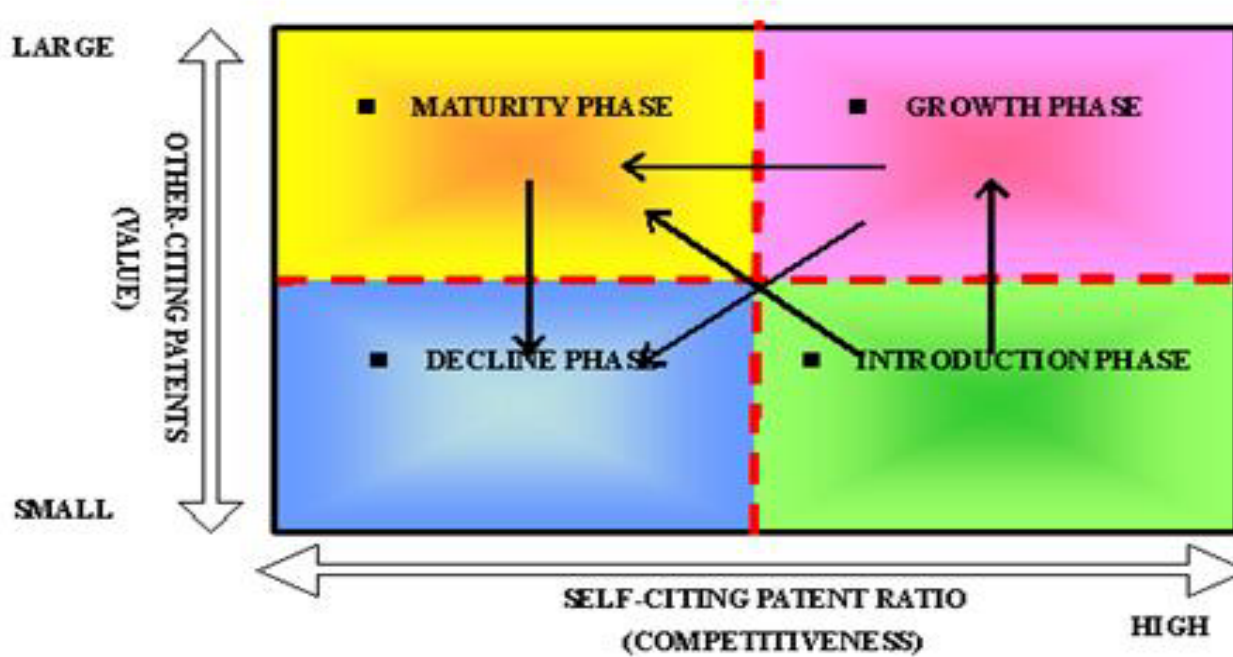
1. FRAMEWORK
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# PATENT STRATEGY MATRIX (PSM)



1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

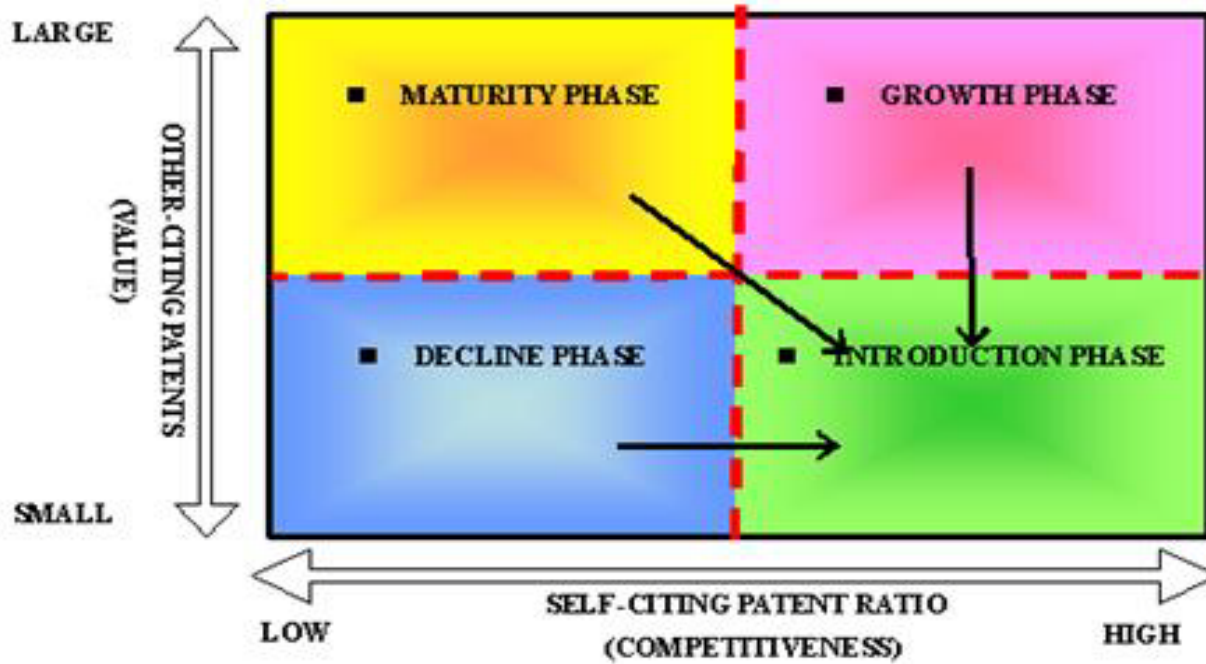
# LIFE CYCLE PATTERN





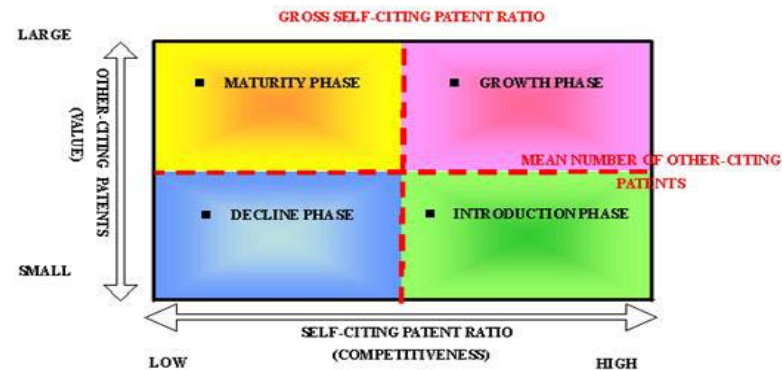
1. FRAMEWORK
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# INVESTMENT PATTERN



1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

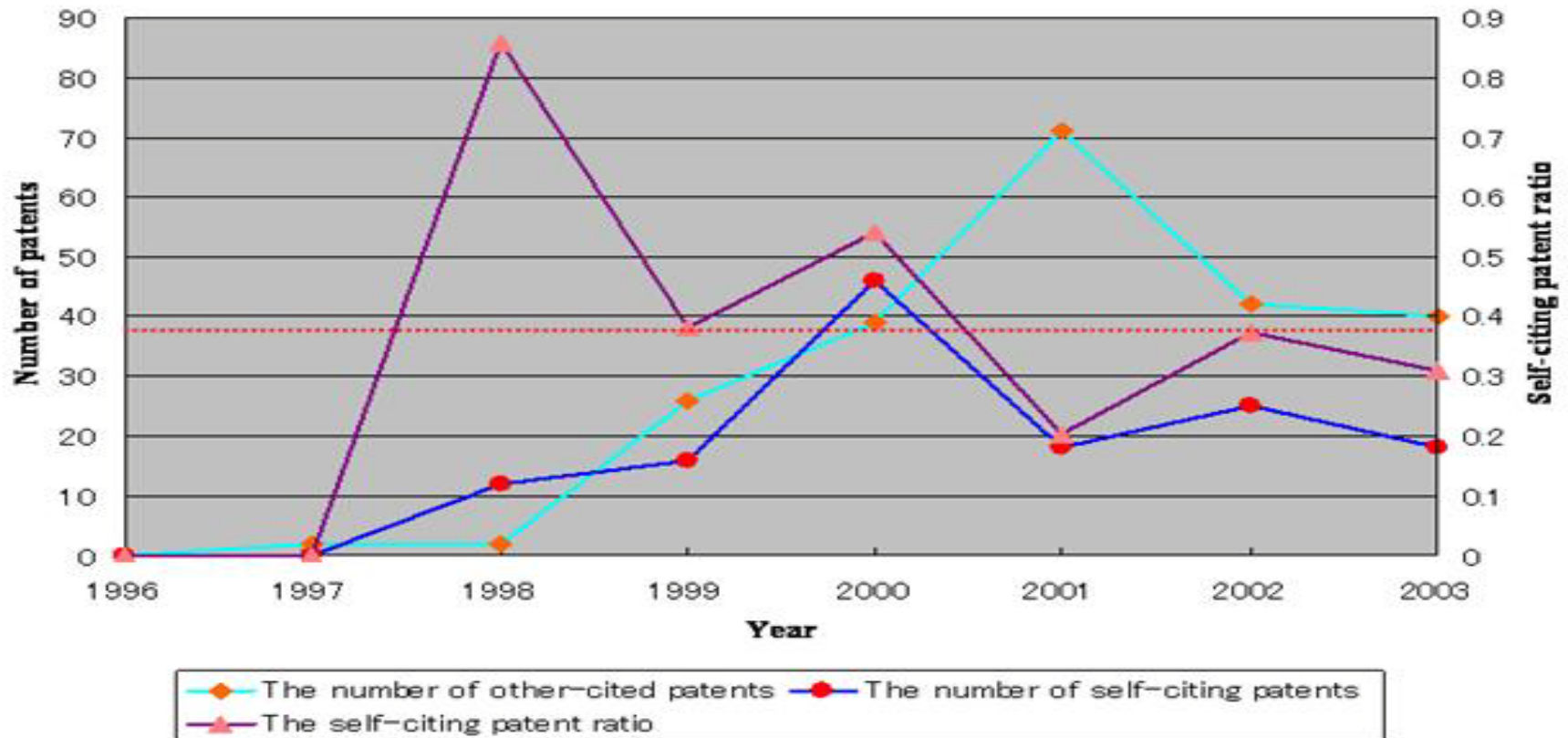
# PATENT STRATEGY MATRIX (PSM)



- ❑ Introduction Phase ⇒ Exclusive Position, Expansion of Market
- ❑ Growth Phase ⇒ Keep Exclusivity, Obtain Competitor's Patents and Licenses, Pervade Products
- ❑ Maturity Phase ⇒ Avoid Patent Infringement, Cross License, Keep Market Standing
- ❑ Decline Phase ⇒ Sell out or License out Patents, Improve Productivity

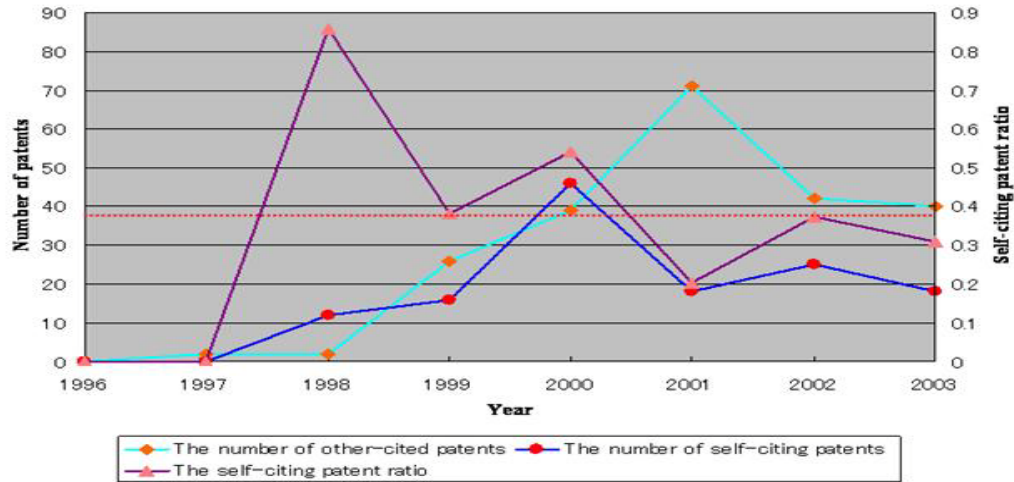
1. FRAMEWORK
2. IMPLEMENTATION
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# TIME-SERIES CITATION ANALYSIS (TCA)



1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

## TIME-SERIES CITATION ANALYSIS (TCA)

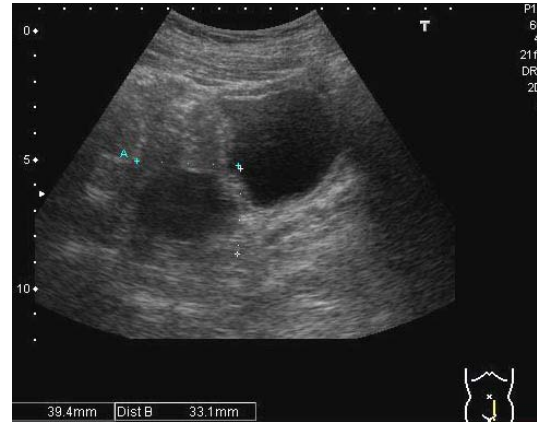


- ❑ Other-cited Patents  $\Rightarrow$  Value of Patents, Competitor's R&D activities
- ❑ Self-citing Patents  $\Rightarrow$  R&D focus
- ❑ Self-citing Patent Ratio  $\Rightarrow$  Competitiveness

1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

# PSM

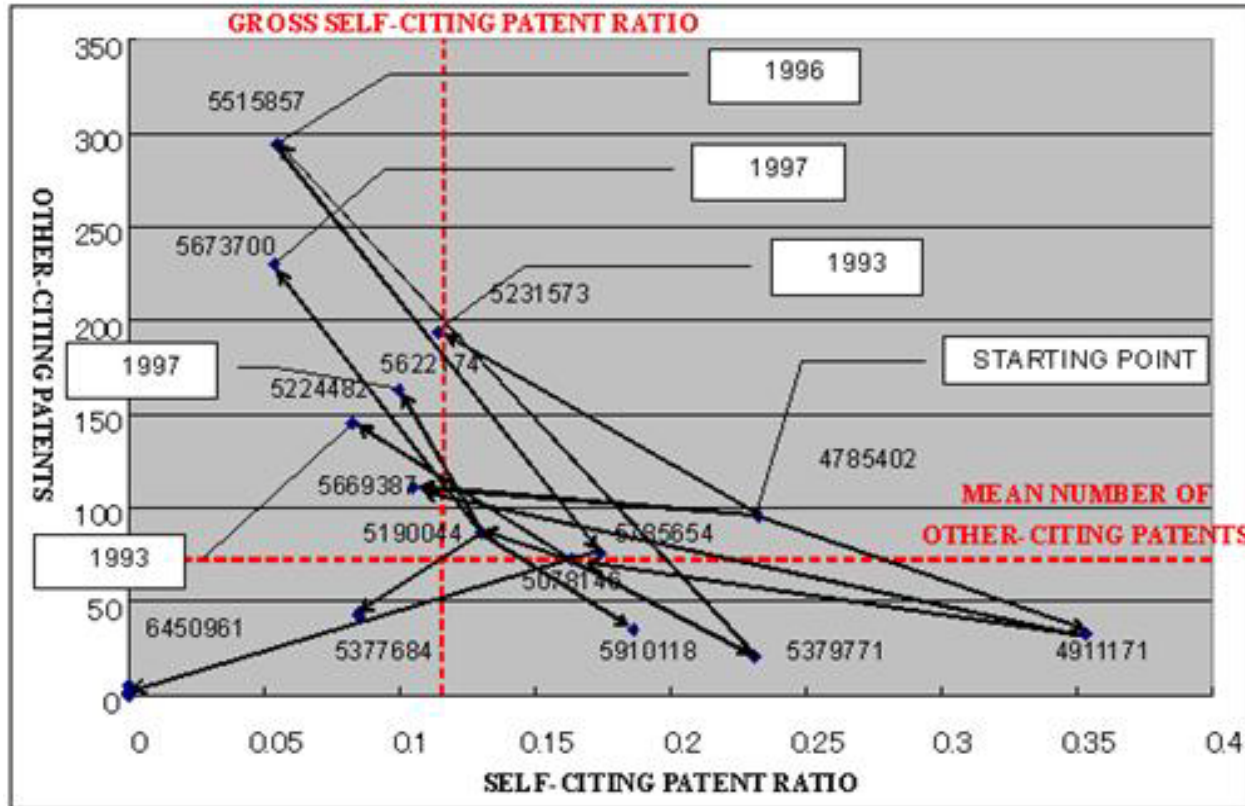
## —ULTRA SONIC DIAGNOSIS—



1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

# PSM

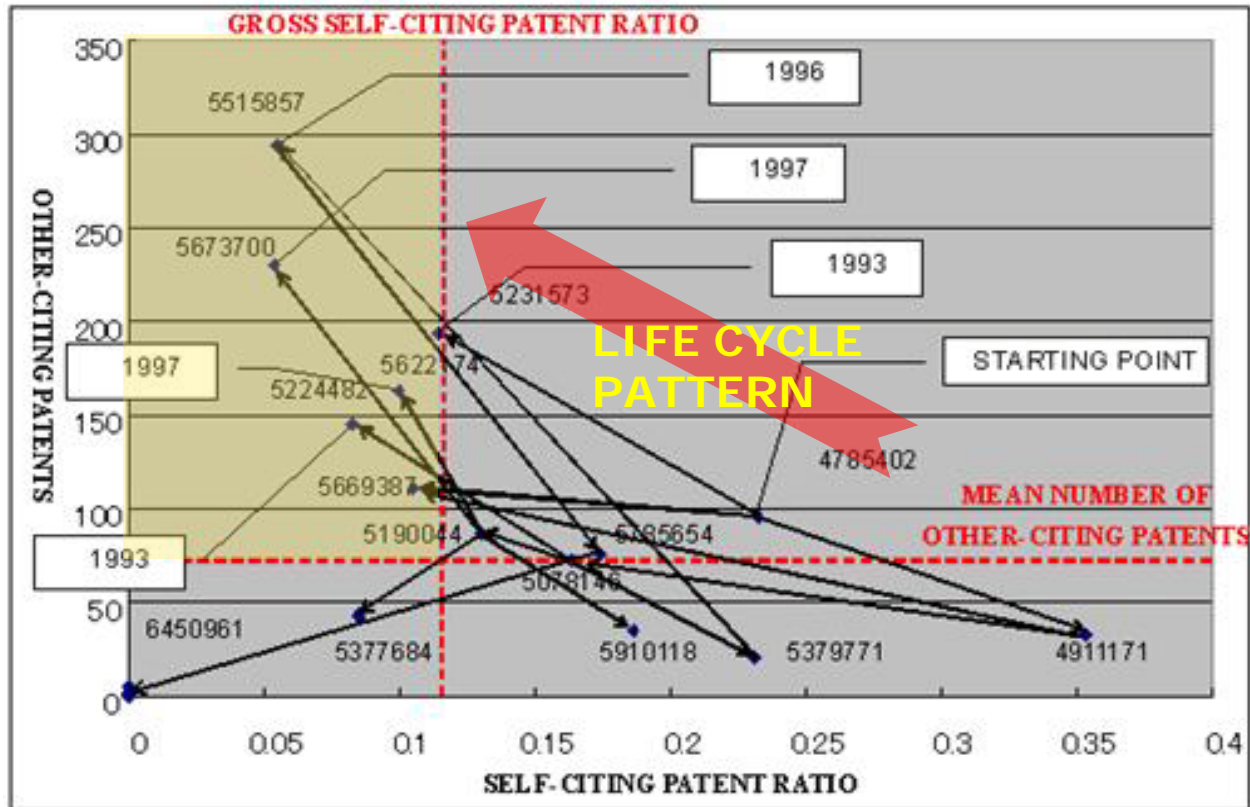
## –ULTRA SONIC DIAGNOSIS –



1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

# PSM

## –ULTRA SONIC DIAGNOSIS –



1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

# PSM

## —ULTRA SONIC DIAGNOSIS—

- 1993-1997 Maturity Phase
  - 1995 Prime Minister's Award of Japan
  - 1996 Top Market Share in Japan (35%) and in the world (18%)

**TOSHIBA** 📞お問い合わせ

[新着情報](#) [発表月別](#) [テーマ別](#)

### 超音波診断装置の生産累計10万台達成について

1996年11月19日

株式会社 東芝  
東芝メディカル株式会社

株式会社東芝は、1975年に世界初の電子スキャン方式超音波診断装置を開発し、1976年から生産を開始してきましたが、11月15日に累積生産台数が世界で初めて10万台に達しました。

超音波診断装置は、プローブを体表に当て、電子スキャン方式により、2~10メガヘルツの超音波を体内に送り、臓器の表面などで反射された超音波を受信することで、リアルタイムに患者の体内の臓器などの断層画像を表示する装置です。

株式会社東芝は、1971年に電子スキャン方式の超音波診断装置の研究を開始し、1975年に東芝総合研究所（現研究開発センター）で試作機を開発しました。その後東京の関東中央病院での臨床評価を経て、1976年に電子スキャン方式超音波診断装置「SSL-53H」を商品化しています。さらに、この超音波診断装置は1995年度全国発明表彰の内閣総理大臣発明賞を受賞しています。

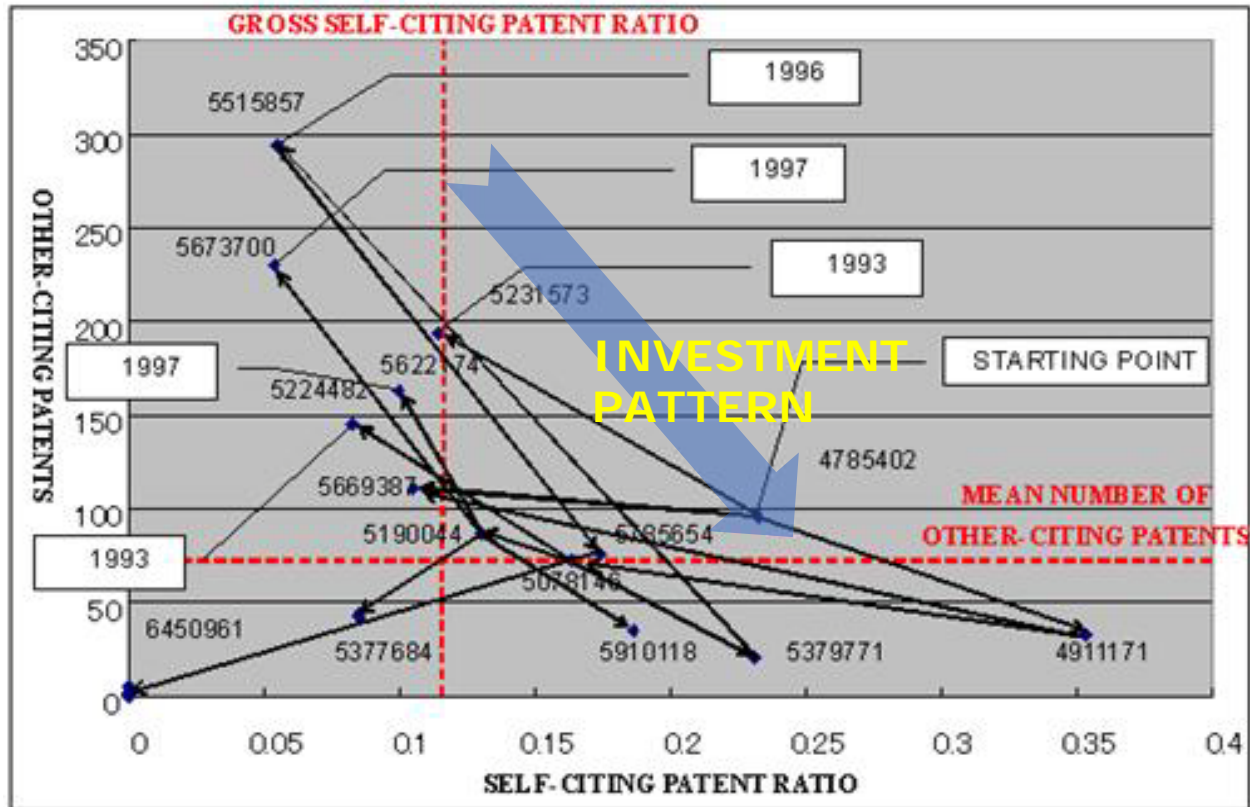
東芝製の超音波診断装置は現在、国内市場（東芝メディカル株式会社が販売を担当）で約35%、全世界の市場で約18%と国内、全世界ともにトップシェアを有しています（東芝調べ）。また、10万台の累計生産台数のうち、国内向けは約38,000台、海外向けが約62,000台に達しています。



1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

# PSM

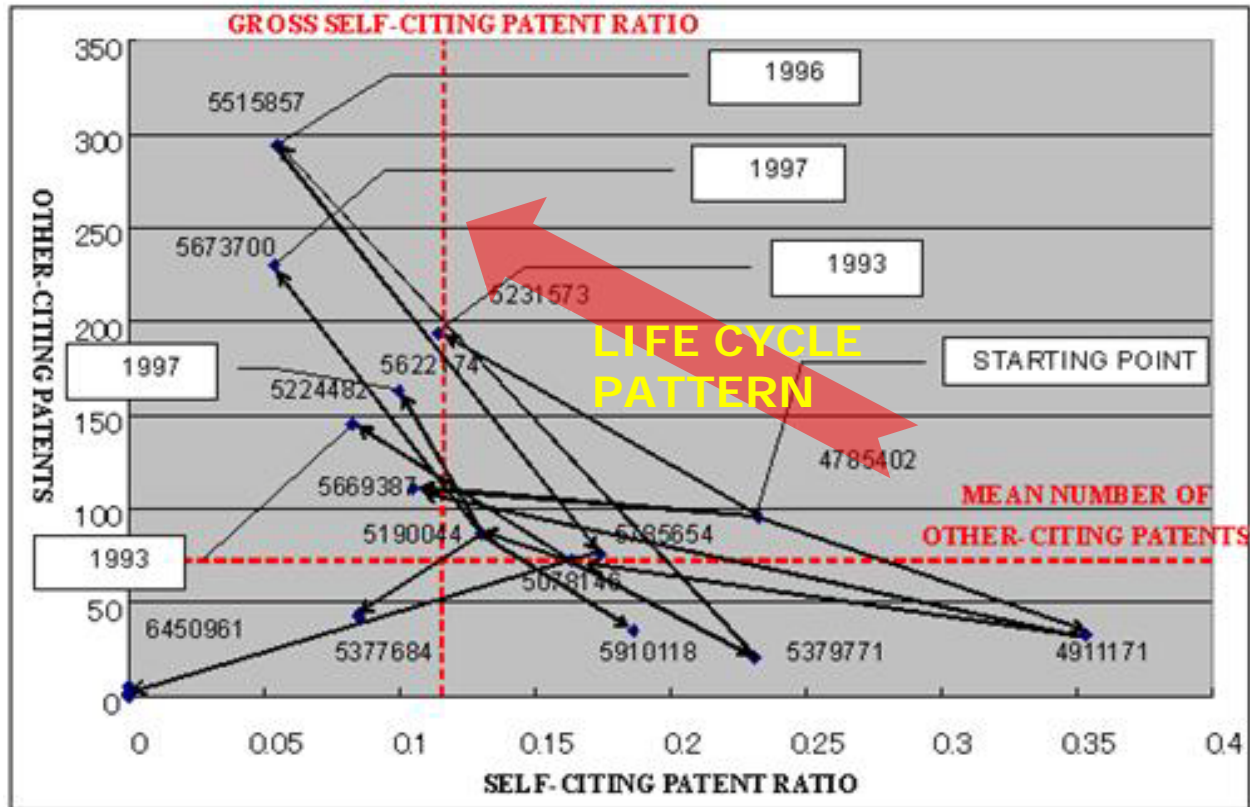
## –ULTRA SONIC DIAGNOSIS –



1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

# PSM

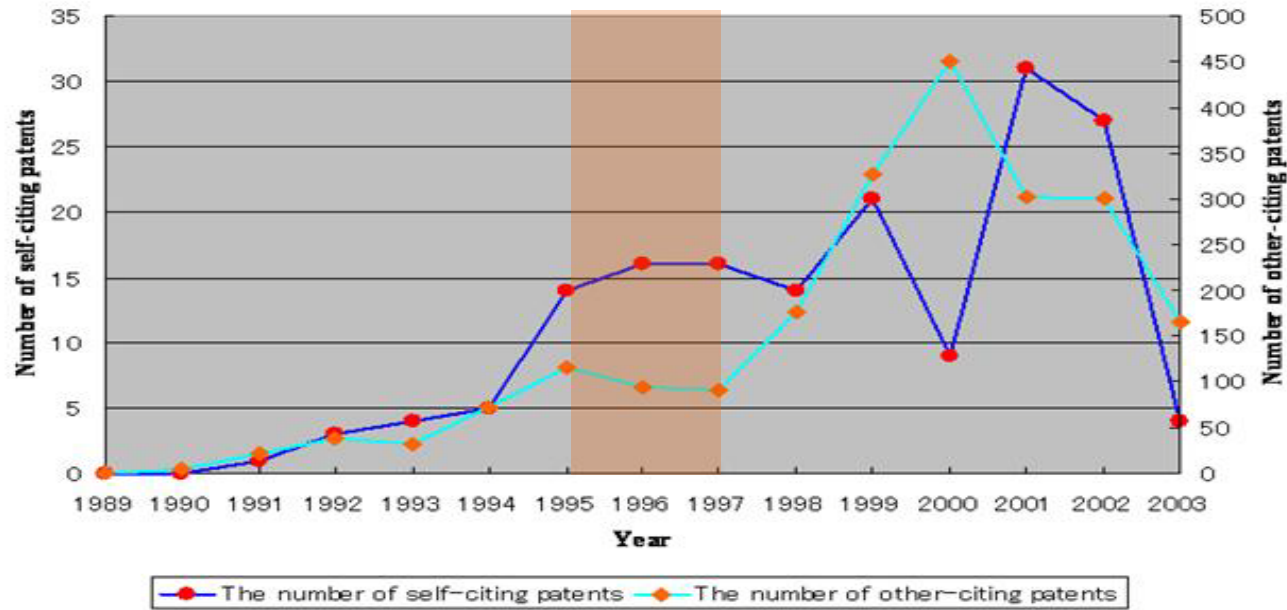
## –ULTRA SONIC DIAGNOSIS –



1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

# TCA

## —ULTRA SONIC DIAGNOSIS—



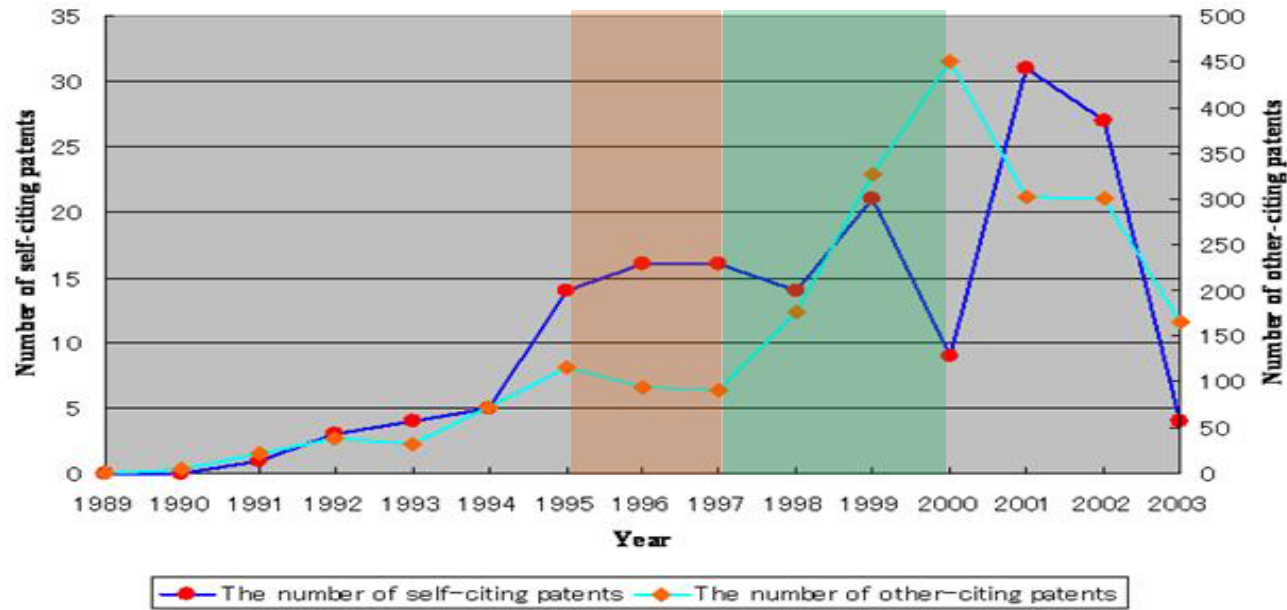
### ○ 1993-1997 Maturity Phase

- 1995 Prime Minister's Award of Japan
- 1996 Top Market Share in Japan (35%) and in the world (18%)

- 1. FRAMEWORK
- 2. IMPLEMENTATION
- 3. CONCLUSION

# TCA

## —ULTRA SONIC DIAGNOSIS—

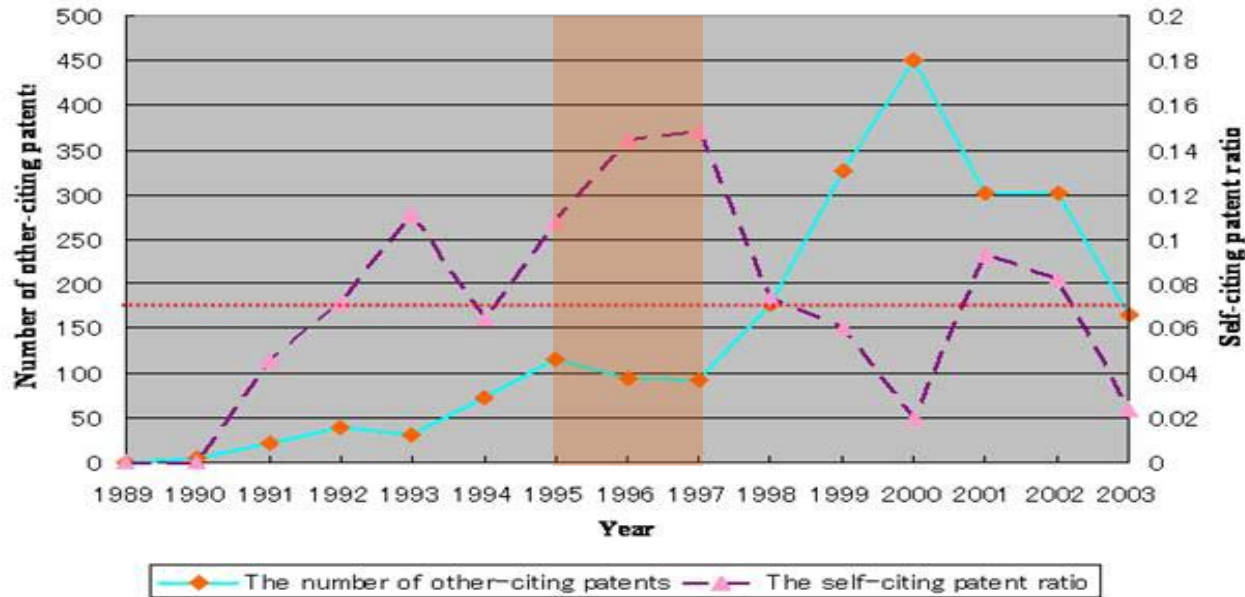


- 1997-2000 Competitors catching up with Toshiba

1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

# TCA

## —ULTRA SONIC DIAGNOSIS —

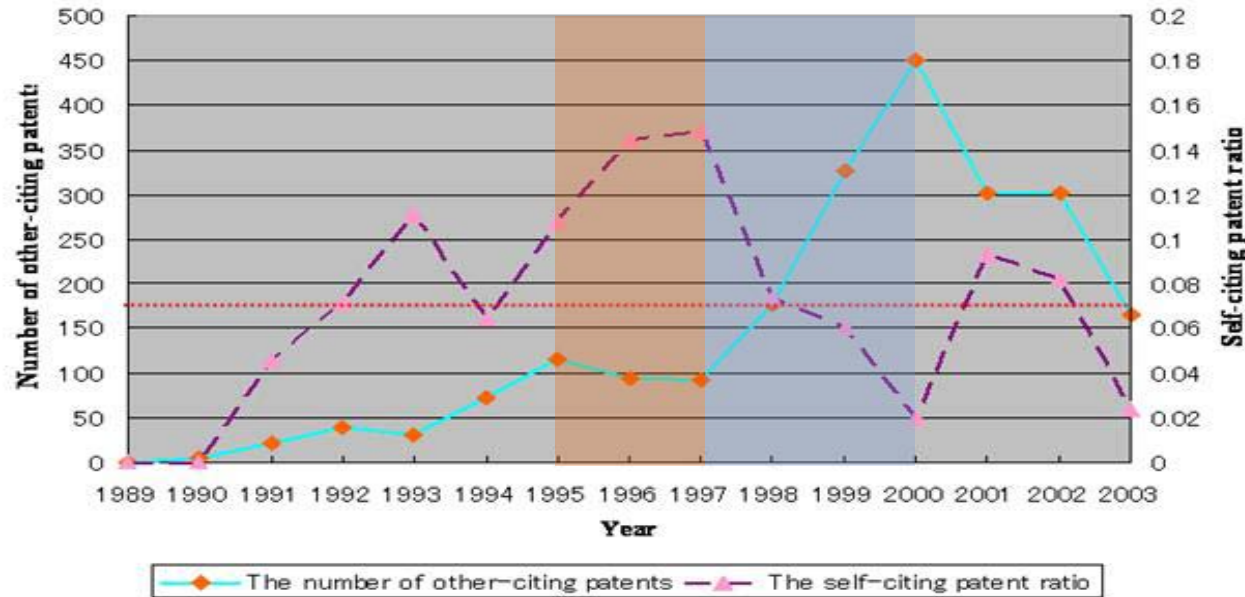


- 1993-1997 Maturity Phase  $\Rightarrow$  High Competitiveness

1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

# TCA

## —ULTRA SONIC DIAGNOSIS—



- 1997-2000 Competitors catching up with Toshiba, Toshiba's Competitiveness Decreasing

- 1. FRAMEWORK
- 2. IMPLEMENTATION
- 3. CONCLUSION

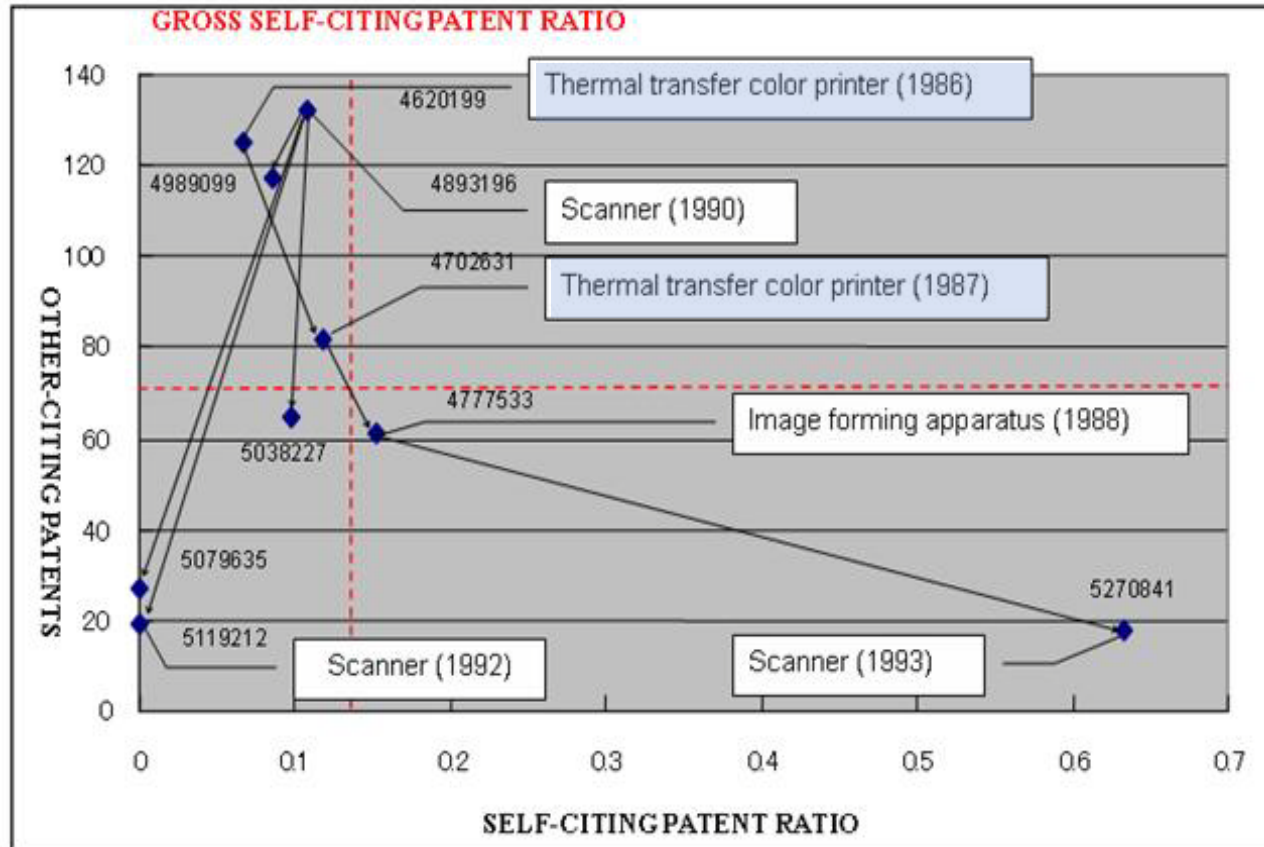
# PSM —IMAGING DEVICE—



1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

# PSM

## —IMAGING DEVICE—

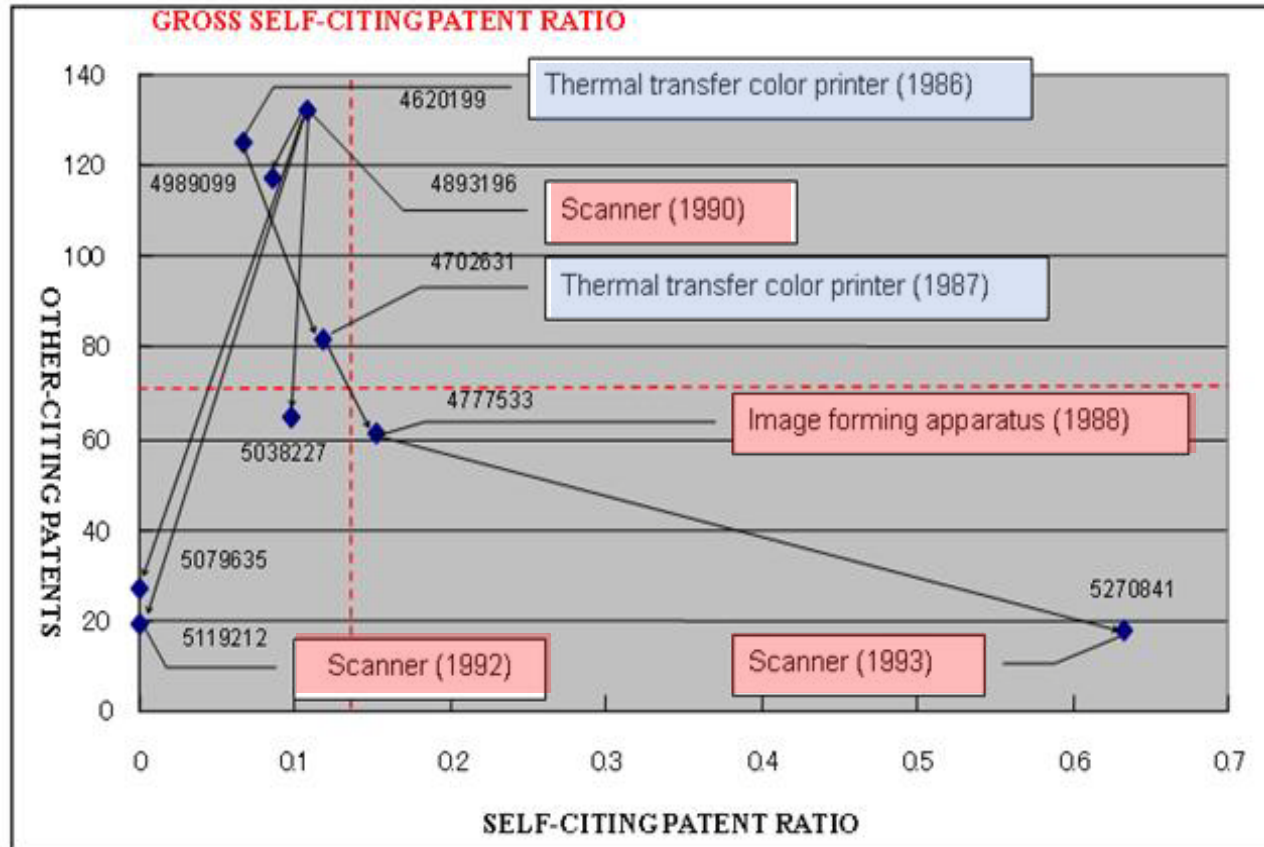




1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

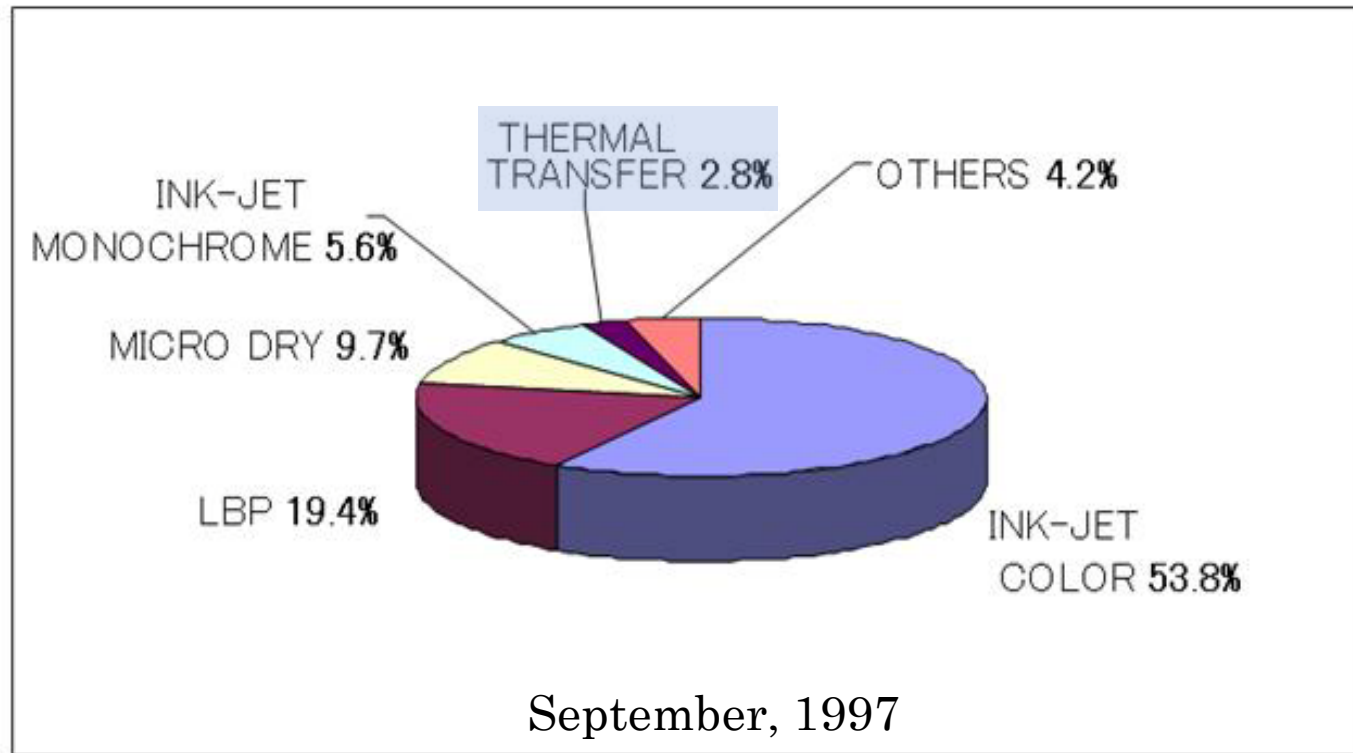
# PSM

## —IMAGING DEVICE—



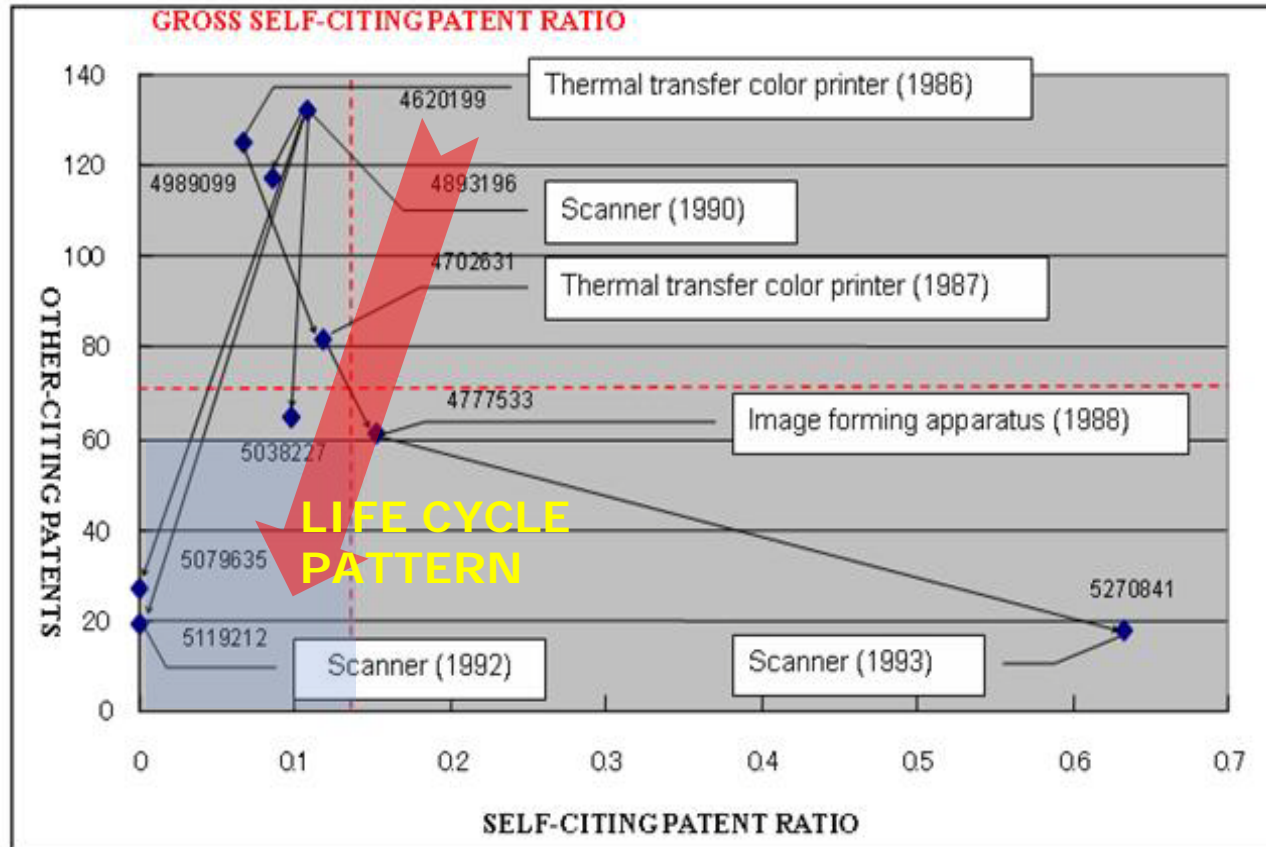
- 1. FRAMEWORK
- 2. IMPLEMENTATION
- 3. CONCLUSION

# PRODUCT SHARE —IMAGING DEVICE—



1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

# PSM —IMAGING DEVICE—



1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

# PSM

## —IMAGING DEVICE—

- 1986-1990 Maturity Phase
- 1992- Decline Phase ⇒ Sell out or License out
  - 1998 Sell out Printer and Copy-machine Business to TECH Co.,

**TOSHIBA** ② お問い合わせ

新着情報 [発表月別](#) [テーマ別](#)

### 東芝、テックおよび東芝ライテックにおける複写機事業等の移管について

1998年8月27日

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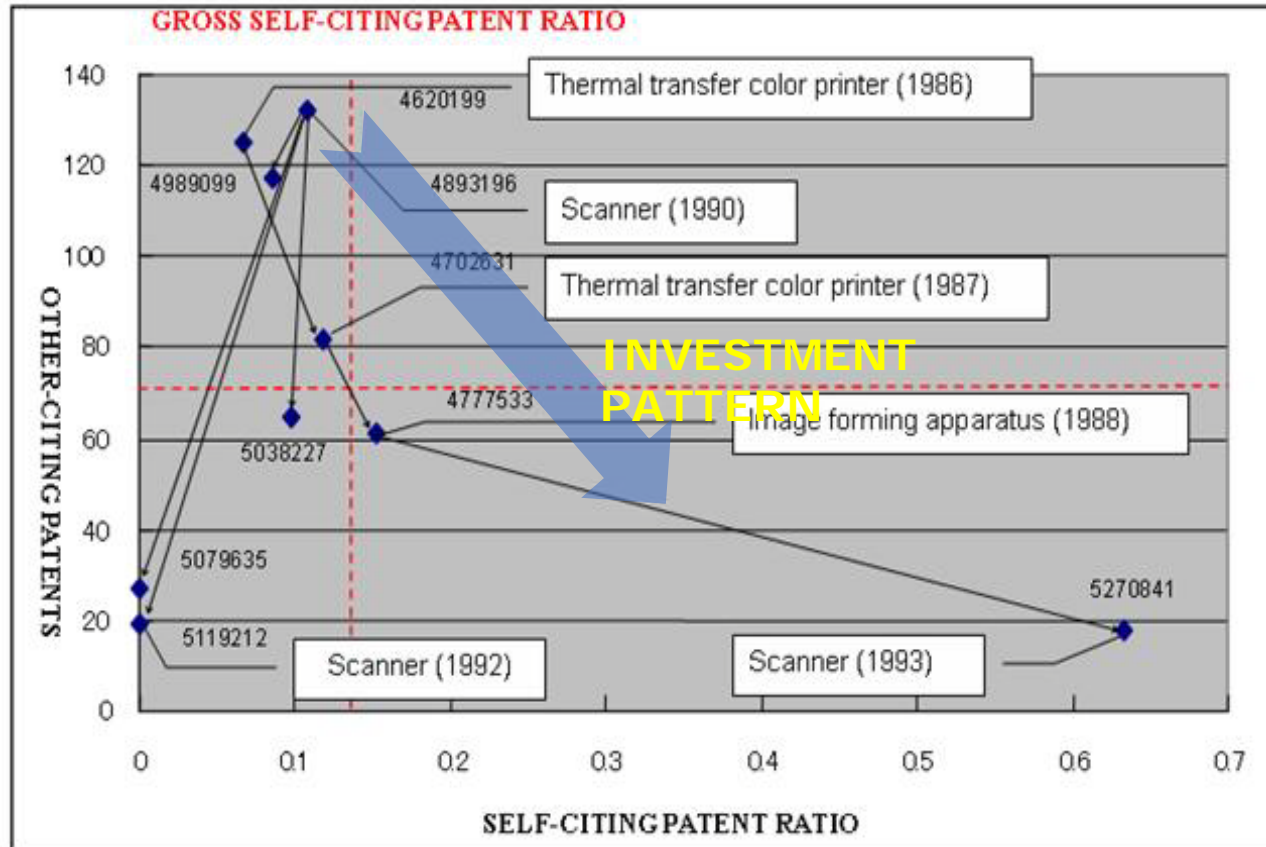
株式会社 東芝  
株式会社 テック  
東芝ライテック株式会社

東芝とテック(本店:静岡県大仁町、社長:久保光生)とは、東芝グループ内における複写機、ファクシミリ、プリンタなどの画像情報通信事業をテックに集中、一元化し、市場環境の変化に対応した製品競争力強化と商品企画、開発の加速化を図るため、平成11年1月1日を目途に、東芝の複写機事業をテックへ全面的に事業移管することで合意しました。

これにあわせて、テックは有償第三者割当増資を行い、東芝がこれを引き受けて、東芝の持ち株比率を50%超とし、テックは社名を東芝テックへ変更します。

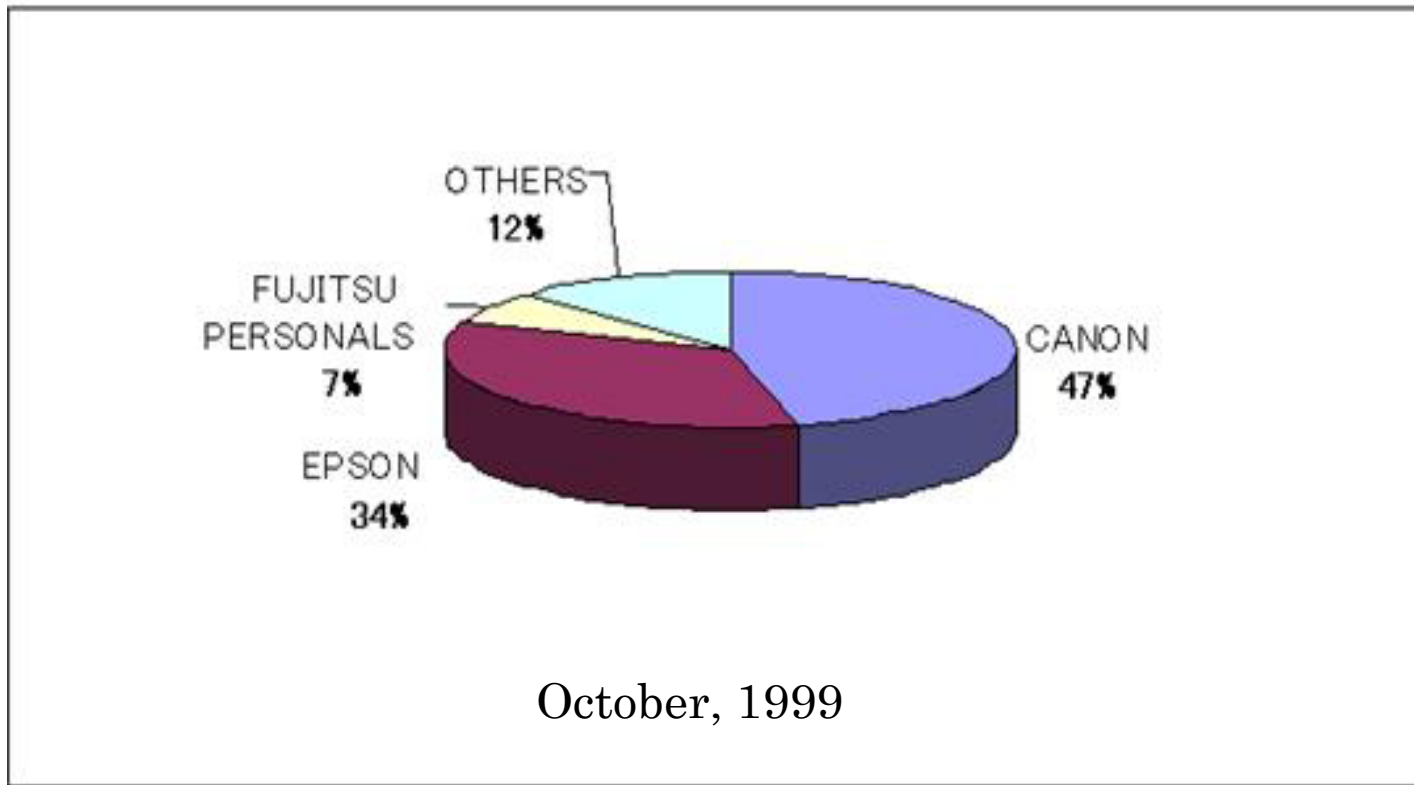
1. FRAMEWORK
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# PSM —IMAGING DEVICE—



- 1. FRAMEWORK
- 2. IMPLEMENTATION
- 3. CONCLUSION

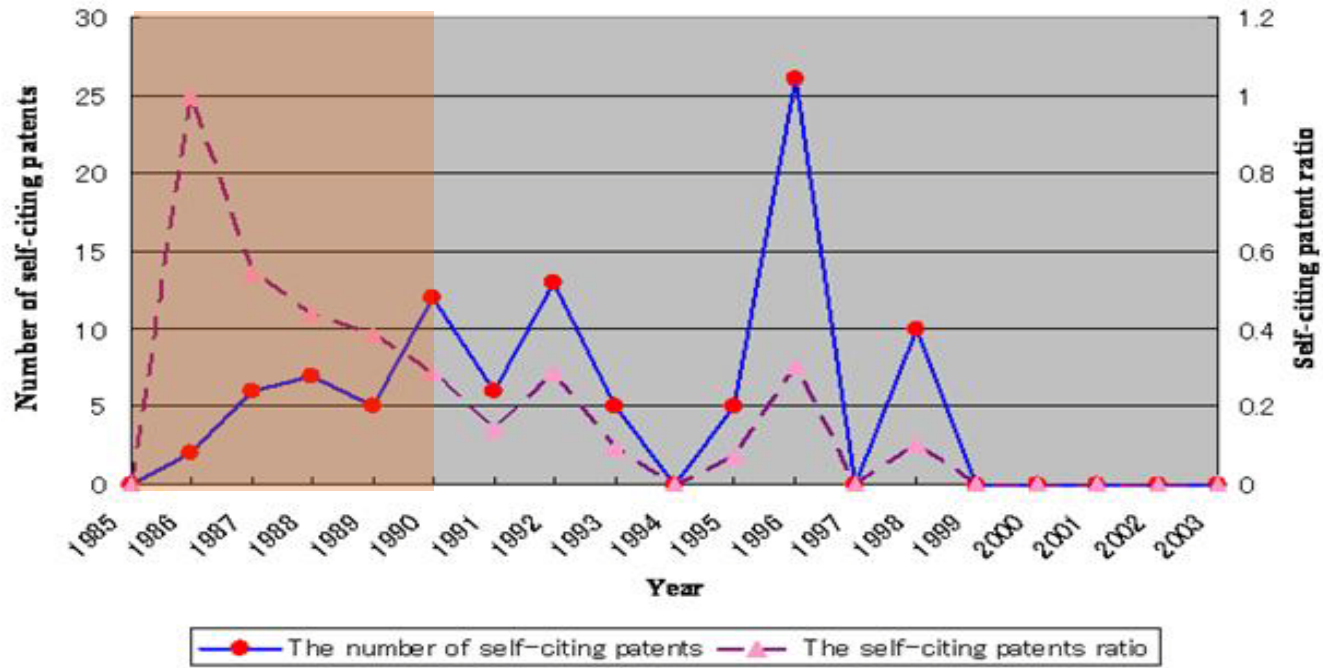
# COMPANY SHARE —IMAGING DEVICE—



1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

# TCA

## —IMAGING DEVICE—

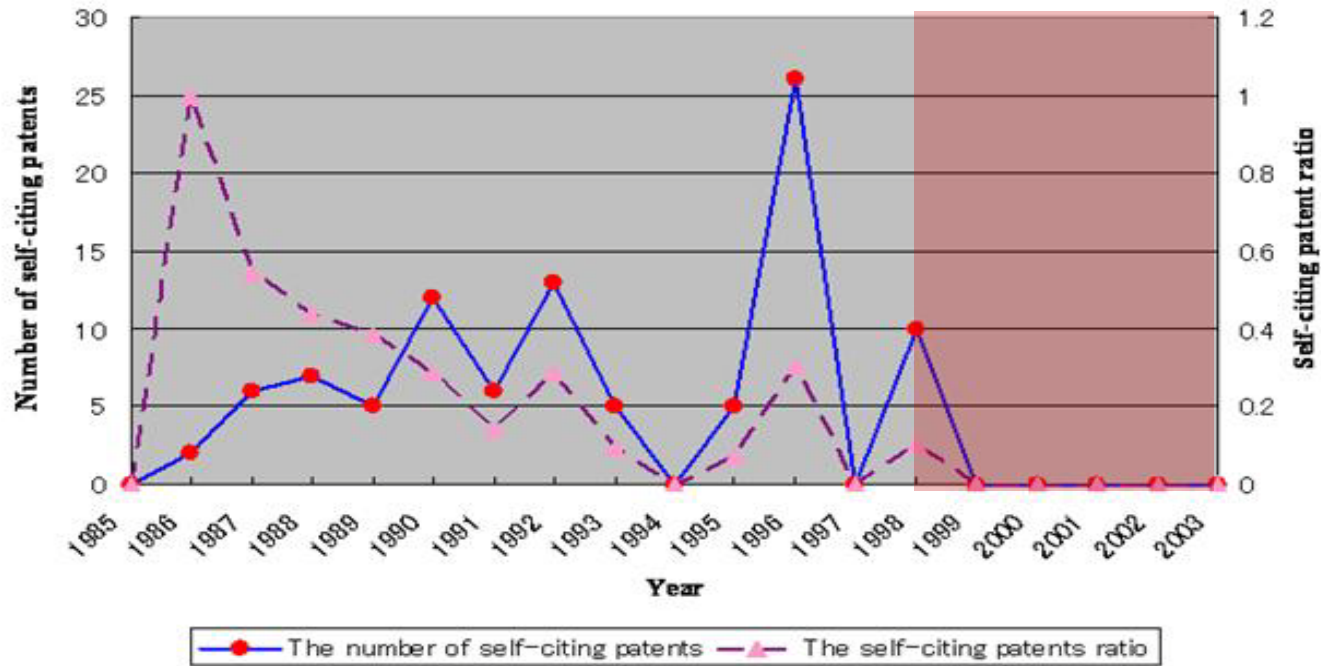


- 1986-1990 Maturity Phase

1. FRAMEWORK
2. IMPLEMENTATION
3. CONCLUSION

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## —IMAGING DEVICE—

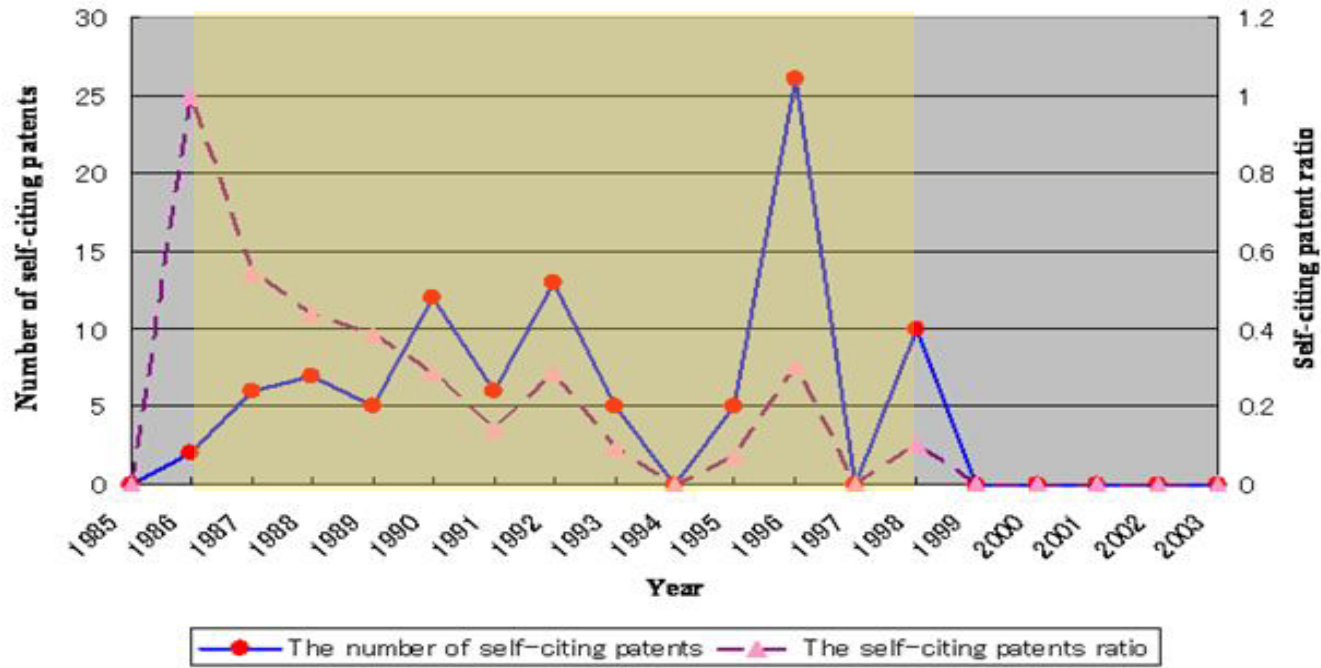


- 1992- Decline Phase  $\Rightarrow$  Sell out or License out
  - 1998 Sell out Printer and Copy-machine Business to TECH Co.,



1. FRAMEWORK
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# TCA —IMAGING DEVICE—

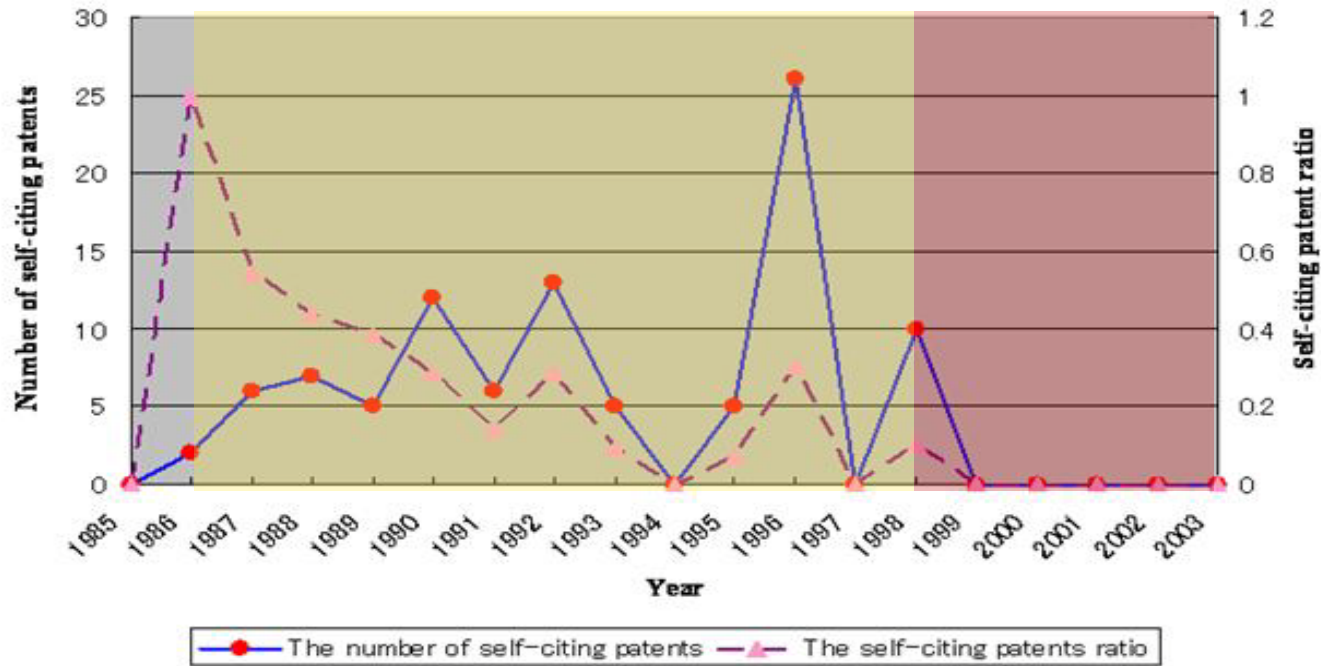


- 1986- Toshiba's Competitiveness Decreasing  $\Rightarrow$  Sell out

1. FRAMEWORK
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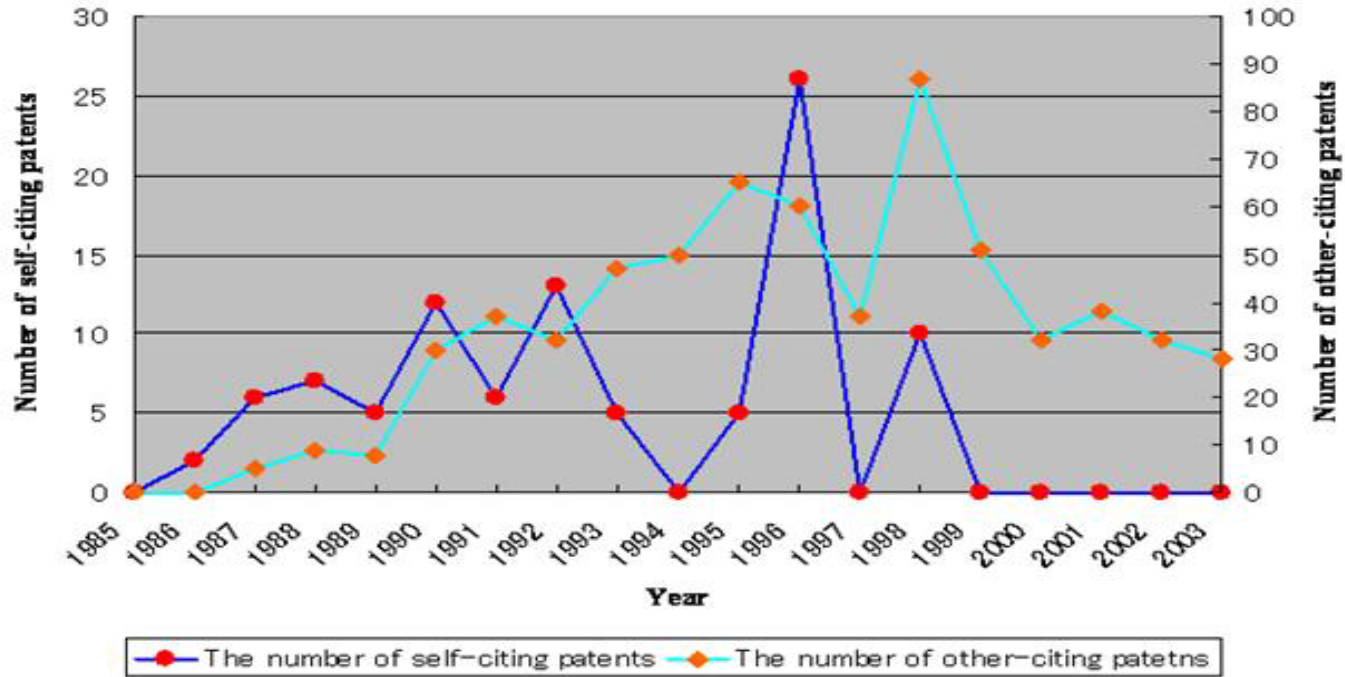


- 1986- Toshiba's Competitiveness Decreasing ⇒ Sell out
  - 1998 Sell out Printer and Copy-machine Business to TECH Co.,

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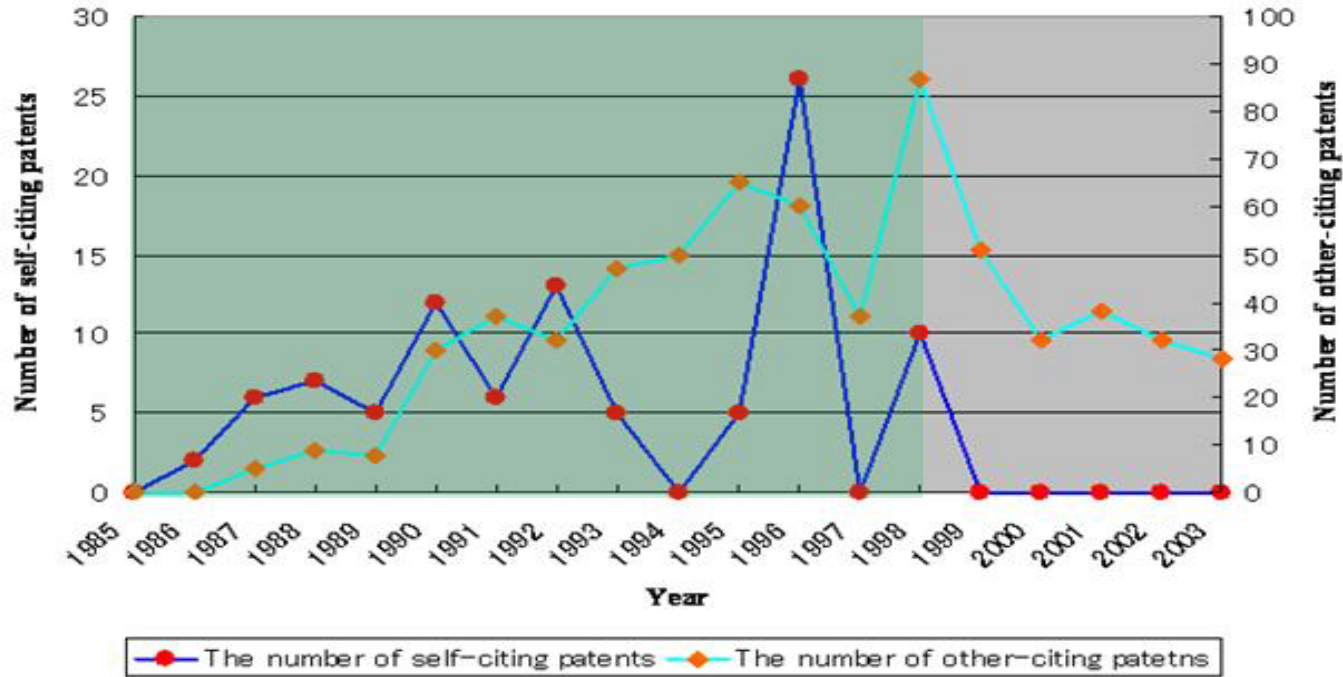
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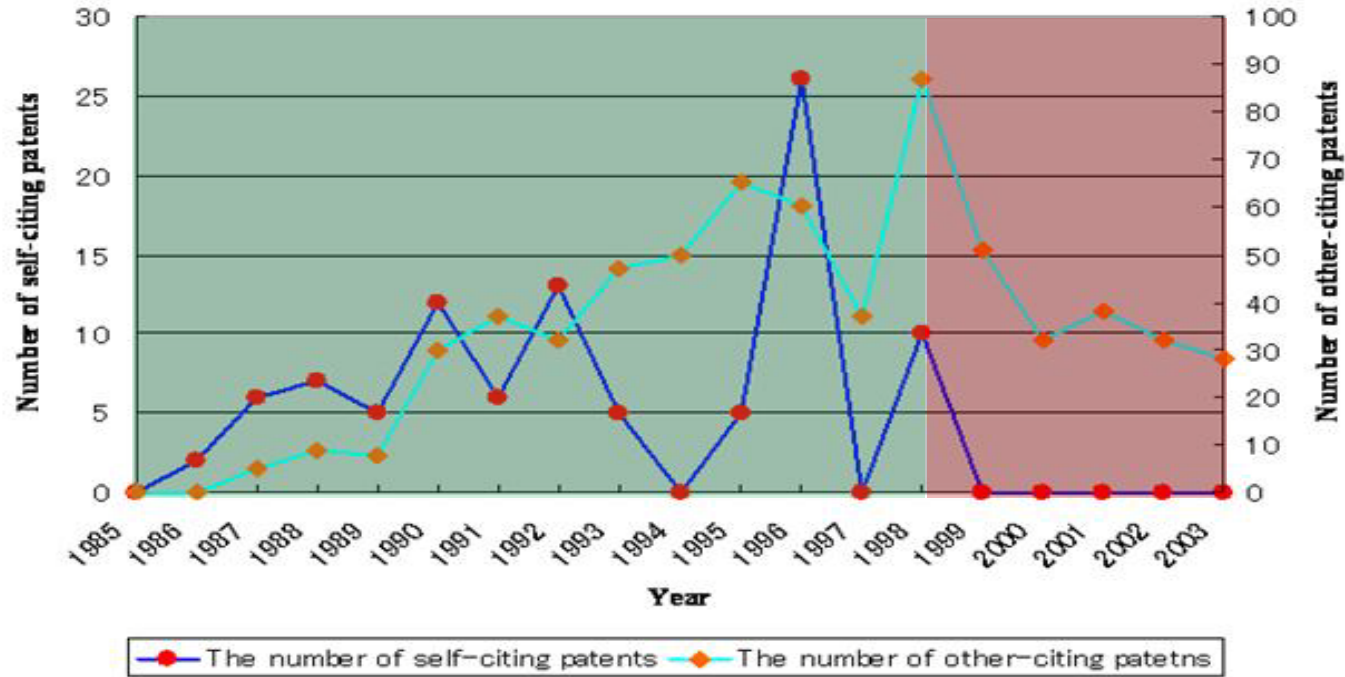
## —IMAGING DEVICE—



- 1986- Value of Patents Increasing  $\Rightarrow$  Sell out

1. FRAMEWORK
2. IMPLEMENTATION
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# TCA —IMAGING DEVICE—



- 1986- Value of Patents Increasing ⇒ Sell out
  - 1998 Sell out Printer and Copy-machine Business to TECH Co.,

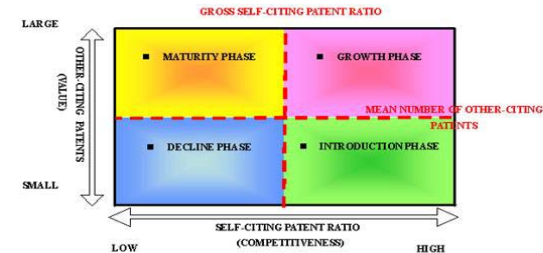
1. FRAMEWORK
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# CONCLUSION

## FRAMEWORK

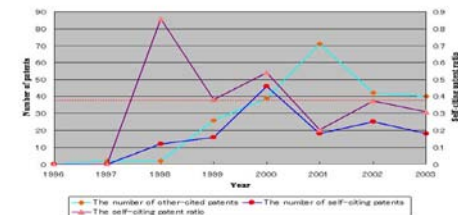
### ◆ Patent Strategy Matrix (PSM)

- ❑ Introduction Phase ⇒ Exclusive Position, Expansion of Market
- ❑ Growth Phase ⇒ Keep Exclusivity, Obtain Competitor's Patents and Licenses, Pervade Products
- ❑ Maturity Phase ⇒ Avoid Patent Infringement, Cross License, Keep Market Standing
- ❑ Decline Phase ⇒ Sell out or License out Patents, Improve Productivity



### ◆ Time-series Citation Analysis (TCA)

- ❑ Other-cited Patents ⇒ Value of Patents, Competitor's R&D activities
- ❑ Self-citing Patents ⇒ R&D focus
- ❑ Self-citing Patent Ratio ⇒ Competitiveness



# Policy Implications

- Limitation of Japanese Patent Office Data Base
  - Lack of citation data
- Evaluation of Importance of science linkage
  - The benefits of academic patenting on research exceed their potential negative effects in Europe. (Zeebroeck *et al.*, 2008)
  - A firm having high citations to the science literature has also a high patent quality. (Nagaoka,2007).
  - The value of academic patents and co-patents of academic-industry collaboration are higher than other patents in Japan (Tamada *et al.*, 2009)
- Improvement of Patent Database and Acceleration of Innovation Research in Japan





**THANK YOU**

**Tetsuaki Oda, Ph. D. / Patent Attorney**  
**Kiminori Gemba, Ph. D.**

**E-mail: [oda@cacd.eng.osaka-u.ac.jp](mailto:oda@cacd.eng.osaka-u.ac.jp)**