TECHNOLOGY REEMERGENCE:
Creating New Markets for Old Technologies,
Swiss Mechanical Watchmaking 1970–2008

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How and why does demand for a legacy technology rematerialize to achieve substantive and sustained market growth?

Contribution:
“This study uncovers the process and mechanisms associated with technology reemergence: the resurgence of substantive and sustained demand for a legacy technology following the introduction of a new dominant design.”
The Challenge

Publishing an...
- inductive,
- theory-building,
- industry/field level study

That draws on...
- qualitative and quantitative data,
- and longitudinal analysis

With the goal of introducing a new theoretical construct
- (i.e., “technology reemergence”).
Questions I faced during the review process

• How to present qualitative and quantitative data in an inductive (theory-building) paper?

• Which data to include as evidence to adequately illustrate the (38-year) longitudinal evolution a field/industry?

• How to illustrate the impact of multiple actors across multiple levels-of-analysis?

(in ~45 pages)
Questions:
Presentation of Evidence

• How to present qualitative and quantitative data in an inductive (theory-building) paper?

• Which data to include as evidence to adequately illustrate the (38-year) longitudinal evolution a field/industry?

• How to depict the impact of multiple actors across multiple levels-of-analysis?

(in ~45 pages)
Using data to illustrate the initial hook/puzzle
State of the Swiss Watchmaking Industry: 1983

“Now we bid farewell to the master craftsmen who have brought us these wonders of the mechanical arts... *Their time has come and probably gone.*”

(Landes, 1983:359)

State of the Swiss Watchmaking Industry: 2008

“The watch industry is today, as it was yesterday, *one of the brightest stars in the Swiss economic firmament.* Better still, during the last five or six years, it has taken the leading position amongst the country's most successful industries.”

(Federation of the Swiss Watch Industry, 2008)
Using archival data to introduce the theoretical and phenomenological puzzle

Figure 1. Trajectory of the Swiss mechanical watch.*

Using a graph to help visualize the hook:

How did this unexpected reemergence happen?
Presenting qualitative and quantitative data in an inductive (theory-building) paper
Presenting qualitative and quantitative data in an inductive (theory-building) paper

**Primary data**
- Trade journal print advertisements (n=845)
- Field Interviews (n=136)

**Secondary data**
- Archival CEO interviews (n=27) and industry data
- Focus Groups (n=42 people)
- Field Observation (attended a watchmaking course)
- Non-participant observation
Presenting qualitative and quantitative evidence

<table>
<thead>
<tr>
<th>Qualitative Data</th>
<th>Quantitative Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Induce mechanisms</td>
<td>• Illustrate high-level trends</td>
</tr>
<tr>
<td>• Identify descriptive, axial, and theoretical codes.</td>
<td>• Distinguish longitudinal shifts between periods</td>
</tr>
<tr>
<td>• Create initial codebook</td>
<td>• Triangulate trends induced in interviews</td>
</tr>
<tr>
<td>• Reinforce patterns found in quantitative data.</td>
<td>• Develop a longitudinal process model</td>
</tr>
</tbody>
</table>
Using codebooks to build reviewers’ confidence in your analysis

To view the entire codebook and online appendix:
Presenting archival and interview data to induce a set of novel mechanisms.
Mechanism: Temporal Distancing

Illustrative advertisements:

“Breguet. Since 1775. Known to history as the watchmaker’s watchmaker.”

“Vacheron Constantin. The world’s oldest watch manufacturer. Geneva 1755”

Illustrative interview quotes:

As one company historian explained, “We take care to distance ourselves from the [quartz] crisis. We prefer to go back to the founding of our business when we mention mechanical watches.”
Mechanism: Temporal Distancing

Illustrative graphs:
“An industry veteran I interviewed noted that most firms began to combine these two elements: ‘Your mechanical Rolex or your Patek is a portable status symbol. It shows your status, your bank account, your power’.”
Mechanism: Value Recombining

Illustrative graphs:
Triangulating common patterns over a 38-year period

Figure 2. Average mentions of value recombination—precision, luxury, and craft—in ads during technological reemergence (1990–2008).

Figure 3. Average mentions of temporal distancing in ads during technological reemergence (1990–2008).

Figure 4. Average use of conceptual bridging—metaphors and similes—in ads during technological reemergence (1990–2008).

Figure 5. Reclaiming the competitive set. Mentions of “Swissness” in ads (1990–2008).
Triangulating common patterns over a 38-year period

Table 1. Results of Analysis of Variance of Advertisement Features

<table>
<thead>
<tr>
<th>Ad feature</th>
<th>t0: Tech. discontinuity</th>
<th>t1: Tech. retrenchment</th>
<th>t2: Tech. redefinition</th>
<th>t3: Market redefinition</th>
<th>All periods</th>
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<td>Quartz</td>
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<td>.50</td>
<td>.26</td>
<td>.11</td>
<td>.38</td>
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<td>Mentions of technology (% of ads depicting feature)</td>
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Mechanisms of technology reemergence (only mechanical ads, adjusted sample)

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* p < .10; ** p < .05; *** p < .01; **** p < .001.
* Tukey HSD post hoc t-tests reported; q-values and adjusted p-values are available from the author upon request.
Presenting a longitudinal field/industry-level process model
Figure 7. Process and mechanisms of technology reemergence.*

1. Technological Retrenchment
2. Technological Reemergence (technology redefining phase)
3. Technological Reemergence (market redefining phase)

Community Factors

- Limited latent demand for the legacy technology
- Reactivation of latent values
- Introduction of new values
- Interpretations of the past
- Broader cultural inputs (e.g., art collecting norms, high-end artisanal movements)
- Shifts in meaning attached to the legacy technology

Organizational Factors

- Recombining values
- Identity marking
- Temporal distancing
- Conceptual bridging

Consumer Factors

- Broader market inputs (e.g., increased discretionary income)
- Reclaiming the competitive set
- Mobilizing enthusiast consumers
- Old and new customer segments ascribe value to the legacy technology

Intermediate Outcomes

- New firms enter the community
- Increased competition within the community
- Competitive differentiation
- Reinvesting in innovation and manufacturing for the legacy technology
- Consumer differentiation
- Diversification and growth of customer demand for the legacy technology

Substantive and sustained market growth for the reemerging legacy technology
Figure 7. Process and mechanisms of technology reemergence.*

Longitudinal analysis

Substantive and sustained market growth for the reemergent legacy technology
Multiple levels-of-analysis
Induction of mechanisms to build a process model
Evidence of outcomes to support a new construct
Summarizing the theoretical contribution with simplified visual models
Summarizing the theoretical contribution in the Discussion section

A simplified model

A short summary to distinguish the new construct from prior work
Some lessons this paper taught me about evidence presentation…

• Be willing to present and use different forms of data to triangulate your analyses and findings.

• Show evidence of broad trends, but also include data and appendices that offer the reader specific details.

• Seek input and guidance from your reviewers and editor.
THANK YOU
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