Convergence



Convergence

Correlating Convergence in Product Design

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What is “Convergence?”

What is "Convergence?"

"The search box is evolving and there will be more and more convergence through it."

– InterActiveCorp CEO Barry Diller discussing the acquisition of Ask Jeeves

What is "Convergence?"

[2006 will] "see the convergence of a whole stack of IT trends."

– British Telecommunications' Futurist, Ian Pearson

What is "Convergence?"

"For us, the key convergence product is the Media Center PC, which is the idea of that single remote control giving you the best TV experience, music, and photos but also the full power of the PC."

– Bill Gates, 2005 Consumer Electronics Show interview

What is “Convergence?”

con•ver•gence | kən ˈ vərjəns | (also con•ver•gency | -jənsē |)

noun

The process or state of converging : the convergence of lines in the distance.

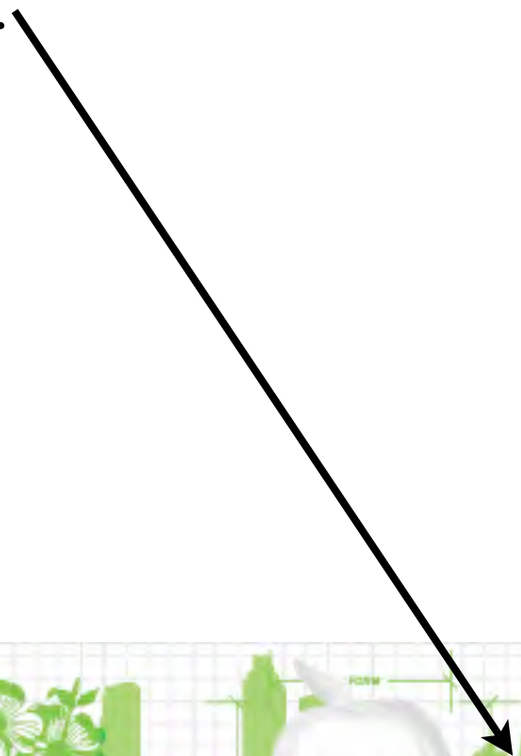
Biology; the tendency of unrelated animals and plants to evolve superficially similar characteristics under similar environmental conditions.

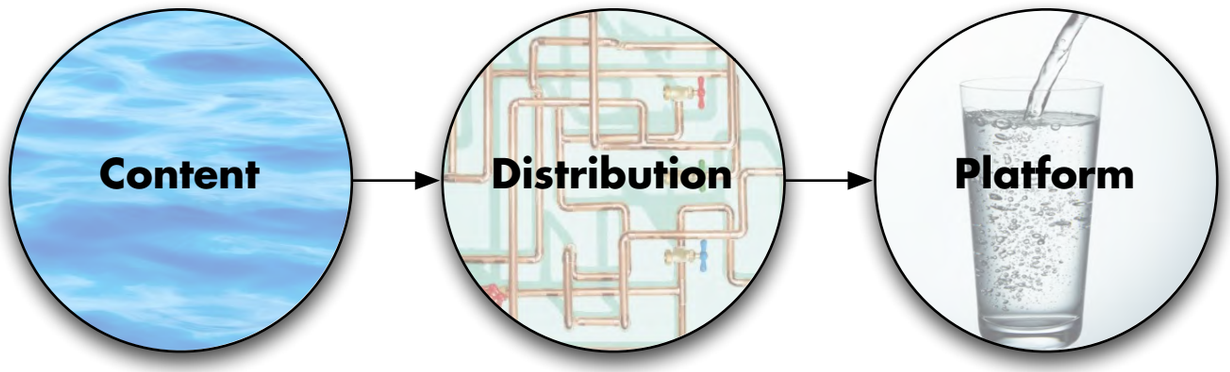
What is “Convergence?”

Uber marketing and technology buzzword...

Unofficial theme of the Consumer Electronics Show for the past decade...

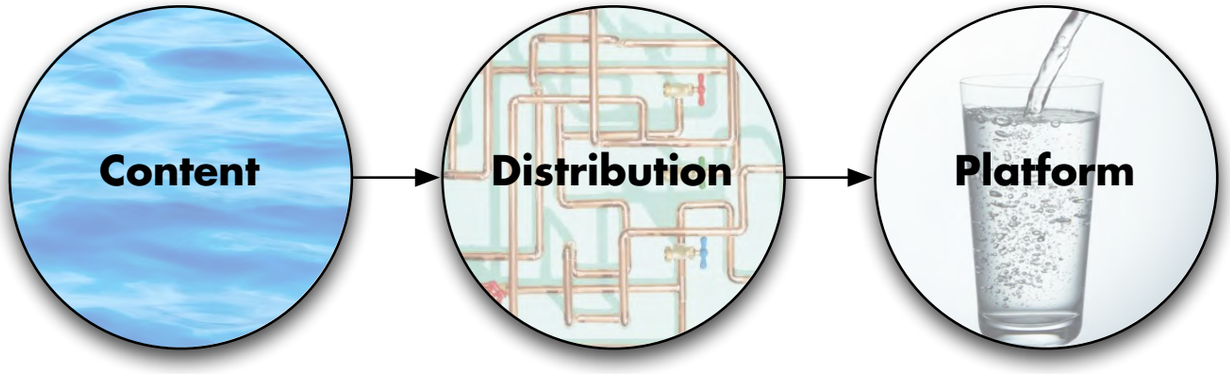
A trendy conference topic...





Three Facets of Convergence

To help frame the term in relation to design.
I will spend the next few minutes breaking this down.

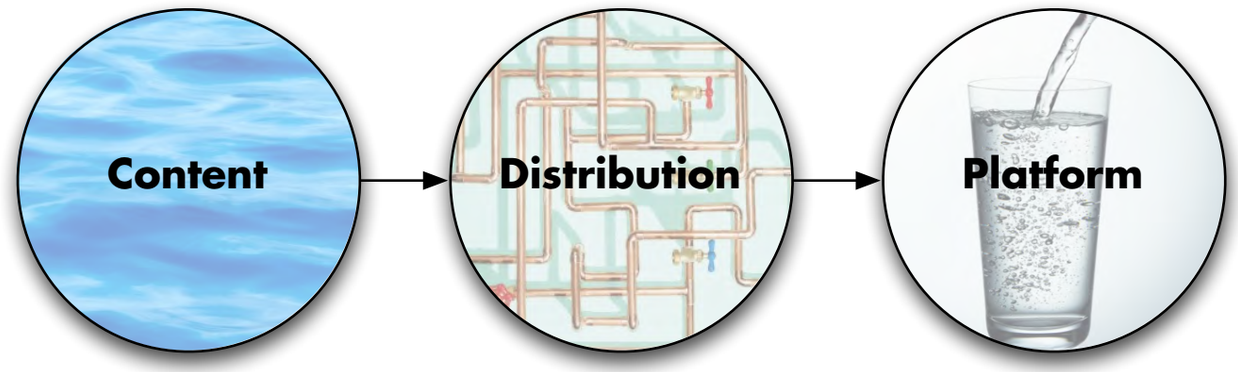


Content

The media people consume.

Drives need for devices.

- Video
- Audio
- Electricity
- Written word
- Water

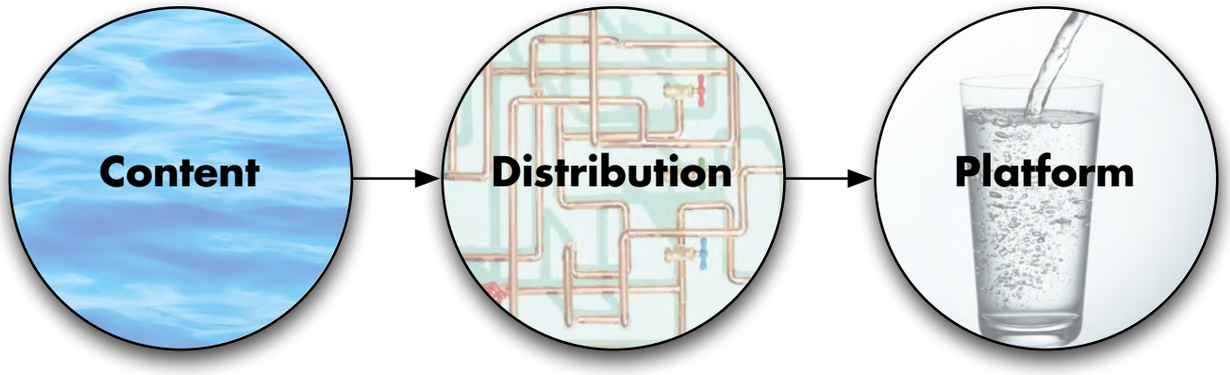


Content

Example: Digital Music

Numerous audio formats competing for consumer attention!





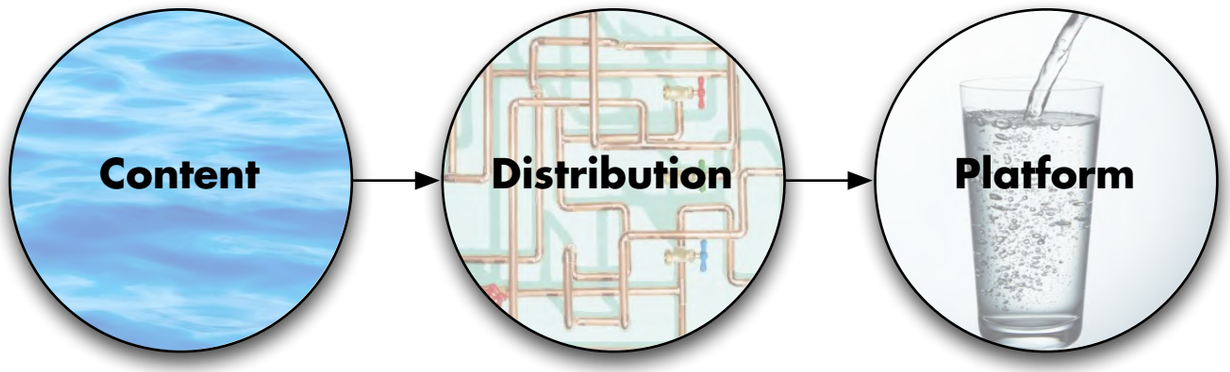
Distribution

The infrastructure that transmits content to a platform.

Very content interdependent.

- Data networks
- Highway system
- Water & Sewage
- Wireless communications
- Cables & Connectors

Content and distribution leap-frog each other to push innovation.



Distribution

Example: Home Movies

Various distribution formats for identical content.

Betahi-fi

VHS

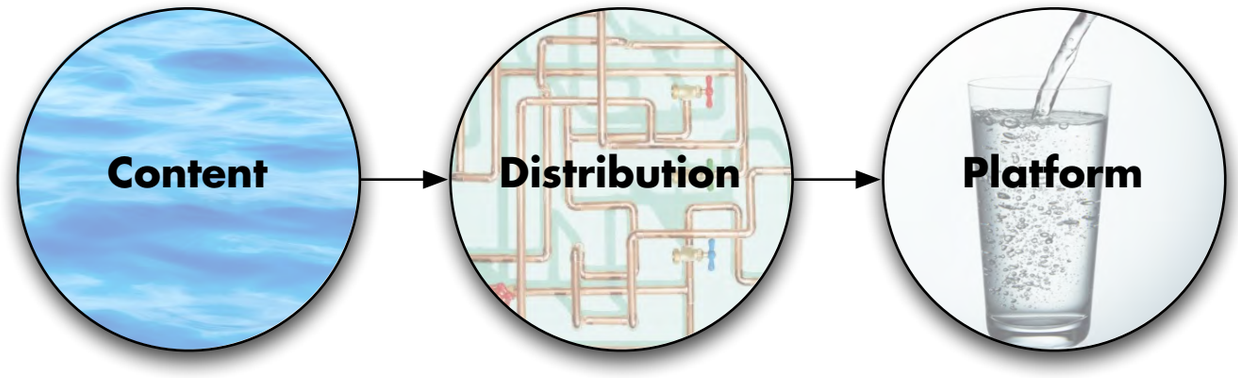
LaserDisc™

DVD™

HD DVD™

Blu-ray Disc™

Netflix operates in the distribution area.

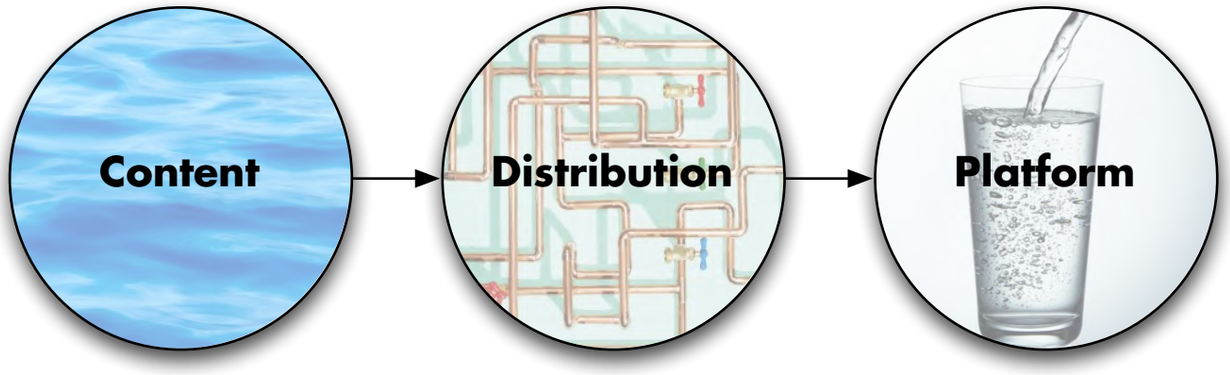


Platform

The device in which content is delivered to and consumed.

Primary point of user interaction.

Realm of the product designer!



Platform

Two distinct variations in platform convergence:

Device-Centric Convergence

Activity-Centric Convergence

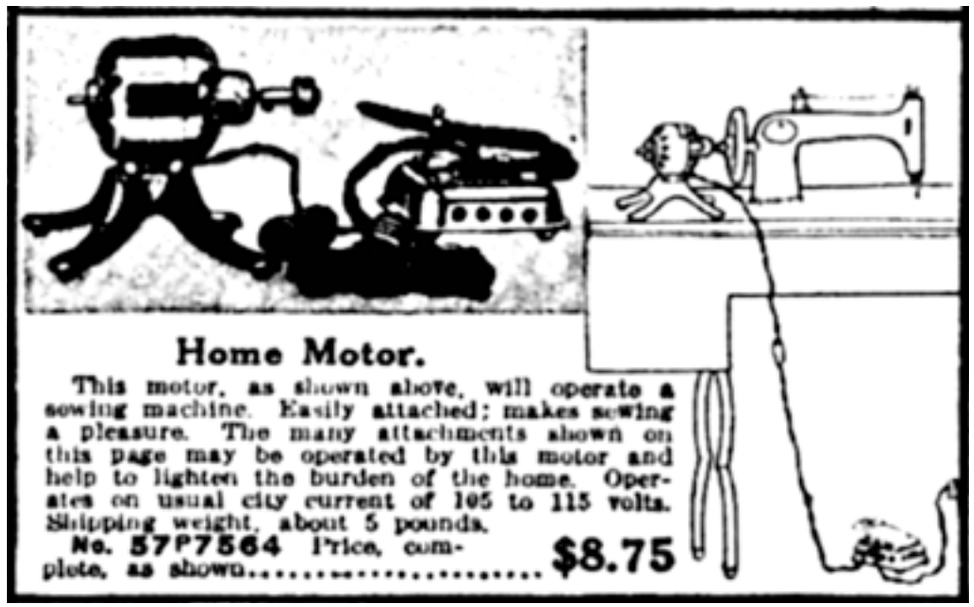
Device-Centric Convergence

Potentially disparate tasks converge to a product form.

Technology: New technology transitions into a consumer device.
Form: Constrained or dictated by supporting technology.

I will define terminology and provide numerous examples.
This will become more clear as examples create connections.

Device-Centric Convergence



Sears Home Motor circa 1918

The electric motor was a trickle-down technology from industrial applications.

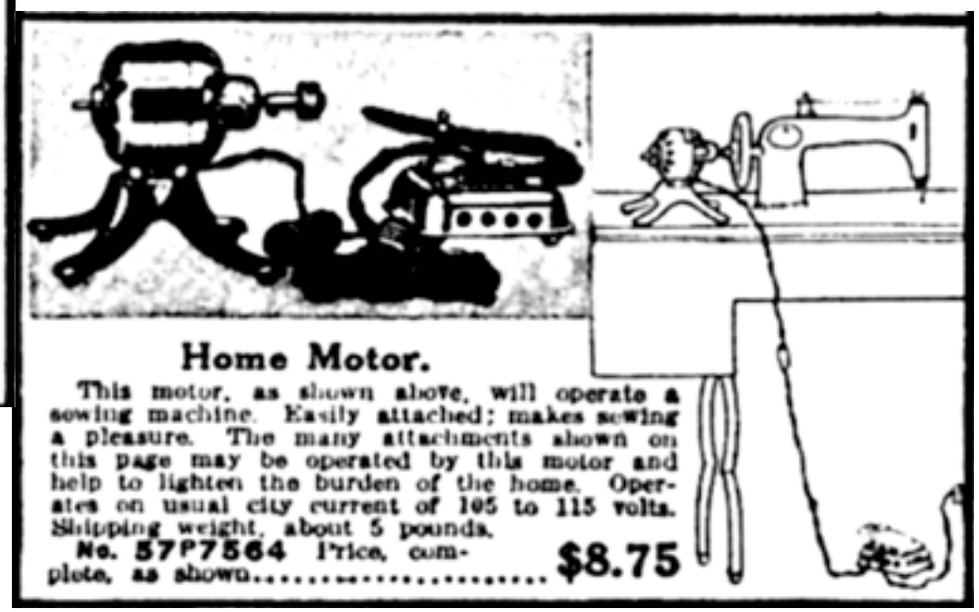
Device-Centric Convergence



Beater Attachment.

Whips cream and beats eggs, and many other uses will be found for these attachments when used in connection with the Home Motor. Parts include the stand, handle and the beater. Shipping weight, about 14 ounces.

No. 57P7585 Price..... **$1.30**



Home Motor.

This motor, as shown above, will operate a sewing machine. Easily attached; makes sewing a pleasure. The many attachments shown on this page may be operated by this motor and help to lighten the burden of the home. Operates on usual city current of 105 to 115 volts. Shipping weight, about 5 pounds.

No. 57P7564 Price, complete, as shown..... **$8.75**

Various attachments with disparate functionality

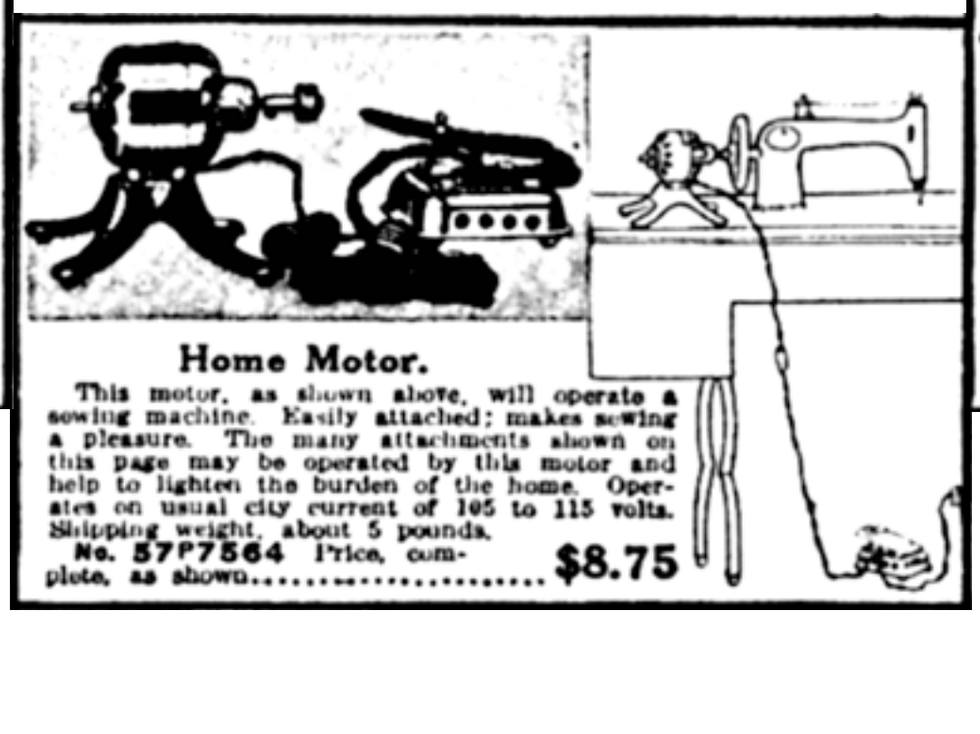
Device-Centric Convergence



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Churn and Mixer Attachment.

Used in connection with the Home Motor, makes a small churn and mixer for which you will find many uses. The attachments include the base, supports, mixer, handle and special cover for jar. Shipping weight, about 1¾ pounds.

No. 57P7582 Price..... **$1.30**

Device-Centric Convergence



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Whips cream and beats eggs, and many other uses will be found for these attachments when used in connection with the Home Motor. Parts include the stand, handle and the beater. Shipping weight, about 14 ounces.

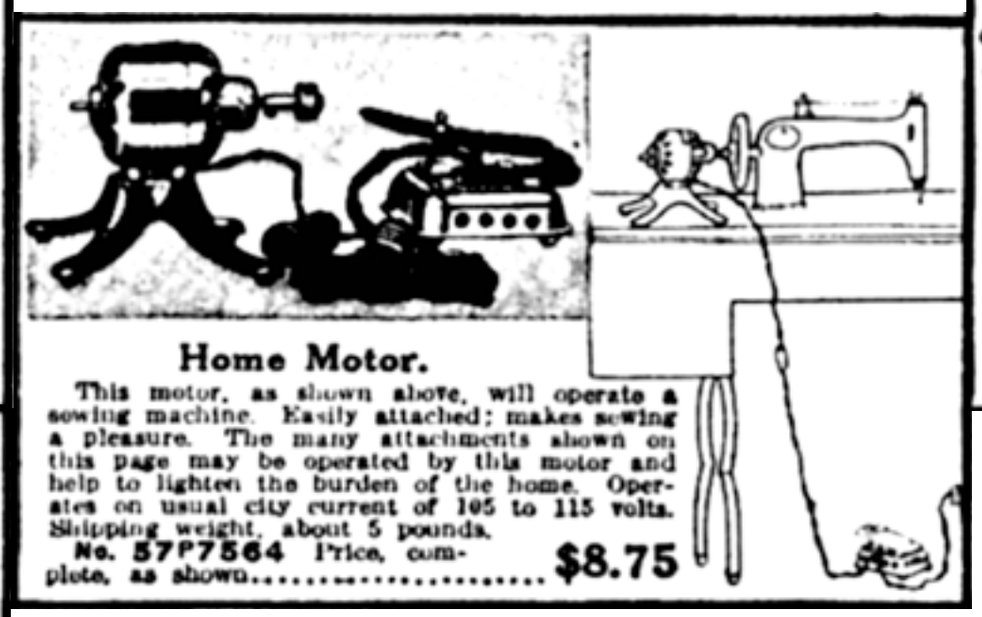
No. 57P7585 Price..... **$1.30**

Household Mixer.

Quickly attached to any lamp socket. You will find many uses for this handy device. Shipping weight, about 3½ pounds.

No. 57P7580

Price, complete as shown above..... **$5.95**



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This motor, as shown above, will operate a sewing machine. Easily attached; makes sewing a pleasure. The many attachments shown on this page may be operated by this motor and help to lighten the burden of the home. Operates on usual city current of 105 to 115 volts. Shipping weight, about 5 pounds.

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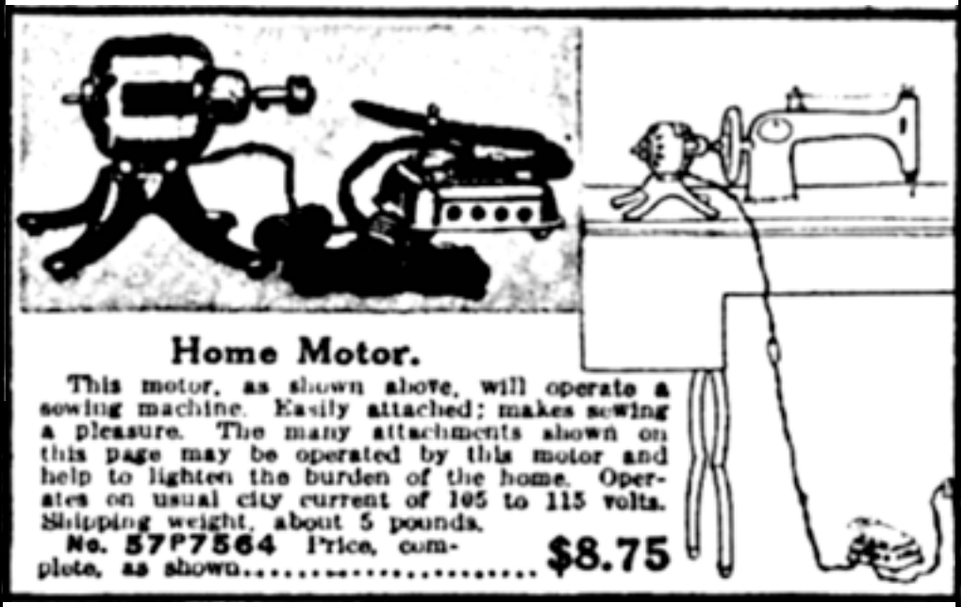


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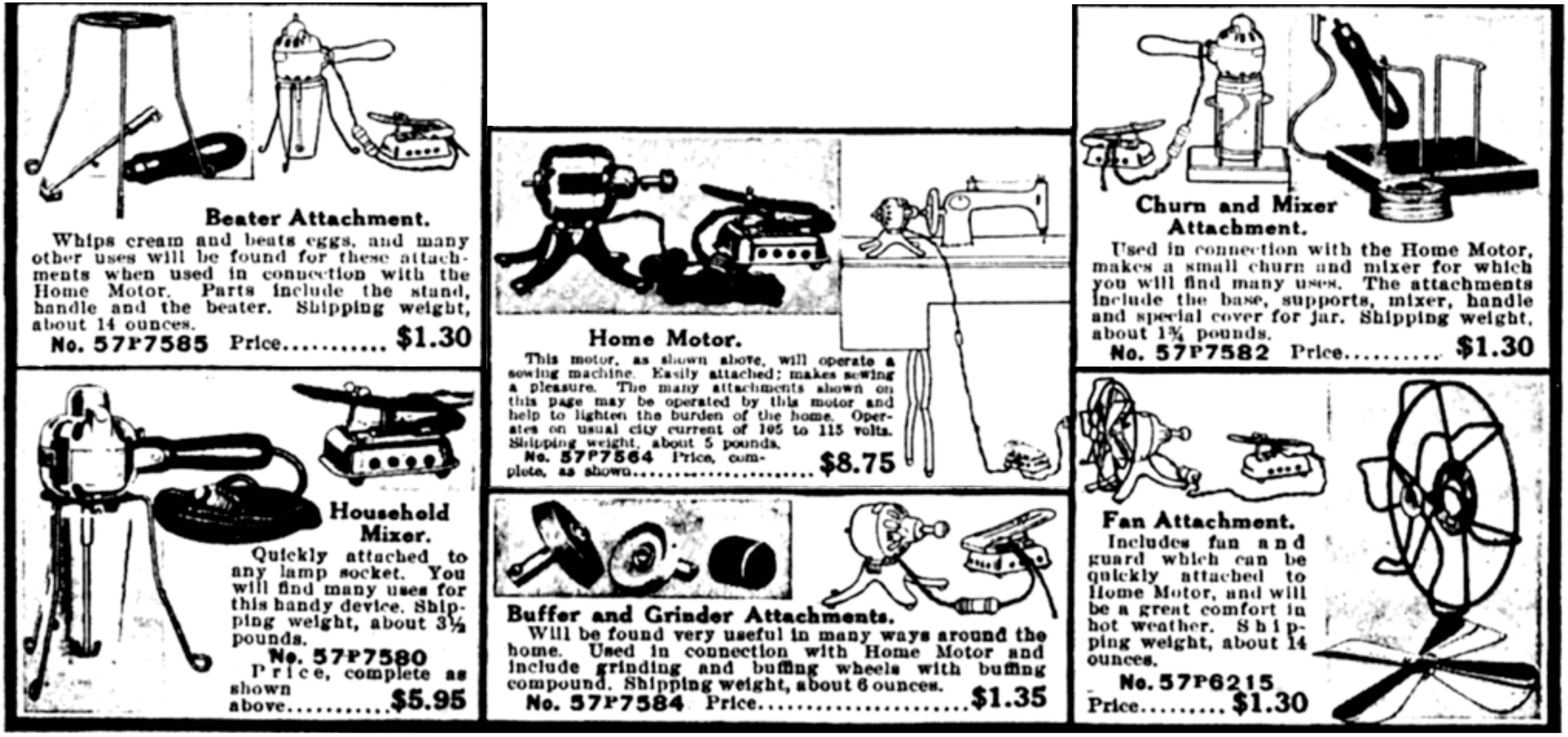
Fan Attachment.

Includes fan and guard which can be quickly attached to Home Motor, and will be a great comfort in hot weather. Shipping weight, about 14 ounces.

No. 57P6215

Price..... **$1.30**

Device-Centric Convergence



Single device for a wide range of generally unrelated activities.
Activities are attracted to technologies.
Continuously reconfiguring for various functions is trade-off for new technology.

Device-Centric Convergence

Potbelly stove

Controlled heat provides:

- Warming a room
- Making hot water
- Cooking food
- Drying clothes

Numerous, disparate activities.

Emerging technology.



circa 1900
typically, one per household

Activity-Centric Convergence

Related tasks merge to best accomplish a focused goal.

Technology: Established technologies support goals.

Form: Products become specialized and varied.

Activity-Centric Convergence

Activity Theory

Focuses on the cognitive process of an individual situated in a social, cultural, historical, and artifactual world. – [Halverson]

Relationship hierarchy:

Activity: "Making Soup"

Task: "Set up stove," "light stove," "eat soup"

Actions: "Measure soup," "adjust stove," "pour soup"

Operations: "Screw on canister," "press ignition," "snap on lid"

Activity-Centric Convergence

Jetboil stove

Controlled heat provides:

- Cooking food



Optimized, specific activity.

Utilizes only required components.

Required technology must be established for activity centric-convergence

What about designers?

Both activity and device-centric products benefit users in different ways...

Research Method

Survey issued to find insight into convergence:

What are important and unimportant product traits?

Which traits relate to converged or focused products?

What correlates a converged product to activity or device-centric convergence?

Research Method

Traits

"Attractive" – Pleasing or appealing to the senses.

"Perceived quality" – The degree of excellence of something.

"Value" – The regard that something is held to deserve.

"Enjoy" – Take delight or pleasure in.

"Intuitive" – Using or based on what one feels to be true even without conscious reasoning.

"Convenient" – Fitting in well with a person's needs, activities, and plans.

"Useful" – Able to be used for a practical purpose or in several ways.

"Easy to use" – Absence of difficulty or effort.

"Would purchase" – Acquire (something) by paying for it; buy.

9 different product traits
Ranging from emotional to functional

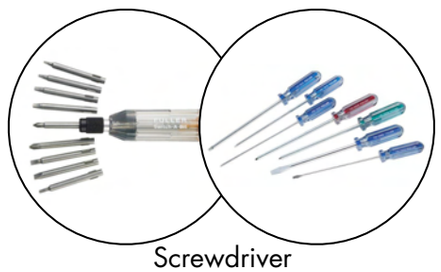
Research Method

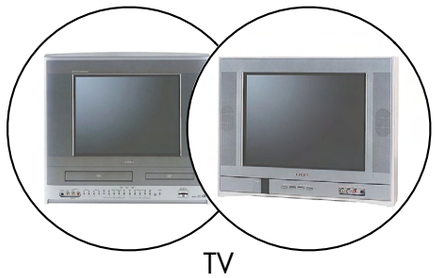
Products


Toaster


Radio


Hammer


Screwdriver


TV


Watch


Printer


Coffee


Phone


Knife

10 overall product categories.
Categories picked from same brand & similar color.
Some groupings, Kitchen, Entertainment, Tools, and Personal items.

Research Method

bake ← Name the primary function of this item → toast

no — Have you ever owned this item or one very similar? — yes





Attractive ☐ ☐ ☐ ☐ ☑

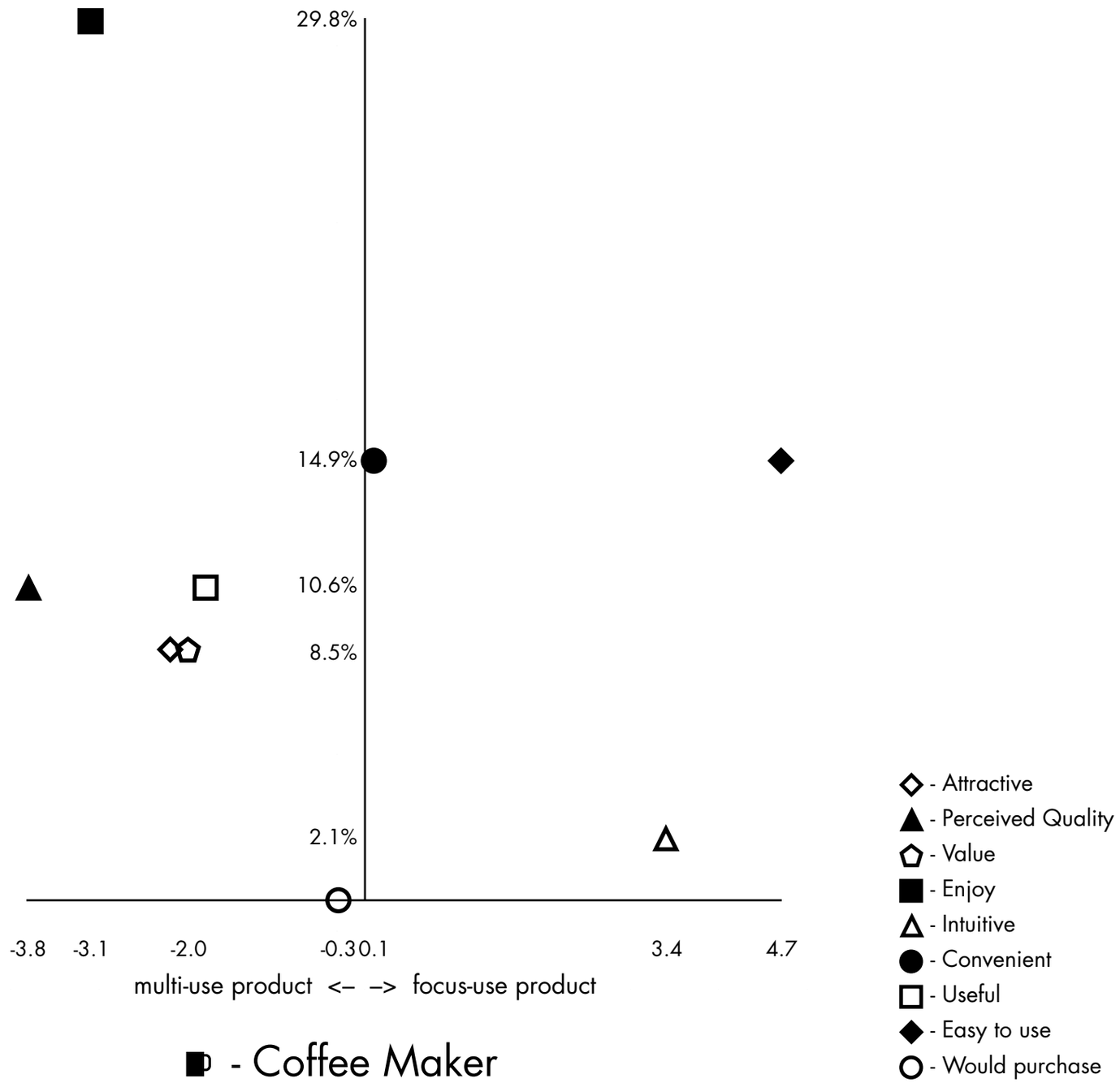
Perceived Quality ☐ ☐ ☑ ☐ ☐

Value ☐ ☑ ☐ ☐ ☐

Enjoy ☐ ☐ ☐ ☑ ☐

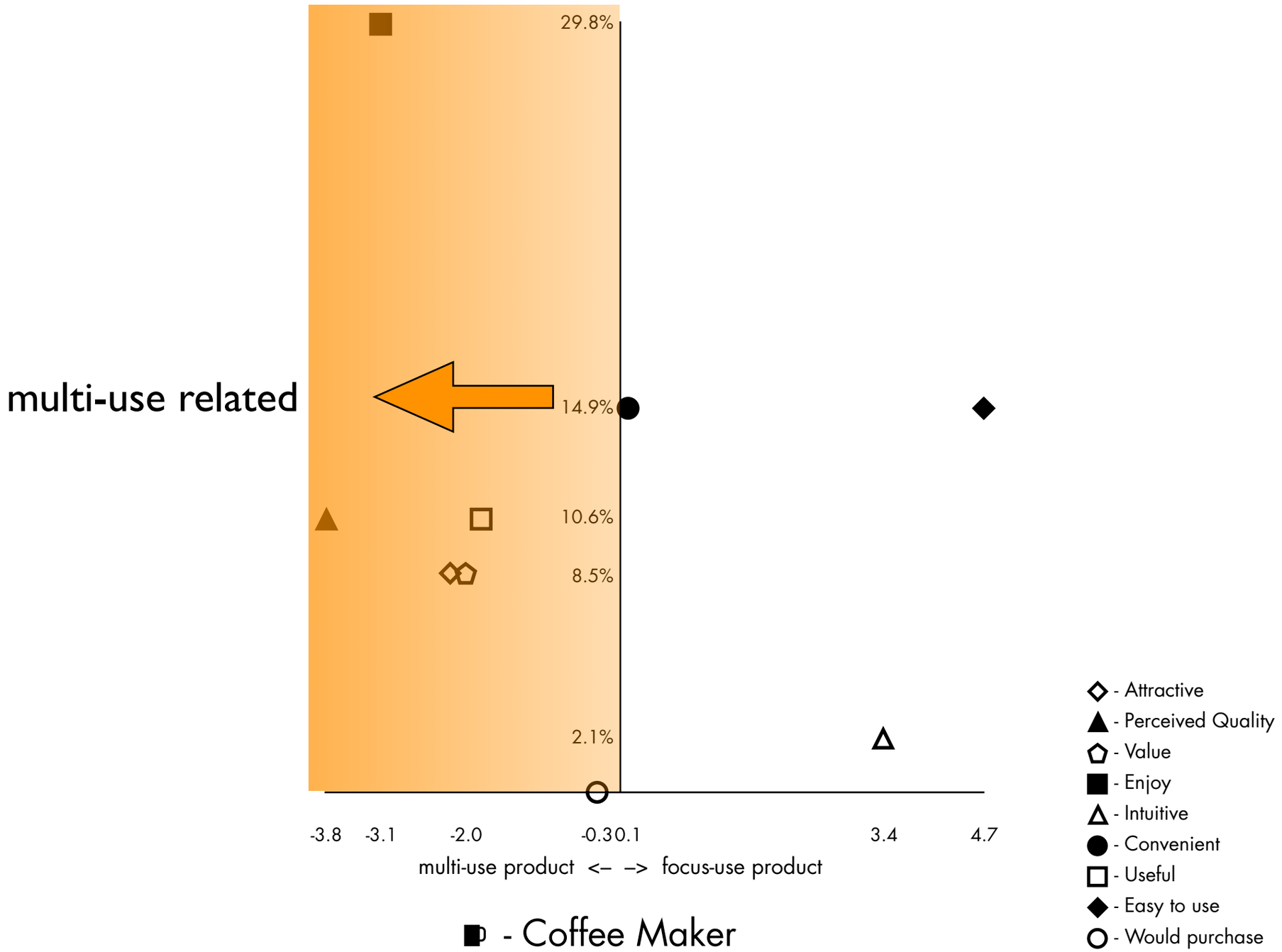
Intuitive ☐ ☐ ☐ ☐ ☑

Research Method



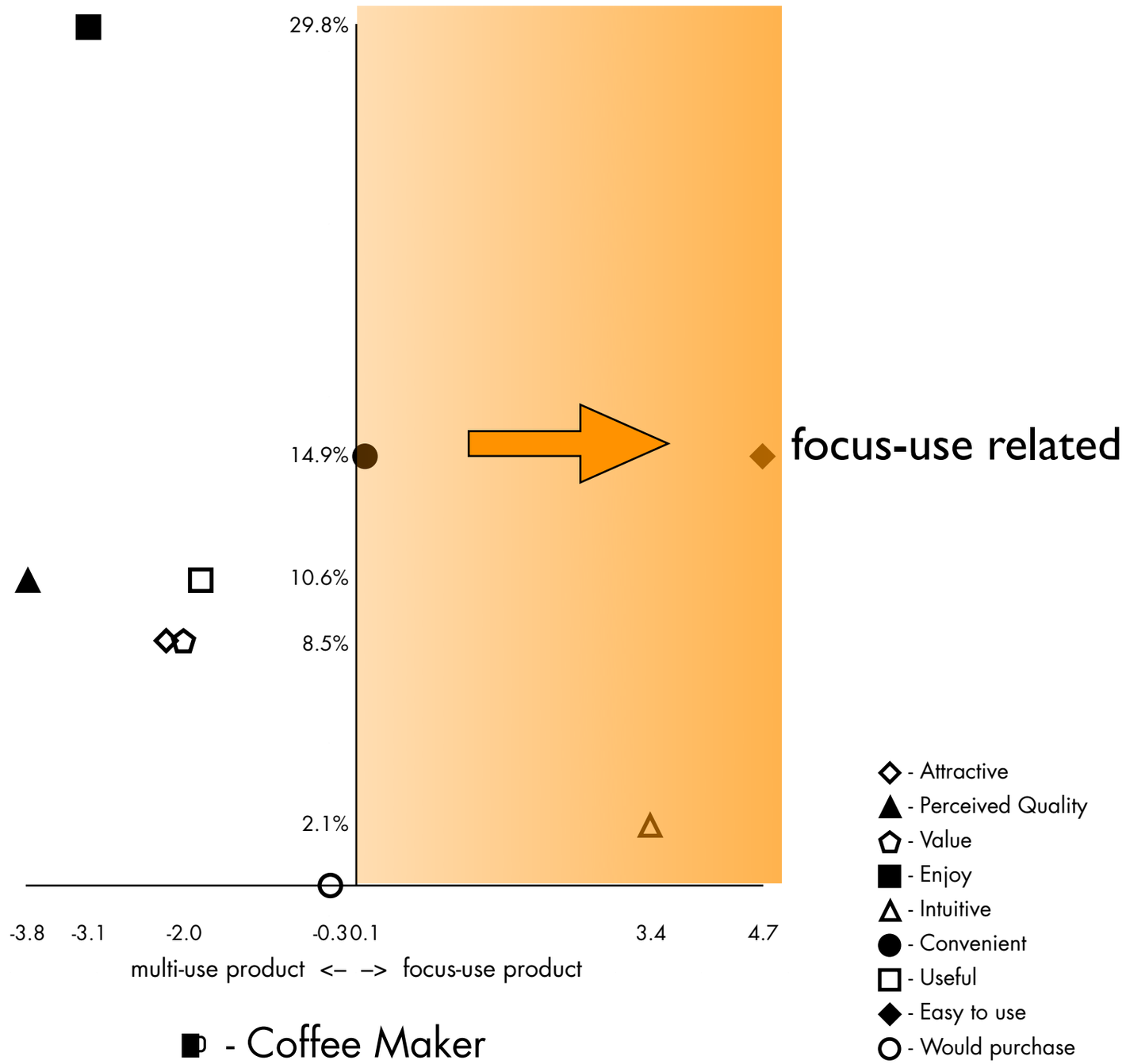
Product graph for “Coffee Maker”
Displays traits scattered across a product category

Research Method



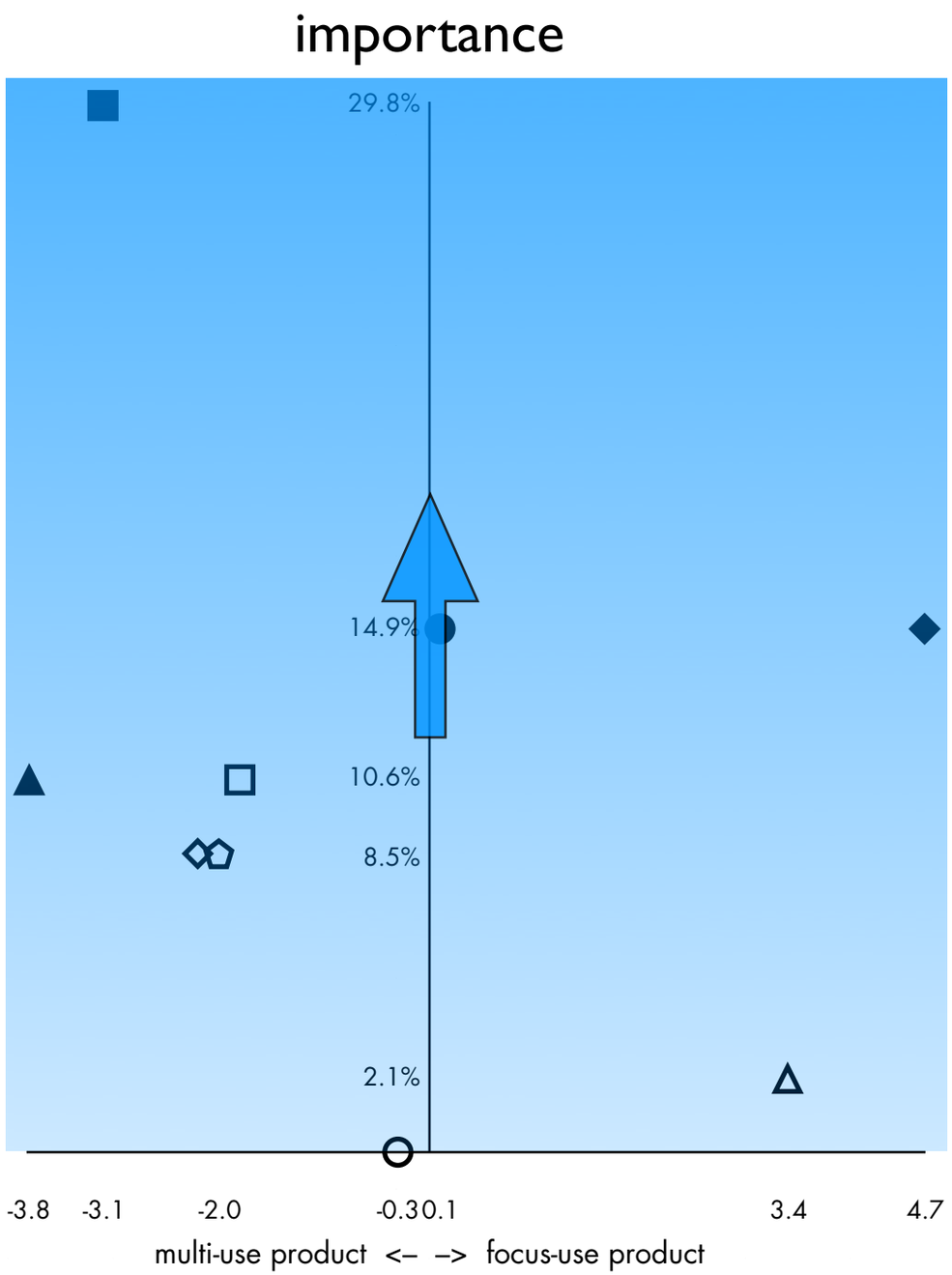
Further left relates to multi-use version of the product.

Research Method



Further right relates to the focus-use product version.

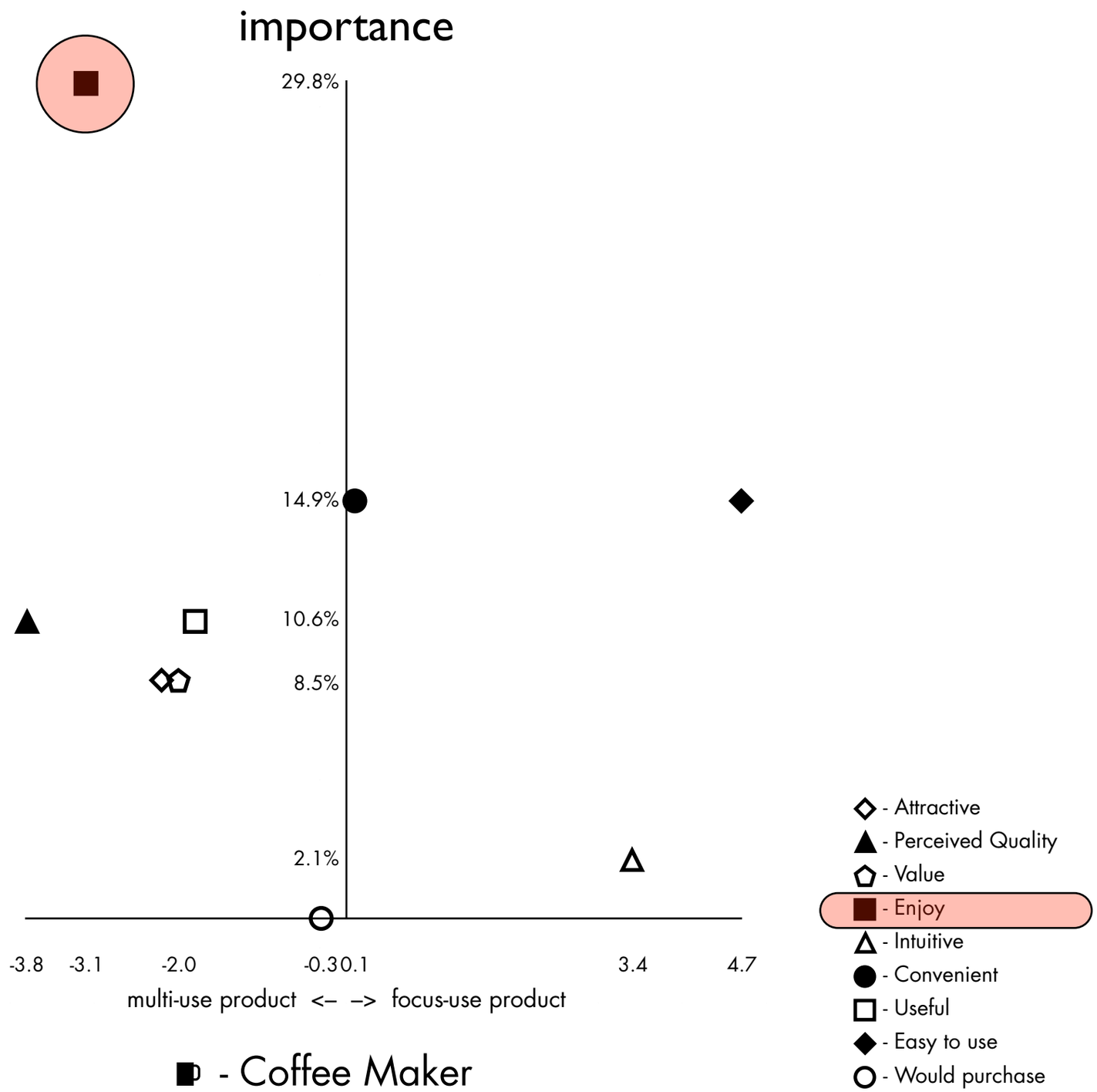
Research Method



- Attractive
- Perceived Quality
- Value
- Enjoy
- Intuitive
- Convenient
- Useful
- Easy to use
- Would purchase

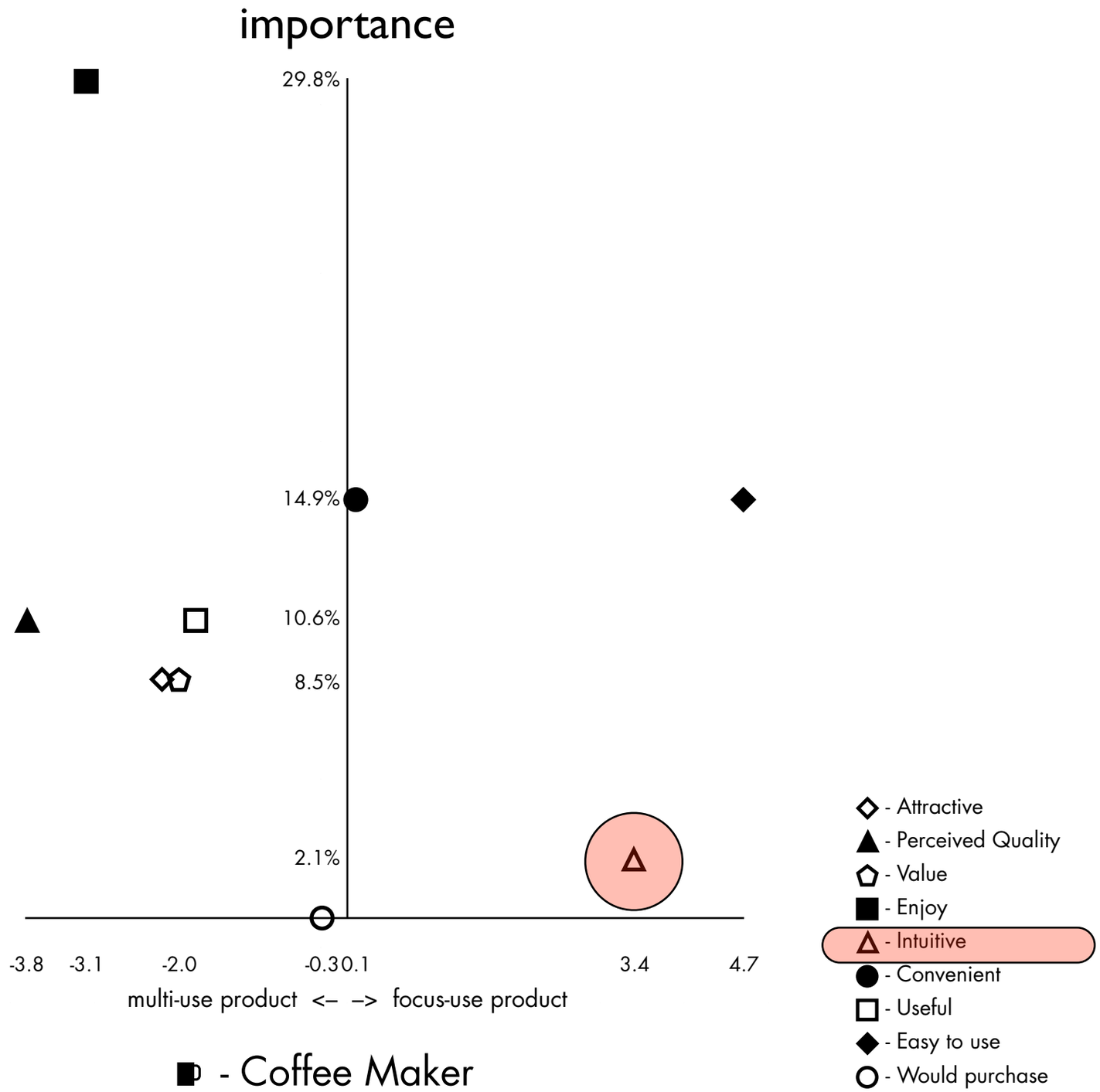
Higher on the y-axis indicates greater importance to respondents.

Research Method



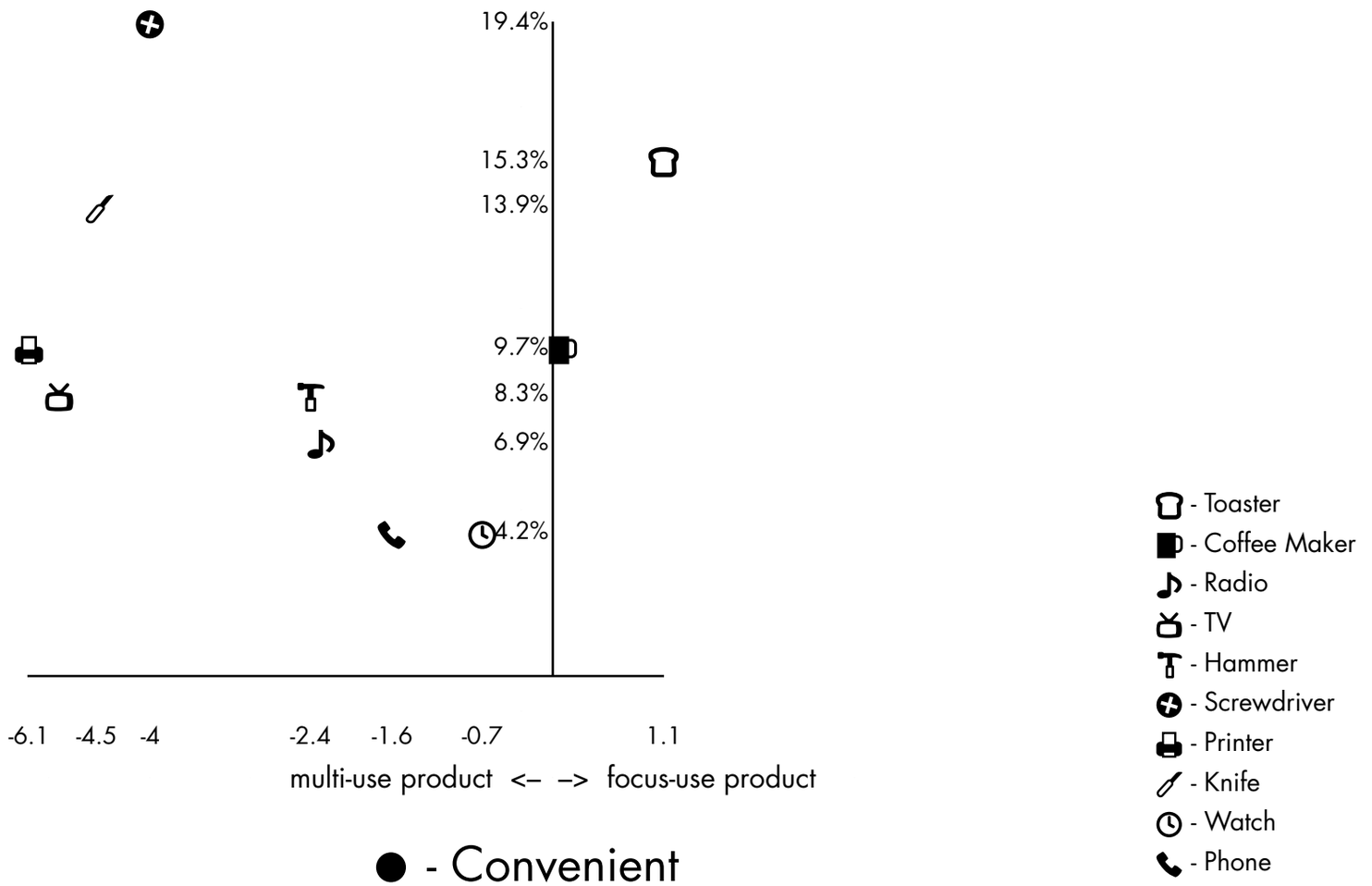
Enjoy is of high importance and related to multi-use Coffee Maker

Research Method



Intuitive is of low importance and related to focus-use Coffee Maker

Research Method



Reverse graphs show products spread across traits.

Convergence Continuation

Emerging Technologies

Growing Technologies

Mature Technologies

What follows is the findings of this research in the form of a continuation.
Across the life-span of a technology.

Emerging Technologies

Primarily device-centric convergence.

Technology: Transitioning from labs or industry.

Form: Highly dependent or indicative or technology.

Users: Uncertain of technology's ideal usage.

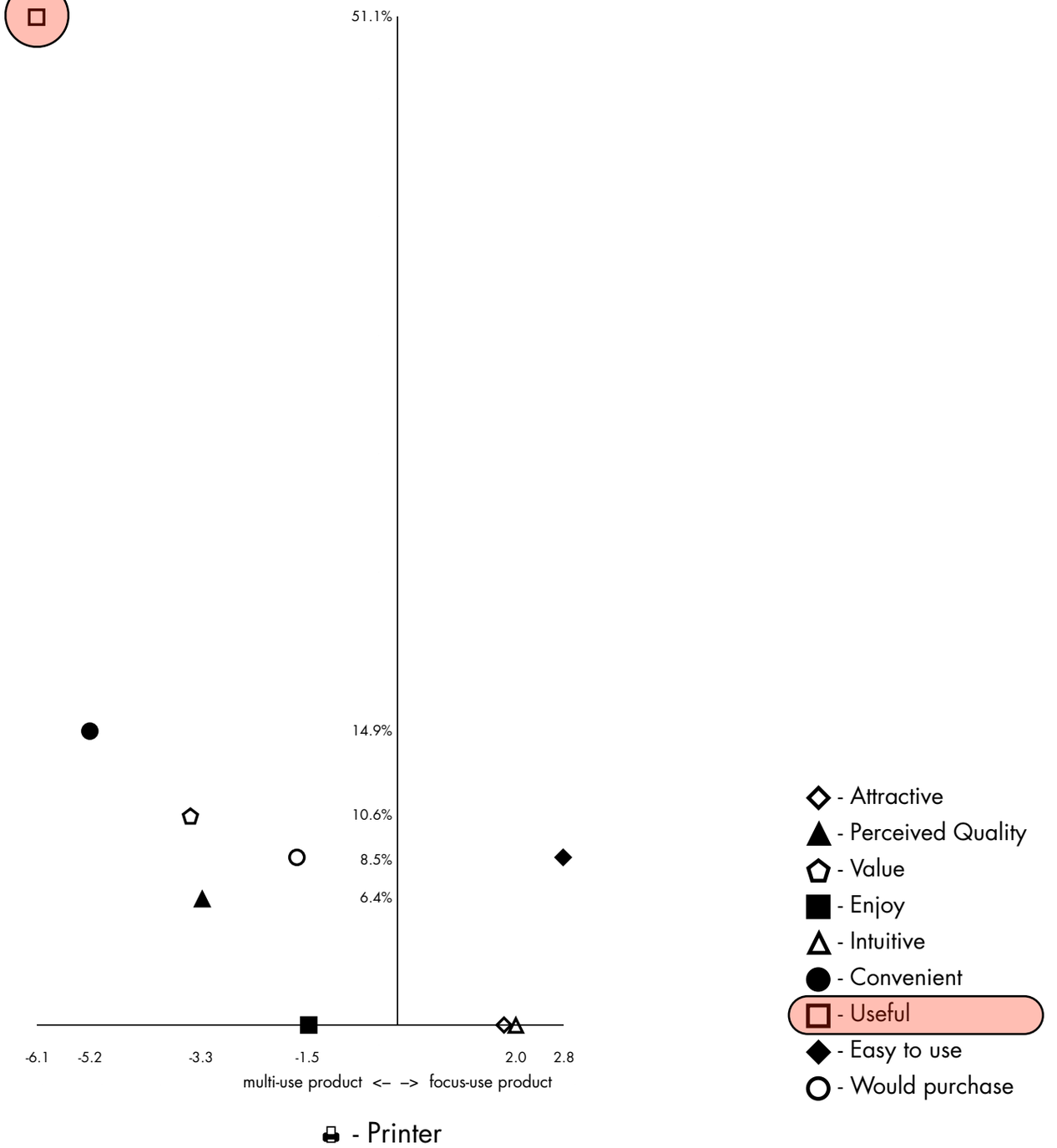
Designers don't fully understand potential of technology.
Users don't fully understand full benefit.

Emerging Technologies



Printer

- "Useful" vastly most important

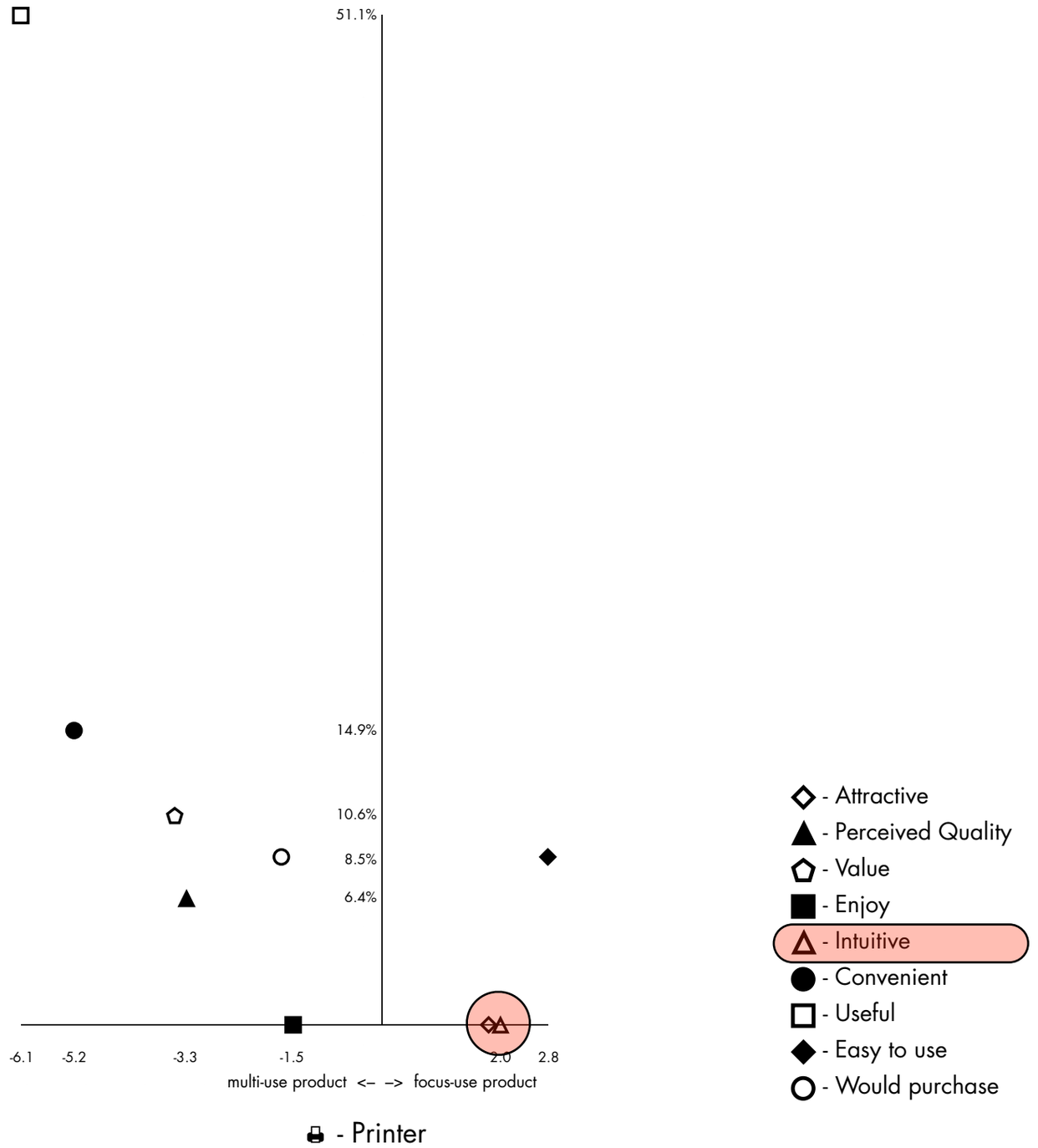


Emerging Technologies



Printer

- "Useful" vastly most important
- "Intuitive" is not important

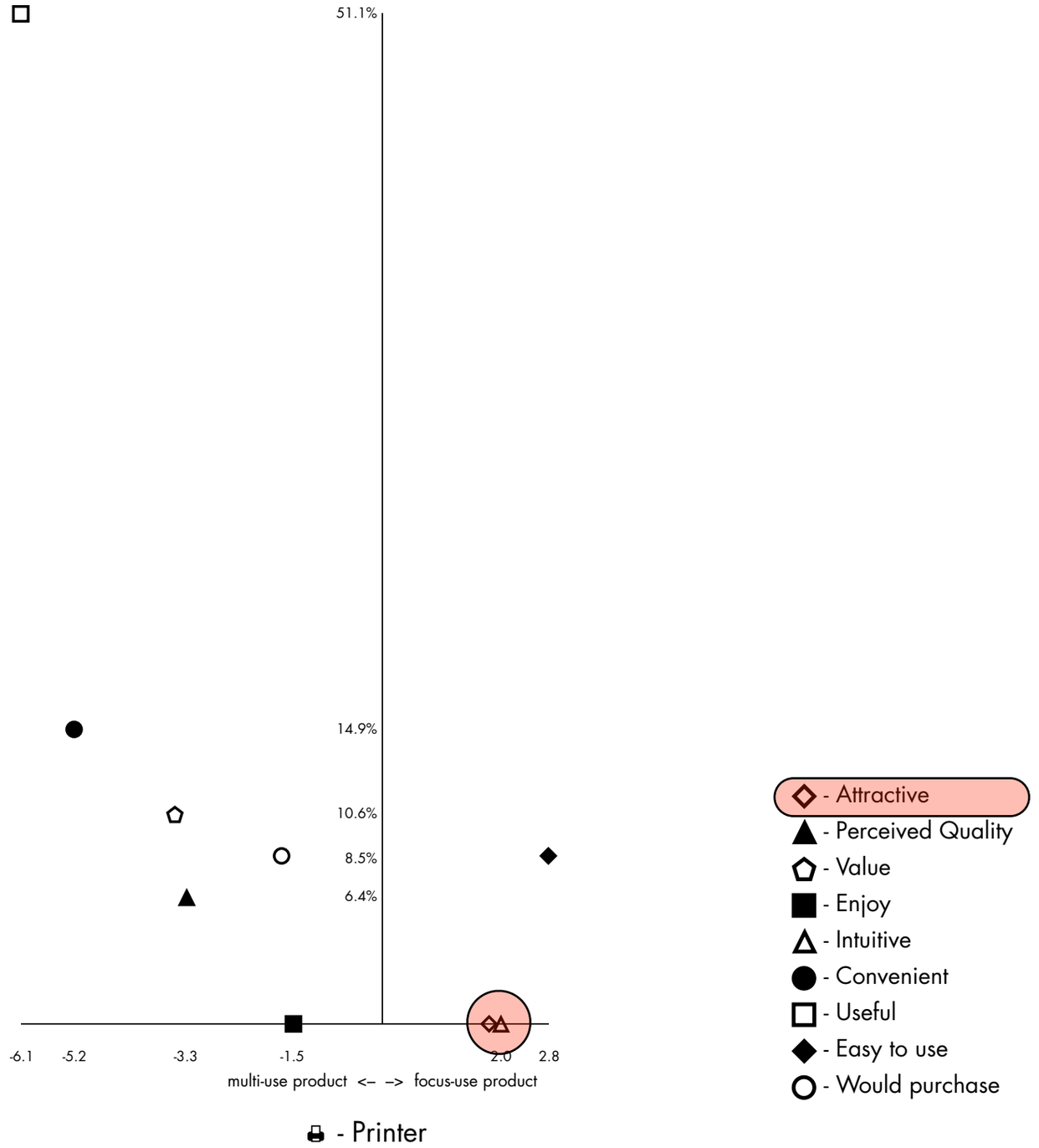


Emerging Technologies



Printer

- "Useful" vastly most important
- "Intuitive" is not important
- "Attractive" is not important

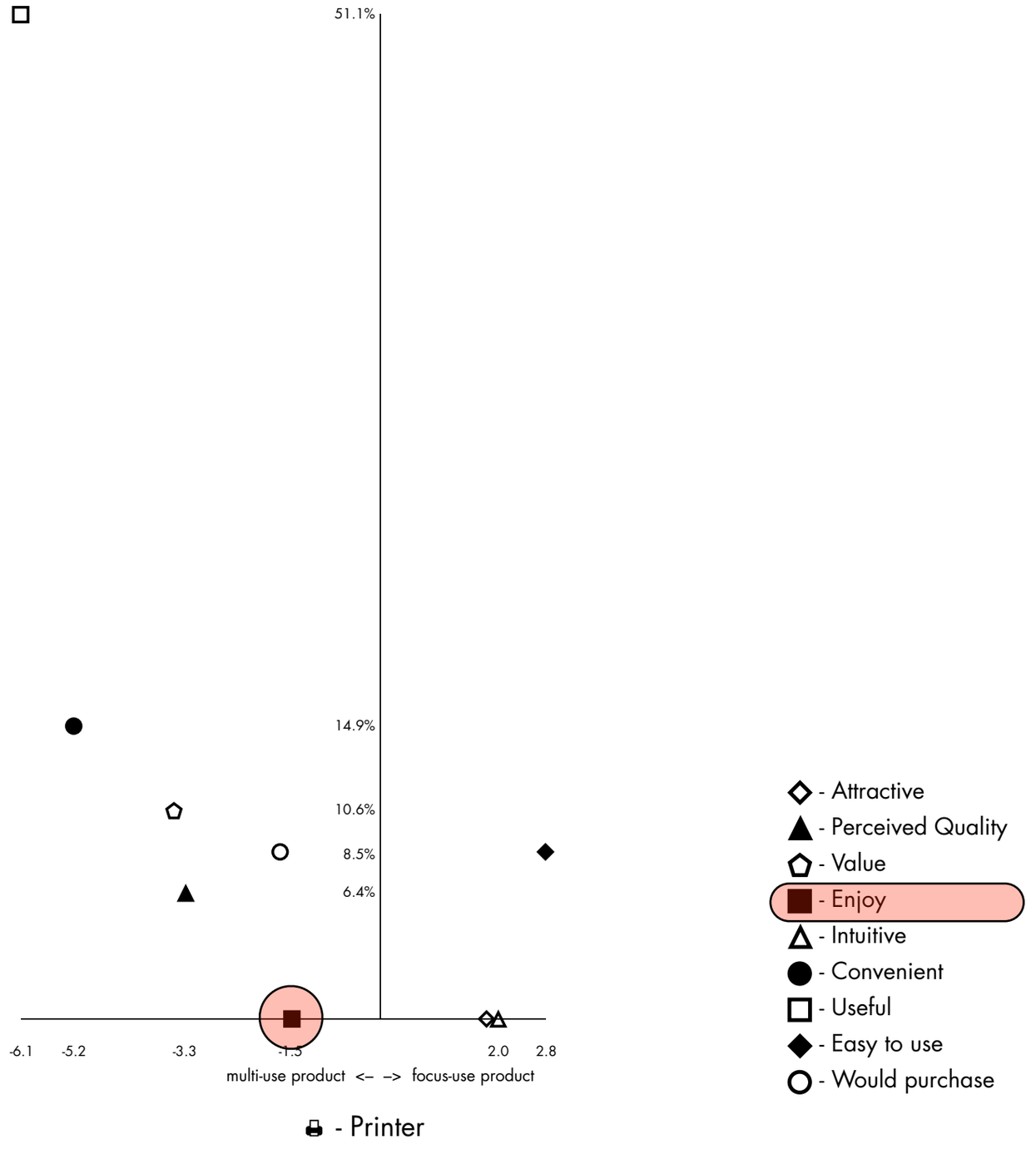


Emerging Technologies



Printer

- "Useful" vastly most important
- "Intuitive" is not important
- "Attractive" is not important
- "Enjoy" is not important

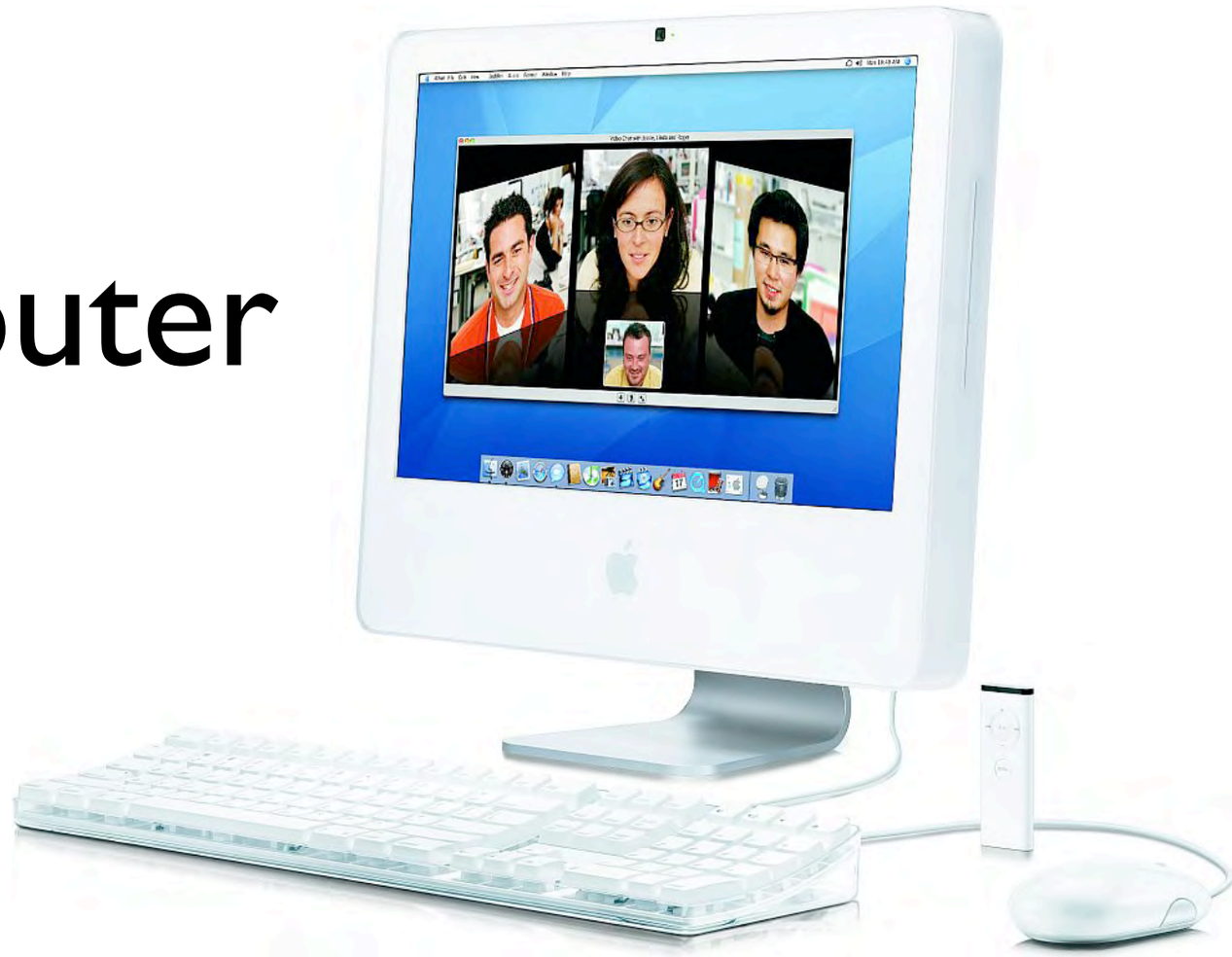


Traits outline a tool with little emotional connection.

Emerging Technologies

Personal Computer

- Converges numerous functions.
- Provides flexible use.
- Not ideal for single task.
- Fulfills basic needs:
  - Functionality
  - Reliability



Emerging Technologies

Designers need to:

- Leverage supporting technology.
- Converge potential functions toward device.
- Anticipate and allow tangent product uses.

Device-Centric Convergence!

Growing Technologies

Transition from device-centric to activity-centric convergence.

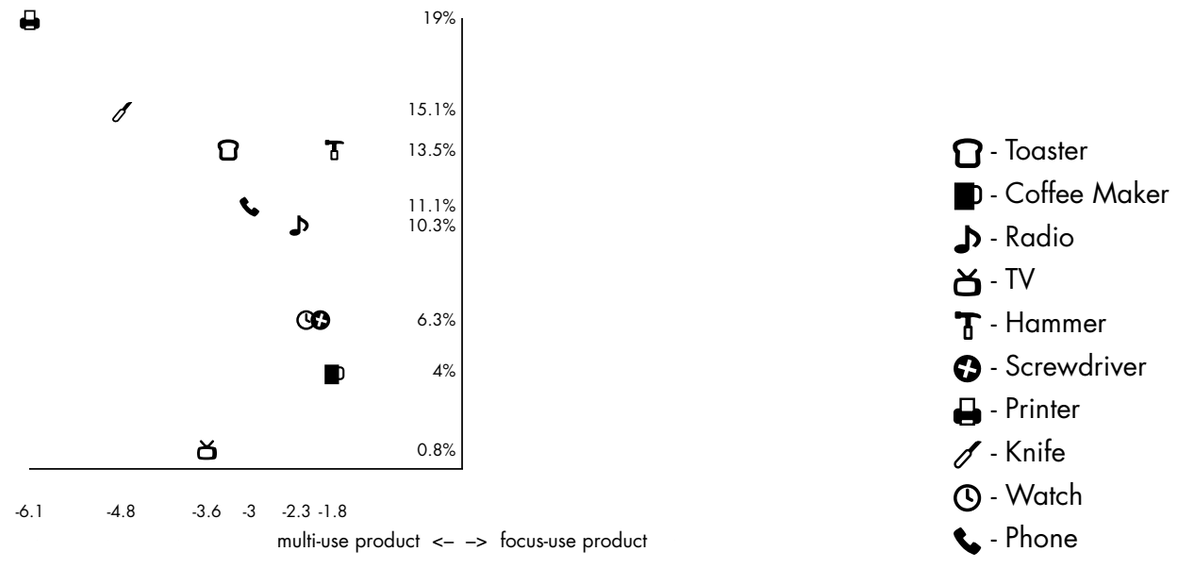
Technology: Becoming more efficient and abundant.
Form: Balancing flexibility against usability.
Users: Discovering ideal uses of new technology products.

Engineering and manufacturing are streamlining.
Designers can study and learn technology's impact on users.

Growing Technologies

Useful

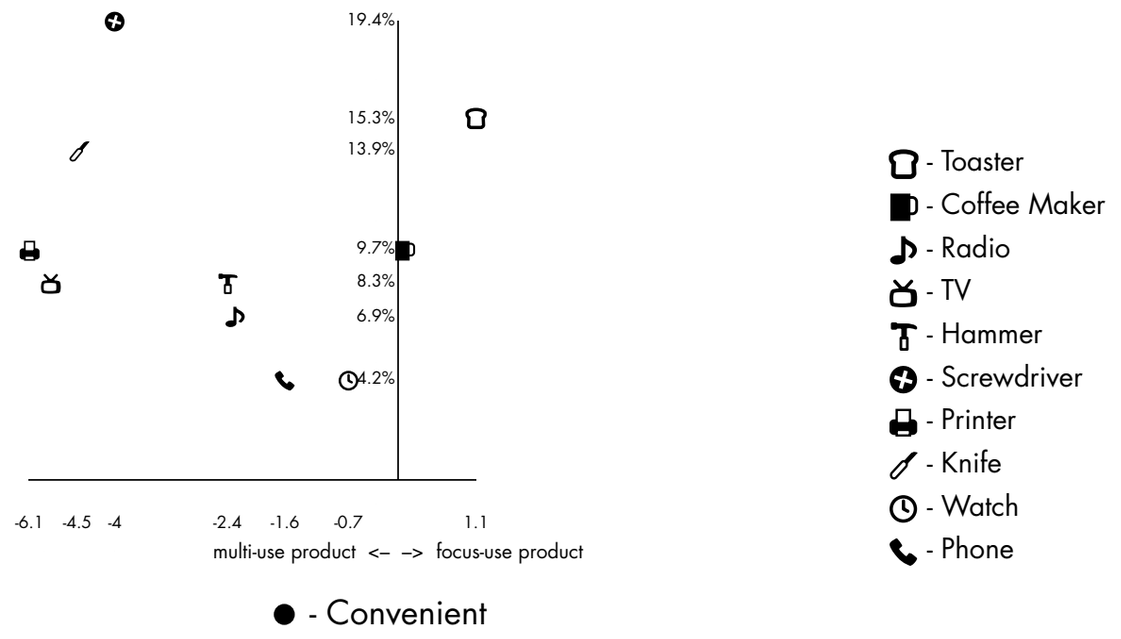
- Related to multi-use products.



Growing Technologies

Convenient

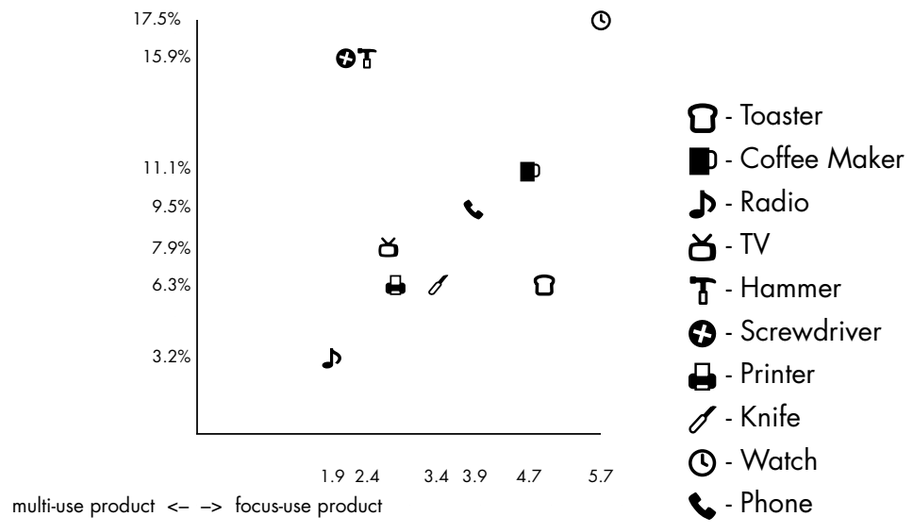
- Related to multi-use products.



Growing Technologies

Easy to use

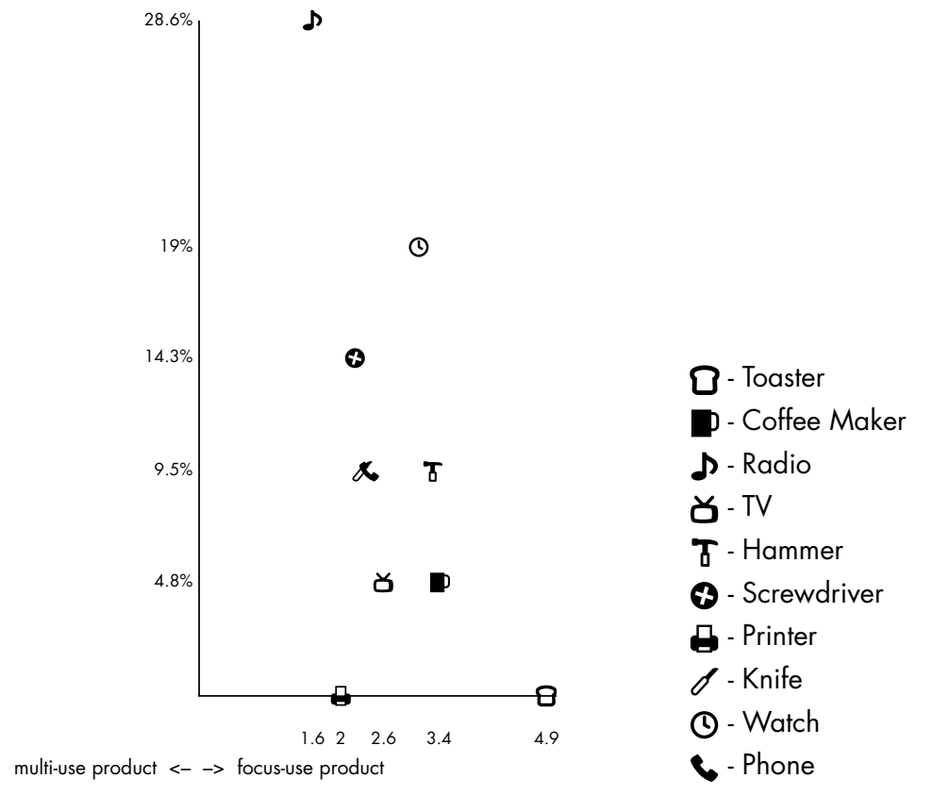
- Related to focus-use products.



Growing Technologies

Intuitive

- Related to focus-use products.

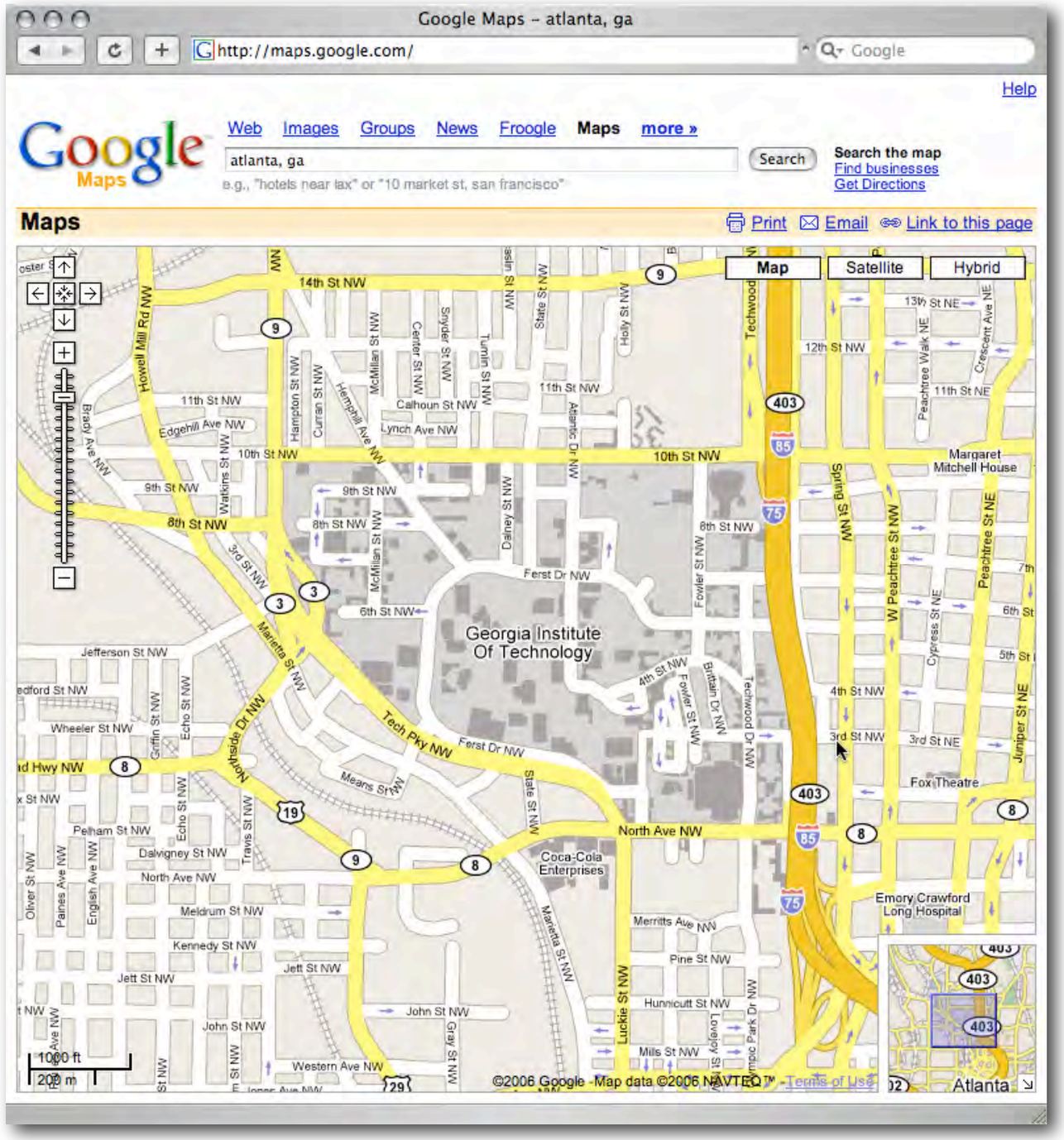


Δ - Intuitive

Growing Technologies

Web 2.0

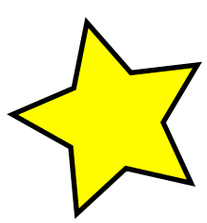
- Clearer benefit of use.
- Appealing to a wider audience.
- Functions more naturally.
- Lower needs addressed:
  - Functionality
  - Reliability
- Newly fulfilled needs:
  - Usability



Less a technology product and more human-oriented!

Growing Technologies

Designers need to:



Research user adoption of emerging technologies.

Target particular activities to benefit from technology.

Emphasize intuitiveness and ease of use.

Transition from device-centric to activity-centric convergence!

This was brief and complex category, but I feel design can have a huge impact in this area.

Mature Technologies

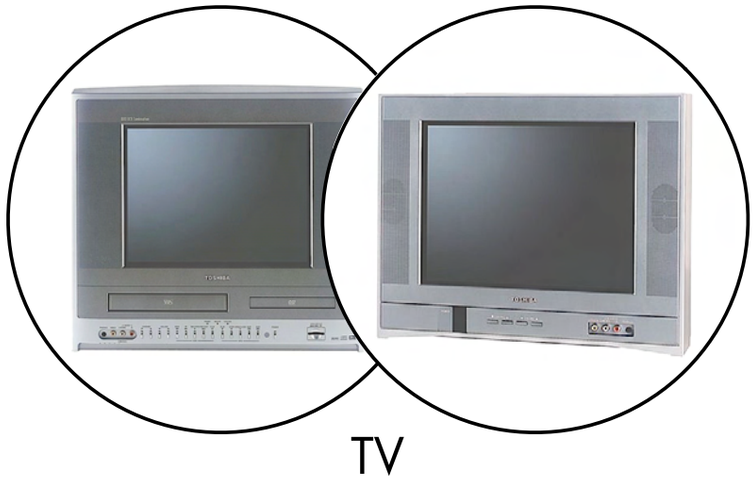
Primarily activity-centric convergence.

Technology: Established and linking to content and distribution.

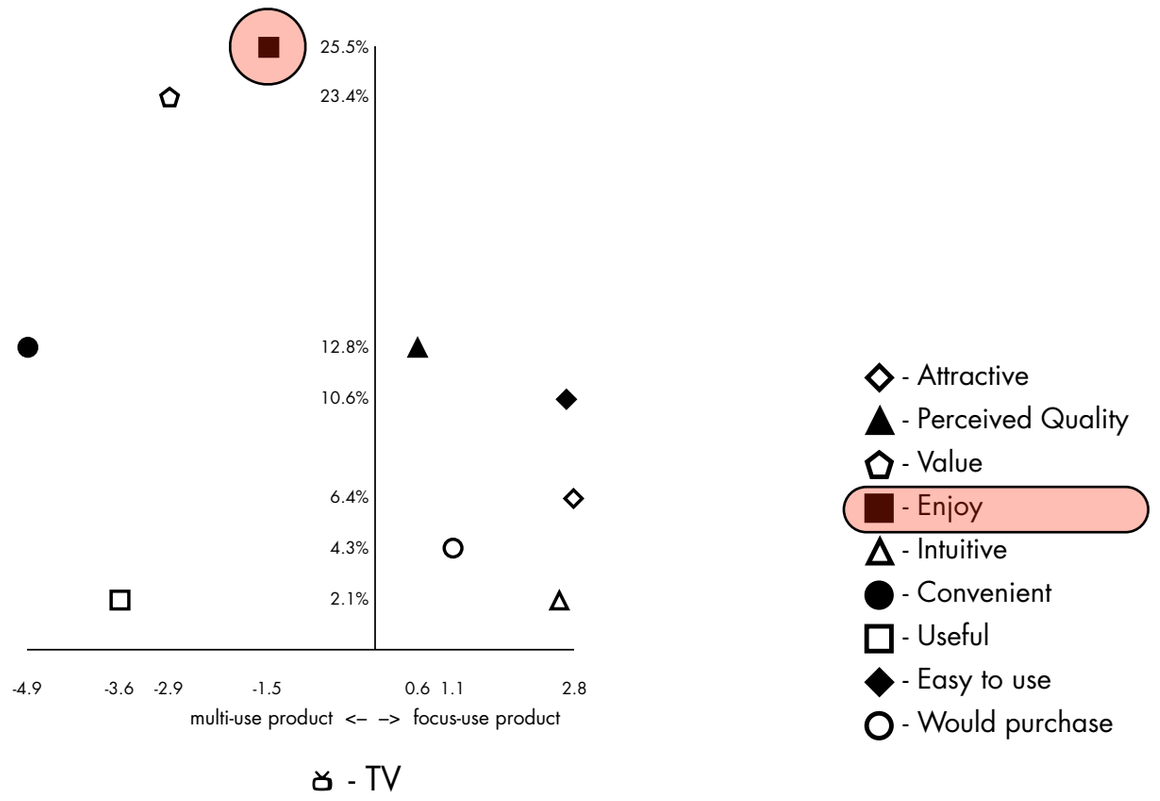
Form: Increased usability and drawing emotional connections.

Users: Looking for the best product experience.

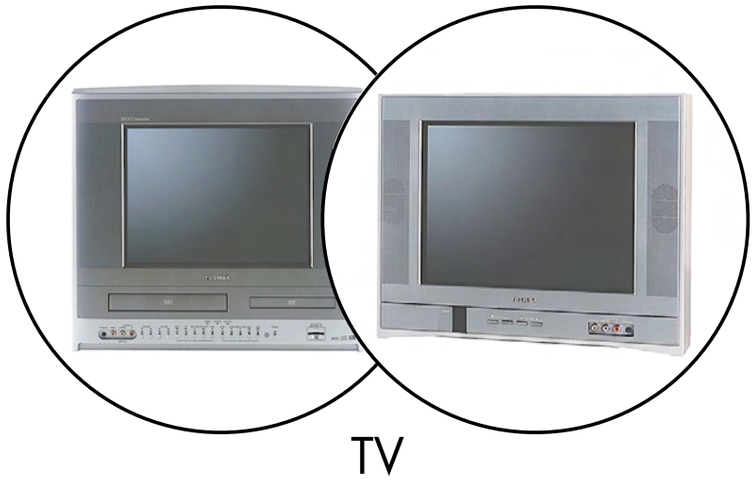
Mature Technologies



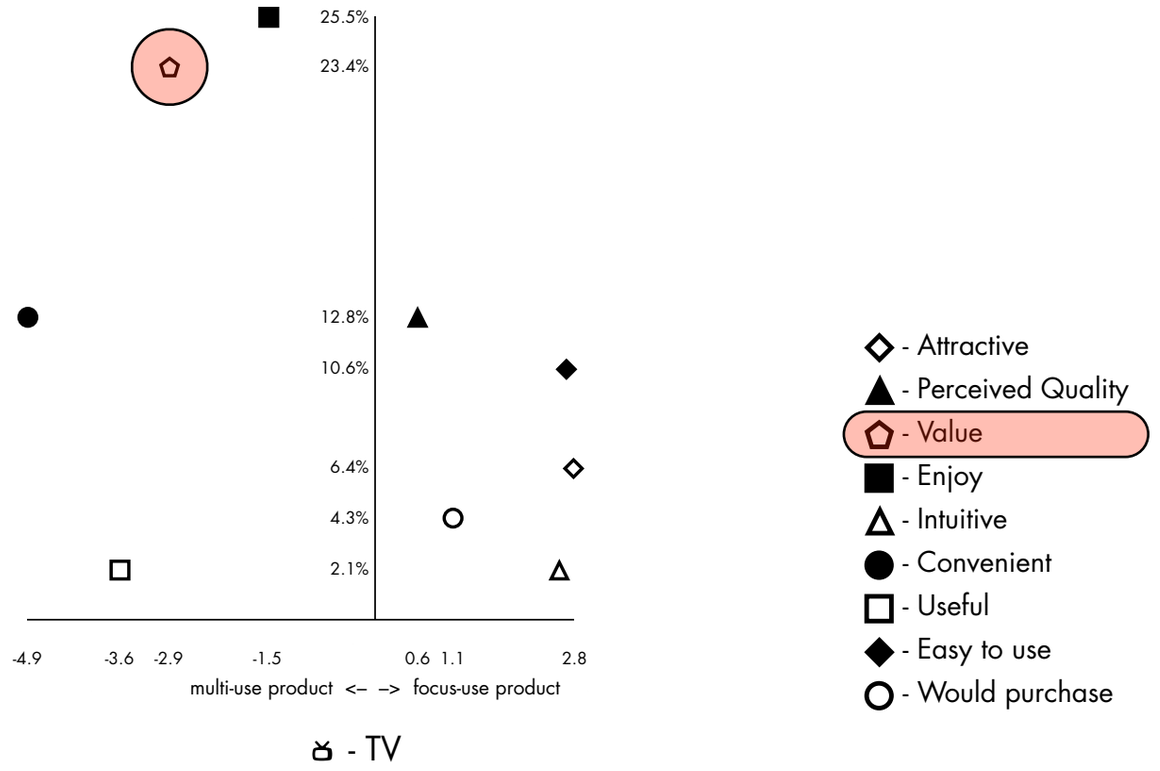
- "Enjoy" is most important



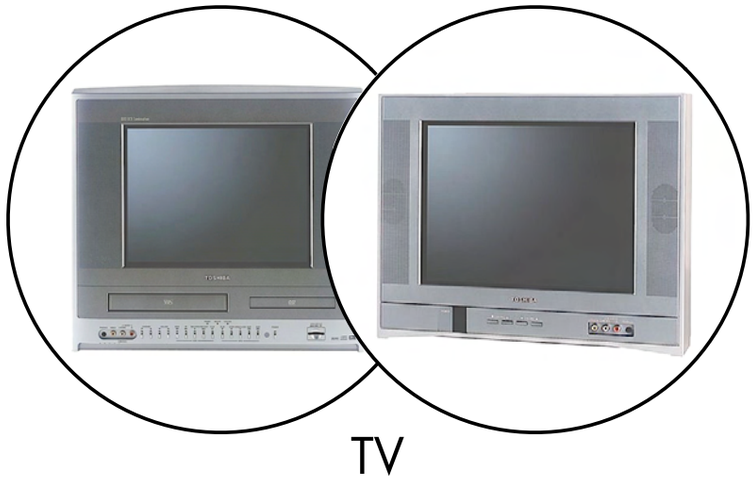
Mature Technologies



- "Enjoy" is most important
- "Value" is also important

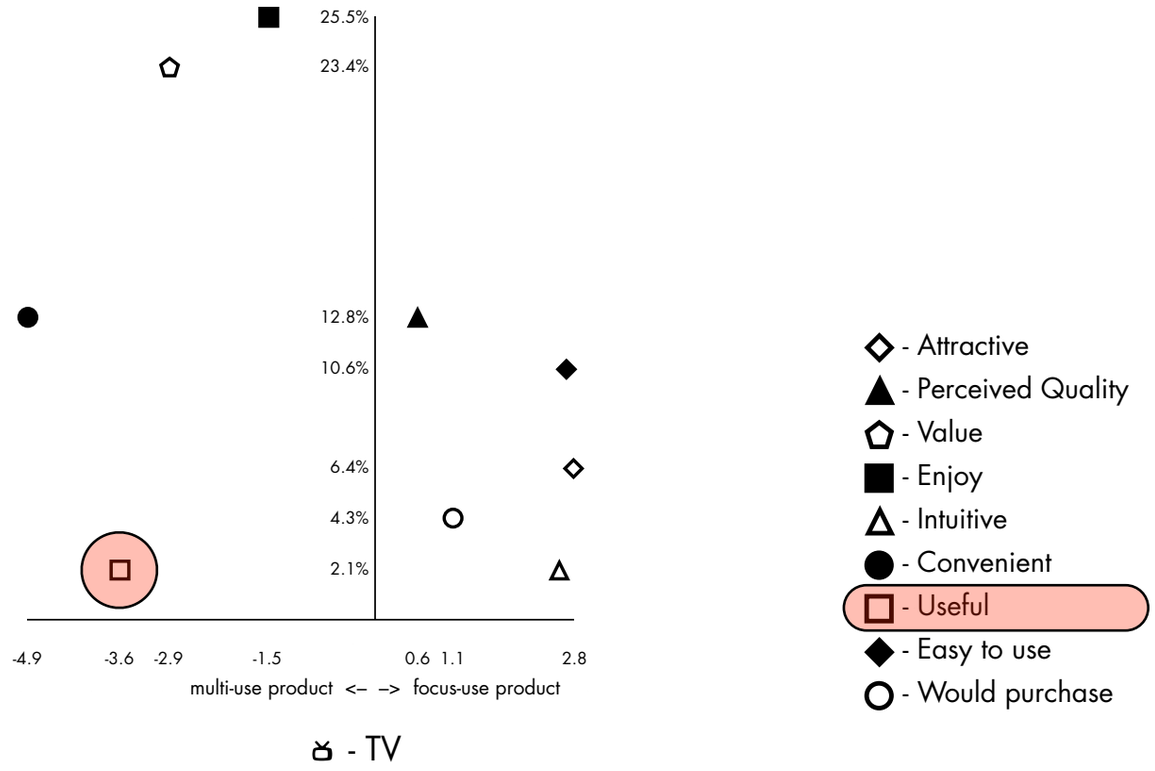


Mature Technologies

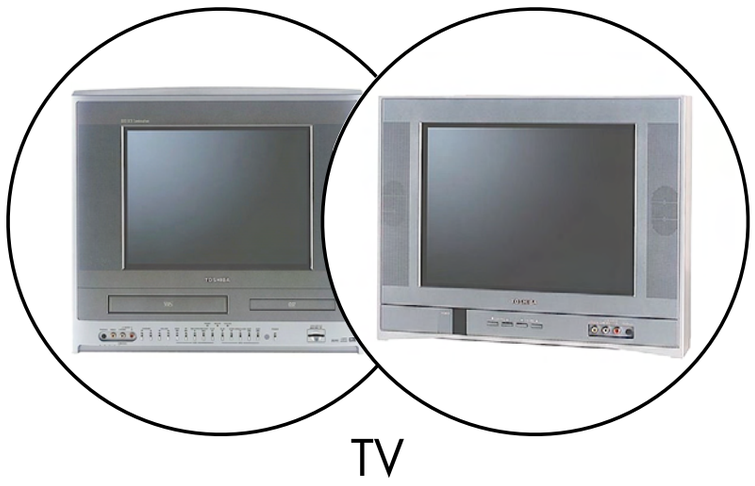


TV

- "Enjoy" is most important
- "Value" is also important
- "Useful" is unimportant

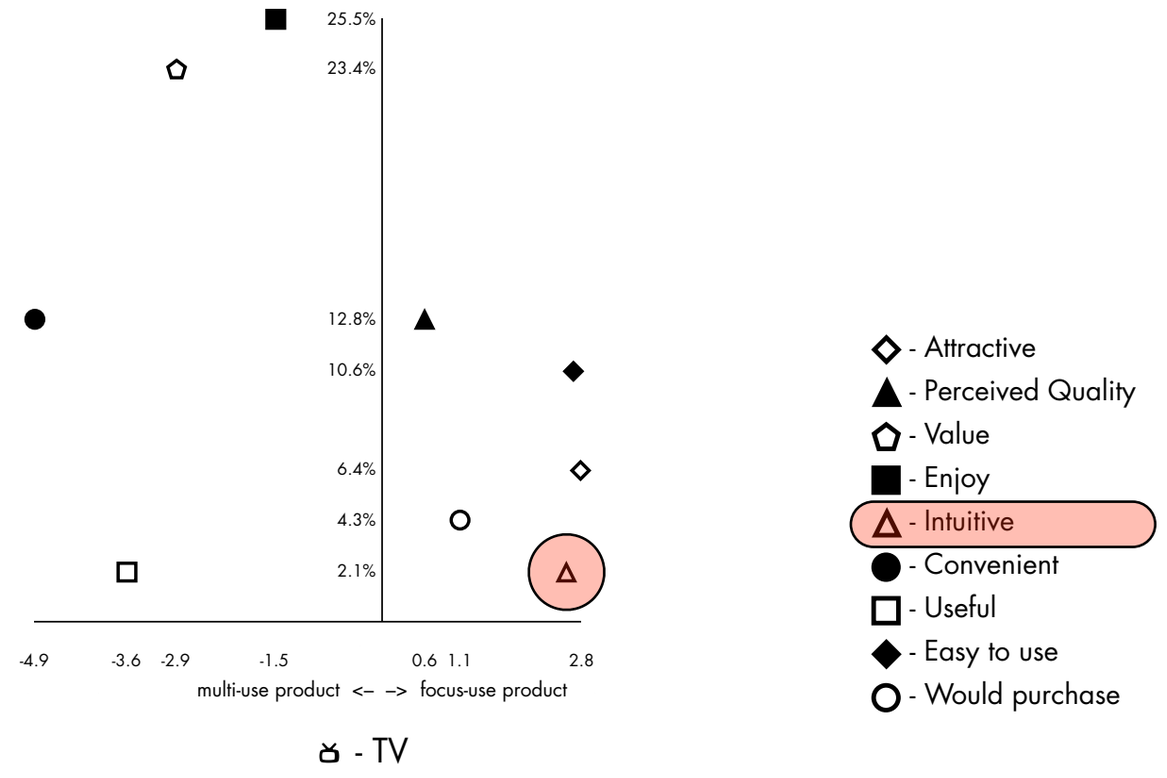


Mature Technologies



TV

- "Enjoy" is most important
- "Value" is also important
- "Useful" is unimportant
- "Intuitive" is unimportant



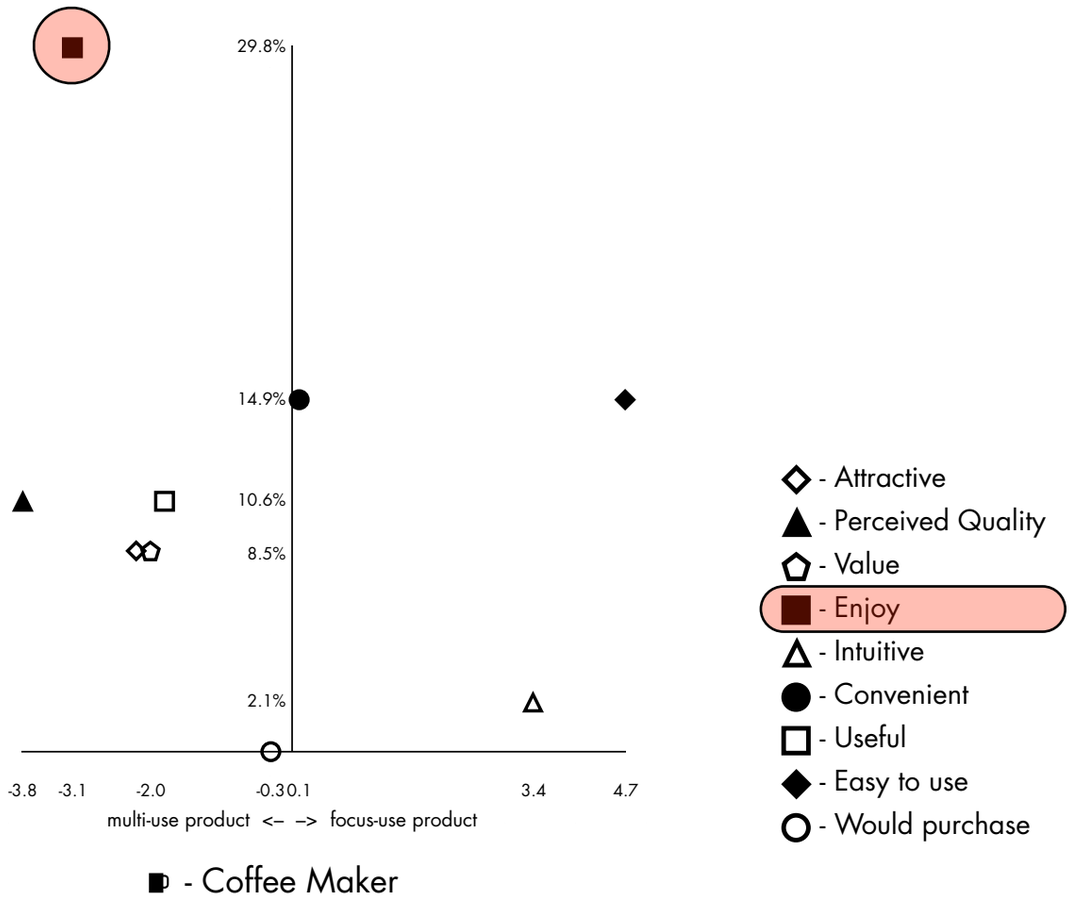
The important traits are more emotional.
Utility and usability are not important and taken for granted.

Mature Technologies



Coffee

- "Enjoy" is most important

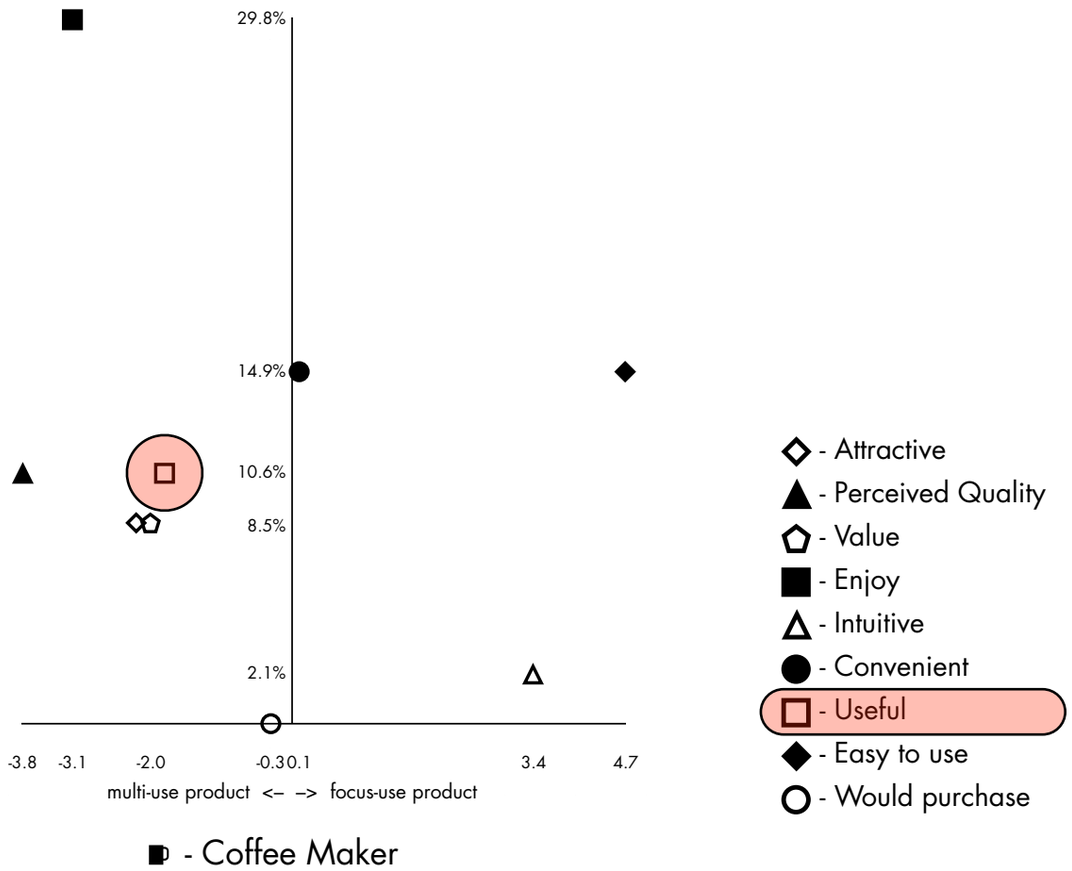


Mature Technologies



Coffee

- "Enjoy" is most important
- "Useful" is less important

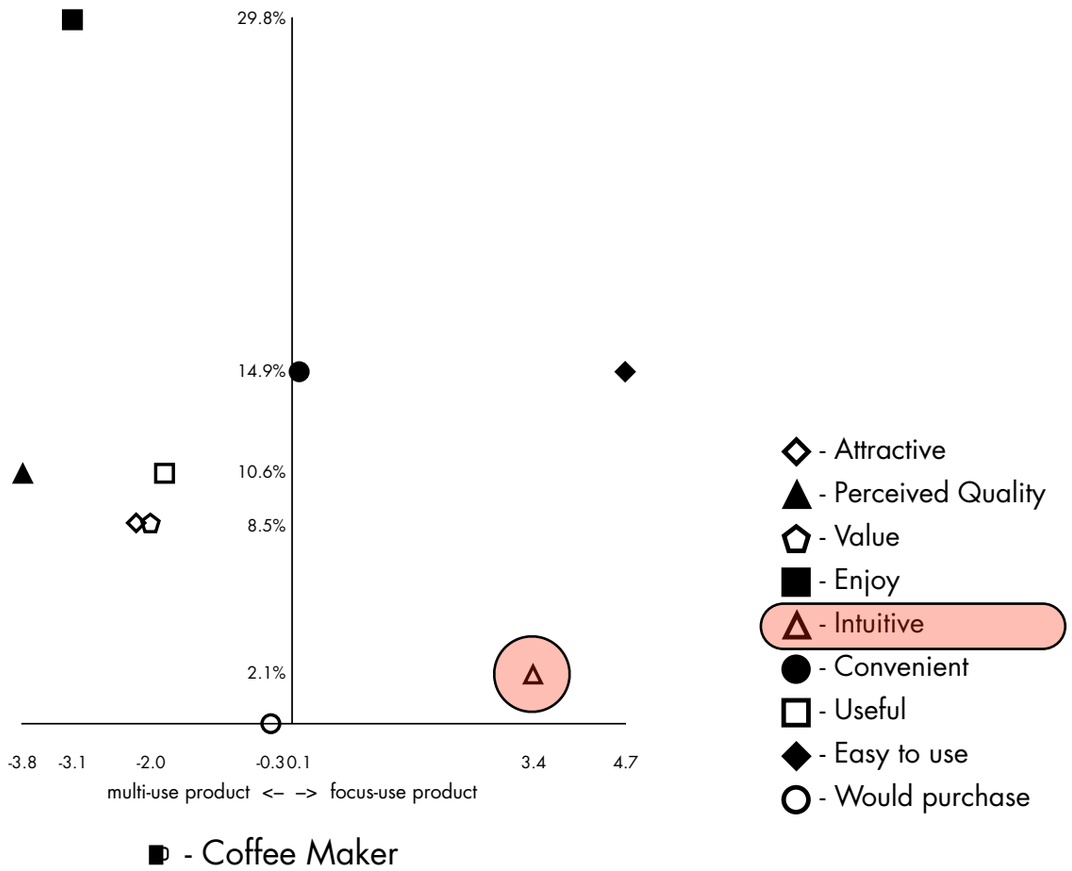


Mature Technologies



Coffee

- "Enjoy" is most important
- "Useful" is less important
- "Intuitive" is not important



Again, emotional traits are important.

Mature Technologies

Philips Senseo

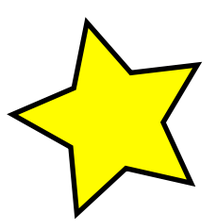
- Water, filter, & coffee integration.
- Minimized interaction points.
- Lower needs addressed:
  - Functionality
  - Reliability
  - Usability
- Appeals to higher emotional needs:
  - Quality
  - Enjoyment



Lower needs are established and stable.
Supporting technologies are also established and stable.

Mature Technologies

Designers need to:



Address higher level needs of quality and enjoyment.

Better integrate content, distribution, and platform.

Converge or create technologies toward a human activity.

Activity-Centric Convergence!

Designer must consider more issues!

Activity Theory: an individual situated in a social, cultural, historical, and artifactual world.

Personal Technologies

Show a different emphasis than products in a person's environment.

- Convenience of device-centric convergence.
- Attractiveness of body-objects.
- Enjoyment and usefulness of personal electronics.

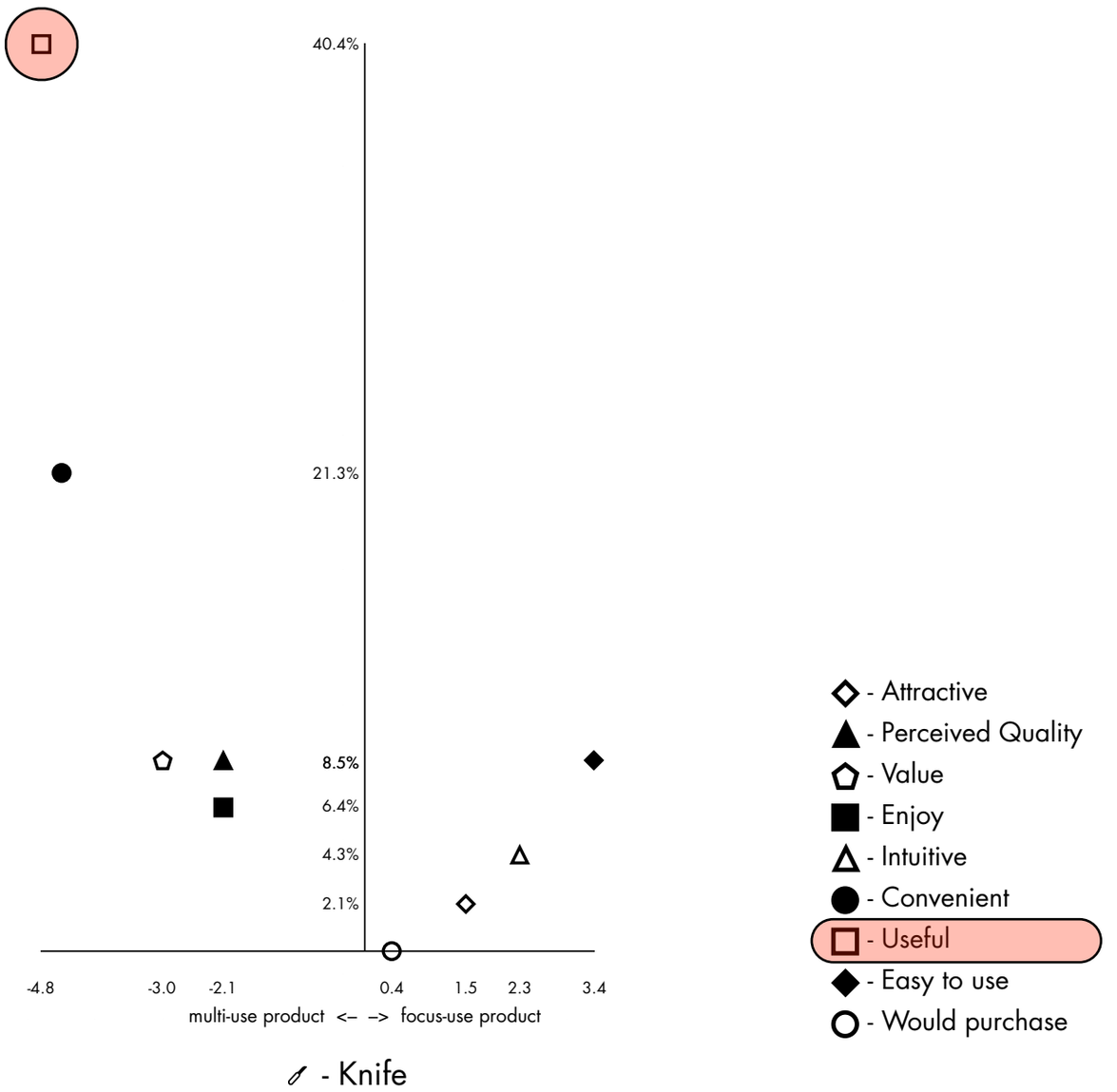
Super-cedes disparate functionality
Beauty and attractiveness of fashion
Enjoyment and usefulness through entertainment and communication

Personal Technologies



Knife

- "Useful" is most important

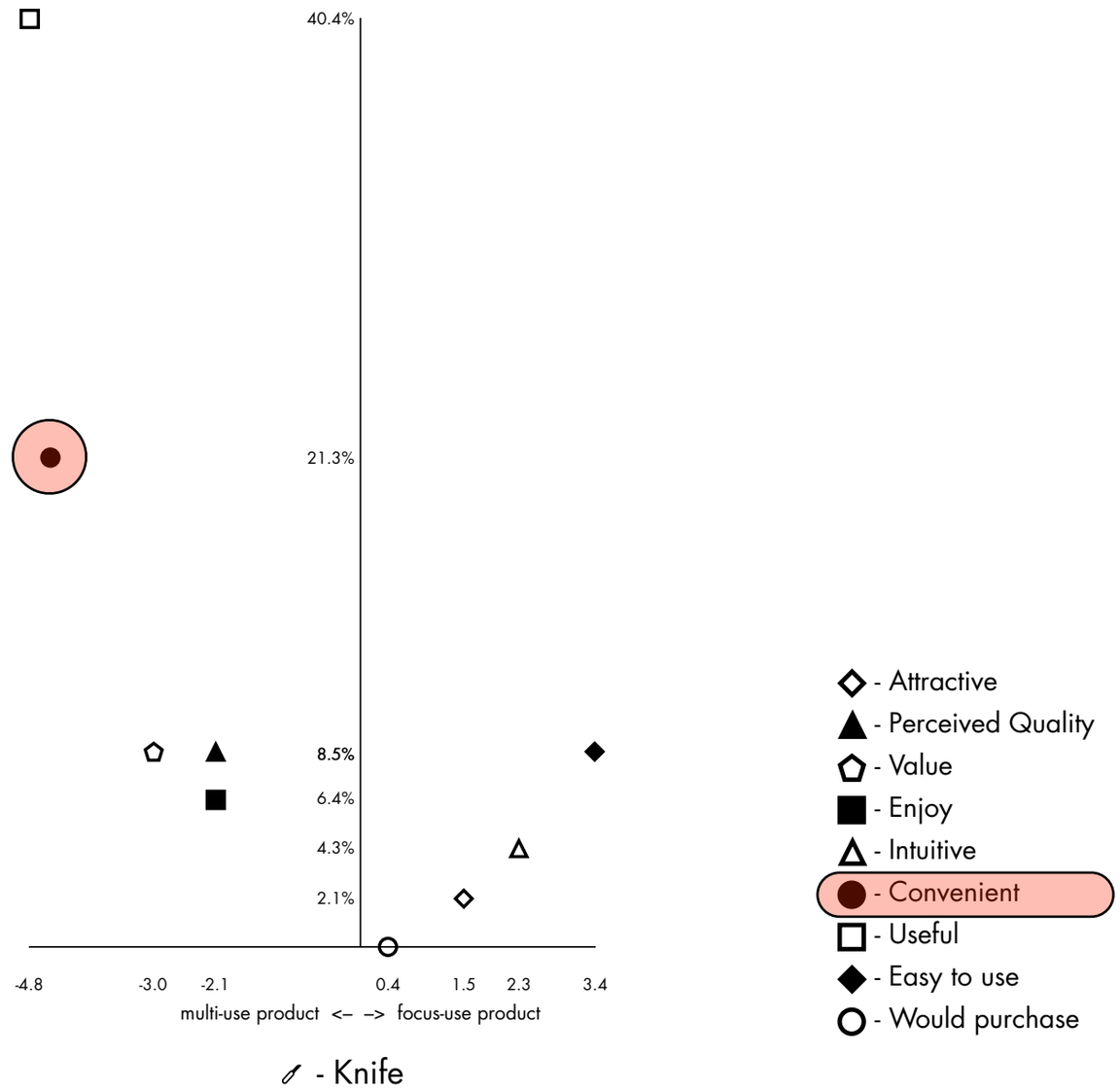


Personal Technologies



Knife

- "Useful" is most important
- "Convenient" is also important

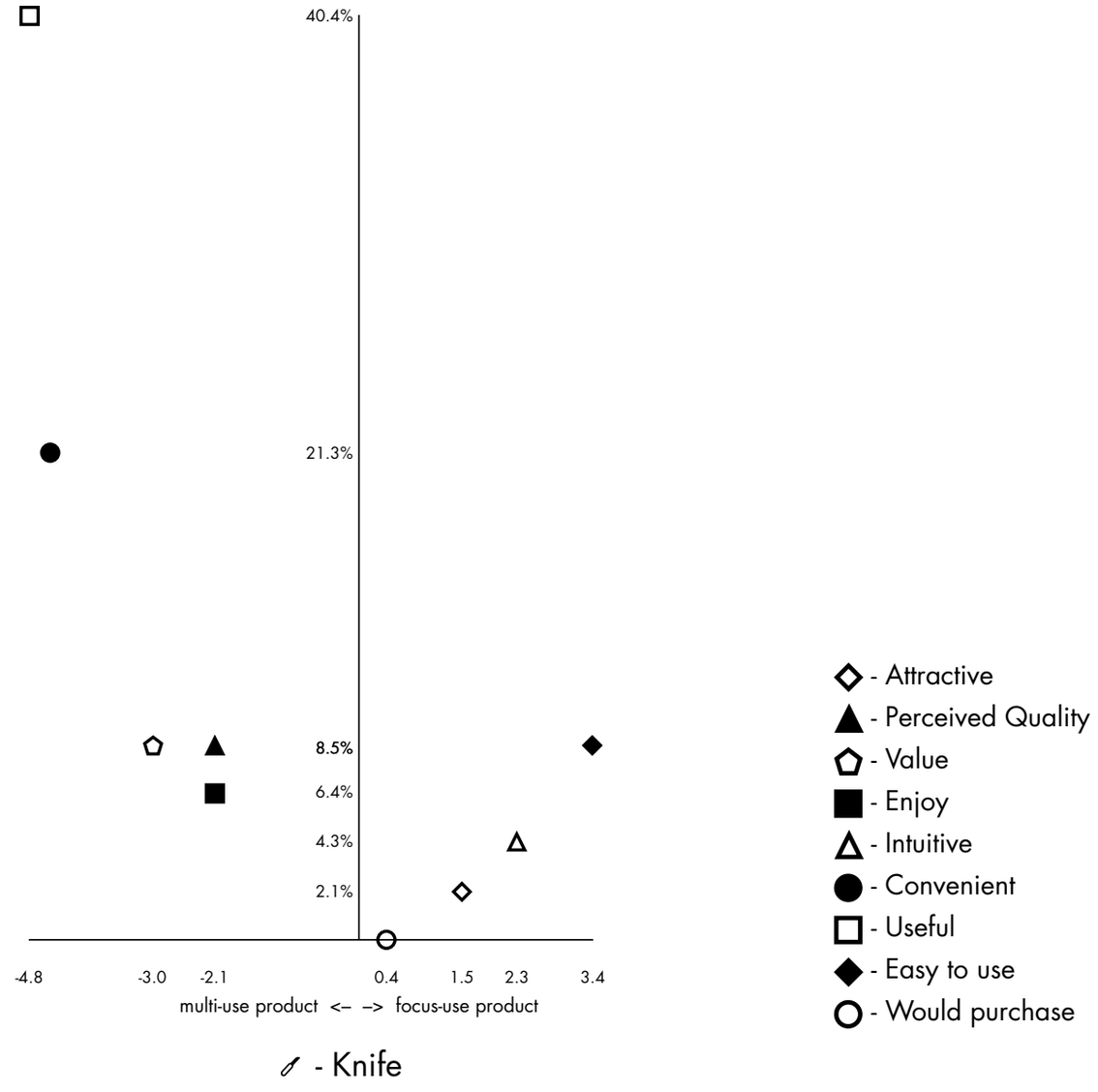


Personal Technologies



Knife

- "Useful" is most important
- "Convenient" is also important
- Numerous disparate functions
- Established, hybrid design



Personal Technologies







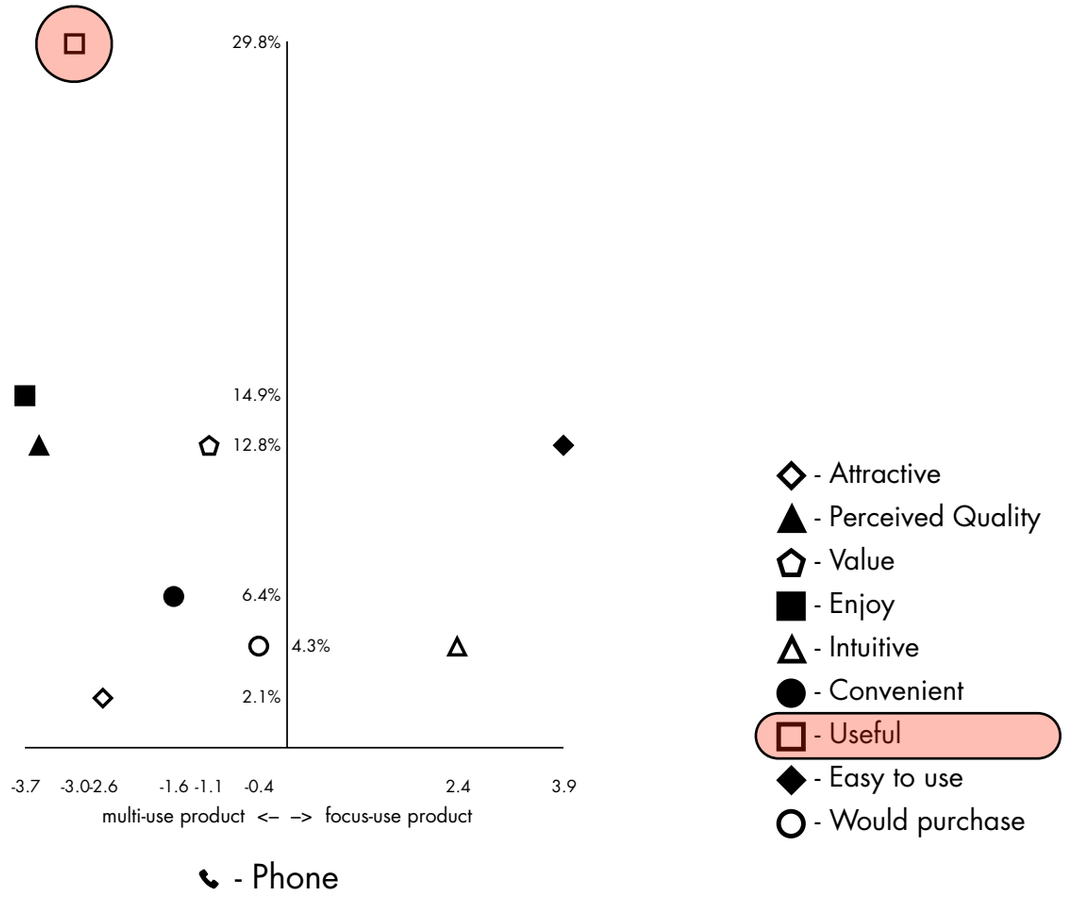


Personal Technologies



Phone

- "Useful" is most important

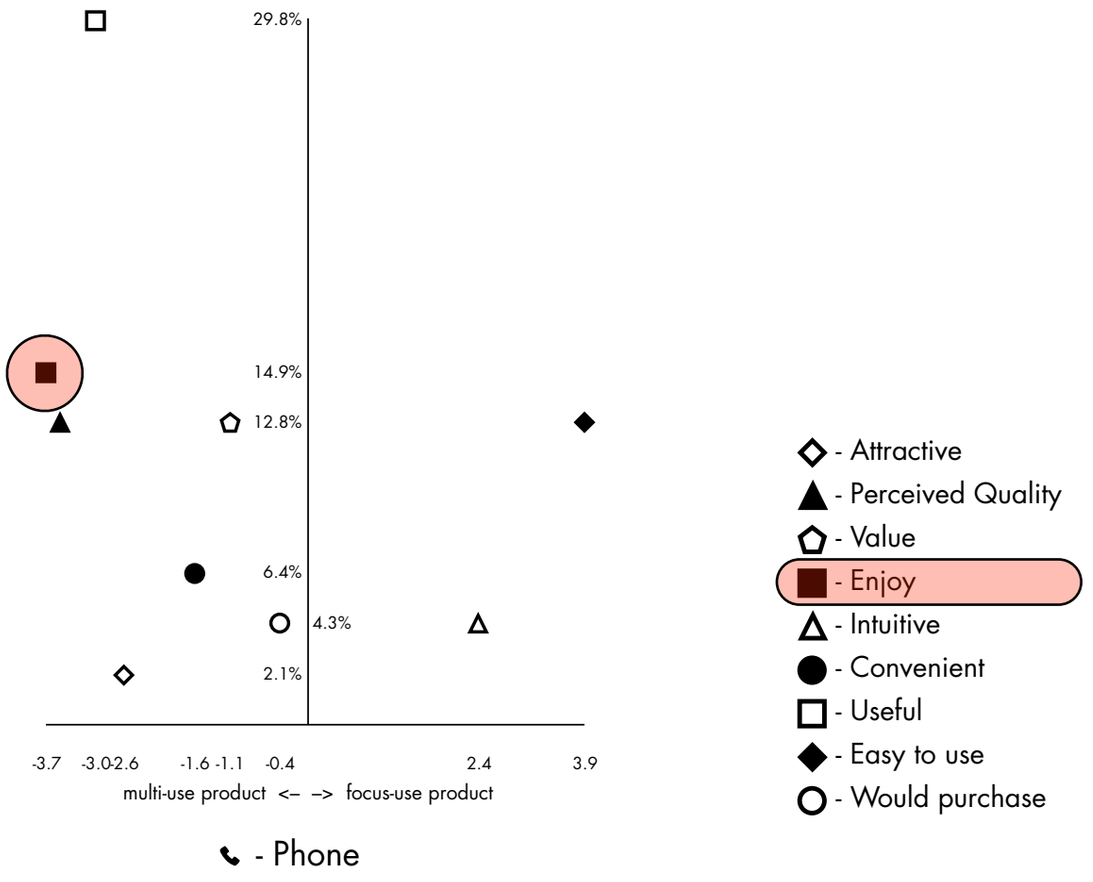


Personal Technologies



Phone

- "Useful" is most important
- "Enjoy" is also important



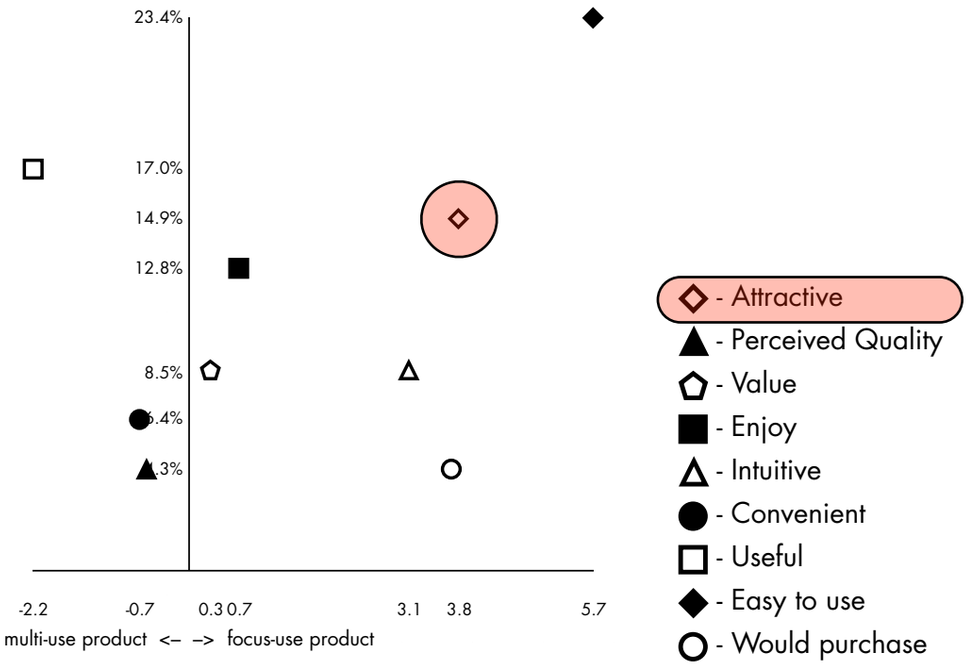
Generally similar to the TV and Coffee Maker, but "Useful" is also important.
Cellphones have tight integration of content, distribution, and platform.
Moving to greater functionality and emotional connection.

Personal Technologies



Watch

- "Attractive" is most important

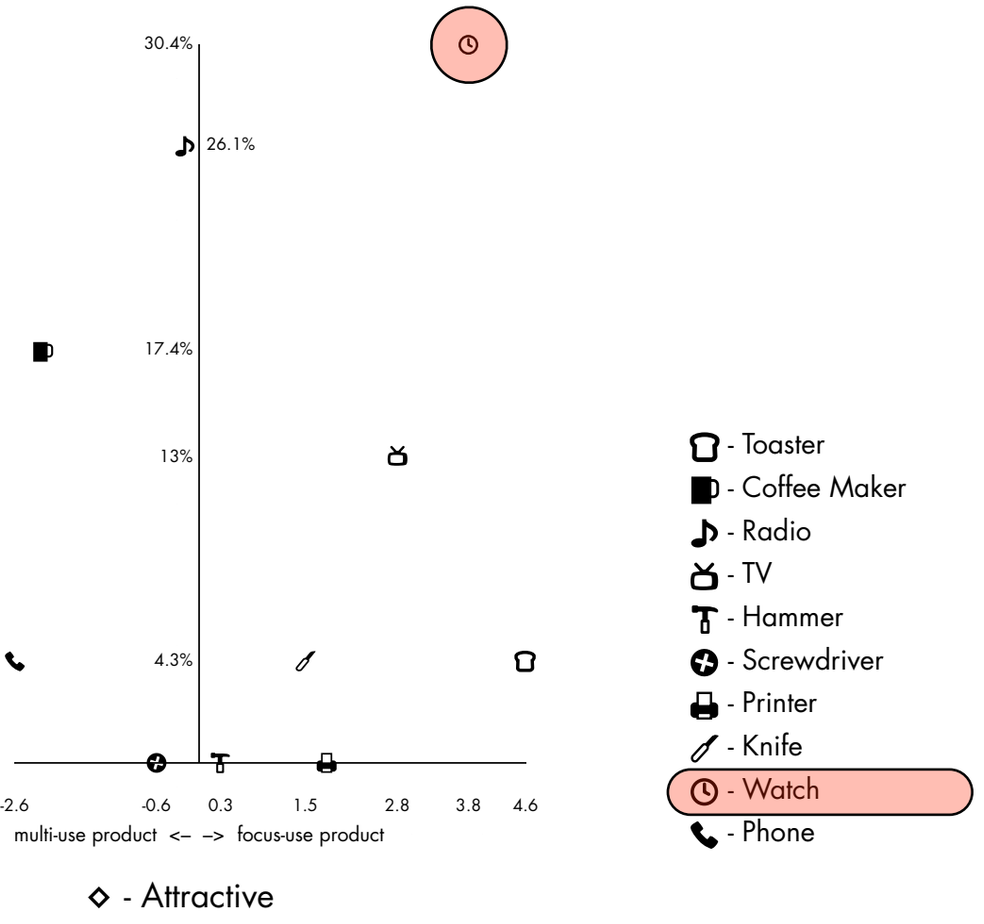


Personal Technologies



Watch

- "Attractive" and "Watch" are related.



Watches are highly visible body-object.
No-one wants something ugly or stigmatizing attached to them.

Personal Technologies







SPOT Watches

- Weather, stocks, sports, & subscription data.
- Bulky form.
- Abundant functions.







- Only 12 models released since 2003.
- Fossil recently ceased development.





Microsoft SPOT Watches.
Converge weather, stocks, sports... and time.

Personal Technologies



Oakley Thump converges eyewear with MP3 player.
Bulbous form for technology incorporation.

Personal Technologies

Worn by this guy:



Personal Technologies

and her:



Personal Technologies

and of course:



Personal Technologies



Oakley Thump II

Personal Technologies





Refined version with smoother lines.
More discrete technology integration.

Personal Technologies





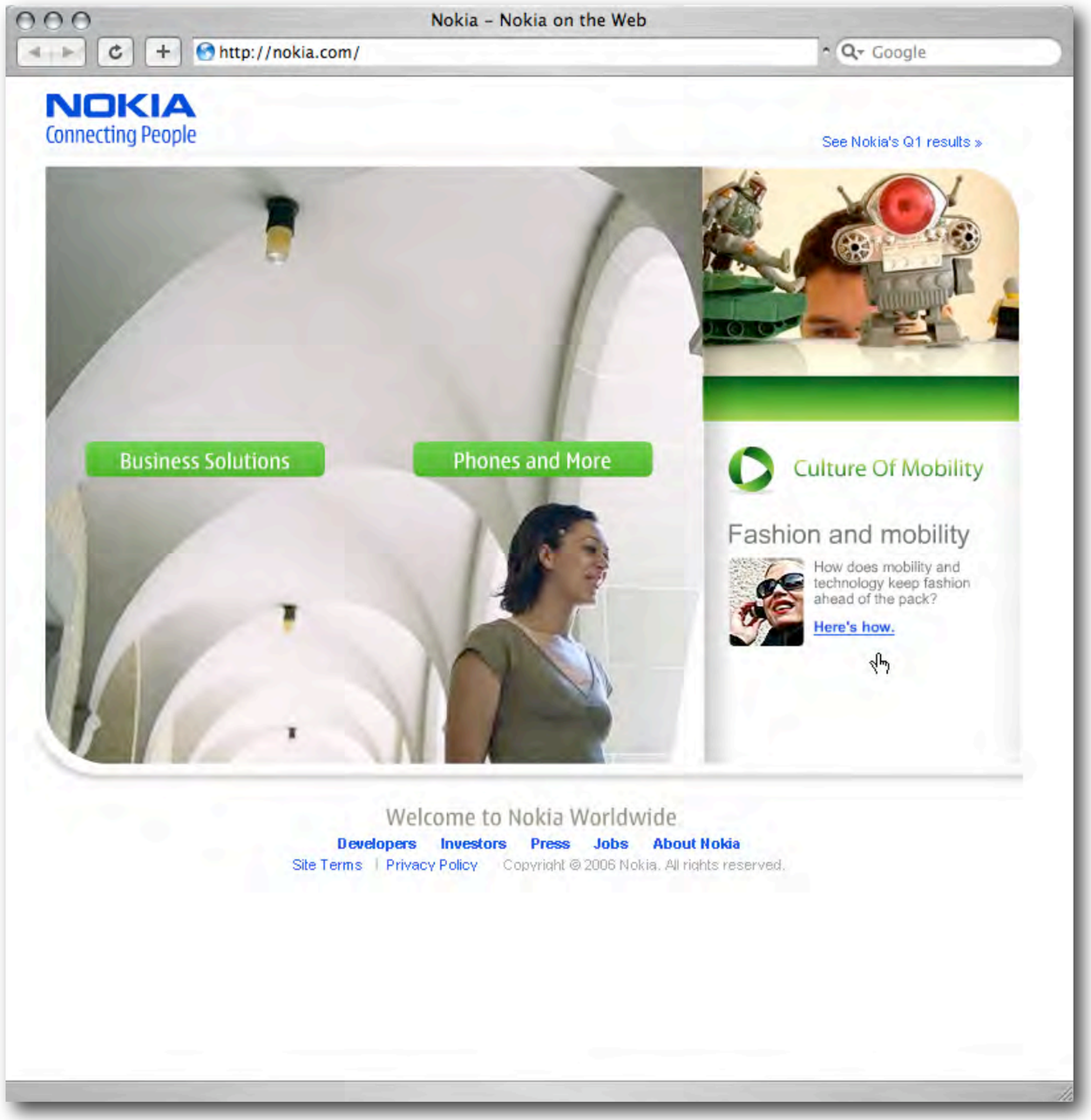






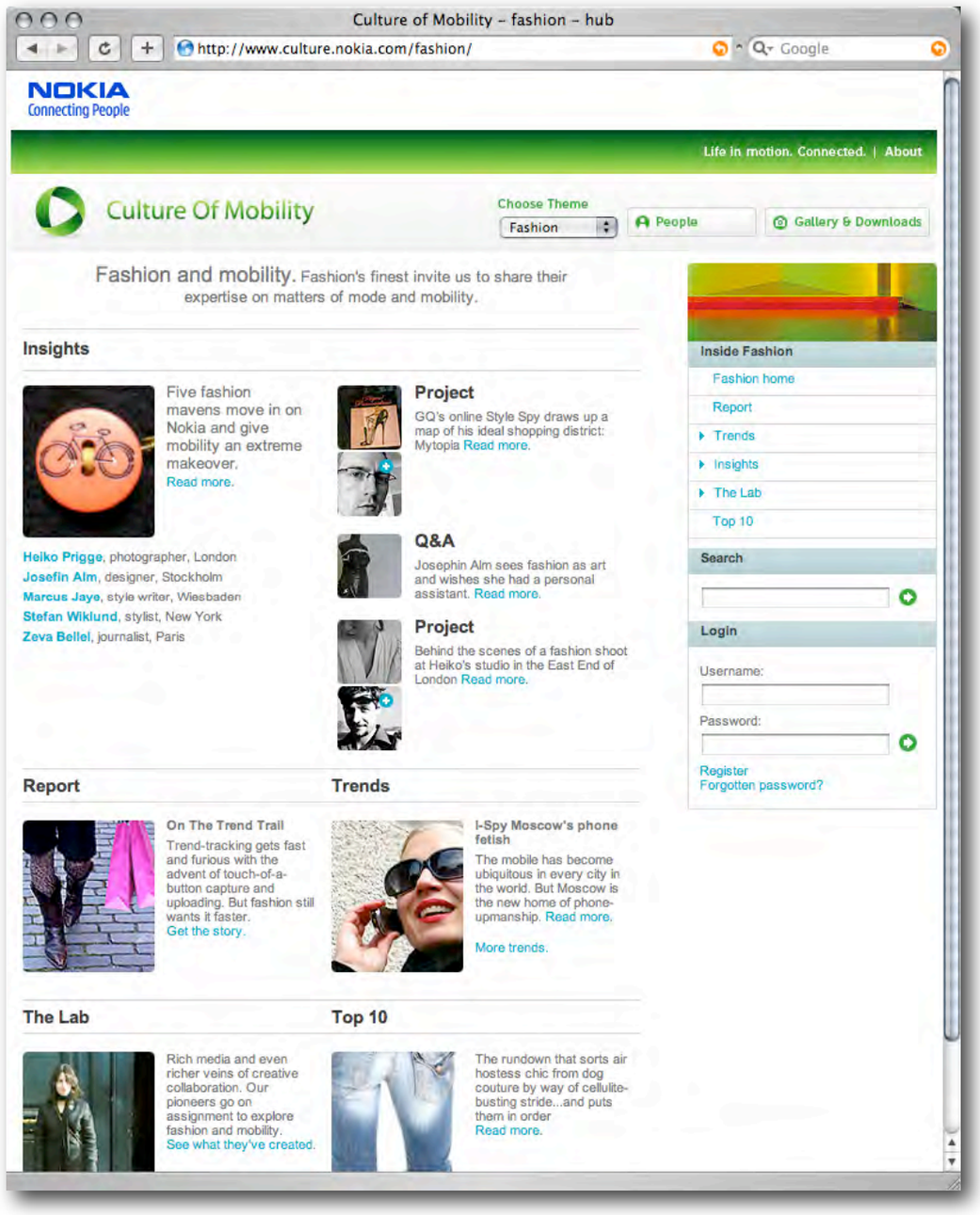
High fashion phones.
New forms focusing on style, aesthetics, beauty.
Less focus on technology feature sets.
Medallion necklace displays images, the time, and photos.

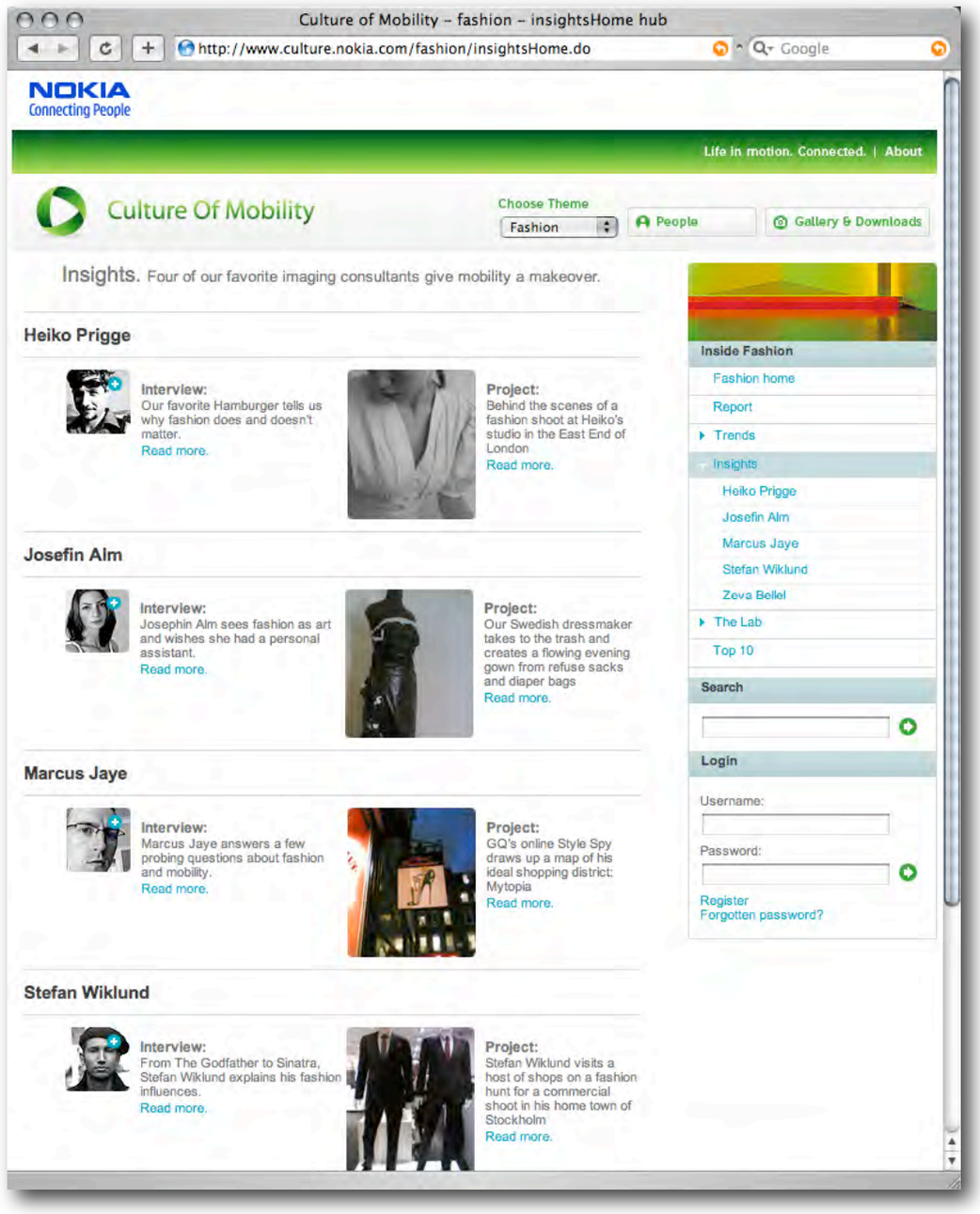
Personal Technologies



One third of Nokia's site is geared to the "Culture of Mobility"

Personal Technologies





Fashion trends, designer's blogs, reviews, shopping, and interviews.
International designers discuss how mobile technology influences their fashion and vice-versa.

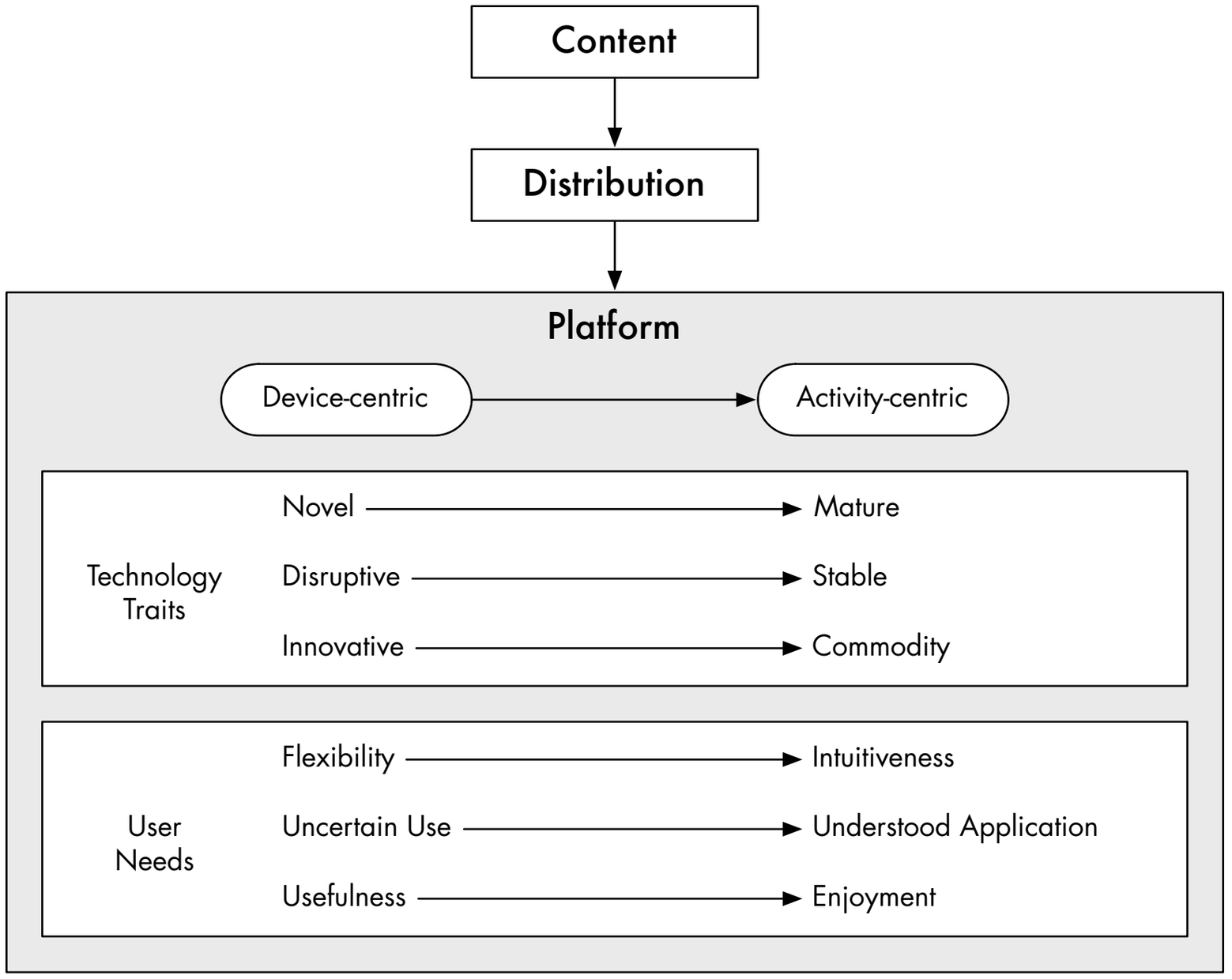
Personal Technologies

Designers need to:

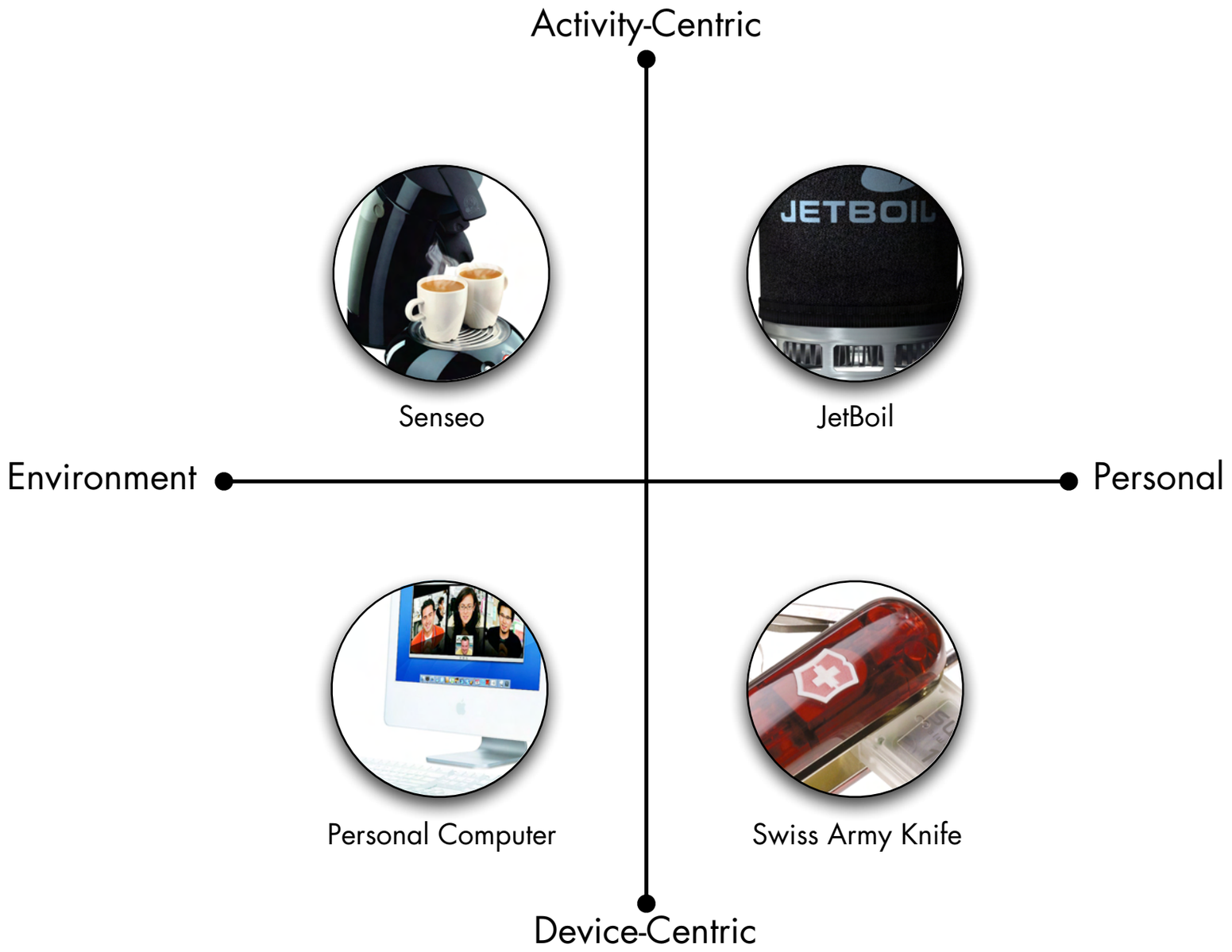
- Merge functions to single form to increase convenience.
- Focus on the aesthetics of body-object products.
- Address emotional connection with personal products.

Conclusions

Conclusions



Conclusions



Thank you! – Questions?

Paper, Slides, & Contact

Thesis paper and these slides are available at:
http://www.bizarobot.com

Please contact me with any additional questions or comments at:
dbingham@mac.com