

Project Architecture

MAE 2250

Phases

- Phase 0: Planning
- Phase 1: Conceptual design
- Phase 2: System design
- Phase 3: Detail design
- Phase 4: Testing and refinement
- Phase 5: Production ramp-up



Iterate

Product Architecture

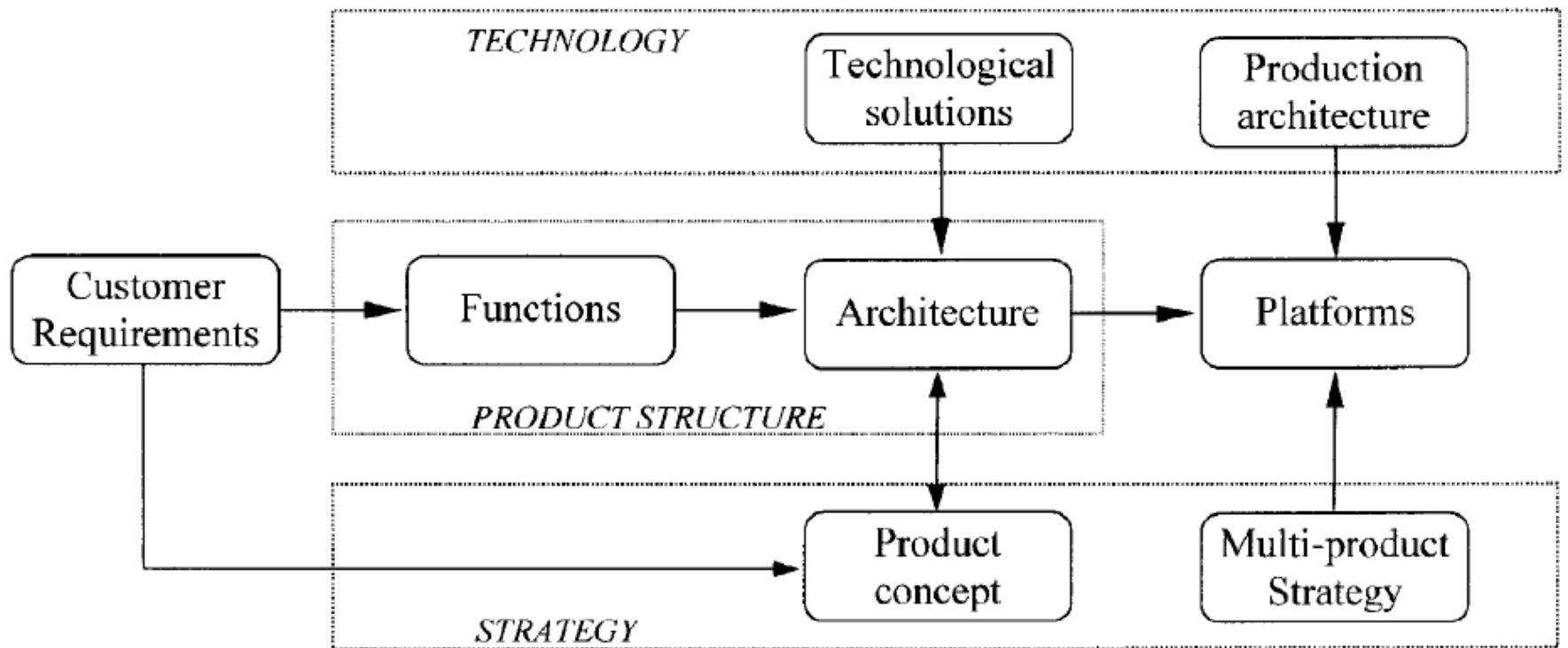
- Few companies produce a single product
 - Risky
 - Doesn't efficiently exploit market niches
 - Isn't adaptive

Exercise

- List a dozen consumer products that are family of products, or a platform product

Architecture

- the physical organization of the products functional elements
 - Form and function
 - Physical units = chunks



companies ask

- How would the architecture of a product impact their ability to offer product variety?
- What would be the cost of different architectures?
- What is the architecture that will allow me to develop the product most quickly?
- What is the architecture that will allow me to manage the development most effectively?

modular vs. integral

- Most **modular** is when each function is associated with a single chunk. Well defined relationship.
- Most **Integral** is when functional elements are implemented using more than one chunk, and each chunk implements many functional elements. The relationships are ill defined.
- Most products are neither strictly modular or strictly integral

Optimality and adaptability

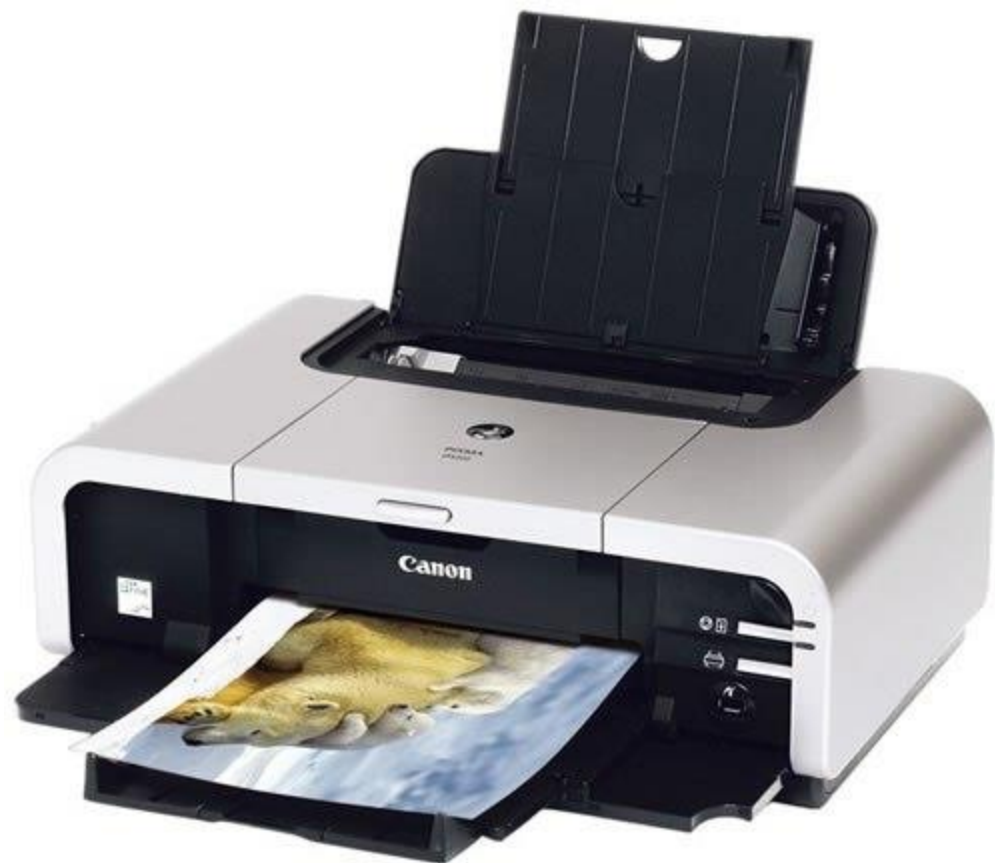
- In the short run, you want to be optimal.
- In the long run, you want to be adaptive

Types of modularity

- Slot modular architecture: Each module has its own interface type
 - Radio in a car has different interface
- Bus modular or sectional modular: All interfaces are the same type.
 - Many different computer peripherals all use PCI bus or USB
 - iAll water components use standard thread interface

Implications

- Product change
 - needs change: accessories
 - technologies change: upgrade
 - environment changes: uncertainty:110/220V
 - Flexibility: Lenses for cameras
- Reuse/standardization: the company can reuse a developed component
- Reliability/repair: Local failure. Quicker recovery
- Variety/market niches
- Manufacturability: Modular components can be produced in parallel, outsourced, etc. But fabrication is more expensive. E.g. DFM Design for manufacturing reduces components
- Product development:
- Performance: Degrades with modularity



Example I: Inkjet printer

- Paper feeder: front-front, 100 page / back front, 500 page
- Black quality: 300 DPI cartridge, 1200 DPI cartridge
- Color quality: 300 DPI cartridge, 1200 DPI cartridge
- Plug and transformer: 110V US, 240V Europe
- **Early printers were not like this!**

Flashlight

- Design a flashlight

