Organizational Design Thinking

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Who is This Guy?

› Worked at the SEI in the Architectures group.
› Currently at CMU’s Software Research Institute.
  ◦ Director of Embedded SW Engineering program.
  ◦ Teach masters/PhD architectures courses in professional masters of SWE programs.
  ◦ Author of *Architecting Software Intensive Systems* and the *Architecture Centric Design Method (ACDM).*
› I do a fair amount of consulting…
  ◦ Design, Coaching, Training…
  ◦ This presentation is based on my experiences with Sony, LG, Samsung, various groups at Siemens, among others.
What Now?!?

- Assume you have trained 25–250 engineers to be architects… it seems to be going well…
  - you get good reviews – management is happy…
  - the engineers really seem to “get it”
- But after the training, the organization still has “issues” with design…
  - life goes on exactly as it did before the training
  - no resources for design work
  - designs are not really used for anything
  - difficult for architects to “try things”
- There is a huge chasm between architectural design and Organizational Design Thinking.

Organizational Design Thinking

- Organizational Design Thinking means that design is an integral part of an organization’s processes, marketing, management, and production.
- While transparent to many stakeholders, design and Organizational Design Thinking is critical for:
  - defining products and planning production
  - ensuring products/systems possess essential properties
  - mitigating technical risk
  - realistically estimating and tracking progress
  - aligning and coordinating organizational structures
  - guiding construction/production
  - for realizing marketing and business strategy
Pain Point #1

- “Drive-by” training does not work and rarely results in lasting changes in practice!
  - hard to map classroom principle to actual practice
  - students forget what they learn, or what they try doesn’t work because they never put principle into practice in a controlled environment
  - one-size-fits-all training has severe limitations and it may inspire an engineer to think about design, but not the broader organization
- *Organizational Design Thinking* takes more than engineers trained in architectural principle.

A Better Approach to Training

- Training has to be part of a comprehensive plan to develop *Organizational Design Thinking*
  - broad basic training is useful for introducing concepts and identifying the top performers
  - all training must include realistic exercises and critique
  - tailor advanced training to fit the organizational context
    - domain: embedded verses IT/web/internet
    - market: captive verses commercial stakeholders
    - culture: organizational and national
    - organization: structure, processes, competencies
  - long term coaching using project exemplars is essential
  - training must include adoption and transition strategies
Pain Point #2

- Once trained, most architects indicate that putting concepts into practice is a challenge.
  - essential architecture design activities are not specified by organizational processes or process frameworks
  - architecture design is treated as an atomic activity, artifact, or milestone in most organizations
  - hard to “fit-together” discrete methods
  - no adoption or transition strategy
  - no guidance about what to do with “architecture design” once you created one

You Must Define a Design Process

- Defining a process has had great impact in fostering Organizational Design Thinking.
- Most of my customers use Architecture Centric Design Method which includes guidance for...
  - interacting with stakeholders to define architectural drivers and creating architectural drivers specification
  - creating the notional architecture
  - evaluating the architecture and defining action plans based on the output of the architecture
  - creating experimental plans to mitigate issues uncovered during evaluation and iteratively refining the architectural design
Whatever process you define...

- it must be detailed and include specific activities and artifacts, inputs/outputs, pre/post conditions
- the architectural design process must be woven into product definition and development processes
- processes and/or process frameworks should not be sacred – tailor organizational processes or frameworks to include architectural design
- the design methods/techniques must be useable by the designers without long-term external help
- include iterative design refinement
Stop Me If You've Heard This One Before...

- Generally what happens...
  - Marketers define/target markets/segments and basic features during in product concept definition.
  - Managers make resource allocation decisions based on marketing plans.
  - At no point is an architect involved and early decisions are made with little or no serious technical assessment.

Pain Point #3...

- This is a major impediment to Organizational Design Thinking and leads to a host of issues:
  - unrealistic expectations in terms of product, cost, price, schedule, value, margins,…
  - misunderstanding/misalignment of business goals, strategy
  - misaligned development organizations and poor utilization of nonlocal (off-shore) resources
  - design issues not identified until production
  - poor market performance and missed opportunities to map technologies to markets and business strategy for economic advantage
The Problems With Managers and Marketers...

- Marketers...
  - often make promises that violate math, physics, chemistry, budget, and schedule constraints
  - have an inflated sense of how “flexible” software intensive systems can be
- Managers...
  - often fail to see the value of design because customers don’t care about design and they don’t always understand what design is used for
  - they get impatient with time spent on design and measure progress in terms of code written and demonstrable functionality

What I Tried, ...

- The intuitive thing seemed to be to familiarize managers and marketers with architecture.
- Maybe if they understood architecture design, they might...
  - understand why it’s important
  - how they could leverage design
  - appreciate investments in design
- So I created and delivered architecture familiarization courses for managers and marketers...
...and Failed!

- The courses were very well received...
  - full day familiarization course
  - 90 minute executive seminar (C-level audience)
- Unfortunately, they had little or no impact on *Organizational Design Thinking*...
  - Attendees indicated they appreciated what architects did, but they should do it faster and at a lower cost!
- My analysis indicated that this failed because...
  - managers and marketers respond to markets and resource constraints, not to architects
  - marketers and managers typically lacked the technical background to see the relevance of architecture design and incorporate it into their analysis and decision making

Disconnected Foci

Manager’s Focus: The Organization

Engineer’s Focus: Element Construction

Marketer’s Focus: The World

Architect’s Focus: Product Design and Construction

Managers and marketers expressed concerns about including architects in early product definition... What would they do? What would they contribute?
The Problem With Architects...

- Hard to transition from engineer to architect because architecture is more than technology...
  - must learn render technical design judgment within less-than-perfect business and organizational contexts and situations
  - technical excellence is a must, but most architects fail to realize that every design choice is a business and economic choice, as well as a technical choice
  - the importance of communication is not understood or appreciated by most engineers
  - often clueless about market forces, organizational, and business concerns and the impact these have on product definition and design choices

The Next Steps...

- The plan was to educate Architects on essential marketing and business concepts so they would...
  - be able to participate in early product definition and interact with marketing/management and know what questions to ask and issues to probe
  - understand how their designs influence markets and marketing, cost, price-points, value props,...
  - be better equipped as they advanced to senior positions to understand the business, market, as well as the technology of their products
The Course

- The *Marketing for Architects* course aims to address the relationship between marketing, engineering, and management.
- The course has been delivered to an initial group of engineers... so far, so good...
  - 10 module course for trained, practicing architects
  - uses interactive case studies to highlight key concepts, encourage discussion and debate
  - includes capstone team exercise
- Good start,... but not sufficient to develop *Organizational Design Thinking*...

Aligning Business Goals and Product Design and Development

We augmented the product definition process to include *Product Teams* that consist of Marketing, Management, and Engineering representatives...

**Architect:**
- technical concerns
  - feasibility
  - design/implementation

**Management:**
- resource concerns
  - schedule
  - production costs

**Marketer:**
- marketing concerns
  - stakeholder need
  - price/value
Results Thus Far...

- Early feedback indicates that this is the right direction to foster broad Organizational Design Thinking...
- Has improved...
  - communication between architects, managers, and marketers
  - product definition
- What they would like next...
  - more formal artifacts or templates
  - better processes to incorporate early product concept definition with architects

Summary: Key Lessons Learned

- **Lesson 1:**
  - Create comprehensive training plans for Organizational Design Thinking that includes technical training with exercises and critique, transition, and coaching.
- **Lesson 2:**
  - Define an architectural design process.
- **Lesson 3:**
  - Teach architects about organizational, business, and marketing contexts.
- **Lesson 4:**
  - Create processes that enable managers, marketers, and architects to work together early in the product lifecycle.
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