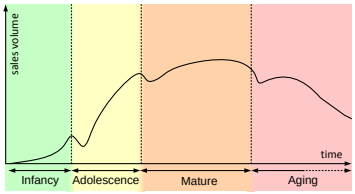
Market Product Life Cycle Consequences for Architecting

-



Gerrit Muller
Buskerud University College
Frogs vei 41 P.O. Box 235, NO-3603 Kongsberg Norway
gaudisite@gmail.com

This paper has been integrated in the book "Systems Architecting: A Business Perspective", http://www.gaudisite.nl/SABP.html, published by CRC Press in 2011.

Abstract

The lifecycle of a product category in the market determines many aspects of the architecting approach. The lifecycle consists typical of 4 phases: infancy, adolesence, mature and aging.
A discontinuity in market success is seen in the transition from one phase to the next phase. The explanation given is that the phases differ in characterictics and require different approaches. The right approach for one phase is sub optimal for the next phase. A set of characteristics per phase is given and the consequences for architecting are discussed.

version: 1.2 status: concept June 23, 2016

1 Introduction

A class of products serving a specific market evolves over time. This evolution is reflected in the sales volume of these products. The systems architecting approach depends where products are in this evolution.

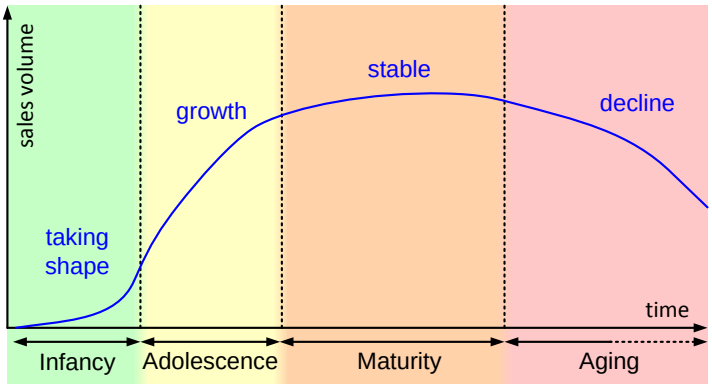


Figure 1: Compared with ideal bathtub curve

The life cycle of a product market combination can be visualized by showing the sales volume as a function of the time. In literature the form of the curve of the sales volume as function of the time is described as bathtub, see figure 1. It is customary to recognize four phases in this curve:

- The life cycle starts with very small sales in the **infancy** phase, where the product finds its shape.
- A fast increasing sales volume in the **adolescent phase**.
- A more or less stable sales volume in the **mature** phase.
- A decreasing sales volume in the **aging** phase.

The curve and its phases represent the theoretical evolution. In the next paragraphs we will discuss observations in practice and an explanation, and we will show that the class of products and the market themselves also evolve on a macro scale.

2 Observed Life Cycle Curve in Practice

Henk Obbink (Philips Research) observed dips in the sales volume, as shown in figure 2. The transition from one phase to the next does not seem to happen smoothly. In some cases the sales drops further and the product does not make the transition at all.

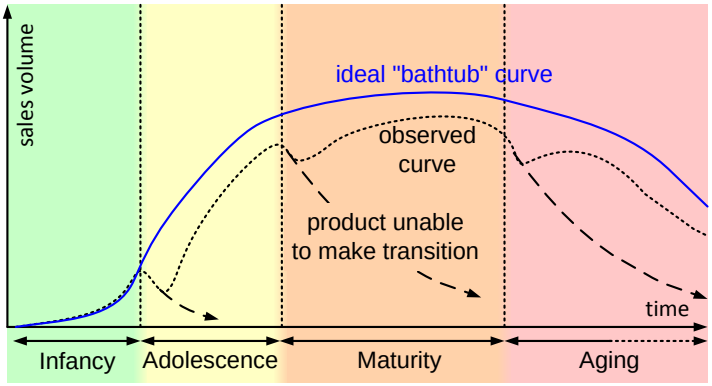


Figure 2: Market product life cycle phases

The hypothesis for the dips in the curve is that characteristics of all stakeholders are different for the different life cycle phases. If the way of working of an organization is not adopted to these changes, then a mismatch with the changed circumstances results in decreasing sales. Figure 2 also indicates that, if no adaptation to the change takes place, that the sales might even drop to zero. Zero sales effectively is killing the business, while still plenty of market opportunity is present.

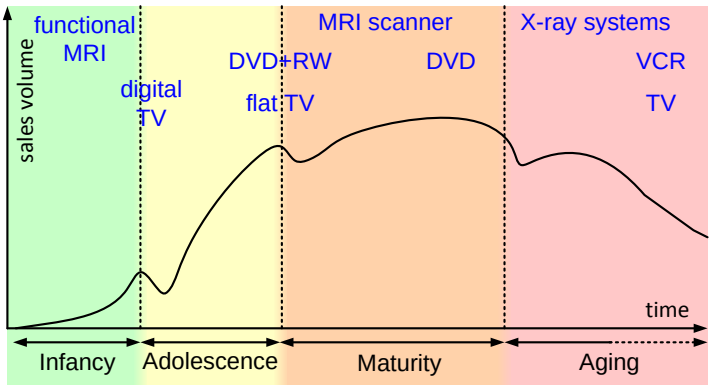


Figure 3: Examples of product classes on the curve

Figure 3 annotates the life cycle graph with a number of products and their positioning in the life cycle. As can be seen products can move backwards in the phases (i.e. become "younger") by the addition of innovative features. For instance MRS scanners moved backwards when *functional imaging* was added, an innovative way to visualize the activity of specific tissues. Similarly, conventional televisions rejuvenated multiple times by adding digital processing, flat screens,

and digital interfaces.

3 Life Cycle Model

	Infancy	Adolescence	Mature	Ageing
Driving factor	Business vision		Stable business model	Harvesting of assets
Value from	Responsiveness	Features	Refinements / service	Refining existing assets
Requirements	Discovery	Select strategic	Prioritize	Low effort high value only
Dominant technical concerns	Feasibility	Scaling	Legacy Obsolescence	Lack of product knowledge Low effort for obsolete technologies
Type of people	Inventors & pioneers	Few inventors & pioneers "designers"	"Engineers"	"Maintainers"
Process	Chaotic		Bureaucratic	Budget driven
Dominant pattern	Overdimensioning	Conservative expansion	Midlife refactoring	UI gadgets

Figure 4: Attributes per phase

Figure 4 shows typical attributes of the life cycle phases.

The *infancy* phase is characterized by uncertainty about the customer needs, and therefore the product requirements. Essential is that the creator/producer is responsive to the customer needs, which will provide insight in needs and requirements. The way of working in this phase reflects the inherent uncertainty, the chaotic development, and the innovative and pioneering mind set. Product cost is still less of an issue, the risk related to the uncertainty is the dominant concern. The design copes with the uncertainty by over-dimensioning those aspects which are perceived to be the most uncertain.

The *adolescent* phase is characterized by strong (exponential) growth of the sales volume, concurrent with an increase in performance, features and product variants. The challenge is to cope with this strong growth in many dimensions. With respect to the requirements a strategic selection is needed, to serve the growing customer base, without drowning in an exploding complexity. The technical and process challenge is to scale up in all dimensions at the same time. Up-scaling the Customer Oriented Processes and the Product Creation Process requires more shared structure between the participants. This involves a mind set change: less inventors, more designers. The design pattern used frequently in this phase is conservative extension of a base design.

The *mature* phase is characterized by more stability of the business model and the market, while the market has become much more cost sensitive. Instead of running along in the feature race more attention is required to optimize the specification and development choices. The value can be shifting from the core product itself to services and complements of the product, while the features of the product are mostly refined. The age of the product starts to interfere with the business, obsolescence problems occur, as well as legacy problems. Innovative contributions become counterproductive, more rigid engineers are preferred above creative designers. The cost optimization is obtained by process optimization, where the processes also become much more rigid, but also more predictable, controllable and executable by a large community of less educated engineers. The design copes with the aging technology by performing limited refactoring activities in areas where return on investment is still likely.

The *aging* phase is often the phase where the product is entirely seen as cash cow, maximize the return on (low) investments. This is done by searching all the low effort high value requirements, resulting mostly in small refinements to the existing product. Often the integral product know how and even specialist know how has been lost. Only very important obsolescence problems are tackled. Again the mind set of the people working on the product is changing to become more maintenance oriented. Cost is a very dominating concern, budgets are used to control the cost. Many changes are cosmetic or superficial, taking place in the most visible parts of the product: the user interface and the outer packaging.

4 Acknowledgements

Henk Obbink observed the discontinuity of market success at the phase transitions. The analysis of this phenomenon was carried out by Jürgen Müller, Henk Obbink and Gerrit Muller.

Pierre America improved the layout of the diagrams.

References

[1] Gerrit Muller. The system architecture homepage. `http://www.gaudisite.nl/index.html`, 1999.

History
Version: 1.2, date: July 28, 2010 changed by: Gerrit Muller

- added introduction
- textual improvements
- changed status to concept

Version: 1.1, date: March 4, 2003 changed by: Gerrit Muller
- Improved the layout of the diagrams

Version: 1.0, date: October 3, 2002 changed by: Gerrit Muller
- Added the text

Version: 0, date: September 17, 2002 changed by: Gerrit Muller
- Created, no changelog yet