Standards

STANDARDS AND DOMINANT DESIGNS

- One of the implications of network effects for the consumer is that there are incentives for those who live and work together to standardise on a common product or service.
- When network effects are important in the demand for a particular product, the supplier of that product faces a ‘standards race’ to try to achieve market success for his product.
- It is generally recognised that the idea of network effects and the idea of a standard are quite closely related,
  - we will define some of the different uses of the term ’standard’.

STANDARDS AND DOMINANT DESIGNS

The most important distinction is between ‘formal’ and ‘informal’ standards.

- **formal** standards are called ‘institutional’ standards or ‘de jure’ standards,
- **informal** standards are called ‘market’ standards or ‘de facto’ standards (or even ‘dominant designs’, so avoiding the use of the term ‘standard’).

Formal standards

- Formal standards are public documents written by a standard institution (such as ISO, CEN, BSI or DIN) or consortia established with the purpose of writing a specific standard for a specific technology.
- As these documents are public and open, any company is at liberty to produce a product or service that adheres to the standard.
- These formal standards are defined by a committee within a standards institution and emerge as a result of a process of consensus or compromise.
- It can be time-consuming to reach an agreement on a formal standard, but in the end, we have an open document, and that openness can be important for innovation.
- In addition, standards professionals believe that this institutional standard produces a result of higher quality than would emerge from competition in the market.

Some examples of a standard ISO

For example, ISO standards ensure that:

- thermometers are calibrated the same way in different hospitals (ISO 80601),
- that food safety hazards are minimized (ISO 22000),
- that personal and sensitive data is protected (ISO/IEC 27000).

Informal standards

- By contrast, informal standards are not public documents and are generally not open.
- Most usually, these are proprietary designs owned by one or more companies, and their claim to be a ‘standard’ derives from the fact (‘de facto’) of their market success rather than institutional endorsement.
- These ‘dominant designs’ have emerged successfully from a standards race and have emerged as a standard through use.
- Allowing such standards to be defined by market competition has several disadvantages.
- It can be a very costly process, especially for the losers, but also for consumers. This market process of reaching a standard may increase the risk of lock-in to an inferior outcome.
- Moreover, the end result is a proprietary standard rather than an open standard and that introduces an undesirable element of monopoly. But set against these disadvantages, the market process is generally quite quick at producing a ‘winner’.

A dominant design

The technology cycle almost invariably exhibits a stage in which the industry selects a **dominant design**.

- Once this design is selected, producers and customers focus on improving their efficiency in manufacturing, delivering, marketing, or deploying this dominant design, rather than continue to develop and consider alternative designs.

Why industries experience strong pressure to select a single technology design as dominant and the multiple dimensions of value that will shape which technology designs rise to dominance?

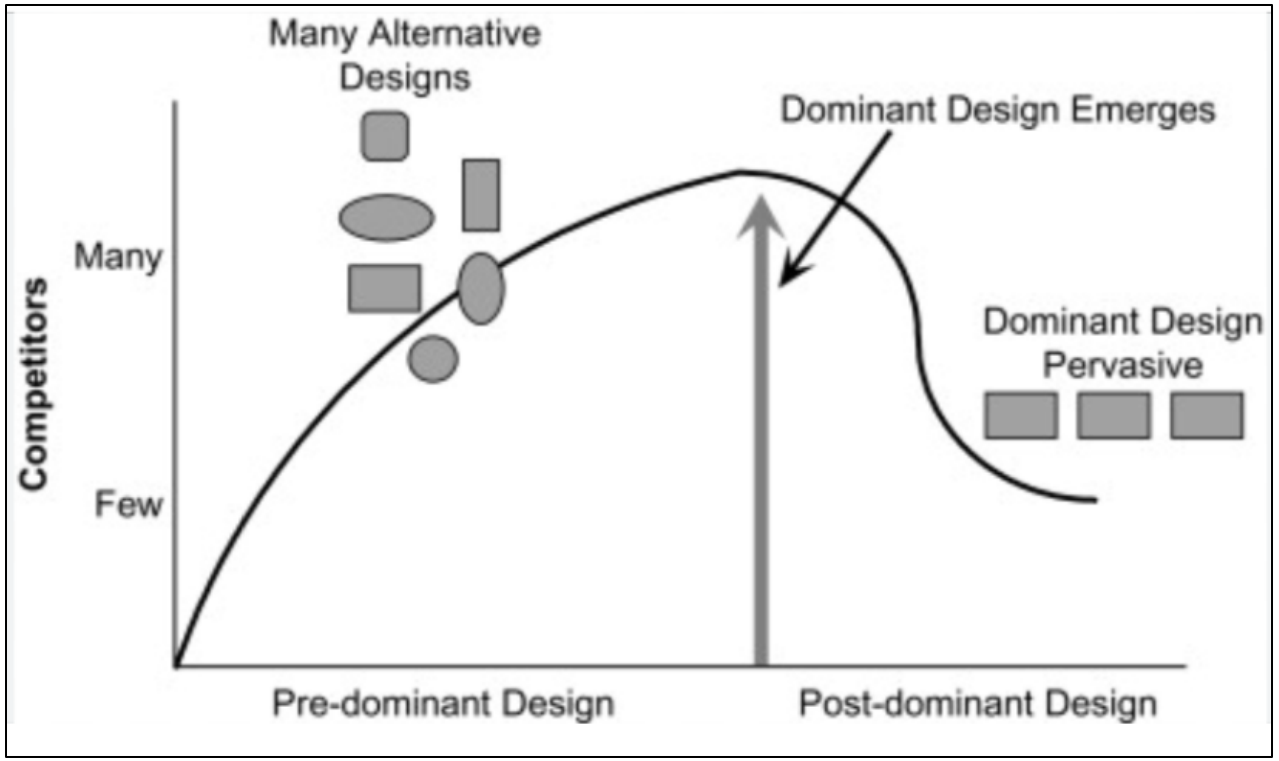
Why and how modularity and platform competition emerges in some industries?

A Dominant design

A single product or process architecture that dominates a product category—usually 50 % or more of the market.

While it may not be officially enforced or acknowledged, it has become a standard (de facto) for the industry.

A dominant design



Alternative Definitions of a Dominant Design in the Extant Literature

Source	Definition of a Dominant Design	Empirical Method to Identify a Dominant Design
Abernathy and Utterback (1978)	A dominant design is a single architecture that establishes dominance in a product category.	Conceptual paper.
Anderson and Tushman (1990)	A dominant design is a single architecture that establishes dominance in a product category.	A design is dominant if it acquires more than 50% market share of the product category and maintains it for four consecutive years.
Utterback (1994)	The dominant design in a product category is the one that wins the allegiance of the marketplace; it is the one that competitors and innovators must adhere to if they hope to command significant market following. A dominant design is a product in a product category that gains general acceptance as the standard on technical features that other market players must follow if they wish to acquire significant market share.	No details provided.
Suaréz and Utterback (1995)	The dominant design is a specific path along an industry's design hierarchy that establishes dominance among competing design paths.	Industry experts were used to classify dominant designs in typewriters, automobiles, televisions, picture tubes, transistors, and electronic calculators.
Christensen, Suaréz, and Utterback (1998)	A dominant design emerges in a product category when one product's design specifications (consisting of a single or a complement of design features) define the product category's architecture.	Industry experts were used to identify the emergence of the dominant design in the rigid disk drive industry based on the technical elements of the product category evolution over time.

WHY DOMINANT DESIGNS ARE SELECTED

Why there is a single dominant design rather than support a variety of technological options?

1. Many industries exhibit **increasing returns to adoption**, meaning that the more a technology is adopted, the more valuable it becomes.
2. As the technology is used, greater knowledge and understanding of the technology accrue, which may then enable improvements both in the technology itself and in its applications.
3. As a technology becomes more widely adopted, complementary assets are often developed that are specialized to operate with the technology.
   - Two of the primary sources of increasing returns are (1) learning effects and (2) network externalities.

STANDARDS AND DOMINANT DESIGNS

The literature on standards tends to distinguish 4 different types or functions of standards.

Any one standard may combine more than one of these functions, but it is useful to make a distinction between them because their economic effects are subtly different. -->

Functions of standards

The first is the compatibility standard or inter-connection standard.

The role of the compatibility standard is to ensure that we can connect items A and B, and that they work with each other, or that a piece of software will run on a particular piece of hardware.

Compatibility standards exist to ensure that the user of a particular product who values network effects can indeed enjoy those network effects.

These compatibility standards can be formal or informal.

Functions of standards

The second is the safety standard or minimum quality standard.

It is concerned with addressing questions such as the following. Is the product safe?

Does it reach a minimum quality threshold?

One object of this standard is simply to protect the consumer. More generally, the object of this type of standard is to overcome certain sorts of market failure that arise if the consumer cannot asses the quality of what he is buying.

These standards tend to be most effective if they are formal rather than informal.

Functions of standards

The third is the standard to reduce variety.

A familiar example of this is the clothing size. The objective of producing clothes in a limited number of standard sizes is to achieve economies of scale and economies of stockholding.

- Of course, there is also an element of compatibility standard here: the size 12 foot cannot fit into a size 8 shoe.

These standard sizes can be formal or informal.

Functions of standards

The fourth is the standard for measurement and description.

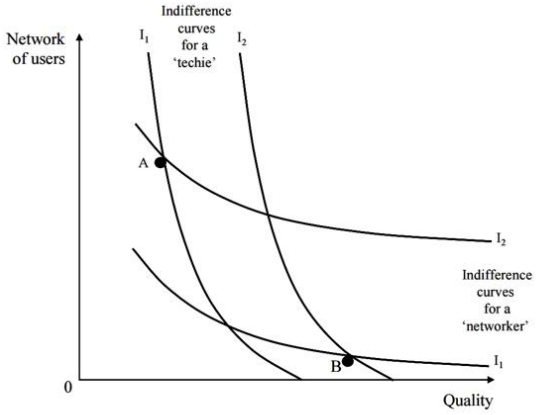
These are, in a sense, a higher level of standard, because they don't so much refer to a standard for a particular product but rather a standard for the units we use to measure and describe the products we buy and sell.

Obvious examples include standards of length, volume and weight.

These standards tend to work best if they are formal, though some informal measurement standards also exist.

An Analysis of the Standards Race

- We can imagine a race in which there are two products – both sold at the same price.
- One product we shall call the ‘established standard’ and the other we shall call the ‘better replacement’.
- The first is of inferior quality, but it is an established product with a large existing network of users.
- The second is of superior quality, but it is a new product and has no network of users at the start of the race.
- As illustrated in the graph, consumer choice between these two products will depend on the shape of consumer indifference curves between quality and network effects.
- In the graph we drew two polar types of consumer indifference curve.
- In this illustration of the standards race, we assume that there is a continuum of customer types, ranging from the ‘techie’ to the ‘networker’.



Consumer choice with network effects

An Analysis of the Standards Race

- Let us imagine that we rank these customer types in order, according to the slope of their indifference curves, from ‘techie’ to ‘networker’, and let us identify the median customer.
- It turns out in races of this sort that the median customer is decisive in the outcome. If the median customer in a particular period prefers the established standard to the better replacement, then more than 50 percent of customers in that period will choose the established standard.
- This means that the network of customers using the established standard will grow by more than the network of customers using the better replacement, and as a result the competitive position of the established standard will strengthen.
- Conversely, if the median customer in a particular period prefers the better replacement to the established standard, more than 50 per cent of customers in that period will choose the better replacement.
- This means that the network of customers using the better replacement will grow by more than the network of customers using the established standard, and as a result the competitive position of the better replacement will strengthen.
- Finally, if the median customer is indifferent between the two products, then they each share 50 percent of sales in that period, and the competitive balance between them is unchanged.

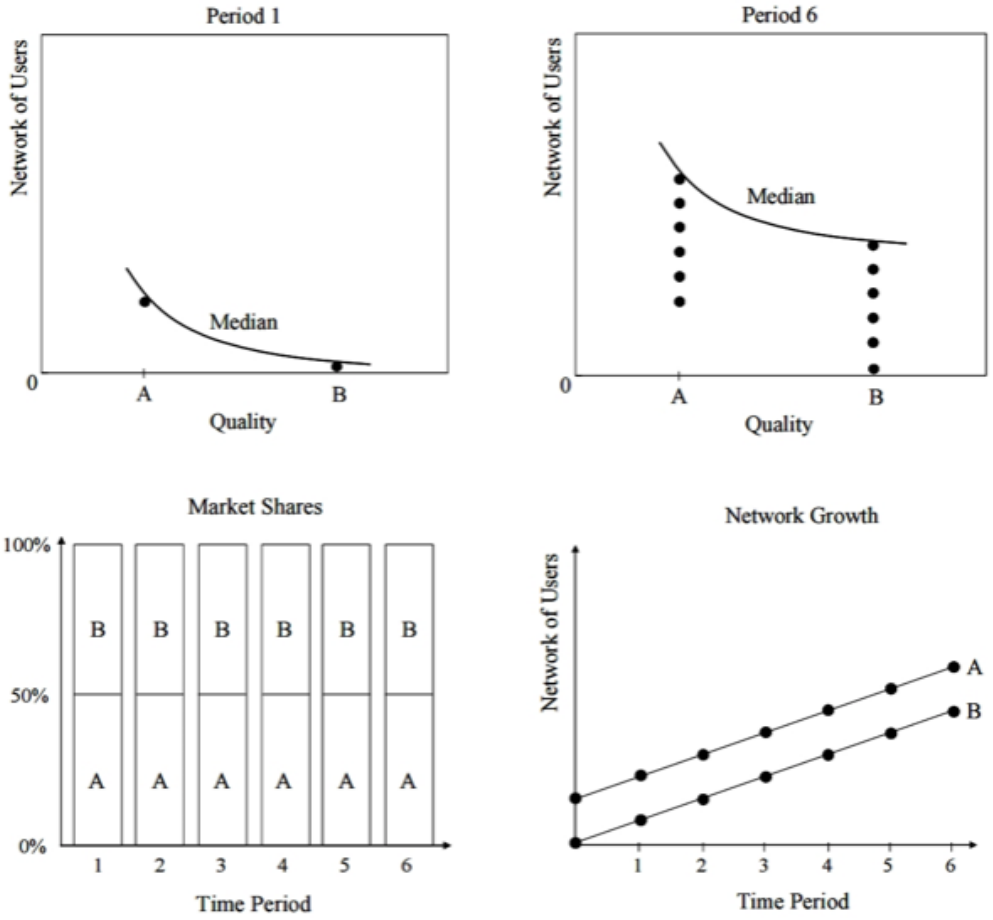
A ‘neck and neck’ standards race

This is the ‘neck and neck’ race where the established standard (A) and the better replacement (B) continue to split the market equally between them, and neither wins the race. This outcome is theoretically possible but pretty unlikely.

In the upper half graphs, we illustrate the choice facing the customer in period 1 (left) and period 6 (right), and we show the indifference curve of the median customer.

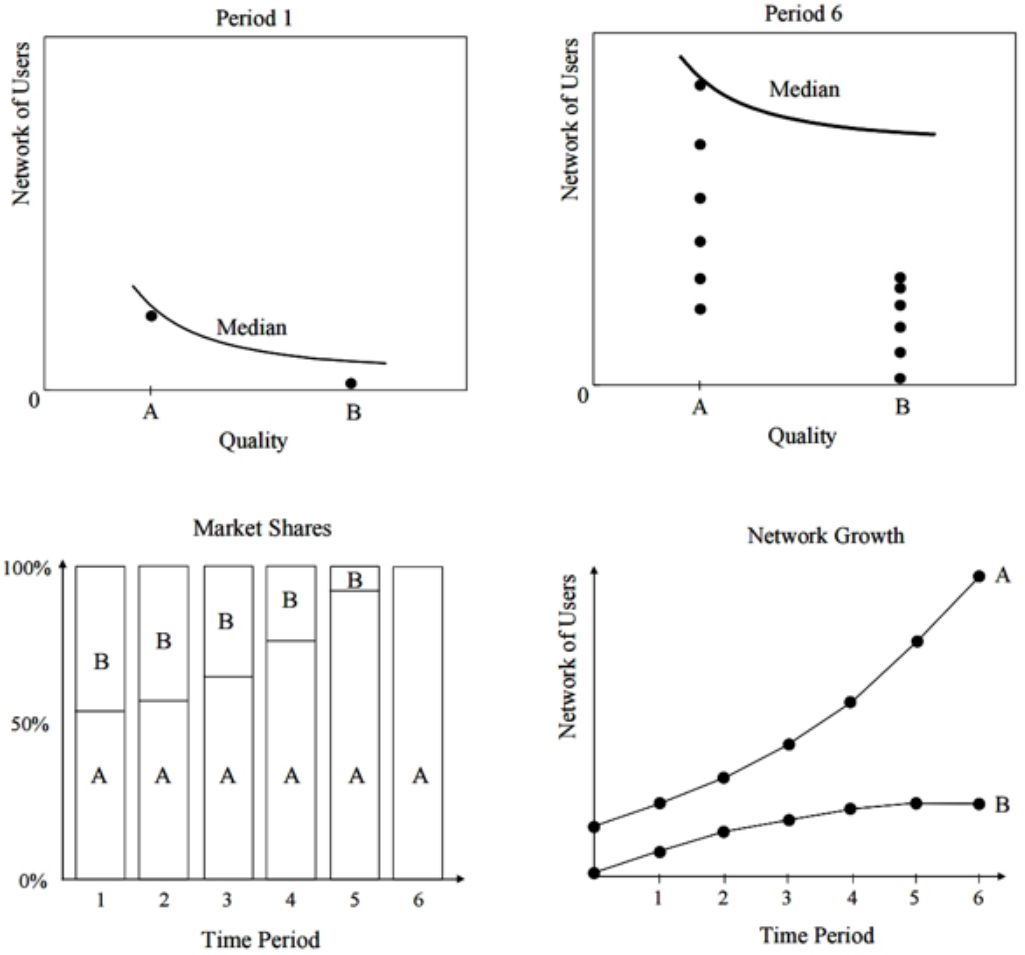
In the lower half graphs, we show the market share split in each period and the trend in the total network of users for products A and B.

We see in the graphs that the market share split is always 50:50 and hence the total network sizes grow in parallel.



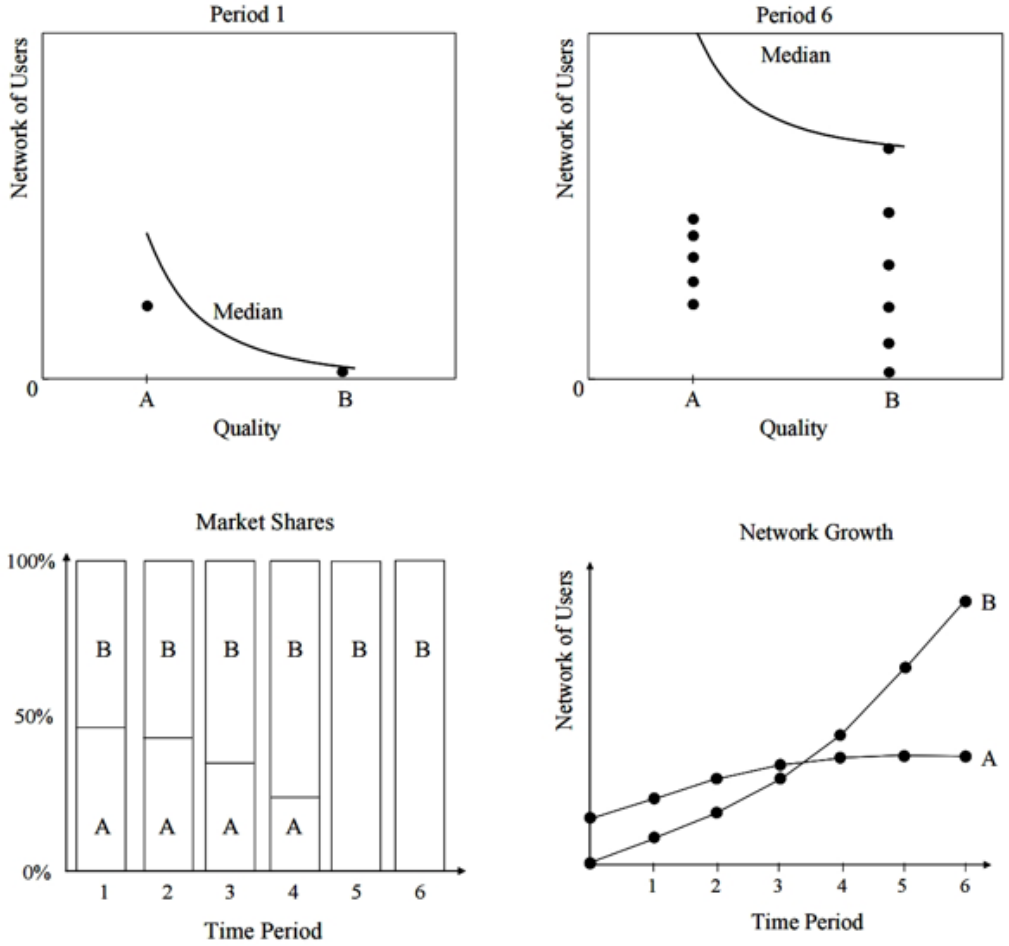
The established standard forges ahead

This is the case where the established standard (A) forges ahead because the replacement (B), better though it may be, is not good enough to make up for its smaller network of users.
In the upper half graphs, we illustrate the choice facing the customer in period 1 (left) and period 6 (right), and we show the indifference curve of the median customer.
In the lower half graphs, we show the market share split in each period and the trend in the total network of users for products A and B.
In the graphs, the market share for the established standard starts off above 50 per cent, and grows, and as a result the total network using the established standard forges ahead.



The better replacement catches up

This is the case where the better replacement (B) is good enough to make up for its smaller network of users, and it catches up and eventually overtakes the established standard (A).
In the upper half graphs, we illustrate the choice facing the customer in period 1 (left) and period 6 (right), and we show the indifference curve of the median customer.
In the lower half graphs, we show the market share split in each period and the trend in the total network of users for products A and B.
In the graphs, the market share for the better replacement is always above 50 per cent, and grows, so that the total network using the better replacement catches up and eventually overtakes the network for the established standard.



Strategies for Winning Standards Races

- Many companies have used the **product preannouncement** as part of their strategy for winning standards races.
- Product preannouncement is often used by the producer of a system that is relatively late to market. Before the product is ready to be launched on the market, the company makes a preannouncement (often to the trade press, or perhaps at an industry conference or exhibition): this states that their system will be launched in a few months' time.
- In the present context, the company's object is usually an attempt to persuade customers to wait for their forthcoming system rather than buy from the existing range of available systems.
- If successful, the preannouncement will delay the growth of the network of users of rival systems, so that when the company is ready to bring its product to market, the established products in the market do not enjoy such a large head start.

Strategies for Winning Standards Races

The preannouncement has been open to abuse.

1. First, some companies gained a reputation for preannouncing products that did not appear until much later, or perhaps never appeared at all.
2. The latter was quite common in the software market, where it became known as ‘vapour-ware’. In the light of this, preannouncements from some companies could lack credibility. Moreover, it was alleged (as part of an anti-trust case against IBM) that the preannouncement could be used in an anti-competitive fashion.

Strategies for Winning Standards Races

- A second strategy for winning standards races has been to recognize that '**the best is the enemy of the good**'.
- To stand a chance of winning a standards race, the company cannot risk being too late to market.
- This may mean that it is better to bring the product to market as soon as it is 'good' rather than to wait until it is at its 'best'.
- Indeed, some have suggested that so intense is the pressure to bring software products to market promptly that companies may decide to market their products even if these software products may still contain 'bugs'.

Strategies for Winning Standards Races

A third, and related strategy, again common in the software market, is to sign up **beta testers** for a new software package.

This is a way of releasing an early version of the software to selected high-value customers, of encouraging them to invest some time in learning to use the software.

Such beta testers may help the software producer to identify faults or areas for improvement and that is of course very important. But in the context of a standards race, the use of beta testers may help to build up a network of users in advance of general release.

Strategies for Winning Standards Races

Several other strategies can be important in this context.

- One is the **explicit sponsorship of some 'blue chip' customers**, to ensure that these important companies become part of the network using a new product.
- Another is the strategy of **building up indirect network effects by licensing third party producers** to make a variety of add-on products that can be used in conjunction with your product.
- A further related strategy is to **develop gateways from other products to your own**, so that you reduce the user's costs of switching from a rival system to your own system.