**Class 1**

**Can You Say What Your Strategy Is?**

Companies that don’t have a simple and clear statement of strategy are likely to fail at executing it. Employees get frustrated when no clear strategy exists for the company or its lines of business. Some companies fail to appreciate the necessity of having a simple, clear, succinct strategy statement that everyone can internalize and use as a guideline light for making difficult choices. A well-understood statement of strategy aligns behavior within the business. It allows everyone in the organization to make individual choices that reinforce one another and boost effectiveness. With a clear definition two things happen: first, formulation becomes infinitely easier because executives know what they are trying to create; second, implementation becomes much simples because the strategy’s essence can be readily communicated and easily internalized by everyone in the organization.

A strategy statement should have three critical components:

* **Objective** – The definition of the objective should include not only an end point but also a time frame for reaching it. The strategic objective should be specific, measurable and time bound. It should also be a single goal.
* **Scope** – It is also crucial to define the scope, or domain, of the business: the part of the landscape in which the firm will operate. A firm’s scope encompasses three dimensions: customer or offering, geographic location, and vertical integration. Clearly defined boundaries in those areas should make it obvious to managers which activities they should concentrate on and, more important, what they should not do.
* **Advantage** – How are you going to reach your objective? Your competitive advantage is the essence of your strategy. What your business will do differently from or better than others will define the all-important means by which you will achieve your stated objective. That advantage has complementary external and internal components: a value proposition that explains why the targeted customer should buy your product above all the alternatives, and a description of how internal activities must be aligned so that only your firm can deliver that value proposition. Clarity about what makes the firm distinctive is what most helps employees understand how they can contribute to successful execution of the strategy.

Developing a Strategy Statement

The first step is to create a great strategy, which requires careful evaluation of the industry landscape. This includes developing a detailed understanding of customer needs, segmenting customers, and then identifying unique ways of creating value to the ones the firm chooses to serve. It also calls for an analysis of the competitors’ current strategies and a prediction of how they might change in the future. The process involves a rigorous objective assessment of the firm’s capabilities and resources and those of competitors. The creative part of developing a strategy is finding the sweet spot that aligns the firm’s capabilities with customer needs in a way that competitors cannot match given the changing external context. The end result should be a brief statement that reflects the three elements of an effective strategy.

Words do lead to action. Spending the time to develop the few words that truly capture your strategy and that will energize and empower your people will raise the long-term financial performance of your organization.

**(Slides and Summaries Class 1)**

* Innovation can really pay off so failing to innovate endangers the firm. But innovating does not secure success and being the innovator does not always pay.
* Leveraging technology requires a strategic perspective.
* But innovation does not replace strategy and is not strategy itself.
* The more activities critical to the competitive advantage the more difficult the imitation.
* Given a particular industry structure firms will have diverse strengths and weaknesses and compete differently. Different operation systems have different characteristics and equally diverse trade-offs. A given operational system should be designed to reflect the priorities and balances associated to the strategy and competitive position of the firm.
* Firms have cost-based advantages if they can lowers costs more than they can lower prices. General cost drivers are: related to firm size or scope (economies of scale, economies of scope, capacity utilization, specialization), related to cumulative experience (learning curve), related to the organization of transactions (vertical integration, long-term contracts, management and control), superior technology can increase production/distribution efficiency, and others such as input prices, location and economies of density.
* Firms can have differentiation-based advantages if they can raise price more than it increases cost. General benefit drivers are: physical characteristics of the product, quality of complementary goods, characteristics associated with sale or delivery, characteristics that shape consumers’ perceptions or expectations and subjective image.
* If customers differ in preferences, firms can have competitive advantages in serving niche markets. In order to be successful in such strategy, firms must differentiate on attributes customers really care about, have a large enough niche and produce at a low enough cost given prices that can be charged.

**Class 1 - Husky Case**

Machine Business/Injection Machine

* Fierce competition
* There is a standardized basis but Husky tries to do customization
* Low switching costs
* Difficult market to enter due to CAPEX requirements, a lot of investment associated with this
* Reputation is also important and specific knowledge is necessary
* Substitutes for these machines? Not really, there are other technologies that you can use for certain applications but no direct substitutes
* Buyer power? The is some degree of buyer power. Big clients have higher buyer power, also because of the bidding process
* Not much supplier power because components are mainly standardized. In some areas there may be some degree because of customization
* Not such an interesting market to enter but probably OK if you are already there
* Husky has been doing well historically. There is some degree of competitive advantage

Mold Business

* More players in the market
* More distributed competition
* More of a craft
* Not so interesting

Husky’s Strategy

* Type: Differentiation strategy. They are positioning themselves to offer clients something with added value for a price premium. They offer faster and lighter products and high performance machines that are very durable
* Scope: They innovate. They specialize in PET bottles (very narrow scope in terms of the nature of products that they do) and thin wall applications + packaging. Limited economies of scope. No firm can make everything for everyone, there needs to be a strategic focus. They also do added services and have a global market approach, because they are choosing to be more narrow in terms of products and solutions they need to be more global to have enough clients.
* Activities: they need a lot of investment in R&D to sustain their strategy and competitive advantage. Strong logistics and support structure as they want their clients to be very reassured that they can provide service if something happens. They have a really skilled internal sales force, offer complementary products that help clients maximize the value they get from products they buy, training centers and very firm values in terms of support and expectation.

If you are a differentiated producer you need to add extra value and that costs more money. Clients only pay more if they benefit from it – “they don’t pay more, they get more”.

The crisis

* Prices of the resin went up, especially for PET
* Lower cost structure of competitors
* Sales force unprepared to respond to competitive entry (unable to explain the benefits)
* Fragility of reputation in new markets
* Competitors with products with same perceived quality but cheaper
* Commoditization of the market
* Loss of competitive edge on cost and productivity
* Stagnation of main market

Should they change their strategy? Or improve just some aspects?

* Keep strategy
* Enter new segments
* Endure crisis (there are a lot of opportunities to cut costs)
* Innovate more
* Further develop global presence
* Rethink business model (at least temporarily)
* Change Strategy
* Become general producer
* Do regardless off
* Reduce costs, mostly in waste. They used to have a really good margin.
* Drop the modd business

**Class 2**

**The S-Curve: A New Forecasting Tool**

The beginning of the S-curve represents the introduction of a new technology. Usually, a lot of research is developed and a lot of try and error is made. The first products that are introduced in a certain market are not perfect and some problems arise, which are taken care of and new design concepts appear and other approaches are tried. In early stages of research, one removes one impediment only to find another. And that is why the S-curve is so flat in the beginning. Progress is made and we begin to ascend the S-curve of a certain technology. Then another problem strike and has to be overcome. Progress is slow at first but then accelerates and, with performance improvements, the curve becomes steeper.

For each new product (or process) the S-curve shows precisely **how much performance has improved and how much effort has been expended to gain that improvement**. Usually it shows us a **rather long period of little progress followed by growing success.** But the progress can also work the other way as technological limits are approached. Rather than showing more and more progress with less and less effort like at the beginning, **at the end of the S-curve each new step makes less and less progress and performance improvement is rather slow** when compared to the steeper part. We start to watch diminishing returns.

The S-curve traces out the path of development of new products and processes with each successive point on the curve representing an improvement in performance. The pattern of the S-curve repeats itself again and again in industry after industry. These curves describe reality.

**A forecasting tool –** if that is true and if the limit for an S-curve can be predicted, then the S-curve can yield valuable insights. If we can define important performance parameters, trace the early days of progress of these parameters versus the effort to make that progress, and develop a point of view on what the limits of these performance parameters are, then we have a basis for foreseeing how much further current products can be improved and how much effort it will take to get them to higher levels of performance. It will give insights about how products will fare in the future, what new products to try to develop and how much effort will be required to develop them. What we want to know is the relationship between effort put and results achieved. You might think you should be plotting results against the amount of time involved. But that would be an error. It is not the passage of time that leads to progress, but the application of effort. If we would plot against time spent we would be making assumptions about the rate of effort applied. The forecasting error would be a result of bad competitive analysis, not bad technology analysis. Thus, it such circumstances it might appear that a technology still has a great potential but in fact what is fueling its advance is rapidly increasing amounts of investment. At some point it gets more and more expensive to develop each new generation of a certain product or technology.

* **The higher the slope, the more productive we are.** Thus, a convenient way of pinpoint where we are on a curve of results versus efforts is to talk about the slope or productivity of the technical effort. At the start of the curve we need to put in significant effort before we can expect to see results. Once the learning is done, we begin to make significant progress for very little expenditure or effort. That usually does not last too long. At some point we begin to approach the limits of the technology and we start to run out of steam. Then the question is might there be another way to deliver the desired performance to customers. Some new technology which, though still undeveloped, might eventually outperform the current one, which is increasingly resisting improvement?

But too often we don’t ask those questions. Behind conventional management wisdom is the implicit assumption that the more effort we put in, the more progress that results. In fact, this is only the case in the first half of the S-curve. In the other half it is wrong.

S-curves almost always come in pairs. The **gap** between the pair of S-curves represents a **discontinuity** – a point when one technology replaces the other. In fact, rarely does a single technology meet all customers’ needs. There are almost always competing technologies, each with its own S-curve, trying to defeat the others in a market segment. Companies that have learned how to cross technological discontinuities have escaped this trap. They invest in research in order to know where they are on relevant S-curves and know what to expect from the beginning the middle and the end of these curves. These companies have become very sophisticated at massaging the shape of the curve, making it steeper by developing new products and processes faster than their competitors.

*The cost of being late to the market overwhelms the cost increases for accelerating development.* Some companies have learned how to share the development of technology and products by making extensive use of external suppliers and managing that in an efficient way. The better companies collaborate as much as they can. Administrative procedures can also be eliminated to speed up development. But, perhaps the most important, companies have learned that in order to be fast to the market, they must invest in understanding the science that supports the base of the S-curve. Companies that get products to market ahead of their competitors still don’t take shortcuts: they do their research first, then tackle engineering. As a result their S-curves are steeper than other companies trying to develop the same technology. However, none of these efforts will save a company from a new technology.

EFFICIENCY VERSUS EFFECTIVENESS

There is one major problem when it comes to the management of technology: companies focus more on efficiency when they should be concerned with effectiveness. **Effectiveness is set when a company determines which S-curve it will pursue**. Efficiency is the slope of the present curve. Effectiveness deals with sustaining a strategy – efficiency with the present utilization of resources. New technologies can outperform old one by wide margins. There are many decisions that put effectiveness and efficiency at odds with each other, particularly those involving resource allocation. Pursuing a new S-curve means withdrawing resources from the maturing business. It always appears more economical to protect the old business than to feed the new one at least until competitors pursuing the new approach get the upper hand. There is also the belief that the defender, the competitor with the largest market share and the most knowledge about production processes and distribution will have the advantage in combat in the marketplace. But the reverse can be true as the defender has an inherent disadvantage. The attacker can hide in a niche and it is often more powerful than it appears, and more motivated. It is not uncommon to fund 80% of the effort going to the defense of products that are more important for what they have contributed in the past than for what they are going to contribute in the future. This consumes funds that could be spent on technical or market exploration or fields with higher potential or higher productivity.

Even if a defender succeeds in managing his own S-curve better, chances are he will not be able to raise his efficiency. Not much use against an attacker whose productivity might be climbing ten times faster because he has chosen a different S-curve. All to frequently the defender believes his productivity is actually higher than his attacker’s and ignores what the attacker potentially may have to offer to the customer. Defenders and attackers often have a different perspective when it comes to judging productivity.

**Some products fail at first to meet customer standards, but then, almost overnight, they set new high-quality standards** and storm the market. Even if the defender admits that the attacker’s product may have an edge, he is likely to say it is too small to matter. Reallocating resources is thus a painful business. But in order to manage a technological discontinuity, that is exactly what they must do – forsake the past by abandoning a technology that, more often than not, has just entered the most productive phase of its S-curve.

**Industry Life Cycles**

**(Slides and Summaries Class 2)**

* Technology and product performance is not static, it evolves with effort and time.
* Early progress is slow and then it rapidly accelerates. Finally it slows down and hits diminishing returns.
* Never evaluate a technology or product only through current performance, always reflect on curve position.
* S-curves appear in pairs. Each represents a different underlying technical approach. Next generation represents performance advances in multiples based on significant innovations.
* Changing S-curve needs to be justified as to if, when and how to do it, anticipating the requires changes in strategy, product and organization.
* The fundamental dilemma is that it always appears to be more economical to protect the old business than to feed the new one, at least competitors pursuing a new approach get the upper hand. But by then it might be too late.
* Innovation and Technology Cycle – a number of variations of the new innovation occur. Early innovations are usually crude and experimental when first introduced as new technology rarely works well. The new technology is not well understood and each company aims to differ from competitors. Old innovations rarely just vanish, they are stretched to their limits. And the cycle ends with the emergence of a dominant design

DOMINANT DESIGN – collection of enduring product standards to which the bulk of an industry conforms. It comes from the combination of market demand, technological possibilities and individual, organizational and governmental factors – each company pushes its own. The market operates with package of relatively well established innovations in favor of technical excellence to reduce technical uncertainty. The dominant design is not the frontier of technical performance. It might not be the best product but it is the best overall package. It is important because it reduces experimentation and establishes clear performance targets. It allows companies to design standardized and interchangeable parts to optimize organizational processes, volumes and efficiency – prerequisite to mass adoption and volume production. For customers the emergence of a dominant design is also important because it reduces product-class confusion and decreases prices.

INCREMENTAL CHANGE – After a dominant design arises, technological process is driven by numerous incremental innovations of new dominant design instead of trying to invent new ones and technological regime becomes more orderly. Most performance improvement over the lifetime of technology will occur outside the era of incremental change as the focus of competition shifts from higher performance to lowers costs and differentiation via minor design variations and strategic position tactics.

Product and Process Innovation: Introduction > Growth > Maturity > Decline

Who exits and who survives? Early entrants tend to dominate. The process favors firms more able to blend product and process innovation to force the hand towards dominant design. In this stage firms explore advantages pf growth and scale by increasing returns to process R&D. Success breeds success. Firms exist or do not enter if they are outside given the dominant design or if they have insufficient process improvement capabilities.

* First innovation evolves very slowly and then it starts to take off. Finally, it stabilizes.
* When upgrading products with new technologies there is a period where the new product technology performs worse than the older one. This has implications for strategy.
* At the end of the S-curve the firms have power and are established in the market.
* At the beginning you may not have clients or resources but at least you don’t have a whole business that is likely to be destroyed.
* S-curve transitions is where a lot of action happens. If you are a new firm, at the beginning you don’t have any liabilities and just want to develop the new technology. But the incumbents have a huge liability and a lot of times they cannot sustain their leadership. Paying attention to this transition is great to spot new opportunities. It is important to understand how the technology cycle evolves.
* Variation is something we can now do that we could not do before, or doing it in a different way.
* Fermentation is when we have a discontinuity. It’s a different approach towards a certain problem. We set trials, we are on to something but not sure what. You have an idea of how to evolve and how to solve the problem but you don’t know for sure what customers want.
* Dominant design is the way of thinking about a certain product, the most efficient way to deliver a certain innovation.
* Incremental change – orderly performance
* In general, in innovation, first movers have an advantage because there is earlier trial and error and firms are closer to the customer. The later the less opportunities you have to learn and to become the dominant design.

**Class 2 – E-ink Case**

Good moves:

* Developed credible partnerships (Toppan and Philips)
* Developed good product vision
* Good intellectual property, a lot of patents
* Good starting team, CEO with a lot of experience.
* Got products to market early and that gave them more exposure
* Strong company culture
* Ability to raise funds
* Strong research capabilities
* Visibility/exposure
* Very strong lead customer (Sony)

Questionable moves:

* Took on too many projects in different markets (very common risk because at the beginning the company really needs cash but this makes you lose focus)
* Missed expectations of main clients
* Missed IPO window, they went too late and missed a really good opportunity for funding
* Lack of market focus
* Underestimated the manufacturing complexity and costs
* Trouble managing partnerships (mostly the culture dimension)
* Management problems
* Grew workforce ahead of product
* Not enough market research/due diligence (they were putting things out but not really worried about how they were working)
* R&D too focused in the short-term projects and lot in the long-term

Some of these questionable moves arose from management problems but others are inherent to a startup firm where the balance is hard to keep. Some of them are the result of just trying to survive.

What could have been different?

* Could have considered licensing, which would involve a different business model (licensing has lower margins and a much smaller magnitude)
* This was during a clear beginning of the S-curve in a dominant design era. What was going to be the dominant design of the radio paper? What would maximize their chances of becoming the dominant design? E-Ink is one of the protagonists in the new S-curve
* Narrowing their product scope
* Focusing more on e-paper issues/characteristics
* Could have entered the display market itself (doing this would be the complete opposite of licensing) – Philips stopped manufacturing so I-ink could have started
* It would be very hard to make these decision and not obvious

Middle options:

* Projects that focus more on the long run and sustainability
* Focus more on performance metrics/outcomes
* Partner up with content providers
* Iterating more with partners and clients
* Resolving gap between vision and implementation. They had a clear vision but were doing too many things ate the same time. They were very unreasonable regarding what they thought they could do and what they actually did in terms of time.

As a VC would you invest?

|  |  |
| --- | --- |
| Yes | * No |
| * Lots of opportunities still available * Expected growth * Have actual product + revenue stream * Good R&D * First-mover advantage * Ahead of competitors * New structure will work * Still much of the outlooks is there | * Alternative technologies are a threat * Too expensive to enter now given uncertainty * If they get more VC they will have to dilute themselves more * They like R&D too much * Too attached to their vision and they forget about clients that need and want a product that is not being delivered * Not clear business model |

E-Ink is selling what they believe the dominant design is. But for everyone else the dominant design can be something else. You have all of these firms convinced of what the dominant design will be. This is the pre dominant design phase where every firm claims to be the future. Ultimately, one of these firms will be able to push through the S-curve and actually beat all others when it comes to actually being the dominant design. In the beginning there is a lot of trial and error. You put money in the company if you believe there is still a fair chance they will become the dominant design.

The dominant design is not a physical way of displaying information with electronic ink. It is all about how customers interact with technology.

In this phase you need to deal with a lot of uncertainties, you need to balance a lot of aspects such as vision, money, partnerships, teams. In this case they were not a total disaster but they were not the dominant design.

**Class 3**

**The Art of Standards Wars**

Standards wars are battles for market dominance between incompatible technologies. The outcome can determine the survival of the companies involved.

* Incompatibilities can arise almost by accident, yet persist for many years
* Network markets ten to tip towards the leading player, unless the other players coordinate to act quickly and decisively
* Seceding from the standard-process can leave you in a weak market position in the future
* A large buyer can have more influence than suppliers in tipping the balance
* Those left with the less popular technology will find a way to cut their losses, either by employing adapters or by writing off existing assets and joining the bandwagon
* Consumer expectations can easily become self-fulfilling in standards battles
* Technologies can seek well-suited niches if the forces towards standardization are not overwhelming
* Ongoing innovation can lead to victory in standards wars
* Adapters can be the salvation of the losing technology and can help to ultimately defuse a standards war
* Adoption of a new technology can be painfully slow if the price/performance ratio is unattractive and if it requires adoption by a number of different players
* First-mover advantages need not be decisive, even in markets strongly subject to tipping
* Victory in standards wars often require building an alliance
* A dominant position in one generation of technology does not necessarily translate into dominance in the next generation of technology

**Standards wars are especially bitter – and especially crucial to business success – in markets with strong network effects that cause consumers to play high value on compatibility.**

What is distinct about standards wars is that there are two firms vying for dominance. In some cases, one of the combatants may be an incumbent that controls a significant base of customers who use an older technology. In other instances, both sides may be starting from scratch. Standards wars can end in a truce, a duopoly or a fight to death. True fight-to-death standard wars are unique to markets with powerful positive feedback based on strong network effects.

Before entering a standards battle, would-be combatants are well-advised to consider a peaceful solution. Declaring an early truce in a standards war can benefit consumers as well as vendors. Even bitter enemies have repeatedly been able to cooperate to establish standards when compatibility is crucial for market growth. The more costly a battle is for both sides, the greater are the pressures to negotiate a truce.

Not all standards wars are alike. They come in three distinct flavors. The starting point for strategy in a standards battle is to understand which type of war you are fighting. The critical distinguishing feature of the battle is the magnitude of the **switching costs**, or more generally the **adoption costs**, for each rival technology. The classification depends on **how compatible each player’s proposed new technology is with the current one**:

* Evolution strategy – When a company or alliance introduces new technology that is *compatible* with the old. This strategy is based on offering a superior performance with minimal consumer switching or adoption costs.
* Revolution strategy – when a company or alliance introduces new technology that is *incompatible* with the old. It is based on offering such compelling performance that consumers are willing to incur significant switching or adoption costs.
* Rival Evolutions – If both your technology and your rival’s technology are compatible with the older, but incompatible with each other.
* Evolution versus Revolution . If your technology offers backward compatibility and your rival’s doesn’t. This war is a contest between the backward compatibility of the Evolution strategy and the superior performance of the Revolution. It includes the important case of an upstart fighting against an established technology that is offering compatible upgrades.
* Rival Revolutions – If neither technology is backward compatible.

Your ability to successfully wage a standards wars depends on your ownership of **seven assets**. If you own these assets, your value-added to other players is high. Some assets, however, may even be more valuable in peace than in war (such as the ability to innovate or manufacturing capabilities). No asset is decisive.

* Control over an installed base of users – An incumbent firm that has a large base of loyal locked-in customers in uniquely placed to pursue and Evolution strategy offering backward compatibility.
* Intellectual Property Rights – Firms with patents and copyrights controlling valuable new technology or interfaces are clearly in a strong position.
* Ability to innovate – The ability to make proprietary extensions in the future puts you in a strong position today.
* First-mover Advantages – If you already have done a lot of product development work and are farther down the learning curve than the competitors you are in a strong position.
* Manufacturing Capabilities – If you are a low-cost producer due to either scale economies or manufacturing competence, you are in a strong position. Cost advantages can help you survive a standards war or capture share competing to sell a standardized product.
* Strength in Complements – If you produce a product that is a significant complement for the market in question, you will be strongly motivated to get the bandwagon rolling. This too puts you in a natural leadership position, since acceptance of the new technology will stimulate sales of the other products you produce.
* Reputation and Brand Name – A brand-name premium in any large market is highly valuable. But reputation and brand name are especially valuable in network markets, where expectation in pivotal. It’s not enough to have the best product: you have to convince consumers that you will win.

TACTICS

The logic of **preemption** is straightforward: **build an early lead, so positive feedback works for you** and against your rival. The first firm to gain significant experience will have lower costs and can pull even further ahead. The trick is to **exploit positive feedback**. With learning-by-doing, the positive feedback is through lower costs. With network externalities, the positive feedback comes on the demand side as the leader offers a more valuable product or service. One way to preempt is simply to **be the first to the market**. Product development and design skills can be critical in gaining a first-mover advantage. But early introduction can also entail compromises in quality which can doom your product. Speed must come from **superior product design**, not by marketing an inferior product. You also need to be aggressive early on to build an installed base of customers. Find the “pioneers” who are most keen to try the new technology. Pricing below cost is a common tactic to build an installed base. Discounting to **attract large, visible or influential customers** is virtually unavoidable in a standards war. You can also pay people to take your product if it can **generate network externalities for other paying customers**.

The second key tactic in a standards war is the **management of expectations**. Expectations are a major factor in consumer decision about whether or not to purchase a new technology. Just as incumbents will try to knock down the viability of new technologies that emerge, so will those very entrants strive to establish credibility. **Vaporware** is a classic tactic aimed at influencing expectations: announce an upcoming product so as to freeze your rival’s sales. The most direct way to manage expectations is by assembling allies and by making **grand claims** about your product’s current or future popularity.

ONCE YOU’VE WON

* How best to proceed when you actually won a standards war? There is a great deal of room for strategy. Technology marches forward so you have to keep looking for the next generation of technology. You may be especially vulnerable if you were victorious in one generation of technology through a preemption strategy. Going early usually means making technical compromises, which gives that much room for others to execute an incompatible Revolution strategy against you. So you should not go early and then lack flexibility to adapt. You can choose to harvest your installed base of customers. The strategic implication is that **you need a migration path or roadmap for your technology**. If you cannot **improve your technology with time**, while **offering substantial compatibility with older** **versions**, you will be overtaken sooner or later. Rigidity is death, unless you build a really big installed based and even this will fade away eventually without improvements.
* To fend off challenges from upstarts you need to make it hard for rivals to execute a Revolution strategy. The key is to **anticipate the next generation of** technology and co-opt it. Look in all directions for the next threat and take advantage of the fact that consumers will not switch to a new technology unless it offers a marked improvement in performance. **Anticipate or imitate improvements and incorporate them into your products**. Avoid being frozen in one place by your own success. If you cater too closely to your installed base by emphasizing backward compatibility you open the door for a revolution strategy by an upstart. Your product roadmap has to **offer your customers a smooth migration path to ever-improving technology** and it must also stay close to the cutting edge. Give old members of your installed base free or inexpensive upgrades to a recent version of your product.
* Once you’ve won you want to keep your network alive and healthy. Retain your franchise as the market leader, but have a **vibrant and competitive market for complements to your product**. Try to maintain a competitive market in complementary products and avoid the temptation to meddle. Enter into these markets only if integration of your core product with adjacent products adds value to consumers.
* You may need to **improve performance** just to compete against your installed base, even without an external threat. **Drive innovation even faster**. One way to grow even after you have a large installed base is to start discounting as a means of attracting the remaining customers that have relatively low willingness to pay for your product. But be careful.
* Once you have a strong installed base, basic principles of competitive strategy dictate that you seek to leverage into adjacent product spaces, exploiting the key assets that give you a unique ability to create value for consumers in those spaces. However, you may be better off by encouraging healthy competition in complementary products, which stimulates demand for your own product, rather than trying to dominate adjacent spaces. Acquisition of companies selling neighboring products should be driven by true **synergies** of bringing both products into the same company.
* How can you secure a competitive advantage for yourself short of maintaining direct control over the technology (for example through copyrights or patents)´Even without direct control of the installed base or ownership of key patents you may be able to make the other factors work for you. You can build a bandwagon using an “openness” approach of ceding current control over the technology while **keeping control over the improvements and extensions**. If you know better than others how the technology is likely to evolve, you can use this information to your advantage by preserving important future rights. Developing proprietary extensions is a valuable tactic to recapture at least partial control over your own technology. You may gain some control later if you launch a technology that takes off and you can be the first to market with valuable extensions and improvements. If you are too successful and demand for your product grows too fast many of your resources may end up devoted to meeting with current demand rather than investing in R&D for the future. If this happens you can use all your profits to **identifying and purchase firms that are producing next-generation products**

IF YOU FALL BEHIND

* Usually it is not possible to wrestle leadership from another technology that is equally good and more established. You may be able to protect a niche in the market but you can always position yourself to **make a run at leadership in the next generation of technology.´**
* A tried and true tactic when falling behind is to add an **adapter** or to somehow **interconnect** with the larger network. This is good if the **enhanced network**, externalities of plugging into a far larger network are substantial. However, sometimes the larger network can keep you out. The biggest problems with adapters, when they are technically and legally possible, is performance degradation. Adaptors and converters among software programs are also highly imperfect as they can be buggy. Be careful about the large network changing interface specifications to avoid compatibility.
* The marginal cost of producing information goods is close to zero. This means that you can cut your price very low and still cover incremental costs. Hence, when you find yourself falling behind in a network industry, it is tempting to cut price in order to spur sales – survival pricing. However, this is unlikely to work. The problem is that the purchase price of software is minor in comparison with the costs of deployment, training and support.

Before you can craft standards strategy, you first need to understand what type of standards war you are waging. The single most important factor to track is the compatibility between the dueling new technologies and established products. Standards wars come in three types: Rival Evolutions, Rival Revolutions and Revolution vs. Evolution. Strength in the standards game is determined by ownership of critical assets: control of an installed base, intellectual property rights, ability to innovate, first-mover advantages, manufacturing capabilities, presence in complementary products, brand name and reputation. The main lessons for strategy and tactics are:

* *Before you go to warm assemble allies*. You’ll need the support of consumers, suppliers of complements, and even competitors. Not even the strongest companies can afford to go it alone in a standards war.
* *Preemption is a critical tactic during a standards war*. Rapid design cycles, early deals with pivotal customers and penetration pricing are the building blocks of a preemption strategy.
* *Managing consumer expectations is crucial in network markets*. Your goal is to convince customers – and your complementors – that you will emerge as the victor. Such expectations can easily become a sell-fulfilling prophecy when network effects are strong. To manage expectations you should engage in aggressive marketing, make early announcements of new products, assemble allies, and make visible commitments to your technology.
* *When you’ve won a war, don’t rest easy.* Cater to you own installed base and avoid complacency. Don’t let the desire for backward compatibility hobble your ability to improve your product; doing so will leave you open to an entrant offering less compatibility but superior performance. Commoditize complementary products to make your systems more attractive to consumers.
* *If you fall behind, avoid survival pricing as it just signals weakness.* A better tactic is to establish a compelling performance advantage or to interconnect with the prevailing standard using converters and adapters.

**Networks and Positive Feedback**

The industrial economy was populated with oligopolies: industries in which few large firms dominated the markets where market shares rose and fell only gradually. In contrast, the information economy is populated by temporary monopolies. Hardware and software firms vie for dominance, knowing that today’s leading technology or architecture will, more likely than not, be topped in short order by an upstart with superior technology. There is a central difference between the old and new economies: the old industrial economy was driven by *economies of scale*; the new **information economy is driven by *economies of networks***. **The key concept is positive feedback**. Success brings more success, which is the essence of positive feedback. Failure breeds failure. This, too, is the essence of positive feedback. Why is positive feedback so important in high-technology industries? The answer is organized around the concept of a **network**. Whether real or virtual, networks have a fundamental economic characteristic: **the value of connecting to a network depends on the number of other people already connected to it**. Other things being equal, it’s better to be connected to a bigger network than a smaller one.

**POSITIVE FEEDBACK**

The notion of positive feedback is crucial to understanding the economics of information technology. Positive feedback makes the strong get stronger and the weak get weaker, leading to extreme outcomes. Positive feedback in the marketplace leads to extremes: **dominance of the market by a single firm or technology**.

The backward cousin of positive feedback is **negative feedback**. In a negative-feedback system, the strong get weaker and the weak get stronger, pushing both towards a happy medium. Attempts by the industry leader to capture share from smaller players would often trigger vigorous responses as small players sought to keep capacity utilization from falling. Such competitive responses prevent the leading firm from obtaining a dominant position. Furthermore, past a certain size, companies found growth difficult owing to the sheer complexity of managing a large enterprise. And as the larger firms become burdened with high costs, smaller firms found profitable niches. The market found a balanced equilibrium rather than heading toward the extreme of a single winner.

When two or more firms compete for a market where there is strong positive feedback, only one may emerge as the winner. Such a market is tippy, meaning that it can tip in favor of one player or another. In the most extreme form, positive feedback can lead to a **winner-take-all market** in which a single firm or technology vanquishes all others. These dynamics are driven by the strong desire of users to select the technology that ultimately will prevail – that is, to choose the network that has or will have the most users. The biggest winners in the information economy, apart from consumers generally, are the companies that have launched technologies that have been propelled forward by positive feedback. Positive feedback systems follow a predictable pattern. We see the adoption of new technologies following an S-shaped curve with three phases: (1) flat during launch, (2) a steep rise during take-off as positive feedback kicks and (3) levelling off as saturation is reached.

**Demand-side economies of scale** – virtually every industry goes through a positive feedback phase early in its evolution. Traditional economies of scale , the supply-side economies of scale, is when firms lower unit cost as their dimensions grows. Positive feedback based on supply-side economies of scale runs into natural limits, at which point negative feedback takes over. These limits often arise out of the difficulties of managing enormous organizations. In the information economy, positive feedback has appeared in a more virulent form based on the demand-side economies of scale, not just the supply side. Sometimes a firm’s dominance is based on demand-side economies of scale. Customers value technologies or products that are widely used, the industry standard. Unlike the supply-side economies of scale, demand-side economies of scale don’t dissipate when the market gets large enough: if everybody else is using a certain product that benefits from positive feedback than the more reasons for someone to use it too. There is a **virtuous cycle: the popular product with many compatible users becomes more and more valuable to each user as it attracts ever more users**. In contrast, the product loses value as it is abandoned by users, a vicious cycle. If consumers expect your product to become popular, a bandwagon will form, the virtuous cycle will begin, and consumers’ expectations will prove correct. But if consumers expect your product to flop, your product will lack momentum, the vicious cycle will take over, and again consumers’ expectations will prove correct. Success and failure are driven as much by consumer expectations and luck as the underlying value of the product. **Marketing strategy designed to influence consumer expectations is critical in network markets**. Being first to market usually helps but is not decisive. Nor are demand-side economies of scale so strong that the loser necessarily departs from the field of battle. Both demand and supply economies of scale have been around for a long time. But the combination of the two that has arisen in many information technology industries is new. The result is a “double whammy” in which growth on the demand side both reduces cost on the supply side and makes the product more attractive to other users – accelerating the growth in demand even more. The result is specially string positive feedback.

**NETWORK EXTERNALITIES**

Network externalities means that large networks are more attractive to users than small ones. The sponsor of a network creates and manages that network, hoping to profit by building its size. Buyers are picking a network, not simply a product. Companies must design their strategies accordingly. Building a network involves more than just building a product: finding partners, building strategic alliances, and knowing how to get the bandwagon rolling can be every bit as important as engineering design skills. Externalities arise when one market participant affects other without compensation being paid. Positive network externalities give rise to positive feedback: when I join a network, the value of the network is enhanced since it is now bigger.

Collective switching costs – Network externalities make it virtually impossible for a small network to thrive. The challenge to companies seeking to introduce new but incompatible technology into the market is to build network size by overcoming the collective switching costs, the combined switching costs of all users. In many information industries, **collective switching costs are the biggest single force working in favor of incumbents**. Control over a large installed base of users can be the greatest asset you can have. The collective switching costs are far higher than all of our individual switching costs because coordination is so difficult. However, the internet distribution of new applications and standards is very convenient and reduces some of the network externalities for software by reducing switching costs.

Is your industry subject to positive feedback?

Not all information infrastructure markets are dominated by forces of positive feedback. Not every market tips. If your market is a true winner-take-all market subject to such tipping, standardization may be critical for the market to take off at all. Whether a market tips or not depends on the balance between two fundamental forces: economies of scale and variety. Strong scale economies, on either the demand side or the supply side of the market, will make a market tippy. But standardization typically entails a loss of variety. If different users have highly different needs, the market is less likely to tip. The strongest positive feedback in information industries comes on the demand side, but you should not ignore the supply side in assessing tipping. Traditional economies of scale that are specific to each technology will amplify demand-side economies of scale.

**Igniting Positive Feedback: PERFORMANCE VS. COMPATIBILITY**

Building your own base of users for a new technology in the face of an established network can be daunting. Without a compelling reason to switch, consumers refuse to adopt new technologies. There are two basic approaches doe dealing with the problem of consumer inertia: the **evolution strategy of compatibility** and the **revolution strategy of compelling performance**. These strategies reflect an underlying tension when the forces of innovation meet up with network externalities: is it better to wipe the slate clean and come up with the best product possible (revolution) or to give up some performance to ensure compatibility and thus ease consumer adoption (evolution)? You can improve performance at the cost of increasing customer switching costs, or vice versa. Ideally, you would like to have an improved product that is also compatible with the installed base, but technology is not usually so forgiving, and the adapters and emulators are notoriously buggy. You will inevitably face the **performance/compatibility tradeoff**.

* **Evolution: Offer a Migration Path** – compatibility with the installed base of equipment is often critical to the launch of a new generation of technology. When compatibility is critical, consumers must be offered a smooth migration path to a new information technology. The evolution strategy, which offers consumers an easy migration path, centers on reducing switching costs so that consumers can gradually try your new technology. In virtual networks, the evolution strategy of offering consumers a migration path requires an ability to achieve compatibility with existing products. In real networks, the evolution strategy requires physical interconnection to existing networks. They key to the evolution strategy is to build a new technology by linking it to the old one. One of the risks of following the evolution approach is that one of your competitors may try a revolution strategy for its product. Compromising performance to ensure backward compatibility may leave an opening for a competitor to come in with a technologically superior product. You need to develop a technology that is at the same time compatible with, and superior to, existing products. Only in this way you can keep customers’ switching costs low, by offering backward compatibility, and still offer improved performance.

One way to deal with the compatibility/performance tradeoff is to offer one-way compatibility. Your strategy with respect to selling upgrades should be to give the users a reason to upgrade and then to make the process of upgrading as simple as possible. In order to smooth user migration paths to new technology you can use creative designs, think in terms of the system and consider converters and bridge technologies. Another obstacle has to do with legal and contractual reasons: you need to have or obtain the legal right to sell products that are compatible with the established installed base of products. Incumbents with intellectual property rights over an older generation of technology may have the ability to unilaterally blockade a migration path.

* **Revolution: Offer Compelling Performance** – the revolution strategy involves brute force: offer a product so much better than what people are using that enough users will bear the pain of switching to it. This strategy works by first attracting customers who care the most about performance and working down from there to the mass market. The trick is to offer compelling performance to first attract pioneering and influential users, then to use this base to start up a bandwagon propelled by self-fulfilling consumer beliefs in the inevitable success of your product. Substantial improvements in performance are necessary to make the revolution strategy work. A growing market offers more opportunities to establish a beachhead against an established player. New customers alone can provide critical mass. A rapidly growing market tends to enhance the attractiveness of the revolution strategy. It is inherently risky. It cannot work on a small scale and usually requires powerful allies. But even the successful technologies start off slowly and accelerate from there, following the logistic, or S-shaped, growth pattern.

Anyone launching a new technology must also face a second fundamental tradeoff, in addition to the performance/compatibility tradeoff. Do you choose an “open” approach by offering to make the necessary interfaces and specifications available to others, or do you attempt to maintain control by keeping your system proprietary? Proprietary control will be exceedingly valuable if your product or system takes off. An installed base is more valuable if you do not face rivals who can offer products to locked-in customers. Likewise, your network is far more valuable if you can control the ability of others to interconnect with you. However, failure to open up a technology can spell its demise, if customers fear lock-in or if you face a strong rival whose system offers comparable performance but is nonproprietary. Openness will bolster your chances of success by attracting allies and assuring would-be customers that they will be able to turn to multiple suppliers down the road. Which route is the best, openness or control? The answer depends on whether **you are strong enough to ignite positive feedback om your own**. Remember that your goal is to maximize the value of your technology, not your control over it. The total value added to the industry depends first on the inherent value of the technology – what improvement it offers over existing alternatives. But when network effects are strong, total value also depends on how widely the technology is adopted – that is, the network size. To maximize the value of your new technology you will likely have to share that value with other players in the industry. Opening up the technology freely can fuel positive feedback and maximize the total value added of the technology. But the boundary between openness and control is not sharp.

**Openness** – the openness strategy is critical when no one firm is strong enough to dictate technology standards by itself. Openness also arises naturally when multiple products work together. The underlying idea is to forsake control over the technology to get the bandwagon rolling as the whole is greater than the sum of parts. You can choose a “full openness” strategy, where anybody has the right to make products complying with the standard, whether they contributed to its development or not, or choose an alliance strategy, where each member of the alliance contributes with something toward the standard and, in exchange, each is allowed to make products complying with the standard.

**Control** – only those in the strongest position can hope to exert strong control over newly introduced information technologies. Companies strong enough to unilaterally control product standards and interfaces have power but they have much to lose by promoting poorly conceived standards.

STRATEGIES IN NETWORK MARKETS

* Performance Play – is the boldest and riskiest of the four generic strategies. It involves the introduction of a new incompatible technology over which the vendor retains strong proprietary control. It makes the most sense if your advantage is primarily based on the development of a striking new technology that offers users substantial advantages over existing technology.
* Controlled Migration – consumers are offered a new and improved technology that is compatible with their existing technology, but is proprietary. If you have secure domination in your market you can introduce the new technology as a premium version of the old technology, selling it first to those who find the improvements most valuable.
* Open Migration – is very friendly to consumers as the new product is supplied by many vendors and requires little by way of switching costs. It makes most sense if your primarily advantage is based on manufacturing capabilities. In that case, you will benefit from a larger total market and an agreed-upon set of specifications, which will allow your manufacturing skills and economies of scale to shine.
* Discontinuity – refers to a situation where a new product or technology is incompatible with existing technology but is available from multiple suppliers. It favors suppliers that are efficient manufacturers or that are best placed to provide value-added services or software enhancements.

**(Slides and Summaries Class 3)**

* In general, industries are subject to supply-side economies of scale (traditional economies of scale). Larger firms tend to have lower units costs but this has natural limits and at some point there are diminishing returns. This creates oligopolies. In addition, some industries are also subject to demand-side economies of scale, or network externalities. These are constituted by benefits bounded by the size of the market and where a firm controls the market for some time (monopoly).
* Externality – action by a producer on a consumer that affects other producers or consumers and is not reflected in the market price.
* Network externality – when the products’ benefits to each individual user increases with the number of users. There are direct externalities, where there are network benefits and other users are required to have value (connectedness) and indirect externalities, where the value is in having other consumers have inter-operable products (to be part of a system).
* Early adoption rates are too slow. The potential adopter would confer greater benefits on society than she herself realizes. She ignores these external benefits until her private marginal benefit exceeds her private marginal cost.
* Excess inertia means that viable, differentiated products don’t get users. Even if another network would be superior for all users, no one wants to be the first to leave the existing technology.
* Lock in happens when there are investments in multiple complementary and durable assets that lock a user in a particular technology/system. This means that there are high switching costs. To be unlocked the value proposition has to be high.
* To attract users to a network firms can: commit to provide complementary goods, look for alliances, joint ventures or large commitments with customers to jump-start the size of the network, use penetration pricing or low access price to build up the network, manage expectations (for example by creating vaporware) and refrain from exploiting installed bases so not to extract every last cent they can from existing customers.
* In order to influence switching costs firms must pay attention to compatibility with existing equipment, transaction costs to switching suppliers, the cost of learning how to use a new brand/product/inputs and the uncertainty about the quality of untested brands or inputs.
* Architecture refers to the ownership and control of the standards, rules and protocols that govern how technology products work and work together. Owning and controlling the architecture that is critical to the operation of a class of products is an example of having added value. But having a lot of added value is not sufficient for being able to obtain a lot of profits.
* Good products are not enough, implementation matters.
* Successful architecture is proprietary but open.
* After winning a firm should stay on guard, offer migration paths (lower barriers of entry to those outside the system), commoditize complementary assets, leverage the installed base and stay a leader.
* Network externalities happen on the consumer side and it means that a user benefits more of a product because other consumers also use it. I make a decision about joining a market. I make it based on my own benefits. But the fact that other people are joining a network brings an external benefit to the entire network. That is a network externality because it is not factored in the decision.
* It is difficult to overcome the power of network externalities and that is why incumbents have huge market shares until some other competitor can give performance increases with somewhat low switching costs.
* In markets that benefit from network externalities and positive feedback one system tends to be dominant and the others are small players.

**Class 3 – Foursquare Case**

Business Model

* Location-based services company
* They are working for users that get some types of benefits. A lot of these benefits are related with network externalities because there is interaction among the users of the platform and the value depends on how many users and how many venues use the application:
  + Communicate with friends (strong same-side NE because it has to do with interaction between the users themselves)
  + Information about locations (NE, same side)
  + Gaming experience (NE, depending on the nature of the game)
  + Benefits from shops (NE, cross-side because we have the users and the venues and interaction between the two sides)
  + Challenge themselves (no NE)
  + Feedback from other users (NE, same side)
* Venues
  + Attract new customers (the more users you have the more visibility you get, NE)
  + Keep customers loyal (NE, cross-side)
  + Analyze competition by studying patterns
  + New tool, especially for small and medium enterprises
  + Customer analysis/information (NE, if only few users are using foursquare not a lot of conclusions can be taken)
  + If you are ahead of the competition by using this while they are not you get some sort of advantage.

What explains their growth?

This was a clear pre dominant design time and here there needs to be a lot of learning and and iterative process with users.

* They generated a service with potential value for users and venues
* The value is going to depend on how many users use the platform on both sides
* First mover advantage
* Previous experience with dodgeball
* Customer base + pool of ideas
* Focused approach
* Smart launch (SXSW) and had an immediate effect because it was launched in a social environment and they could expand their initial customer base
* Postpone monetization
* Focus on user/venue benefit and on leveraging the network externalities
* Learning oriented approach, very careful about where the opportunities were, they were very vigilant and aggressive on that front because they were always very close to customers
* Extended platforms
* Took appropriate risks
* Establishment of an API, you start competing as a community and not as a single firm. The API provides an opportunity for people to build the platform
* Clear vision of the future
* Partnerships with key brands which increased brand awareness and credibility. This is a very good way to create legitimacy. Being a small unknown company this is important to gain big known brands on your side
* Strong VC support
* Good control of the platform
* User + venue content generation

Is growth important? Why?

* It’s important because of convergence on one or few firms in markets with network externalities. The race for scale is important because a “winner takes all” situation is very likely to happen.
* The bigger the network the more valuable it is.
* Because of the nature of this market it is likely that only one or few firms will survive.
* What are the issues that contribute for only one firm to survive?
  + The strength of network externalities is very high (the stronger the NE are the more likely it is that we converge into one firm/ecosystem)
  + Costs of multihoming – how costly it is for users and venues to work in different providers. Early adopters are willing to pay the cost of multihoming but the higher the costs of multihoming the more likely it is to just have one platform. To lower the costs of multihoming the firm should let other platforms create synergies with it by leveraging their own customer base
  + Compatibility
  + Demand for differentiated services – the more differentiation is demanded the more providers there will be. In this case the bulk of the market is pretty much the same. Some people like gaming but most of them probably just wants to connect with their friends

What now?

How should foursquare monetize? They should attract more customers or more elements to the network first because they should make sure they do not drive users and venues away. So they should continue to build the network, work more on usage and have a clear differentiation strategy because when bigger players start entering this game they need to make sure they have a clear differentiated value proposition.

What can happen?

Either they launch something and become the dominant design, they get bought or they build sufficient differentiated space in order to compete with facebook, google and other giants.

**Class 4**

**Managing Intellectual Capital**

If there are innovators who lose, there must be followers and/or imitator who win. Successful followers may in turn lose in the next generation to even later followers.

The most fundamental reason why innovators with good marketable ideas fail to enter or open up markets successfully is that they are operating in an environment where **new technology is difficult to protect** and this constrains their ability to appropriate the economic benefits arising from their ideas. Patents do now work in practice as they do in theory and they are specially ineffective at protecting process innovations. Often patents provide little protection because the legal and financial requirements for upholding their validity or for proving their infringement are high. In some industries, particularly where the innovation is embedded in processes, trade secrets are a viable alternative to patents. Moreover, the degree to which knowledge about an innovation in tacit or easily codified also affects the ease of imitation. Tacit knowledge is, by definition, difficult to articulate and so is hard to pass on unless those who possess the know-how can demonstrate it to others. It is also hard to protect using intellectual property. Codified knowledge is easier to transmit and receive and easier to protect using the instruments of intellectual property law.

* Simplistically then, we can divide **appropriability regimes into “weak” (innovations are difficult to protect because they can be easily codified and legal protection of intellectual property is ineffective) and “strong” (innovations are easy to protect because knowledge about them is tacit and/or they are well protected legally).** Strong appropriability is the exception rather than the rule. Innovators who try to enter markets where intellectual protection is good have a reasonable chance of winning commercially; in weak regimes they often lose. Innovators must adopt clever market entry strategies if they are to keep imitators and other followers at bay.~

BEFORE THE EMERGENCE OF A DOMINANT DESIGN

The best market entry strategies for innovators with good, marketable ideas depend not only on the appropriability regime, but also where the industry is in in its **development cycle. The existence of a dominant design is of great importance to the strategic positions of the innovator and its competitors**. Once a dominant design emerges, competition migrates to price and away from design fundamentals. Competitive success then shifts to a whole new set of variables. Scale and learning become much more important, and specialized capital is deployed as incumbents seek to lower unit costs through exploiting economies of scale and learning. The product/process innovation cycle does not characterize all industries. It seems more suited to mass markets where customer tastes are relatively homogeneous. It is less characteristic of small niche markets where the absence of economies of scale and learning attaches much less of a penalty to multiple designs.

**Strong Appropriability** – None of these threats need unduly worry an innovator who is preparing to enter a market with relevant technology which is inherently difficult to replicate and/or has a good intellectual property protection, because the innovator knows that the ideas possessed must form some part of the eventual dominant design. Even if the innovator comes to market in this early phase with a sound product concept but the wrong design, good intellectual property protection may afford the time needed to perform trials needed to get the design right. If the innovator possesses an impenetrable thicket of patents or has technology which is simply difficult to copy, then the market may well afford the innovator the necessary time to ascertain the right design without being eclipsed by imitators.

**Weak Appropriability** – In the early design development of an industry with weak appropriability, the innovator has to recognize that imitators may enter the fray, modifying the product in important ways, yet relying on the fundamental designs pioneered by the innovator. When imitation is possible and occurs in conjunction with design modification before the emergence of a dominant design, followers have a good chance of having their modified product anointed as the industry standard, often to the great disadvantage of the innovator. In this situation the innovator must be careful to let the basic design float until sufficient evidence has accumulated that a design has been delivered which is likely to become the industry standard. The reason for letting the design float is that once a heavy capital investment is committed to a particular design, the innovator will have created irreversibilities that will prove to be a sever handicap if the initial guesses with respect to what the market wants turn out to be wrong. In summary, the probability may be low that an innovator in a market with weak appropriability will enter possessing the dominant design. The probability will be higher the lower the cost of prototyping and he more tightly linked the firm is to the market.

AFTER THE EMRGENCE OF A DOMINANT DESIGN

If the innovator is still in the game when the dominant design has emerged then the company has to **secure access to complementary assets.** The successful commercialization of an innovation requires that the know-how in question be utilized in conjunction with the services of other assets such as marketing, competitive manufacturing and after-sales support. On the other hand, successful commercialization of the innovation may depend critically on a bottleneck asset which has only one possible supplier. There is the possibility of “cospecialization” – where the innovation and the assets depend on each other. The main decision the innovator has to make is what to do with respect to complimentary assets. Two pure types stand out:

* At one extreme the innovator could integrate into (build or acquire) all of the necessary complementary assets. But this is likely to be unnecessary and expensive.
* At the other extreme, the innovator could attempt to access these assets through straightforward contractual relationships, but this exposes the innovator to various hazards and dependencies that he may well wish to avoid.

**Contractual Modes**

The **vantage of collaborative agreements** – whereby the innovator contracts with independent suppliers, manufacturers or distributors – are obvious. The innovator will not have to make the up-front capital expenditures needed to build or buy the assets in question. This reduces risk as well as cash requirements. Also, they add credibility to the innovator, especially if he relatively unknown while the contractual partner is already established and viable. Even for established companies, strategic partnering is essential, enabling companies to learn things they could not have learned without many years of trial and error. This might lead them to miss the market window. But they must keep control of their intellectual property. Smaller, less integrated companies are often eager to sign on with established firms because of the name recognition and reputation.

However, it is important to note that strategic partnering makes the company exposed to **certain hazards**, particularly for the innovator, and especially when he is trying to use contracts to gain access to special capabilities. It may be difficult to induce suppliers to make costly, irreversible commitments which depend on the success of the innovation. Making these alliances is inviting the partners to take risks along with the innovator. There is the added danger that the partner won’t perform according to the innovator’s perception of what the contract requires and also the risk that the partner may imitate the innovator’s technology and attempt to compete with him. This possibility is particularly acute if the provider of the complimentary asset is uniquely situated with respect to the complimentary assets in question and has the capacity to absorb and imitate the technology.

**Integration Modes**

Integration modes, which by definition involve equity participation, are distinguished from pure contractual modes in that they typically facilitate greater control and access to commercial information. Owning rather than renting the requisite specialized assets has clear advantages when the complimentary assets are in fixed supply over the relevant time period. However an innovator may not have the time to acquire or build the complimentary assets that ideally he would like to control. This is particularly true when the imitation is easy, so timing becomes crucial. Or he may not have the financial resources to proceed. Innovators need to rank complementary, specialized assets as to their importance. If the assets are critical, ownership is warranted. When imitation is easy, strategic moves to build or buy complementary assets which are specialized must occur with due reference to the moves of competitors. There is no point in moving to building a specialized asset of one’s imitator can do it faster and cheaper. In industries experiencing rapid technological change, technologies advance so rapidly that it is unlikely that a single company has the full range of expertise needed to bring advanced products to the market in a timely and cost effective fashion. Hence, the integration issue is not just a small firm issue.

**Mixed Modes**

The real world rarely provides extreme or pure causes. Decisions to integrate or license involve trade-offs, compromises and mixed approaches. There are blends of contracting and integration. Sometimes mixed modes represent transitional phases. In different industries firms are discovering that they lack capabilities in the others. Since interdependence of some of them, this requires collaboration, coordination and information flows.

**OUTCOMES OF MARKET ENTRY STRATEGIES**

The key decision the innovator has to make after the emergence of a dominant design is what to do with complimentary assets – contract for their use, integrate to control them, or something in between. The innovator’s best strategy and chance of success will depend on:

* Appropriability regime: weak or strong
* The interdependence between the innovator (and the imitators) and the owners of complimentary assets
* The innovator’s competitive position vis-à-vis potential imitators with respect to his ability to access complementary assets

The last point can represent a major problem for the innovator when the potential imitators already own the complementary assets. It is sometimes observed that many small firms which generate new, commercially valuable competency-enhancing technology fail, while large multinational firms, often with a less meritorious record with respect to innovation, survive and prosper. Large firms are more likely to possess the relevant specialized assets within their boundaries, so that extraction of profits from innovation is likely to be more complete and survival more assured if innovation is competency enhancing. Small domestic firms are less likely to have the relevant specialized assets within their boundaries and so will have to incur the expense either of trying to build them or of trying to develop coalitions with competitors/owners of the specialized assets. This does not stem form size itself, but from the portfolio of specialized assets that big firms are likely to control.

* The best situation is, of course, where appropriability is strong, the innovation is competency enhancing and the innovator is strongly placed with regard to the relevant complementary assets.
* Contractual strategies are appropriate whenever imitation is difficult and the innovator is well placed with regard to the suppliers of complementary assets. However, the innovator’s chances of winning diminish as appropriability weakens and imitators are better positioned with respect to commissioning the complementary assets.
* The most difficult decision for innovators occur when the owners of complementary assets are strongly placed (because there are few suppliers, the asset in question being a critical bottleneck in the market entry programme) and the innovation can only be exploited in conjunction with the asset but not vice versa.
* In the worst case, when imitators are better placed (for example because they own the relevant assets) and imitation is easy, the innovator cannot afford the risk of committing substantial resources to integrating. The firm should contract to limit its exposure, but this will further reduce the already low chances of winning, and if it wins, the asset owner will be ideally placed in the future to extract maximum benefits from the contract.

Unfortunately, all too often in the real world of international commerce, legal and technical protection is weal, complementary assets (like specialized marketing and selling systems) are more important than the innovation itself, and they are in the hands of potential competitors.

In the end, smart choices may not guarantee success. If an innovator chooses to integrate when it should have contracted (or not even enter the game), it will certainly commit more resources than needed for no additional strategic benefit. Conversely, if the innovator contracts when it should integrate it may never get into the game because an imitator may cut the innovation out. The asset supplier will always be in a position to extort maximum benefits from the innovator whenever a contract fails.

Lessons for management:

* The probability of successful commercialization can be analyzed rationally in advance . focus R&D on delivering innovations which will have a good chance of benefiting you rather than competitors;
* In the early design phase, stay particularly close to the market and keep option open. Try to get your design accepted as the industry standard, but be flexible enough if some other standard is adopted;
* Identify the relevant specialized complementary assets early, and decide in advance whether you can contract for their use, or need to start integrating to control them;
* Monitor your competitors, and recognize that your toughest competitor may not be an imitator but someone who owns important complementary assets;
* If you develop an order-of-magnitude innovation which will probably lose you money to exploit find a strategic partner or sell the idea out – before committing further resources you will not be able to recover;
* Strength in one area of technology will not necessarily compensate for weaknesses elsewhere. As technology becomes more public and less proprietary, dynamic capabilities and strength in manufacturing and other capabilities are necessary to derive advantage from whatever technology an innovator may possess.

Even with a terrific product, the innovator is likely to lose unless its intellectual property is extremely well protected and/or it is strategically well positioned with respect to key complementary assets. It will never be enough to have the best science and engineering establishment and the most creative engineers and designers. Since the fruits of scientific effort are increasingly open to imitation, extracting value from a nation’s scientific and engineering prowess will require its firms to have good access to competitive capacities in certain of the key complementary assets, such as manufacturing. Public policies that don’t recognize that translating scientific and technological leadership into commercial leadership in most cases requires parallel excellence in capacities complementary to the innovation process will doom a nation to economic decline. It is the complementary capacities and dynamic capabilities which must be built if a nation with the technological lead is also to lay claim to commercial lead.

Lessons for governments of innovation nations:

* Pay attention to intellectual property protection domestically and internationally;
* Enterprise adaptability is critical, requiring fluid labor markets and entrepreneurial management;
* Recognize that science and technology alone will not provide enough of a foundation to guarantee economic growth. Targeting the innovation process also requires attention to capacities complementary to innovation;
* Access to foreign markets is critical to innovators, particularly if protected foreign firms are imitators or followers. The importance of access transcends the incremental profits in the foreign market, as access can serve to check imitators, especially when imitators possess critical complementary assets not currently owned by the innovator;
* Strength in capacities complementary to R&D will promote economic welfare where imitation is easy.

**The product market and the market for “ideas”: commercialization strategies for technology entrepreneurs**

There has been a dramatic increase in investment technology entrepreneurship and in the development of inventions and technology with significant potential commercial application. A key management challenge is how to translate promising technologies into a stream of economic returns. The problem is not so much the invention but the commercialization. Sometimes the commercialization strategy involves direct entry into the market. On the other hand, many technology entrepreneurs have secured extraordinary returns by integrating their innovations into an existing value chain, often involving intimate cooperation with established industry players.

A crucial factor determining patterns of competitive interaction between start-up innovators and established firms is the presence of absence of a “market for ideas”. The absence of a market for ideas reduces the ability of some entrepreneurs to earn returns on their inventions and it eliminates incentives for startup innovation. Markets for ideas play a crucial role in shaping commercialization strategy and industry dynamics.

There are two central elements in the commercialization environment: the nature of the appropriability environment and the distribution of ownership and control over specialized complementary assets, such as distribution and manufacturing capabilities, or a brand-name reputation. The innovator’s share of the value created by her innovation will be smaller when appropriability is weak (due to imitation by competitors) or when specialized complementary assets are controlled by other players. For many startup innovators, those firms that control key complementary assets are precisely those that are more likely and/or most effective potential imitators. A principal hazard in pursuing cooperation with complementary asset owners is the possibility that these owners are current product market players with incentive to expropriate the innovator’s technology and commercialize it themselves. As a result, **commercialization strategy for startup innovators often presents a tradeoff between establishing a novel value chain and competing against established firms versus leveraging an existing value chain and earning returns through the market for ideas**.

Whereas most previous strategic analysis highlights the level of appropriability as a driver of strategic choice, this framework suggests that the key driver of an effective commercialization strategy should be the “type” of appropriability (for example, whether appropriability is based on formal intellectual property rights such as patents versus informal mechanisms such as secrecy). Even when tight secrecy offers a strong appropriability environment, transacting in the market for ideas will often undermine that secrecy and increase the potential for expropriation. In contrast, when the innovator controls form intellectual property rights such as a patent, the potential for expropriation will be reduced and the innovator is likely to find a cooperation strategy more attractive. A weak intellectual property environment increases the relative returns to competition over cooperation. Hence, the potential for disruptive technologies to overturn established sources of market power is higher in environments with weaker intellectual property protection.

A startup that is looking to launch its product independently must develop key capabilities and acquire complementary assets to ensure that the innovation offers a novel customer value proposition. Several difficulties confront technology entrepreneurs implementing a product market-focused commercialization strategy. The startup innovator must undertake aggressive investments, manage multiple dimensions of uncertainty and focus scarce organizational resources on establishing a market presence. The startup must simultaneously persuade customers of their novel value proposition while avoiding “detection” and an aggressive response by established players. **A product market strategy requires that the technology entrepreneur offers an integrated value proposition and avoids detection and a competitive reaction from established market players.**

The main alternative to competing directly in the product market is through a cooperation strategy that is composed of identifying and executing agreements with other firms – usually incumbents – who serve as conduits for commercializing technology to the product market. However, negotiations take place in the shadow of potential product market competition. That is, the value derived from cooperation increases with the threat posed by the startup innovator to the product market position of the established firm. The startup can formally license intellectual property to one or more idea buyers. The key element of licensing is that both the startup and licensees cooperate in commercialization while maintaining organizational independence. At another extreme, the markers for ideas may operate through acquisitions of startups innovators by established firms. As well, “intermediate” contracting relationships are possible, from joint ventures to strategic “educational” alliances to milestone financing. The key point is that any form of cooperation strategy has the impact of limiting investment by the startup in downstream commercialization, muting potential product market competition between startup innovators and incumbent firms.

**Commercializing through the market for ideas confers several benefits**, allowing buyers and sellers of technology to soften downstream product market competition, avoid duplicative investment, and engage in complementary technology development. Cooperation reinforces established market power and softens market competition. As well, transactions in the market for ideas allow startup innovators to avoid sunk investments in complementary assets necessary for commercialization. At the same time, established firms avoid investments in imitative research programs necessary for “catching-up” to the new market entrant.

**However, several forces counter the benefits from contracting, discouraging collaboration.** The most fundamental friction arises from the paradox of disclosure as disclosure increases the buyer’s intrinsic valuation but reduces the inventor’s bargaining power. The disclosure of information shifts the bargaining power form the sellers to the buyers of knowledge. This can be soften if precise intellectual property rights are available. However, the operation and effectiveness of a market for ideas depends crucially on whether startup innovator can credibly threaten to compete with potential partners. Moreover, technology entrepreneurs must overcome the costs of identifying and accessing appropriate partners. In this matter, venture capitalists play an important role as they lower the cost for startup innovators of pursuing a cooperative commercialization strategy. But perhaps the key potential hazard facing a startup innovator is the potential for expropriation by potential idea buyers. Two alternative appropriability mechanisms – intellectual property protection and technology design – may allow a firm to disclose technology while preserving bargaining power as certain technology designs have the benefit of displaying functionality while masking details that would allow imitation.

The control over costly-to-build complementary assets is a key wedge between the capabilities of a startup and more established firms in an industry, and the inability to acquire these resources cost-effectively has an important impact in the returns earned by a startup innovator. Specifically, when specialized complementary assets are required, sunk costs of product market entry become substantial. When considering commercialization strategy choice, an increase in the importance or concentration of control of complementary assets raises the relative returns to cooperation over competition. Thus, even though an increase in the importance of complementary assets reduces the absolute share of total value earned by the innovator, this factor will tend to encourage collaboration with more established firms over direct and independent entry into the product market.

* **The attacker’s advantage** – In an environment with poor intellectual property protection and where incumbents do not control the complementary assets necessary for effective commercialization established firms have the opportunity to imitate once they recognize the nascent threat and competition is likely to be intense. While entrepreneurs have the opportunity to overturn established positions, easy imitability gives most startups a very small share of the value over the long term. But there are few opportunities for contracting with current market leaders. In this case “stealth” is a crucial element of en effective competition-oriented commercialization strategy. A stealth strategy is to position the technology in the market in order to exploit the blind spot of current market leaders. Successful commercialization of these disruptive innovations is accomplished by careful positioning of the new technology towards underserved customer groups- Established firms focus on responding to the needs and requirements of current customers and that makes them particularly vulnerable to entry emphasizing new customer segments.
* **Ideas factories** – Standing in complete contrast is an environment where successful invention precludes effective development by more established firms but those firms control the complementary assets for effective commercialization. Were the **appropriability regime is strong and incumbents have the complementary assets** we expect the emergence of “ideas factories” – technological leaders focusing on research and commercializing through reinforcing partnerships with more downstream players. The key issue is no longer whether to pursue a cooperation strategy but when and how in order to promote “bidding wars” and try to extract the maximum economic benefits. When markets for ideas exist, a high rate of innovation by startups research-oriented firms is associated with the reinforcement of incumbent market power.
* **Reputation-based ideas trading** – Here the appropriability regime is weak and incumbents control the key complementary assets. In this environment the disclosure problem is severe. Though a market for ideas would confer a potential mutual gain a cooperative solution is difficult to achieve because established firms are tempted to expropriate the technology revealed to them. This expropriation discourages startups from pursuing collaboration as a strategy and additionally discourages research in the first place since competition is likely to be unprofitable. But an established firm can develop a reputation for “fairness”, thus encouraging future startups to approach them with promising new technologies. But while individual established firms may engage in reputation-based ideas trading, the extent of the market may depend on third parties such as venture capitalists who act on behalf of startups
* **Greenfield competition** – Where incumbent complementary assets are unimportant and the appropriability regime is strong, the power to determine the most effective commercialization strategy lies with the innovator. While the potential for returns in the product market are high (since imitation is difficult), this market power will be reflected in increased bargaining powers with potential partners. As a result, the relative returns to competition over cooperation will depend on factors distinct from the intrinsic value of the technology. Both competition and cooperation strategies can be effective. The ability to control the development and evolution of platforms and standards may be decisive. For example, tight control over the technology may allow a technology entrepreneur to ensure compatibility with future generations of the technology; as a result, investments to control the key elements of the value chain may be worthwhile. On the other hand, when there are few opportunities to leverage the current technology as a platform for future generations, an “open system” may be more effective. Technology entrepreneurs must analyze the opportunities for future hazards associated with cooperation and competition at each stage of the value chain, with the result that the optimal strategy may involve intermediate level of integration.

Firms opportunistically take advantage of potential revenue opportunities as they present themselves, rather than choosing a strategy that focuses resources and attention towards activities most likely to yield the highest long-term return. The ability to extract value from the innovation ultimately depends on the customer value proposition, rather than the simple offering of the technology itself

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**Cooperation** Is much more likely to be chosen by firms able to acquire intellectual property protection or for whom control over complementary assets is not cost-effective. The key to an effective cooperation strategy is to initiate cooperation at a point where technological uncertainty is sufficiently low but sunk costs have not yet become substantial. At the heart of a **competition** strategy is the ability to delay the timing when established firms recognize the threat posed by the novel value proposition offered by the technology entrepreneur. If detection is sufficiently early, established firms can respond and adapt the entrepreneur’s technology in order to take advantage of their competencies and specific positioning. Strategies such as targeting niche customer segments allow a startup innovator to delay detection until they are ready to compete head-to-head with incumbents – a stealth commercialization strategy achieves this objective.

* Key aspects of the commercialization environment drive entrepreneurs to choose between cooperation and competition, and these strategies impact the evolution of market structure. When intellectual property protection is strong and important specialized complementary assets are held by incumbent firms, startups generate more innovative rents if they pursue cooperative options with incumbent firms rather than competing directly in product markets. As a result, changes in technological leadership need not result in changes in market leadership. In contrast, when weak intellectual property for innovation exists alongside low barriers to entry, competitive commercialization strategies are more likely. A clear understanding of this environment leads startup innovators to exploit the blind spots of incumbent players. As a result, the failure to recognize threats to market leadership may often be the result of an active stealth strategy on the part of entrepreneurs.
* While intellectual property protection provides a valuable asset, it also serves to enhance the creation of a market for ideas. Consequently, it allows for cooperation between startups and incumbents who might otherwise view innovation purely as a competitive threat. This serves as an opportunity for incumbents to tap the high-powered incentives, creativity and flexibility traditionally associated with small firms.
* If entrepreneurial innovation undermines existing incumbent assets, the returns of cooperation are reduced in favor of competition. In contrast, the fact that a technology is disruptive should not be decisive if key complementary assets remain with established players. In this situation, an incumbent’s competitive position may often be enhanced rather than threatened by startup innovation.
* Stronger intellectual property protection allows innovators to earn greater rents by improving their contracting operations and not simply by granting them market power. That is, such policies alleviate the problems of disclosure allowing startup firms to consider contracting options without fear of expropriation.

**(Slides and Summaries Class 4)**

* The profits from innovation go for the innovator, imitators and other followers, suppliers, other owners of complementary assets and customers.
* If a firm closely tracks competitors, it can launch the same products in the market and save in development costs.
* If entrants and incumbent competitors can imitate the source of your advantage they can produce similar products at similar costs. However, legal restrictions (patents, copyrights, trademarks, licenses), superior access to inputs and customers, tacit knowledge, market size and scale economies, early mover advantages, history dependence and culture, leadership, personality and human capital are weapons that help prevent imitation. There are a lot of appropriability mechanisms, ways for the firm to protect its innovation. The main mechanisms used are not legal ones. In practice it is not a patent that decided whether a firm is competitive or not. They are important but for most firms daily life and strategy is what is most important.
* Depending on the type of industry each type of mechanism for appropriability differs, their importance is relative.
* Technologies often require complementary assets for commercialization such as competitive manufacturing, distribution, service, complementary technologies and regulatory capabilities. If complementary assets are readily available, then the owner of the innovation is in the driver’s seat. If other firms hold the “checkpoint” complementary assets they will extract a large share of the profits. Imitators and followers with complementary assets may be better equipped to profit from innovation.
* Complementary assets is everything that is around the core knowledge, the core technological know-how. But in a lot of circumstances you need to have access to a lot of other things in order for being successful.
* Most of the time the owner of complementary assets will try to leverage its position when it comes to the technology you want to commercialize which means both will want different things.
* Innovators must decide between acquiring complementary assets and contracting them:

|  |  |
| --- | --- |
| Integrate | Contract |
| Complementary assets are specialized  Appropriability regime is weak  Specialized asset is critical  Competitors have no advantage in complementary asset  Financially feasible | Diversifies risk  Reduces cash requirements  Increases incentives  Brings credibility |

* With innovation based on new technological competences, race between innovator and incumbent is enacted. The innovator runs to establish complementary assets that hold its innovative position. The incumbent runs to gain technological competencies that allow it to compete.
* Sometimes the innovators are not the winners and imitators are the ones who capture the value. Aside from first mover advantages there are other factors that account for capturing value and profitability.
* What influences the distribution of profits among players is the market.
* Appropriability is the ability to appropriate, to secure something, to keep it. It refers to how easy it is to protect an idea, a technology, to secure value for an innovation.
* There can be a great idea but zero value being captured because it is too easy to replicate and there is no way to protect it.
* If someone can copy something from you the first mover advantage no longer exists.
* When something is easy to replicate or imitate then speed is of critical value because the more you get into the learning process and start getting things right the bigger are the odds you succeed.

**Class 4 – Lexar Media Case**

**Class 5**

**Open Innovation**

Companies are increasingly rethinking the fundamental ways in which they generate ideas and bring them to the market – harnessing external ideas while leveraging their in-house R&D outside their current operations.

In the past, internal R&D was a valuable strategic asset, even a formidable barrier to entry by competitors in many markets. These days, however, the leading industrial enterprises from the past have been encountering remarkably strong competition from many upstarts. Newcomers conduct little or no basic research on their own, but instead get new ideas to the market through a different process. Companies that compete in the same industry can innovate in different manners. Instead of internal R&D, they can turn to external sources. Whatever technology companies need, they can acquire it from outside, usually by partnering or investing in promising startups. In this way, they can keep up with the R&D output all without conducting much research of their own.

Why is internal R&D no longer the strategic asset it once was? We can now see a fundamental shift in how companies generate new ideas and bring them to the market. In the old model of **closed innovation**, successful innovation required control and companies had to generate own new ideas that they would then develop, manufacture, market, distribute and service themselves. It was a vicious cycle as those that invested more heavily in R&D than their competitors and hired the best and the brightest were able to discover the best and greatest number of ideas which would allow them to get to the market first, allowing them to reap the most profits, which they protected by aggressively controlling their Intellectual Property to prevent competitor from exploiting it. They would then reinvest the profits in more R&D, creating a virtuous circle of innovation.

A number of factors contributed to erode the underpinnings of closed innovation:

* There was a dramatic rise in the number and mobility of knowledge workers, making it increasingly difficult for companies to control their proprietary ideas and expertise.
* Growing availability of private venture capital, which has helped to finance new firms and their efforts to commercialize ideas that have spilled outside the silos of corporate research labs.

If a company that funded a discovery doesn’t pursue it in a timely fashion, the people involved could pursue it on their own – in a startup financed by venture capital. The successful startup would generally not reinvest in new fundamental discoveries, but instead look outside for another technology to commercialize. In this new model of **open innovation**, firms commercialize external (as well as internal) ideas by developing outside (as well as in-house) pathways to the market. Companies can commercialize internal ideas through channels outside of their current business in order to generate value for the organization. Some vehicles for accomplishing this include startup companies and licensing agreements. The boundary between a firm and its surrounding environment is more porous, enabling innovation to move easily between the two. Open innovation is based on a landscape of abundant knowledge, which must be used readily if it is to provide value for the company that created it. However, an organization should not restrict the knowledge it uncovers in its research to its internal market pathways. No longer should a company lock up its IP, but instead it should find ways to profit from others’ use of that technology through licensing agreements, joint ventures and other arrangements. A company that is focused too internally can miss a lot of opportunities because many will fall outside the organization’s current business or will need to be combined with external technologies to unlock their potential. Like this, companies can reap tremendous benefits. Many industries are currently transitioning from closed to open innovation. The locus of innovation in these industries has migrated beyond the confines on the central R&D laboratories of the largest companies and is now situated among various startups, universities, research consortia and other outside organizations. Extending companies’ R&D to the outside world by moving their own innovations outside allows any idea that originates in their labs to be offered to outside firms, preventing promising projects from losing momentum and becoming stuck inside the organization.

However, not all industries have been or will be migrating to open innovation. This is true for those that depend mainly on internal ideas and that have low labor mobility, little venture capital, few and weak startups and relatively little research being conducted at universities.

**The Different Modes of Innovation –** Byexploring ways in which external technologies can fill gaps in their current businesses and looking at how their internal technologies can spawn the seeds of new businesses outside the current organization, firms have focused their activities in one of three primary areas: **funding, generating or commercializing** innovation.

* Funding Innovation

Two types of organizations – innovation investors and benefactors – are focused primarily on supplying fuel for the innovation fire. Innovation investors’ capital helps move ideas out of corporations and universities into the market, typically through the creation of startups. They can also supply valuable advice. Innovation benefactors provide new sources of research funding, they focus on the early stages of research discovery and by doing this they get a first look at the ideas and can selectively fund those that seem favorable to their industry.

* Generating Innovation

There are four types of organizations that primarily generate innovation: innovation explorers, merchants, architects and missionaries. Innovation explorers specialize in performing the discovery research function that previously took place primarily within corporate R&D laboratories. They innovate for the sake of innovation, seeking new missions for their work and much of their basic research is finding applications in commercial markets. Innovation merchants must also explore, but their activities are focused on a narrow set of technologies that are then codified into IP and aggressively sold to and brought to the market by others. They will innovate but only with specific commercial goals in mind. Innovation architects create value for their customers by putting everything together where the DIY approach doesn’t work. They work closely with a lot of companies in complex and fast-moving environments and provide integrated solutions to their clients while seeking financial profits from their work. Innovation missionaries consist of people and organizations that create and advance technologies to serve a cause, the mission is what motivates them.

* Commercializing Innovation

Two types of organizations are focused on bringing innovations to the market: innovation marketers and one-stop centers. Innovation marketers define attributes and this is their keen ability to profitably market ideas, both their own as well as others. Marketers focus on developing a deep understanding of the current and potential needs in the market and this helps them to identify which outside ideas to bring in-house. They interact a lot with their customers to gain in-depth knowledge about their needs. Innovation one-stop centers provide comprehensive products and services. They take the best ideas and deliver those offerings to their customers at competitive prices. They thrive by selling others’ ideas, but are different in that they typically from unshakable connections to end-users, increasingly managing a customer’s resources to his or her specifications (specially B2B).

Some companies do all three. Others are called fully integrated innovators and continue to espouse the closed innovation credo of “Innovation through total control”. They need to manage and coordinate a lot of different internal R&D efforts to stay competitive, for example products that are 100% produced in-house, where all technology comes from the same company.

A corporation can deploy different modes of innovation in different markets as competing modes can exist in the same market. One possible development in the future is the rise of specialized intermediaries that function as brokers or middlemen to create markets for IP.

* The logic that supports an internally oriented, centralized approach to R&D has become obsolete. Useful knowledge has become widespread and ideas must be used with readiness. If not, they will be lost. Such factors create a logic of open innovation that embraces external ideas in conjunction with internal R&D and this change offers novel ways to create value. However, companies must still perform the difficult and arduous work necessary to convert promising research results into products and services that satisfy customers’ needs. Innovators must integrate their ideas, expertise and skills with those of others outside the organization to deliver the result to the marketplace. Firms that can harness outside ideas to advance their own businesses while leveraging their internal ideas outside their current operations will likely thrive in this new era of open innovation.

**Lead User Idea-Generation Process**

Traditional idea generation techniques based on customer input usually collect information on new product needs from a random or typical set of customers. The “lead user process” collects information about both needs and solutions from users in other markets that face similar problems in a more extreme form.

Many firms generate new product ideas based on information collected from current or potential users. These traditional market research techniques collect information from users at the center of the target market. The “lead user” (LU) process involves identifying and learning from lead users both within the target market and in “advanced analog” markets that have similar needs in a more extreme form. This method generate breakthrough new products at a higher rate. Despite the strategic importance of effective new product development as a source of competitive advantage, most new product development activities fail to achieve their anticipated level of market success as most of the products developed tend to be marginal contributors to the firm’s portfolio, rarely involving very new or “breakthrough” ideas.

Traditional marketing research methods obtain information from respondents at the center of the market – respondents whose thinking is limited by their current experience and environment. There are two major points of difference between methods traditionally used and the LU idea-generation method: the kind of respondents from whom information is collected and the type of information that is collected. First, traditional methods obtain data from representative users or customers at the center or near the center of the intended target market. Second, they obtain need information only, and assign the task of generating ideas for solutions leading to new products to manufacturers. In contrast, the LU idea-generation methods collect information on both needs and ideas for solutions from LU. Lead users are identified as users of a given product or service type that combine two characteristics:

* **They expect attractive innovation-related benefits from a solution to their needs and so are motivated to innovate and they experience needs for a given innovation earlier than the majority of the target market.**

LU have a better ability to generate breakthrough ideas – new product ideas that form the basis of an entire new line of products or services. Traditional methods focus on subjects that are strongly constrained by their real-world experience. Thus, those who use an object or see it used in a familiar way are blocked from using that object in a novel way. Representative target-market customers, users of today’s products, seem to be poorly situated to envision novel needs or solutions. LU are better situated in this regard, they “live in the future”, experiencing today what representative users will experience months or years later. Users rather than manufacturers, to whom the solution creation is awarded in traditional methods, are often the initial developers of what later becomes commercially significant new products or processes.

LU ideas are significantly more novel than ideas generated by non LU methods, they address more original/newer customer needs, have significantly higher market share, have greater potential to develop into an entire product line are strategically more important. Also, projected annual sales are higher than those generated by non-LU methods. LU methods do generate ideas with greater commercial potential. Non-LU methods produce mainly funded ideas for improvements and extensions to existing product lines. Also, LU methods of identifying and learning from lead users outside of the target market will increase the overall rate at which the organization generates major product lines. LU ideas involve as high a level of intellectual property protection as ideas generated by non-LU methods. However, LU idea-generation methods cost more in time and money. All in all, the LU idea-generation method does appear to generate better results than traditional methods.

**(Slides and Summaries Class 5)**

* Open innovation combines external and internal R&D into architecture and systems whose requirements are defined by business model not firm boundary.
  + Increases speed of research and innovation, cuts risks and generates new innovative ideas
  + Blurs boundaries of firm R&D and commercialization
  + Inputs can come from internal sources (marketing, strategic planning) and external ones (customers, market information)
  + Sources such as inventors, startup companies or university laboratories are actively sought out
  + Commercialization can be internal or external at any level

|  |  |
| --- | --- |
| Open | Closed |
| All smart people In the field work for us  To profit from R&D must discover, develop and ship  We can get to market first if we innovate  First company to market will win  If we create most and best ideas we’ll win  We must control our IP | There are smart people inside and outside  External R&D can add value alongside internal  We need not originate research to benefit  Building better business model is more important than first to market  We win if we make best use from internal and external  We can profit from others’ use f our IP and benefit from theirs when appropriate |

* Firms can effectively motivate distributed work and innovation outside its formal boundaries by combining fun, monetary, and career incentives.
* To hire or not to hire, or rather, to command or to inspire – firms can effectively orchestrate collective work according to cost and complexity.
* Users – that actually innovated – can play a much more preeminent role in driving innovation of the firm provides the right development environment.

**Class 5 – InnoCentive.com Case**

Why do firms refer problems to IC?

* Wider range of people to look at problems
* How do we get really good ideas? Increase the likelihood of getting good ideas when we have a diversity of people and backgrounds we get greater variance
* Lack of expertise (knowledge)
* If you have internal limitations than maybe it’s easier/faster to outsource the problems as the company might speed up the process
* Add capacity (it extends the ability for you to do something)
* Think outside the box, more creative solutions, maybe even outside the industry the firm is operating in
* Protect their identity
* Limited risk because they pay for results
* Overcome internal hurdles
* Switch from problem solving to solution analyzing
* No solution found internally (even if they have the right expertise)
* You want the best outcome possible, the best solution. The more answers you get the bigger the odds are. That increases the length of the variance. The likelihood of drawing a good solution is higher
* Increase number of solvers
* Cheap labor

Nature of the problem?

|  |  |
| --- | --- |
| Outside competence of the firm  Can’t solve internally  Describable  Codifiable  Evaluate the solution  Valuable to firm  Limited solver resources needed | Retain solution  Independent  Modular  No need to disclose valuable key strategic knowledge  Time sensitive  Problems that leverage complementary assets |

You really need to manage your R&D staff in a sensitive way in order to augment the capacities you will gain from external sources but also to limit the downsizes.

Value of IC in particular?

* Lots of expertise in creating problems/challenges
* Lots of expertise in evaluation
* Custom service
* A lot of very talented people – network externalities as if there are more solvers there will be more companies. There is a two sided platform effect as the network externalities are same-sided and cross-sided as well
* Security of the environment when it comes to IP
* Good participation ratio (not only a lot of users but also active)
* Great hit rate

Why do solvers participate in IC?

* Challenge themselves
* Money
* Gratification to contribute
* Part-time job/freelance
* Range of opportunities to contribute
* Reputation/recognition
* Self-esteem
* Professional reasons
* Fun

Is collaboration a good or bad idea?

|  |  |
| --- | --- |
| Good | Bad |
| Combine knowledge  Increase the chance of getting to a solution  New knowledge from teams  Get at least a piece of the cake  Social value | Demotivates you to compete against a team  Anchoring – after an idea has been presented it is more difficult to think freely  Coordination issues  Decrease reputation value  Legal issues  Lower autonomy |

**Class 6**

**Customer Power, Strategic Investment, and the failure of Leading Firms**

It is hard for firms to repeat their success when technology or markets change. The failure of leading firms can sometimes be ascribed to managerial myopia or organizational lethargy, or to insufficient resources or expertise. Why and under what circumstances do financially strong, consumer-sensitive, technologically deep and rationally managed organizations fail to adopt critical new technologies or enter important markets? Failure to innovate may lead to the decline of once-great firms. A primary reason why such firms lose their positions of industry leadership when faced with certain types of technological change has little to do with technology itself. Rather, they fail because they listen too carefully to their customers – and customers place limits on the strategies firms can and cannot pursue. Patterns of resource allocation heavily influence the types of innovation at which leading firms will succeed or fail. In every organization, ideas emerge daily about new ways of doing things. Most proposals to innovate require human and financial resources. The patterns of innovation evidenced in a company will therefore mirror to a considerable degree the patterns in how resources are allocated to, and withheld from, competing proposals to innovate. Because effective resource allocation is market-driven, the resource allocation procedures in successful organizations provide impetus for innovations known to be demanded by current customers in existing markets. Firms possessing the capacity and capability to innovate may fail when the innovation does not address the foreseeable needs of their current customers. When the initial price/performance characteristics of emerging technologies render them competitive only in emerging market segments, and not with current customers, resource allocation mechanisms typically deny resources to such technologies. The inability of some successful firms to allocate sufficient resources to technologies that initially cannot find application in mainstream markets, but later invade them, lies at the root if the failure of many once-successful firms.

Why do firms that lead may fail when faced with technology change? New technologies often are initially deployed in new markets, and these are usually brought into the industry by entering firms. Established firms confront new technology often by intensifying their commitment to conventional technology, while starving efforts to commercialize the new one, even while it is gaining ground market.

Incumbent firms may stumble when technological change destroys the value of established technological competences or when new architectural technologies emerge. We need to make a distinction between the innovations that **sustain the industry’s rate of improvement in product performance** and those innovations that **disrupt or redefine that performance trajectory**.

* Sustaining technological changes have an impact on an established trajectory of performance improvement and they address the improvements that the company’s current customers expect. On the other hand, disruptive technologies disrupt an established trajectory of performance improvement, or redefine what performance means. The new architectures do not address the perceived need of current customers but they do possess attributes that appeal to emerging market segments. In general, sustaining technological changes appeal to established customers in existing mainstream markets. They provide existing customers with more of what they expect. In contrast, disruptive technologies rarely can initially be employed in established markets. They tend instead to be valued in remote or emerging markets.

Leading firms might successfully pioneer in the development and adoption of many new and difficult technologies, and yet they lose their positions of industry leadership by failing to implement others. In spite of the wide variety in the magnitudes and types of sustaining technological changes in the industry, the firms that lead in their development and adoption are the industry’s leading, established firms. The established firms lead in the adoption of sustaining technology, entrant firms follow. In contrast, the firms that lead the industry in introducing disruptive innovation tend to be entrant.

The ability of established firms to lead the industry in the sustaining innovations that power steep technological trajectories are technologically difficult, risky and expensive but there is no evidence that this makes them gain market share. This leadership enables them to maintain their competitiveness only within specific technological trajectories. On the other hand, **entrant firms’ leadership in disruptive innovations enable them not only to capture new markets as they emerged but, because the trajectories of technological progress are steeper than the trajectories of performance demanded, to invade and capture established markets as well.**

Why is it that firms which at one point could be esteemed as aggressive, innovative, customer-sensitive organizations could ignore or attend belatedly to technological innovations with enormous strategic importance? When confronted with disruptive technological change, developing the technology per se is not the problem. It is in the process of allocating scarce resources that disruptive projects get stalled. Programs addressing the needs of the firm’s most powerful customers almost always consume the resources from the disruptive technologies, whose markets tend to be small and where customers’ needs are poorly defined.

* Although entrants are the leaders in commercializing the disruptive technology, the first engineers to develop it usually are from the leading firms and use bootlegged resources. While architectural innovative, these designs almost always employ off-the-shelf components. Prototypes are made and showed to lead customers of the existing product line so that they can evaluate the new models. But they show little interest in the disruptive technologies because they do not address their current needs for higher performance within the established architectural framework. As a consequence, marketing managers are unwilling to support the disruptive technology and offer pessimistic sales. Also, because the disruptive technology is targeted at emerging markets and lower performance is lower, initial forecasts of sales and margins are low, which makes financial analysts against the disruptive technology as well. In response to the needs of current customers, the marketing managers throw impetus behind alternative sustaining projects. These give their customers what they want, can be targeted at large markets and generate sales and profits required to maintain growth. Although they generally involver greater development expense, such **sustaining investments appear less risky than investments in the disruptive technology, because the customers are there**. Established firms are more concerned with competitive wars against each other, rather than to prepare for an attack from entrants below. New companies were formed to exploit the disruptive product architecture. The start-ups find new customers and start selling their products without a clear marketing strategy. Once they find an operating base in new markets, they start adopting sustaining improvements in the new technology and the performance improvement evolves at a faster rate than the one requires by their new markets, which allows them to move into new upscale ones. Customers in these established markets eventually embrace the new technology they rejected earlier because now their performance requirements are met. Once this starts to happen, leading firms start to enter the market with this new technology as well, but at this point the entrants are already fully performance competitive as they develop advantages in costs and design experience. The new products (with new technology) cannibalize the sales of the older in such a way that many times former leading firms are forced to leave the market because they cannot keep up.

Many of the sustaining innovations are extremely expensive and risky form a technological point of view. Yet, because they addressed well-understood needs of known customers, perceived market risk was low. Although these sustaining innovations clearly helped the innovators retain their customers, there is no evidence from the industry’s history that any firm was able to gain market share by virtue of such technology leadership. On the other hand, disruptive innovations are technologically straightforward: several established firms had already developed them by the time formal resource allocation decisions were made. But these were viewed as extremely risky because they could not see the markets for it.

Engineers in established firms that developed disruptive-architecture products were innovative not just in technology, but in their view of the market as they intuitively perceived opportunities. But organizational processes allocate resources based on rational assessments of data about returns and risks. Information provided by innovating engineers was hypothetical at best: without existing customers, they could only guess the size of the market, the profitability of products, and required product performance. In contrast, current customers could articulate features, performance and quantities they would purchase with much less ambiguity. The popular slogan “stay close to your customer” may not always be robust advice.

Neglect of disruptive technologies prove damaging to established firms because the trajectory of performance improvement that the technology provided was steeper than the improvement trajectory demanded in individual markets. The mismatch in these trajectories provide pathways for the firms that enter new markets eventually to become performance competitive in established markets as well. If the trajectories were parallel we would expect disruptive technologies to be deployed in new markets and stay there; each successive market would constitute a relatively stable niche market out of which technologies and firms would not migrate.

A firm’s scope for strategic change is strongly bounded by the interests of external entities such as customers and shareholders that provide the resources the firm needs to survive. So we usually see this resources used to sustaining innovation that addresses current customers’ needs. But managers can, in fact, change the strategic course of their firms in directions other than those in which its resource providers are pulling it. Managers can align efforts to commercialize disruptive technology – which entails a change in strategy – with the forces of resource dependence. Shortly, the reason why strong, capably managed firms stumble when face with particular types of technological change, is an issue of investment.

When technological competence exists but impetus from customers lacks, firms are unable to commercialize what they already can do. This is because disruptive technologies initially tend to be saleable in different markets whose economic and financial characteristics render them unattractive to established firms. In the end, it appears that although the stumbles of these established firms are associated with technological change, the key issue appears to be firms’ disabilities in changing strategy, not technology.

**(Slides and Summaries Class 6)**

* Innovation can be defined in many dimensions: product innovation, process innovation and business model innovation.
* Radical innovation establishes a new dominant design and alters the fundamental technology of the product’s components. It can unseat an incumbent by rendering its competitive advantages and capabilities moot.
* Incremental innovation refines or improves either the product, its components or the process of producing it. It tends to reinforce the capabilities of the dominant incumbent.
* Sustaining innovation maintains a trajectory of performance improvement established in a market. It gives customers more and better attributes that they already value and have come to expect.
* Disruptive innovation introduces different packages of attributes to a market than the ones currently valued by the mainstream customers.
* Characteristics of disruptive innovation:
  + Technologically simple
  + Starts at low price
  + Minimizes infrastructure and regulatory barriers
  + Success not predicted on existing customer’s behavioral change
  + Enables larger population of non-specialists to do/have something that historically only specialists/high end could do/have
* Should I push or stretch the technology, until I can use it in existing market segments and applications, with existing customers?
* Should I find or create a new market segment in which the attributes of the disruptive technology as it exists today are valued?
* Steps to deal with disruptions:

1. Determine if technology is sustaining or disruptive
2. Define strategic relevance of disruptive technology
3. Locate initial market for disruptive technology
4. Place responsibility for building disruptive technology in an independent organization
5. Keep disruptive organization independent

* When disruptive innovation comes in the market it has a very different set of bundles and it’s far away from the mainstream technology and segments that are being served currently.
* When disruption technologies enter the market they are not seen as a threat but at some point their evolution trajectory becomes so fast and so steep beyond what others predict that they start to steal business from other technologies that are already installed in the market. It is very hard for firms to deal with disruptive innovation.
* The new bundle is totally different from the old one.
* Let it flow independently to see if it really has the potential to take off by itself. It should have an independent viable path rather than keeping it and managing it in the traditional way of the firm, so there needs to be a different strategy.